

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF HAWAI‘I**

In the Matter of the Application of)	
)	
HAWAIIAN ELECTRIC COMPANY, INC.,)	
HAWAI‘I ELECTRIC LIGHT COMPANY, INC.,)	
and MAUI ELECTRIC COMPANY, LIMITED)	Docket No.
)	
For approval to commit funds in excess of)	
\$2,500,000 for the Smart Grid Foundation Project,)	
to Defer Certain Computer Software Development)	
Costs, to Recover the Capital and Deferred Costs)	
through the Renewable Energy Infrastructure)	
Surcharge, and Related Requests)	
_____)	

**APPLICATION OF
HAWAIIAN ELECTRIC COMPANY, INC.,
HAWAI‘I ELECTRIC LIGHT COMPANY INC., and
MAUI ELECTRIC COMPANY, LIMITED**

ATTACHMENT 1 TO EXHIBIT E

AND

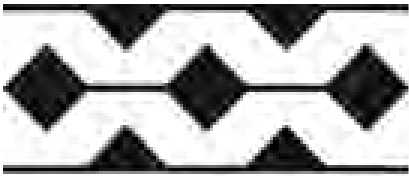
ATTACHMENT 2 TO EXHIBIT E

Attachment 1

Smart Grid Foundation Project

Exhibit E

Smart Meter Procurement Request for Proposal



**Hawaiian Electric
Maui Electric
Hawai'i Electric Light**

SMART METER PROCUREMENT

REQUEST FOR PROPOSALS

RFP NO. 031214-02

Issued Date: March 5, 2015

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Hawaiian Electric Company, Inc.

**Smart Meter Procurement
Request for Proposal
031214-02**

EXECUTIVE SUMMARY

The Hawaiian Electric Company, Inc. (Hawaiian Electric) is an energy utility, regulated by the State of Hawaii's Public Utilities Commission (PUC), providing electric generation, transmission, and distribution services. Hawaiian Electric is a wholly owned subsidiary of Hawaiian Electric Industries, Inc., which is a publicly owned corporation. Hawaiian Electric has two subsidiaries, Maui Electric Company, Ltd. (Maui Electric), and Hawaii Electric Light Company, Inc. (Hawaii Electric Light). Hawaiian Electric, Maui Electric, and Hawaii Electric Light are collectively referred to for purposes in this document as "The Companies."

The Companies are currently seeking proposals for the procurement of approximately 500,000 single-phase, three-phase, and CT-rated smart meters. The purpose of this procurement is to enable the continued rollout of The Companies' smart grid.

The Contract Document scope of work of the successful Meter Supplier, upon bid award, includes the Delivery of up to 500,000 smart meters, including a preliminary field test of a limited number of meters. Additionally, The Companies expect the Meter Supplier to provide technical training to The Companies. Therefore, in order for bidders to submit a complete proposal, a complete response to the Meter Functional Requirements spreadsheet (Attachment E) is required to verify the meters' compatibility with the needs of The Companies and the existing advanced metering infrastructure (AMI).

Bidders shall also submit the Detailed Cost Template (Attachment F) to offer The Companies the opportunity to evaluate and compare pricing.

The capital project identified in this request for proposal (RFP) is targeted to start in 2015 and be completed (delivered) by 2019. Training work is expected to begin in late 2015 but may fall into 2016 if deemed necessary by time constraints.

Toni Mitobe-Shuster shall be the main point of contact and lead the coordination of the bidding and procurement process. Please contact:

Hawaiian Electric Company
Attention: Toni Mitobe-Shuster, CP11-UP
900 Richards Street
Honolulu, HI 96813

The Hawaiian Electric AMI Division shall be the main point of contact and lead the coordination of this project after bid award.

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1.0 Request for Proposal

1.1 *Proprietary Rights and Confidentiality*

This request for proposal (RFP) has been prepared exclusively for The Companies and is proprietary in nature. The Companies reserve all copyrights for this document and its constituent parts and prohibit any unauthorized use or reproduction hereof. All portions of this RFP and Attachments are designated as confidential (“Confidential Information”). Confidential Information shall not be disclosed to third parties without The Companies’ prior written consent, except that the bidder may disclose Confidential Information to the bidder’s consultants, affiliates, attorneys or potential subcontractors who need the Confidential Information for purposes of preparing a responsive proposal, and provided that such recipient is advised of the confidentiality of the Confidential Information and is bound by the Non-Disclosure Agreement (NDA) currently executed with The Companies for this RFP.

1.2 *Proposal Schedule*

The Smart Meter installation Project has the following bid schedule:

RFP Issue	Thursday, March 5, 2015
Intent to Submit Bid Form Due	Tuesday, March 10, 2015 2:00 PM
Deadline for Questions	Friday, March 13, 2015, 2:00 PM
Bids Due	Monday, March 23, 2015, 4:00 PM

(Hawaii Standard Times [HST])

1.3 *Intent to Submit Bid Form*

Please submit the “Intent to Submit Bid” form (Attachment A) to the contact person specified in Section 1.5 of this RFP **by 2:00 PM HST, Tuesday, March 10, 2015**. This confirms the bidder’s intention to submit a proposal. The Companies reserve the right not to consider any proposal from a potential bidder who does not provide timely confirmation.

1.4 *Bid Submittals*

Bids are due on or before 2:00 PM HST on Monday, March 30, 2015 (the Proposal Due Date). The Companies in their sole discretion may cancel or postpone the Proposal Due Date at any time by providing notice to each potential bidder, which notice shall be deemed an amendment of this RFP.

One (1) hard copy of the proposal shall be delivered to and received by The Companies at the following addresses on or before the Proposal Due Date:

Via U.S. Postal Service

Hawaiian Electric Company, Inc.

PO Box 2750

Honolulu, HI 96840-0001

Attn: Toni Mitobe-Shuster, Hawaiian Electric Purchasing (CP11-VP)

Via overnight mail or hand delivery

Hawaiian Electric Company, Inc.

820 Ward Avenue

Honolulu, HI 96814

Attn: Toni Mitobe-Shuster, Hawaiian Electric Purchasing (CP11-VP)

Hawaiian Electric Purchasing will record the date and time of receipt of proposals. Hawaiian Electric Purchasing's record of receipt will be deemed controlling in the event of any dispute whatsoever relating to the delivery of a proposal. The Companies may reject proposals that are delivered after the Proposal Due Date, or otherwise not in conformity with the requirement of this RFP, at their sole discretion and without notice to bidder.

The proposal shall be signed and dated by one having authority to contractually obligate the bidder by the terms of the proposal.

The hardcopy proposal shall be contained in a sealed envelope with the following information shown on the package:

**Response to Smart Meter Procurement
RFP No. 031214-02
Confidential Sealed Bid Proposal
Deliver to Toni Mitobe-Shuster (CP11-VP)**

The bidder's company name and address shall also be noted on the package.

An electronic copy of the proposal may also be submitted (but not in place of the hard copies) to a.mitobe-shuster@Hawaiianelectric.com.

1.5 Bid Validity Period

All bids submitted shall be valid for a period of twelve (12) months after the Proposal Due Date.

1.6 Bid Proposal

Bid proposals as noted in Section 3.0 shall include and address each of the following:

Transmittal Letter
Executive Summary
Scope of Work
Detailed Project Schedule & Detailed Work Plan
Experience, Qualifications, and References
Detailed Pricing
Functional Requirements Response
Technical Requirements Response
Acceptance of, or exceptions taken to, the Purchase Contract (“Contract Document”)
Exceptions taken, if any, to the RFP

The documents that will govern the services to be delivered under this RFP shall consist of the provisions set forth in the Purchase Agreement, the applicable work authorization(s), and the statements of work describing specific services to be provided to The Companies incorporated into the applicable work authorization), and all exhibits attached to or incorporated into the foregoing (collectively, the Contract Documents).

1.7 Additional Information

After the receipt of the proposals, The Companies may request additional information to clarify the bidder’s proposals via email or a conference call. Failure by a bidder to provide the additional information or to participate in such requested meeting without an excused reason acceptable to The Companies in their sole discretion may be cause for disqualification. The Companies may negotiate with one or more bidders, as The Companies may determine in their sole discretion.

1.8 Bidder's Responsibilities

Each bidder has the sole responsibility for carefully reviewing the RFP and all attachments and for thoroughly investigating and informing themselves with respect to all matters pertinent to this RFP, its proposal, and its anticipated performance under the Contract Document.

Each bidder is responsible for proposing all terms, conditions, agreements, and services that will be required for its successful completion of the smart meter delivery.

In preparing and submitting proposals, bidders shall not rely upon any oral statements made by The Companies' employees, consultants, or agents.

Each bidder shall be solely responsible for and shall bear all costs incurred in its preparation of its proposal and/or its participation in this RFP, including, but not limited to, all costs incurred with respect to the review of the RFP documents, site visits, third-party consultant consultation, and investigation and informing itself with respect to matters pertaining to its proposal and this RFP, and same shall not be reimbursed by the Companies to any bidder, including the selected potential Meter Supplier.

Each bidder should clearly identify each page in its bid that it considers confidential or proprietary. Regardless of the confidentiality of any information submitted, all such information may be subject to review by the Hawaii Public Utilities Commission (PUC) or any other governmental authority with jurisdiction relating to these matters and may be subject to discovery in legal proceedings. Under such regulatory and legal circumstances, The Companies will make reasonable efforts to preserve bidders' confidential information, including that such information be filed under seal.

1.9 Modification of Proposal

A proposal may be modified at any time prior to the Proposal Due Date.

In order to modify its proposal, the bidder shall submit a revised proposal, clearly identified as such, which expressly supersedes and replaces the earlier proposal from the bidder; the revised proposal shall identify the date of the earlier proposal that it is superseding and replacing.

Revised proposals are subject to all requirements of this RFP, shall not incorporate or rely upon the proposal that it is superseding and replacing and shall be delivered to or received by The Companies on or before the Proposal Due Date.

A proposal may not be modified or revised after the Proposal Due Date.

1.10 Withdrawal of Proposal

A proposal may be withdrawn at any time prior to the Proposal Due Date.

A proposal will be deemed withdrawn upon receipt by The Companies of a hardcopy “Withdrawal of Proposal” notice delivered to the office identified in Section 1.5 above, on or before the Proposal Due Date.

Proposals that have been withdrawn pursuant to this section will not be considered by The Companies and may be discarded.

Proposals may not be withdrawn after the Proposal Due Date for any reason, including, but not limited to, errors or mistakes.

1.11 Correction of Errors in Proposal

A bidder may correct errors in its proposal prior to the Proposal Due Date by modification or withdrawal of a proposal pursuant to Sections 1.10 or 1.11, above.

After the Proposal Due Date, only The Companies are authorized to correct errors in the proposals.

Minor errors in a proposal that The Companies detect after the Proposal Due Date may be deemed waived, or the bidder may be allowed to correct such error if The Companies determine it is in their best interest to do so.

Errors in proposals that The Companies detect after the Proposal Due Date, when the error is patent and the correct information is clearly evident, may be corrected by The Companies. Examples of such errors may include typographical errors, errors in extending unit prices, arithmetical errors, and transposition errors.

1.12 Opening of Proposal

The Companies will open proposals on or after the Proposal Due Date as The Companies, in their sole judgment and discretion, deem appropriate. Bidders are not entitled to be present for The Companies’ opening of proposals.

1.13 Evaluation of Proposal

Proposals will be considered in conjunction with information submitted by other bidders as well as any additional information as The Companies, in their sole discretion, deem appropriate.

The evaluation of proposals will be based upon criteria that The Companies, in their sole judgment and discretion, believe to be in the best interest of The Companies and their customers. Bidders shall not be entitled to disclosure of The Companies' evaluation criteria or information pertaining to The Companies' actual evaluation and analysis of proposals.

The Companies shall have the right to reject any proposal, which The Companies, in their sole judgment and discretion, believe to be unsatisfactory or unresponsive, and may, as well, at any time up to the award of the Contract Document, withdraw this RFP and elect not to award the Contract Document.

Subject to the foregoing, and other factors in their best interest, The Companies will review, evaluate, and recommend selection of a winning proposal based on the following evaluation criteria:

- **Cost Proposal**

The bidder's proposal shall provide a per-meter cost in accordance with the Meter Functional Requirements (Attachment E). Quantities for each meter form and class are provided in the Customer and Meter Counts (Attachment H). The bidder will be compensated for hardware delivered and expenses incurred under this Contract Document on a time and expenses basis, with monthly invoicing requirements as described in Section 2.4.

- **Responsiveness to Bid Specifications and Requirements**

Bids initially will be screened for completeness and compliance with the Bid Proposal Requirements as described in Section 3.0.

- **Bidder Experience and Qualifications**

The bidder's experience is another evaluation criterion.

- **Acceptance of Contract Document Terms & Conditions**

This refers to the acceptance of the Contract Document terms by the bidder. Any proposed modifications to, or disagreements with, the Contract Document will be evaluated here.

1.14 Award

The Companies reserve the right to award the Contract Document to the bidder that, in The Companies' sole judgment and discretion, has provided a proposal that is in the best interests and provides the best value to The Companies and their customers.

The Companies reserve the right to award the Contract Document to other than the lowest bidder.

The Companies reserve the right to determine not to award the Contract Document, or to re-bid, restate, revise, or cancel this RFP or any project related to the RFP.

The Companies shall not be required to identify to any bidder the basis upon which it awarded the Contract Document to the selected bidder and/or rejected the proposals of any other bidder.

This RFP will be awarded to the successful bidder as a whole package, or in partial.

1.15 Notification of Award

The Companies will notify the bidder of its selection, by phone, electronic mail, or other means.

The selection is provisional until execution of a Contract Document by The Companies and the selected bidder. Until such time, The Companies may revoke or change their selection for any reason, including but not limited to failure of The Companies and the selected bidder to agree on final terms for the Contract Document.

1.16 Protest of Appeal of Award

No bidder shall have the right to protest or appeal the award of the Contract Document made by The Companies.

2.0 Project Background and Objectives

2.1 *Hawaiian Electric Company*

Hawaiian Electric is a wholly owned subsidiary of Hawaiian Electric Industries, Inc., which is a publicly owned corporation. Hawaiian Electric has two subsidiaries, Maui Electric and Hawaii Electric Light. Hawaiian Electric, Maui Electric, and Hawaii Electric Light are collectively referred to for purposes in this document as “The Companies”.

Additional information can be found at www.hawaiianelectric.com or will be made available upon request.

2.2 *Smart Meter Procurement*

Smart grid modernizes the electric grids, enables more renewable energy, reduces outage times, increases the efficiencies of our operation, reduces costs, and, most importantly, delivers tangible benefits to our customers. The Companies propose to implement smart grid on all five islands served (Oahu, Maui, Lanai, Molokai, and Hawaii).

The Companies’ overarching goal is to successfully implement a smart grid that brings the greatest benefit to customers: implementing a smart grid, efficiently and cost-effectively. Smart grid brings enormous changes for The Companies, for The Companies’ customers, and for the state of Hawaii. The Companies’ plans reflect their understanding of the complexity of this undertaking. As the Hawaii PUC requested, The Companies have developed a roadmap and business case. As such, The Companies have based their roadmap and business case on a review of other smart grid implementations and on carefully specified fundamental assumptions, documented in The Companies’ Smart Grid Roadmap and Business Case.¹

This RFP is designed to identify the most suitable bidder to supply The Companies with smart meters for integration with the Silver Spring Networks’ (SSN’s) AMI, as part of The Companies’ smart grid initiative. The meters are fundamental to the overall initiative.

2.3 *Project Objectives*

The key objectives of the Smart Meter procurement include the following:

- Procure meters, factory-stage (including installation of SSN Network Interface Card [NIC]), conduct First Article Testing and ship the smart meters

¹ A PDF of The Companies’ Smart Grid Roadmap and Business Case is available here:
<http://www.solari.net/documents/portfolio/Solari-Smart-Grid-Roadmap-&-Business-Case.pdf>

- Supply a limited number of meters for 2015 field test
- Provide training on the smart meters to be installed as part of the smart grid project
- Provide equipment warranty for the Smart Meters
- For any rework, reimburse The Companies or complete the rework at the Meter Supplier's own cost as appropriate to limit multiple customer visits

As stated in the Executive Summary, this capital project is targeted to start and be completed (delivered) by the end of 2019. Training work will take place in 2015.

2.4 Pre-Bid Responsibilities

This section provides a description of what The Companies anticipate a successful bidder ("Meter Supplier") shall do in advance of providing a proposal. The following tasks are not included as part of the *contract* deliverables, but shall be submitted as *part of the proposal submittal*:

1. Perform a review of the SSN Communications Data Sheet
2. Complete Functional Requirements Assessment
3. Complete Technical Requirements Assessment
4. Familiarity with Enterprise Program Management Office (EPMO) Project Management

2.5 Contract Task Descriptions and Deliverables

This Section provides a description of the minimum tasks to be performed by the Meter Supplier to meet the Contract Document functional and technical requirements and meter quantities.

a. Task 1: Meter Preparation, Quantities, and Project Schedule

Meter Suppliers shall prepare all meters with the SSN NIC installed at the Meter Suppliers' factory prior to shipment.

The Companies require batteries to be installed and connected on Time of Use (TOU) meters.

The Companies expect Meter Suppliers to deliver meters in accordance with the meter quantities and delivery schedule shown in the following table:

Quantities	485,000 smart meters (300,000 Oahu; 100,000 Maui,
------------	---------------------------------------------------

	Molokai, Lanai; 90,000 Hawaii)
Meter installation schedule	Oahu 2016-2019, Maui 2016-2018, Molokai 2016, Lanai 2016, Hawaii 2016-2018

The Meter Supplier should refer to Attachment H for information regarding the meter types for each of The Companies’ service territories and the combined total meter quantity, including 5 percent spare meters. Note that the information is based on 2013 SAP-CIS data. Total residential meter quantities by class for all service territories are shown in the following table:

Form	Class	Total	Total + 5% spares
1S	CL100	728	764
2S	CL200	379525	398501
2S	CL320	779	818
12S	CL200	55539	58316
3S	CL20	181	190
45S (5S/35S)	CL20	2288	2402
36S (6S)	CL20	4827	5068
9S (8S/946S)	CL20	3209	3369
16S (14S/15S)	CL200	20776	21815
Total		467852	491243

Total self-contained Commercial and Industrial single phase and three phase meter quantities by class for all service territories are shown in the following table:

Self-Contained Single Phase C&I Total		
Form	Class	Total
1S	CL100	288
2S	CL200	26311
2S	CL320	50
12S	CL200	5962
Total		32611

Self-Contained Three Phase C&I Total		
Form	Class	Total

16S (14S/15S) CL200 20554

Additionally, The Companies require the Meter Supplier to provide a 500-meter sample in 2015 (date agreed upon by both parties) to allow The Companies to install and test the meters' functionality and network compatibility prior to authorizing full procurement and shipment. The sample meters will be divided between The Companies as follows:

- Hawaiian Electric: 300 Meters
- Maui Electric: 100 Meters
- Hawaii Electric Light: 100 Meters

The Companies reserve the right to adjust meter quantities as needed.

b. Task 2: Factory Staging, Testing, and Delivery

All meters shall be tested by the meter manufacturer and appropriate proof of testing shall be provided to The Companies. The Meter Supplier will meet the following requirements:

1. Factory Staging and Testing

The Meter Supplier shall stage and test the meters prior to shipping, at the Meter Supplier's premises, where all programming will be performed, and NICs installed. Seven (7) full sets of system documentation in printed form and one (1) set of electronic files shall be provided as part of the Factory Staging and Testing.

The intent of the Factory Staging and Testing is to demonstrate to The Companies that the meters are ready for shipment and installation.

System configuration and testing at the Factory:

- a) The Meter Supplier will work together with The Companies' Meter Shop in order to develop meter programs and meter templates that will be used to configure meters for ordering
- b) The Meter Supplier shall install SSN NICs on all meters prior to shipping
- c) The Meter Supplier shall test all meters and deliver the TEST FILE to The Companies in the format required by The Companies (see attached TEST FILE requirements document – Attachment J)

Requirements:

- a) The Meter Supplier shall submit the Test plan documenting the testing to be performed during staging for The Companies' approval three (3) weeks prior to Factory Staging and Testing.
 - b) The Meter Supplier will provide all necessary personnel and test equipment needed to conduct Factory staging and testing. Any deviations and test failures will be resolved at the Meter Supplier's expense
 - c) Failed tests will be documented, corrected, and re-tested. All defective components will be replaced and re-tested. Defective equipment that cannot be corrected will be replaced at the expense of the Meter Supplier. All tests where the results may be affected by the corrective actions will be repeated
 - d) The Meter Supplier will provide the fully executed and completed Test File and related document to The Companies.
2. Cybersecurity Testing

The Meter Supplier shall hire a third-party subcontractor to perform a penetration test to ensure access to the meter hardware is secure and shall provide an unedited, unredacted copy of the third-party penetration test report to Hawaiian Electric. The Meter Supplier shall submit a signed document describing each test that was performed and the results of each test to indicate the effectiveness of the cybersecurity protection mechanisms (pass/fail). For any failed tests, the Meter Supplier shall provide a mitigation plan, implement corrective measures as appropriate, and re-test. Documentation shall be provided to indicate successful mitigation.

3. Delivery

“Delivery” means the transportation of all equipment to the project sites.

The Meter Supplier shall deliver the equipment to the following addresses:

Hawaiian Electric
799 King St
Honolulu, HI 96813 (Between 9:00 a.m. and 2:00 p.m.)

Maui Electric
210 West Kamehameha Ave
Kahului, Maui 96732

Hawaii Electric Light

54 Halekauila Street
Hilo, HI 96721

The Meter Supplier shall be responsible for the risk of loss or damages that occur during delivery and manufacturing defects of the proposed equipment.

All loading, crating, and skidding used in the shipment of the equipment shall be the property of the Meter Supplier and shall be removed by the Meter Supplier from The Companies' premises immediately following The Companies' request.

Task 2 Deliverables shall include, but not be limited to, all of the above mentioned and:

- Compilation and summary of data collected in the factory lab testing scenarios
- Drawings/specs of the factory lab test setup
- Assessment of the recommended equipment as determined by the factory lab testing
- Any proposed modifications to recommended equipment resulting from the lab testing
- Cybersecurity test document
- Proof that all meters have been tested
- Seven (7) full sets of system documentation in printed form and one (1) set of electronic files, provided as part of the FAT documentation (which includes deliverables listed above)
- Delivery of equipment to the sites, per above requirements

c. Task 3: Training

The Meter Supplier shall provide on-site training to The Companies' personnel (approximately 45 participants) on the smart meters. There will be one training class on each of the three islands of Oahu, Maui, and Hawaii.

The purpose of the training is to enable The Companies' personnel to be able to perform basic maintenance of the equipment (i.e., module change-out, alarm recognition, basic system monitoring, etc.) and to modify on-board programming required for new customers or customers switching rate structures.

The Trainer shall assume that most class participants have limited knowledge and experience on smart meters. Requirements are described below:

1. Trainer Certification

All training personnel shall be fully trained, certified instructors in the discipline on which they provide training.

2. Training Material

The Trainer shall provide all training aids, manuals, workbooks, etc. necessary for the proposed training class in both printed and electronic format.

3. Training shall include, but not be limited to:

- a. Meter configuration
- b. Test equipment use (test equipment to be provided by Meter Supplier)
- c. Use of diagnostic troubleshooting and maintenance tools
- d. Firmware update methodology
- e. Remote programming of meters

4. Classes

- a. Bidder shall provide two training class on Oahu, Maui, and Hawaii (2 for each island for a total of 6 classes)
 - i. Provide classroom training to be scheduled and completed during the week prior to equipment arrival. Location for this classroom training is currently assumed to be at Hawaiian Electric's meter shop, Maui Electric's Meter Shop, and an offsite location within 5 miles of the Hawaiian Electric Light's Hilo Meter Shop to be arranged by the Meter Supplier.
 - ii. Provide one week of Operation and Maintenance training after Final FAT is completed and approved. Location for this training is currently assumed to be at Hawaii Electric Light's meter shop in Hilo.

Task 3 Deliverables shall include, but not be limited to, all of the above mentioned and:

- A recommended Training Syllabus to be provided to and approved by The Companies one (1) week prior to the training
- Provisions for adequate training materials as required for all class members (approximately 45 copies of documentation)

- List of special requirements such as on-site computer terminals, internet access, etc. that The Companies will be required to provide in support of the training at least two months prior to training.
- Names and credentials of trainers

d. Task 4: Equipment Warranty

The Equipment Warranty period and terms will be selected by The Companies based on the proposals submitted during the Bid process, and will extend for that period following The Companies' approval of the Final FAT.

2.6 Invoicing

The Meter Supplier shall submit to The Companies three (3) copies of a monthly invoice, broken down by equipment, recipient, and returns. The invoice will include a brief description of the meters delivered for the current invoiced period (the 1st through 30th/31st of the previous month). The Meter Supplier may be required to submit separate invoices to Hawaiian Electric, Maui Electric and Hawaii Electric Light based on what was shipped to each company.

Payment of invoices will be processed on a monthly basis.

Important: The Meter Supplier shall *mail* the *original* hardcopy of invoice and status report to:

Hawaiian Electric Company
Attn: Accounts Payable (CP11-AD)
P.O. Box 2750
Honolulu, Hawai`i 96840-0001

When the Invoice is mailed, the Meter Supplier shall also send an email with electronic copy of the Invoice to designated representatives for The Companies, which will be determined and communicated to the Meter Supplier at a later time.

All invoices will be submitted to and paid by The Companies.

3.0 Bid Proposal Requirements

The Smart Meter procurement is targeted to start in the second quarter of 2016 and be completed (equipment in-service) by 2019.

Each proposal shall include the items listed in this section.

3.1 *Transmittal Letter*

Provide a transmittal letter that contains the identity of the individual(s) authorized to commit the bidder's company to a contract, identity of the individuals(s) who can be contacted regarding proposal content, identity of the validity period of the offer, etc.

It shall also contain a statement that the proposal meets the specifications of each subsection of the RFP.

An officer of the bidder shall sign the letter.

3.2 *Executive Summary*

Include an executive summary that briefly and concisely conveys what the bidder sees as the most important messages of the proposal, the factors of differentiation, and the critical points that The Companies should consider in their evaluation. Please explain how the bidder's approach will benefit The Companies from immediate and long-term perspectives.

3.3 *Scope of Work*

a. Methodology, Scope, and Approach

- a. Describe the bidder's service delivery methodology and approach for performing the services requested within this RFP.
- b. Include a description of each of the bidder's key phases for assuming responsibility of the services requested based upon the requirements of this RFP.

b. In-scope and Out-of-scope

Based on the information that The Companies provided in this RFP, identify all of the elements that the bidder considers in-scope and out-of-scope for this Project. Include a matrix of what the bidder considers in-scope and out-of-scope as an appendix to the bidder's proposal.

c. Proposed Timeline, Key Milestones, and Deliverables

- a. Identify the bidder's proposed timeline, key milestones, and major deliverables associated with providing the consulting and implementation services.
- b. Include a full description of the deliverables, and identify the party responsible for completion of each deliverable (i.e., primary responsible).

- c. Provide the requested baseline deployment options and duration timelines.
- d. Provide alternative timeline and schedule based on the bidder's experience.
- e. Timelines and schedules shall be delivered in Microsoft Project 2010. Additional formats for presentation purposes will also be accepted.

d. Acceptance Process

- a. Identify the acceptance process and general acceptance criteria that The Companies will utilize to measure the quality of deliverables and achievement of milestones.
- b. Provide an acknowledgement that the bidder's performance will be measured based on The Companies' acceptance of deliverables.

e. Equipment Fabrication and Configuration

- a. Identify specific factory locations to be employed for fabrication and configuration of the meters for the Project.
- b. Indicate manufacturing facility compliance with International Organization for Standardization (ISO) 9001.

f. Reuse Knowledge

Describe the bidder's ability to leverage internal knowledge base and reuse knowledge capital from prior engagements of a similar nature.

g. Project Tools and Templates

Based on the Technical Requirements that The Companies indicated, outline the bidder's experience and capabilities in using the following:

- a. MS Project
- b. Project-specific tools
- c. Microsoft SharePoint

Identify all additional tools and templates that the bidder proposes to utilize for reporting, collaboration, performance dashboards, etc. Include best practice templates and accelerators that demonstrate the bidder's ability to be innovative, productive, and efficient while understanding how to work with The Companies' business culture.

For these additional tools identified, provide an acknowledgement that The Companies will have a perpetual, worldwide, royalty-free license to use such tools during and upon expiration/termination of the Project. Please clearly identify any existing and/or on-going support maintenance fees.

h. Internal Knowledge Transfer and Transition

- a. Describe the bidder's approach to internal knowledge transfer and transition management.
- b. Describe the bidder's commitment to maintaining staff/consultant continuity for the duration of the Project. In the event of unplanned turnover, describe the bidder's process for managing turnover.

i. Organizational Change Management

Describe the bidder's proposed change management approach for the Project.

Identify the bidder's change management philosophy, methodology, management framework, and deliverables necessary for organizational change.

j. Training

Specific to training, provide the following:

Training Sessions – Describe the training sessions, duration, and proposed The Companies' attendees for the types of training listed below:

- Functional support training
- Technical support training
- Train the trainer training
- End-user training provided by the Meter Supplier

Training Skills And Experience – Describe the skills and experience of the bidder's organization in terms of the type of training and coaching services provided.

Training Methodology – Describe the training methodology, curriculum design, and requirements for training data and training materials.

Training Strategy/Timing – Provide a strategy and timing for training of the Project Team, meter technicians and installers, and other ongoing support personnel. Strategy should address the following:

- Approach to development and delivery of training to different target groups
- Planned high level training scope
- Delivery mechanisms
- Approach to identifying trainers
- Define training program development process
- Target level of training
- Approach to competency assessment
- Training schedule, along with required training resources

Training Material – Training material shall be available in time for delivery and review by The Companies' personnel prior to the training sessions and encompass the following:

- Baseline technical, functional, and operational training documentation and course materials
- Business processes and procedures
- Manuals, quick-reference cards for key transactions and processes, etc.
- Material for courses within an approved catalogue based on planning

Customization – Describe the bidder's ability to tailor instruction and materials to the specific needs of The Companies. Provide a sample of the type of training material that would be provided.

Training Activities – Describe activities associated with training including loading of data, creation of a test environment, train the trainer sessions, etc.

Approach to Training – Describe the bidder's approach to training. Please propose both options:

- Option 1: Bidder to conduct an initial training and education program that includes all installers and technicians, including training for personnel of The Companies' selected Meter Installer.
- Option 2: Bidder to train The Companies' trainers, who will then train and educate the installers and technicians.

Approach For Development of Training Materials – Describe the bidder's approach for development of training materials. Please propose both options:

- Option 1: Bidder to develop The Companies' specific training materials.
- Option 2: Oversee and review the development of The Companies' specific training materials by The Companies' resources.

3.4 Bidder Company Information, Experience, and References

The bidder shall provide a brief overview and history of its company, including the following:

- a. Company mission statement
- b. Organizational chart that provides an overview of the company structure (business unit and industry alignment, if applicable), to include the names and titles of the corresponding executives
- c. A brief description of the bidder's core portfolio service offerings that align with The Companies' immediate and longer-term objectives
- d. Financial viability, include audited financial statements for the past three (3) years
- e. A summary of any pending litigation(s)
- f. Contact person(s) and the following contact information for the Project:
 - Name
 - Title
 - Telephone
 - Email

In addition to the requested company information, the bidder shall complete the Smart Meter deployment history as requested in Attachment I. This should include any available project references for such deployments.

3.5 Pricing

The bidder's proposal shall provide a not-to-exceed value for the delivery of Smart Meters in accordance with the functional requirements and delivery schedule depicted in this RFP. Please complete the Detailed Cost Sheet (Attachment F) to reflect all costs described below. For a complete meter count, including meter forms and types, refer to the Customer and Meter Counts attachment (Attachment H).

Estimated costs should be itemized per meter and include all labor and non-labor costs deemed necessary to successfully complete the project and its deliverables as stated in Section 2.1. The proposal shall include costs for all material to be provided by the bidder and required for their delivery, including the delivery of 500 meters in 2015 for the field test. The proposal shall also include a list of spare parts and recommended test equipment, with justification for the equipment and quantities proposed. The bidder should delineate equipment description, quantities, and associated costs in the price sheet, and separately note these items from the required equipment needed for each Project execution. Costs should reflect equipment costs; configuration costs, including the installation of the SSN NIC; testing costs; and shipping costs. Training costs should also be reflected in the cost proposal.

All costs, including labor hourly rates for each job classification will remain valid for one year after the execution of the Contract Document.

Finally, estimated costs should include travel expenses. Travel expenses for this Project should be based upon the most economical, direct, coach air travel from the point of origin to Honolulu and utilize moderate-level hotel accommodations whenever possible. The estimated travel expenses shall not exceed 15 percent of the total Project cost. Use The Companies' standard expense policy. Expenses must be preapproved by The Companies and should reflect actual costs.

Hawaii General Excise Tax, if applicable, shall be listed as a separate line item. The estimated labor and non-labor costs can be summarized in tables similar to the templates provided in Attachment G.

Proposal for Task 4 – Warranty:

Each bidder shall provide costs for each of the following:

- Service Level Agreement, proposed coverage, and cost proposal for a one-year equipment warranty
- Service Level Agreement, proposed coverage, and cost proposal for an extended equipment warranty period of three years, after expiration date of the one-year standard warranty
- Service Level Agreement, proposed maintenance terms and coverage, and cost proposal for an extended equipment warranty period of five (5) years, after expiration date of the one-year standard warranty

3.6 *Bidder Exceptions to the Contract*

Following the RFP process, The Companies and the selected Meter Supplier will execute a Purchase Order Master Terms and Conditions (Contract) in accordance with the standard general contract requirements provided as Attachment B of this RFP (see note below). The Contract will be based in part on the selected Meter Supplier's proposal and other information, if any, that the Meter Supplier submitted during the RFP process. Other terms and conditions may be included in the Contract by mutual agreement of The Companies and the selected Meter Supplier.

It shall be assumed that the bidder agrees to the provisions of the Contract Documents, including all terms and conditions of the Project Contract attached hereto as Attachment B, unless exceptions are specifically and clearly listed in its proposal. Proposals that fail to do so will be considered non-responsive. The bidder should not enclose a copy of its own standard terms and say, "see enclosure" as this will be considered non-responsive. Terms and conditions with respect to which a bidder does not identify exceptions shall be deemed acceptable to the bidder.

Note: The Contract will be provided to all bidders prior to the bid due date.

3.7 *Bidder Exceptions to the RFP*

The bidder shall state any exceptions by the bidder to the specifications and requirements of this RFP clearly in the bidder's proposal. This includes listing and explaining exceptions to detailed requirements from Attachments D (Technical and Cybersecurity) and E (Meter Requirements). This is required for any requirement not met by the Meter Supplier's current production version of the proposed system. Each exception shall be stated separately, shall identify the relevant specification or requirement, shall identify the reason(s) for taking the exception, and shall propose a clearly stated alternative. The Companies will consider proposals that fail to do so non-responsive. No other exceptions shall be allowed.

The Companies shall have the right in their sole judgment and discretion to reject any proposal or evaluate it unfavorable based on exceptions taken.

3.8 *Functional Requirements Assessment*

The bidder shall complete Attachment E – Meter Requirements and submit as an attachment to the proposal submittal.

3.9 *Technical Requirements Assessment*

The bidder shall complete Attachment D – Technology and Cybersecurity Requirements and submit as an attachment to the proposal submittal.

3.10 *Bidder Change Orders after Bid Award*

The Companies understand that work that the Meter Supplier may consider above and beyond what is included in this RFP will constitute a Change Order. The Meter Supplier shall submit any Change Order requests to The Companies, and The Companies shall approve said Change Order requests before the Meter Supplier may conduct any work under said Change Order.

4.0 Appendices

Attachment A: Intent to Submit Bid Form

Intent To Submit Bid Form
Request For Proposal (RFP) #031214-02
Specification Number – Smart Meter Supplier

BIDDER must complete this form and return it via email to Toni Mitobe-Shuster, Purchasing Contract Manager, (a.mitobe-shuster@HawaiianElectric.com), no later than Tuesday, March 10, 2015.

If no proposal will be submitted, then the reason must be indicated by completing the requested data below. In addition, the inquiry documents must be returned with the completed form.

Failure to comply may render the Potential Supplier ineligible for future solicitations for the type of material(s) or service(s) involved.

Receipt of Request for Proposal No. 031214-02 covering the Procurement of Smart Meters:

(Please check and complete the following as applicable)

- A) Receipt of this Request for Proposal is hereby acknowledged and we () will,
() will not, submit a proposal on or before the due date specified.

If a proposal will not be submitted, then check or complete the following as applicable:

- a. () Cannot comply with Specifications or Statement of Work.
- b. () Cannot meet delivery or performance requirement.
- c. () Do not currently manufacture or sell the type of item(s) or service(s) involved.
- d. () Other: _____
- e. We () do, () do not; desire to be considered for future solicitations for the type of item(s) or service(s) involved.

Name, address (include zip code) and telephone number (include area code) of company:

Company Name: _____

Address: _____

Company Representative Name: _____

Position/Title: _____

Phone Number: _____

FAX Number: _____

Electronic Mail Address: _____

Signature _____ Date _____

Attachment B: Purchase Order Master Terms and Conditions

To be sent separately the week of March 9, 2015

**PURCHASE ORDER MASTER AGREEMENT FOR GOODS
WITH**

CONTRACT NO. MSTR-PXX-00-000

START DATE: _____

END DATE: _____

THIS PURCHASE ORDER MASTER AGREEMENT FOR GOODS (hereinafter the "Master Agreement") is made on _____, 20__, by and between **HAWAIIAN ELECTRIC COMPANY, INC., and its subsidiaries, HAWAII ELECTRIC LIGHT COMPANY, INC. (Hawaii Electric Light) and, MAUI ELECTRIC COMPANY, LIMITED (Maui Electric)** (hereinafter collectively referred to as "PURCHASER") and _____ (hereinafter "SELLER"), whose principal place of business is _____, and whose mailing address is _____, doing business in Hawaii.

I. APPLICATION OF MASTER AGREEMENT

When this Master Agreement is attached to and/or incorporated by reference in the PURCHASE ORDER, and the PURCHASE ORDER is accepted by SELLER, the terms and conditions set forth herein, along with the PURCHASE ORDER and any SPECIFICATIONS referenced to therein or herein, shall constitute the terms and conditions of the agreement between the parties whereby the SELLER agrees to sell and the PURCHASER agrees to purchase the items of EQUIPMENT and any related WORK itemized in said PURCHASE ORDER.

1.1 Purpose. The purpose of this Master Agreement is to set forth the terms and conditions of the purchase of EQUIPMENT and any related WORK provided by SELLER to PURCHASER pursuant to PURCHASE ORDERS issued hereunder.

1.2 Term of Master Agreement - This Master Agreement shall begin on _____, 20__ and terminate on _____, 20__; provided, however, that said Master Agreement shall continue to be effective as to any outstanding PURCHASE ORDERS issued prior to the expiration or termination of this Master Agreement.

II. DEFINITIONS

As used in this Master Agreement, the following terms shall have definitions as follows:

2.1 ACCEPTANCE CRITERIA: Shall be defined to mean the successful completion of tests and procedures described in the SPECIFICATIONS.

2.2 ACCEPTANCE DATE: Shall be defined to mean the date that EQUIPMENT or WORK shall successfully meet the ACCEPTANCE CRITERIA as defined herein.

2.3 CONTRACT PRICE: Shall be defined to mean the price of the EQUIPMENT and the WORK as shown on the PURCHASE ORDER inclusive of all enforceable amendments thereto.

2.4 DEFECTIVE EQUIPMENT REPORT: Shall be defined to mean an instrument that PURCHASER shall tender to SELLER during the WARRANTY PERIOD to confirm notice of defects in the EQUIPMENT.

2.5 DEFECTIVE WORK REPORT: Shall be defined to mean an instrument that PURCHASER shall tender to SELLER during the WARRANTY PERIOD to confirm notice of defects in the WORK.

2.6 DELIVERY DATE: To be indicated on the PURCHASE ORDER.

2.7 DELIVERY DELAY CHARGE: Shall be defined to mean a charge to SELLER for delays in delivery in the amounts specified in Sections 9.5 and 9.6 of this Master Agreement.

2.8 DELIVERY DESTINATION: Shall be defined on the PURCHASE ORDER.

2.9 EQUIPMENT: Shall be defined to mean the items of equipment, goods or products listed in the PURCHASE ORDER, inclusive of all enforceable amendments thereto.

2.10 EXCLUSIVE AGENT: Director of Purchasing shall act as exclusive agent for PURCHASER, having the authority and responsibility to represent PURCHASER in any and all matters related to the performance of this Master Agreement.

2.11 FAX: Tele-facsimile.

2.12 F.O.B. POINT: Shall have the meaning given to it in Section 8.1 herein.

2.13 LOSSES: Shall be defined to mean (a) all judgments, settlements, damages, losses, charges, liabilities, penalties, interest claims (including taxes and related interest and penalties incurred directly with respect thereto), however described or denominated, and (b) all related reasonable costs, expenses and other charges (including reasonable attorney's fees and reasonable costs, expenses and other charges (including all reasonable attorneys' fees and reasonable internal and external costs of investigations, litigation, hearing, proceedings, document and data productions and discovery, settlement, judgment, awards, interest and penalties), however described or denominated.

2.14 PURCHASE CHANGE ORDER: Shall be defined to mean the form used to make changes to a PURCHASE ORDER

2.15 PURCHASE ORDER: Shall be defined to mean the order form that includes information related to the EQUIPMENT and any related WORK being purchased.

2.16 SPECIFICATIONS: Shall be defined to mean the document(s) attached to the PURCHASE ORDER and/or incorporated therein, attached hereto, or which otherwise between SELLER and PURCHASER describe the EQUIPMENT and WORK, and any technical drawings referred to therein.

2.17 WARRANTY PERIOD: Shall be defined to mean the period which begins on the ACCEPTANCE DATE and ends one (1) year later (excluding any down time caused by breach of the Warranty); provided, however, that any warranty repairs or replacements shall be deemed to renew the WARRANTY PERIOD as to those items so repaired or replaced; provided further, that except for the exclusions and renewal provisions contained herein, the WARRANTY PERIOD shall in no event extend beyond eighteen (18) months from the date the total EQUIPMENT is shipped, or the WORK is delivered, to PURCHASER.

2.18 WORK: Shall be defined to mean the engineering design, fabrication, installation and adjustment of the EQUIPMENT and any other services described in a PURCHASE ORDER entered into under this MASTER AGREEMENT.

III. PURCHASE ORDER

The EQUIPMENT and any related WORK shall be itemized on a PURCHASE ORDER. Any preprinted terms and conditions appearing on the PURCHASE ORDER (or any subsequent change orders, amendments thereto or other invoices or orders relating to the EQUIPMENT, WORK or PURCHASE ORDER) which are in any way contradictory to or inconsistent with the terms of this Master Agreement shall be considered by the parties to be void. From time to time, pursuant to the terms of Article V herein, PURCHASER may submit its PURCHASE CHANGE ORDER to SELLER for its acceptance. Each such PURCHASE CHANGE ORDER, upon SELLER's acceptance, shall effectively amend and be made a part of the PURCHASE ORDER and this Master Agreement.

IV. INTENDED USE

It is understood by SELLER that PURCHASER intends to use the EQUIPMENT and WORK primarily in support of PURCHASER's electric power operations in Hawaii.

V. CHANGES TO PURCHASE ORDER OR SPECIFICATIONS

5.1 Change Requests - If changes to the PURCHASE ORDER or SPECIFICATIONS are proposed by PURCHASER, SELLER will give each such proposal its most serious and prompt attention. SELLER will promptly respond by stating in writing what effect, if any, such changes will have on the CONTRACT PRICE, DELIVERY DATE, or Warranty provisions of this Master Agreement. In the absence of a written statement from SELLER, such provisions shall apply without modification should PURCHASER elect to amend the PURCHASE ORDER or SPECIFICATIONS with the change pursuant to Section 5.2 herein.

5.2 Change Orders - If changes in the PURCHASE ORDER or SPECIFICATIONS are elected by PURCHASER to be incorporated into this Master Agreement, it is understood and agreed that any such changes shall be made. Any such changes to the PURCHASE ORDER or SPECIFICATIONS shall be evidenced by a PURCHASE CHANGE ORDER. Such PURCHASE CHANGE ORDER shall amend the PURCHASE ORDER or SPECIFICATIONS appropriately to incorporate the change and acknowledge the effect, if any, of the change on the CONTRACT PRICE, DELIVERY DATE or Warranty provisions to this Master Agreement. Such PURCHASE CHANGE ORDERS shall be signed by an authorized representative of PURCHASER.

5.3 Technological Developments - SELLER shall promptly advise PURCHASER of all reasonably available technological advances which are known or become known to SELLER over the course of performance of its obligations under this Master Agreement which may result in the EQUIPMENT having added value (i.e. better performance, design, material, longer useful life, etc.) to PURCHASER. Should

PURCHASER elect to incorporate such advances it shall do so pursuant to Section 5.2 herein.

VI. CONTRACT PRICE

The total CONTRACT PRICE of the EQUIPMENT and WORK shall be indicated on the PURCHASE ORDER, F.O.B. the DELIVERY DESTINATION, for the EQUIPMENT as such may be amended pursuant to Section 5.2

VII. PAYMENT TERMS

7.1 Payment - The CONTRACT PRICE shall be paid to SELLER as follows.

7.1.1 Electronic Payments – For SELLER participating in PURCHASER’s electronic payment program, PURCHASER will pay properly submitted invoices within fifteen (15) days after the date of invoice, the date of invoice being no earlier than the date the EQUIPMENT is actually delivered to the DELIVERY DESTINATION.

7.1.2 Manual Payments – For SELLER not participating in PURCHASER’s electronic payment program, PURCHASER will pay properly submitted invoices within thirty (30) days after the date of invoice, the date of invoice being no earlier than the date the EQUIPMENT is actually delivered to the DELIVERY DESTINATION.

7.2 Invoicing - SELLER shall post all invoices submitted hereunder to:

Hawaiian Electric Company, Inc.
P. O. Box 2750
Honolulu, Hawaii 96840-0001
Attention: Accounts Payable
Purchase Order No. _____
Contract No. _____

Said invoices shall be in duplicate and shall reference the PURCHASE ORDER number and, if applicable, the Contract Number. Should PURCHASER’s PURCHASE ORDER contain more than one item, SELLER’s invoice will make the proper reference. SELLER understands that its failure to follow this requirement may result in delayed payments by PURCHASER.

7.3 Payment for EQUIPMENT and WORK - Payment for the EQUIPMENT and WORK delivered hereunder shall not constitute acceptance thereof. PURCHASER shall have the right to inspect the EQUIPMENT and WORK and to reject any and all of the same which, in PURCHASER’s judgment, fails to meet the ACCEPTANCE

CRITERIA. EQUIPMENT or WORK so rejected or which is supplied in excess of quantities called for herein may be returned to the SELLER at SELLER's risk and expense and, in addition to PURCHASER's other rights, PURCHASER may charge and SELLER shall be liable for all reasonable expenses of unpacking, examining, repacking and reshipment of such EQUIPMENT, or re-performance of the WORK. In the event the EQUIPMENT or WORK is defective, damaged or fails to meet the ACCEPTANCE CRITERIA, PURCHASER reserves the right to require replacement of such EQUIPMENT and/or re-performance of the WORK at no extra cost to PURCHASER, as well as payment of any damages incurred by PURCHASER related thereto.

7.4 Setoff - PURCHASER may set off any amount due from SELLER to PURCHASER (for any matter) against any amount payable at any time by PURCHASER in connection with this Master Agreement.

VIII. DELIVERY

8.1 On Time Delivery - SELLER agrees to deliver all EQUIPMENT and WORK to PURCHASER's DELIVERY DESTINATION on or before the DELIVERY DATE. The Equipment shall be delivered to PURCHASER F.O.B. DELIVERY DESTINATION (the "F.O.B. POINT").

8.2 Option to Delay Delivery - PURCHASER shall have the right, at no additional charge, to postpone the delivery of the EQUIPMENT or WORK (or any component thereof) for a period of up to 90 days. In the event of such a postponement, PURCHASER shall have the right to commensurately delay its payment(s) due by virtue of the delayed shipment of the EQUIPMENT or WORK. SELLER may invoice PURCHASER for storage charges in the amount of 1% of the CONTACT PRICE of EQUIPMENT and/or WORK per each calendar month or each partial calendar month PURCHASER has postponed delivery beyond thirty (30) calendar days. Payment of such storage fees shall be made by PURCHASER within forty-five (45) days from the date of the invoice.

8.3 SELLER's Ability to Ship or Deliver - If at any time, reasonable grounds for insecurity arise regarding SELLER's performance of this Master Agreement or any PURCHASE ORDER in accordance with its terms and the PURCHASER notifies the SELLER of its concern, the SELLER must provide adequate assurance of due performance within ten (10) days after receipt of such notice. If adequate assurance is not provided within the prescribed period, PURCHASER may terminate this Master Agreement and/or any or all outstanding PURCHASE ORDERS or any part thereto without liability except for EQUIPMENT or WORK previously provided to and accepted by PURCHASER. All rights and remedies recited herein shall be in addition to any rights and remedies provided at law or in equity.

8.4 Choice of Carrier and Routing - SELLER shall consult with PURCHASER as to the choice of a particular carrier and routing for delivery of the EQUIPMENT. If

the F.O.B. POINT and PURCHASER's DELIVERY DESTINATION are not the same physical location, SELLER's choice of carrier must be approved by PURCHASER. Such approval shall not be unreasonably withheld.

8.5 Delivery Delays – 1 to 60 Days - If delivery of the EQUIPMENT or WORK is delayed from 1 to 60 days beyond the DELIVERY DATE for reasons other than Force Majeure, then SELLER shall pay PURCHASER a DELIVERY DELAY CHARGE of \$17,000.00 per day for each day that the EQUIPMENT or WORK is delayed in its delivery to the DELIVERY DESTINATION beyond the DELIVERY DATE. PURCHASER shall not be entitled to recover any other charges, damages or payments from SELLER for delivery delays from 1 to 60 days.

8.6 Delivery Delays - Greater than 60 Days - If delivery of the EQUIPMENT or WORK is delayed more than sixty (60) days beyond the DELIVERY DATE for reasons other than Force Majeure, then such delay shall be considered an irreparable delay and a default of SELLER under this Master Agreement. In the event of such a delay, PURCHASER shall have the option to terminate this Master Agreement and/or any or all outstanding PURCHASE ORDERS or any part thereto for cause pursuant to Article XIX. Should PURCHASER elect not to terminate this Master Agreement and/or any or all outstanding PURCHASE ORDERS or any part thereto due to such delay, it shall so notify SELLER in writing, giving the specific time for which it is willing to waive its termination rights for delayed delivery of the EQUIPMENT or WORK. In the event of such waiver of termination rights by PURCHASER and subsequent delivery of the EQUIPMENT during the waiver period, SELLER shall pay to PURCHASER a DELIVERY DELAY CHARGE of \$25,500.00 per day for each day that the EQUIPMENT or WORK is delayed in its delivery to the DELIVERY DESTINATION beyond the DELIVERY DATE up to a total of 200% of the CONTRACT PRICE.

8.7 Delivery Delays Due To Force Majeure - If delivery of the EQUIPMENT or WORK is delayed more than 180 days beyond the DELIVERY DATE due to Force Majeure (as described in Section 24.8), then PURCHASER shall have the right to cancel this Master Agreement and/or any or all outstanding PURCHASE ORDERS or any part thereto without further obligation to SELLER and in such event, SELLER shall return to PURCHASER all monies previously paid to SELLER under such PURCHASER ORDERS or this Master Agreement (except for EQUIPMENT or WORK previously provided to and accepted by PURCHASER); provided, however, that if circumstances are such that PURCHASER makes a good faith determination that delivery of the EQUIPMENT or WORK is not likely to occur within 180 days of the DELIVERY DATE, then PURCHASER may cancel this Master Agreement and/or any or all outstanding PURCHASE ORDERS or any part thereto pursuant to this Section 8.7 immediately upon making such good faith determination.

8.8 Notice of Delay - SELLER shall promptly notify PURCHASER in writing of any occurrence that may delay delivery of the EQUIPMENT or WORK beyond the DELIVERY DATE and include in such notification SELLER's proposed actions to ensure the DELIVERY DATE is met despite such occurrence.

8.9 Delivery Notice - SELLER shall notify PURCHASER by FAX of an impending shipment hereunder seven (7) calendar days prior to actual shipment whether such shipment is to the DELIVERY DESTINATION or F.O.B. POINT. On the day of actual shipment, SELLER shall confirm shipment by FAX notification which shall include: the carrier's name, the way bill number, number of pieces, weight (by piece and total), and destination.

8.10 Packing, Etc. - SELLER will pack and ship the EQUIPMENT in a manner consistent with general industry practice for shipping these kinds of goods so as to minimize any deterioration in transit. Should it be necessary to ship the EQUIPMENT in a disassembled state, SELLER shall ship the EQUIPMENT in the largest units possible consistent with expedient transportation of the EQUIPMENT.

8.11 Shipping Documents – (a) Prompt receipt of shipping documents is essential. Transmittal of shipping documents is not to be delayed for preparation of invoices. The following shall be forwarded to PURCHASER'S Purchasing Officer as soon as possible after shipment goes forward:

Bill of Lading	Original and 2 copies
Packing List	2 copies

(b) To avoid arrival of materials at the DELIVERY DESTINATION prior to notification of shipment and consequent serious inconvenience and extra expense to PURCHASER's field forces, SELLER, or any of SELLER's suppliers making shipment direct, shall transmit on the shipment date, addressed as instructed in this Master Agreement, by air mail, if necessary:

Packing List	1 copy
Bill of Lading	1 copy

(c) The PURCHASE ORDER Number shall be indicated on all invoices and shipping documents.

(d) Unless otherwise directed by PURCHASER, three copies of all other records, documentation and test data, shall be shipped as a package to the Director of Purchasing as set out in Article XXI, simultaneously with, or prior to, the arrival of the EQUIPMENT.

(e) SELLER shall be responsible for expenses incurred by PURCHASER due to SELLER's failure to comply with the requirements of this Article.

(f) Payment of invoices may be withheld pending receipt of these documents referenced in this Article.

IX. TITLE & SECURITY INTEREST

9.1 PURCHASER's Interest - To secure PURCHASER's payments (if any) prior to the shipment of the EQUIPMENT, title to and first security interest in the EQUIPMENT, any WORK in progress and materials required for the execution of SELLER's obligations hereunder, and any WORK which SELLER may subcontract in the support of the performance of its obligations hereunder, shall vest in PURCHASER to the extent PURCHASER has made payments hereunder.

9.2 Security Agreement - The parties hereby agree that this Master Agreement shall constitute the Security Agreement required by the Uniform Commercial Code of the appropriate State. SELLER will execute promptly any financing statement required to perfect and protect the interests of PURCHASER as defined in this Article IX.

9.3 Liens & Encumbrances - SELLER shall pay the bills of its suppliers promptly and comply with reasonable requests of PURCHASER for evidence of payment. However, SELLER shall have the right to withhold payment to any of its suppliers who have furnished defective, substandard or incorrect materials or workmanship in which case SELLER shall defend, indemnify and hold harmless PURCHASER against all claims, losses and expenses (including attorneys' fees) resulting from SELLER's election to withhold such payments. SELLER shall not by its actions or inactions permit any attachments to the EQUIPMENT or WORK of liens, encumbrances or claims for labor or material and shall defend, protect and hold harmless PURCHASER from all such claims, liens and encumbrances growing out of the design, manufacture, assembly, transit and installation of the EQUIPMENT.

9.4 Filing of Liens. SELLER agrees that it shall not file any liens as a result of producing EQUIPMENT or WORK hereunder and that it shall not permit or give cause to its subcontractors or other suppliers to file such liens. When requested, SELLER shall provide PURCHASER with lien waivers for itself, its subcontractors and other suppliers in a form satisfactory to PURCHASER, who may withhold any payment(s) otherwise due until it has received reasonable assurances that all of the SELLER's obligations arising from the EQUIPMENT or WORK have been paid. If a lien is filed, SELLER shall cooperate fully with PURCHASER, at SELLER's expense, to cause the lien to be removed.

X. WARRANTY

10.1 Performance Warranty - SELLER warrants that the EQUIPMENT and WORK will perform in accordance with the performance requirements and meet the criteria set forth in the SPECIFICATIONS and will be fit for the use intended by PURCHASER if such use has been communicated to SELLER. SELLER further warrants that if the EQUIPMENT is a fabricated unit, it will function properly for a commercially reasonable length of time for the intended purpose, if no other time is required herein.

10.2 Design, Materials and Workmanship Warranty - SELLER further warrants that the EQUIPMENT will be new and merchantable, and the EQUIPMENT and WORK will be of good material and workmanship and first-class quality, fit and sufficient for the purpose intended and free from defects in design, materials and workmanship.

10.3 Documentation Deliverables - Any deliverable consisting of documentation of any EQUIPMENT or WORK will accurately reflect the operation of such EQUIPMENT or WORK.

10.4 No Litigation - There is no action, suit, proceeding or investigation pending, or to the SELLER's knowledge, threatened, that questions the validity of this Master Agreement or SELLER's right to enter into this Master Agreement, the PURCHASE ORDER or to consummate the transactions contemplated by them.

10.5 Qualified to Do Business - SELLER is duly licensed, authorized or qualifies to do business and is in good standing in every jurisdiction in which a license, authorization or qualification is required for the ownership or leasing of its assets or the transaction of business of the character transacted by it, except where the failure to be so licensed, authorized or qualified would not have a material adverse effect on SELLER's ability to fulfill its obligations under this Master Agreement.

10.6 No Conflicts - The execution, delivery and performance of this Master Agreement by SELLER (a) has been duly authorized by SELLER and (b) will not conflict with, result in a breach of, or constitute default under any other agreement to which the SELLER is a party or to which it is bound.

10.7 Consents - Except as otherwise provide dint he Master Agreement no authorizations or other consents, approvals or notices of or to nay person are required in connection with (a) the execution, delivery and performance by the SELLER in accordance with the applicable provisions of this Master Agreement and in compliance with all applicable laws and SELLER regulators requirements, or (c) the validity and enforceability of this Master Agreement.

10.8 Survival of Warranties - The warranties set forth in this Article X, together with service warranties and guarantees, shall run to PURCHASER, its successors, assigns, and to the users of the EQUIPMENT and WORK and shall survive any

inspection, delivery, acceptance or payment by PURCHASER for the EQUIPMENT and WORK.

10.9 Defect Correction - Parts and Labor - In the event of a breach of either of the warranties in Sections 10.1 or 10.2 during the WARRANTY PERIOD, SELLER shall at its own cost for all parts and labor and without undue delay repair, replace, modify and/or reinstall the EQUIPMENT so as to correct said warranty breach. Shipment of all Warranty repair EQUIPMENT hereunder shall be by the most expeditious means commercially available. SELLER shall make such corrections of defective EQUIPMENT upon written notice thereof anytime such defects appear during the WARRANTY PERIOD.

10.10 WORK Remedial Measures - In the event of a breach of Section 10.1 (Performance Warranty) or 10.2 (Design, Materials and Workmanship Warranty), SELLER shall (a) bring the affected WORK into material compliance with the specifications set forth in the applicable PURCHASE ORDER, within a commercially reasonable period of time (which shall in no event exceed fifteen (15) day after the notice of defect, unless otherwise agreed to by the parties in writing, or (b) re-perform the WORK within a commercially reasonable period of time (which in no event shall exceed fifteen (15) days after notice of defect, unless otherwise agreed to by the parties in writing, or if (a) or (b) cannot be accomplished (c) return the appropriate portion of the Contract Price paid by the PURCHASER with respect to the applicable portion of the EQUIPMENT or WORK.

10.11 PURCHASER May Repair - PURCHASER shall have the right but not the obligation, to effect repair of any and all defects in the EQUIPMENT, if SELLER shall have previously authorized such action or, in PURCHASER's reasonable commercial judgment SELLER is unable or unwilling to effect the repair. In the event that PURCHASER elects to take this action, it shall be entitled to deduct from any amounts owing to SELLER the direct and incidental costs incurred in remedying the breach of warranty. Should PURCHASER make such deduction of costs, PURCHASER will furnish its bills and other documentation as it may have in its possession on request. PURCHASER's action to effect cure of any warranty breach shall not relieve SELLER of any of its obligations hereunder or under the applicable Uniform Commercial Code except to the extent that PURCHASER's repair effort shall have directly caused further defects in the EQUIPMENT.

10.12 Notice of Defects - PURCHASER shall give SELLER prompt notice of all defects known to it, either orally to SELLER's on-site representative or telephonically to SELLER's customer service representative. In addition, PURCHASER will tender a DEFECTIVE EQUIPMENT REPORT or a DEFECTIVE SERVICE REPORT to SELLER confirming notice of such defects. Upon receipt of such oral or telephonic notice, SELLER shall promptly and without undue delay notify PURCHASER of its intentions and preferences to effect repair of the EQUIPMENT or re-performance of the WORK.

10.13 EQUIPMENT Warranty Limitations - The warranties under Sections 10.1 and 10.2 shall not apply (a) to normal maintenance services or adjustments; or (b) to any EQUIPMENT which has been repaired or altered, other than as provided above, in any way so as to adversely affect its operation or reliability in SELLER's judgment; or (c) to the effects of ordinary corrosion, erosion, or wear and tear of EQUIPMENT, or failure occurring from operation or condition of service more severe than allowable under the SPECIFICATIONS for the EQUIPMENT.

THE WARRANTIES SET FORTH IN THIS ARTICLE X ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION: IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND INCLUDING ALL REPRESENTATIONS TO THE PURCHASER NOT CONTAINED IN THIS MASTER AGREEMENT.

10.14 Performance Bond - If required by PURCHASER for a particular PURCHASER ORDER, a Performance Bond or acceptable Letter of Credit shall be furnished by the SELLER and deposited with PURCHASER, at SELLER's expense, in the amount of one hundred percent (100%) of the CONTRACT PRICE set forth in such PURCHASE ORDER, guaranteeing to the PURCHASER and SELLER's full compliance with the Warranty and other provisions of this Master Agreement and the applicable PURCHASE ORDER. Such Bond shall remain in force until the WARRANTY PERIOD has expired for EQUIPMENT purchased under such PURCHASE ORDER. Said Bond is to be submitted thirty (30) days after issuance of the applicable PURCHASE ORDER.

XI. INTELLECTUAL PROPERTY WARRANTY

11.1 No Infringement Warranty - SELLER warrants that none of (a) the EQUIPMENT, the use thereof or any of the applications, processes or designs employed in the manufacture thereof, or (b) the WORK or means of providing the WORK performed by SELLER under this Master Agreement or any PURCHASE ORDER, infringes the valid claims of any patent, patent application, copyright, trademark, trade secret or any other property right of any third party (collectively, "Proprietary Rights").

11.2 Infringement Remedies - In addition to its other obligations under this Master Agreement, SELLER hereby acknowledges and agrees that if any of the (a) the EQUIPMENT, the use thereof or any of the applications, processes or designs employed in the manufacture thereof, or (b) the WORK or means of providing the WORK performed by SELLER under this Master Agreement or any PURCHASE ORDER (collectively, "Item(s)") are found, or are reasonably likely to be found, to infringe or contributorily infringe upon the Proprietary Rights of any third party, SELLER will, at its sole expense and in a manner, in PURCHASER's sole determination, so as to minimize any disturbance to PURCHASER's business activities, either: (a) obtain for PURCHASER the right to continue using the Item(s), (b) modify the Item(s) so that it or they no longer infringe upon any proprietary rights whatsoever (provided, however, that

any such modified Item(s) will, in PURCHASER's sole determination, remain functionally equivalent to the unmodified version(s)), or (c) replace the Item(s) with a non-infringing functional equivalent(s); provided, however, that any such replacement or modification will not, in PURCHASER's sole determination, degrade or harm the performance or quality of the affected component(s) of the applicable Item in any material way. SELLER hereby acknowledges and agrees that in any case, if it is unable to provide any of the remedies as set forth in this Section 11.2, that SELLER will, upon prompt and immediate notice to PURCHASER, promptly (i) instruct PURCHASER to return such Item(s) to SELLER, and (ii) refund to PURCHASER any and all fees applicable to any such Item(s) and pay PURCHASER its actual damages resulting directly there from in an amount up to 200% of the CONTRACT PRICE.

11.3 Indemnity - In the event of a breach or alleged breach of any Warranty in this Article XI, SELLER shall, at its own expense, defend any suit or proceeding brought against PURCHASER and the respective current, future and former officers, directors, employees, agents, successors and assigns of each entity comprising the PURCHASER (the "PURCHASER INDEMNITEES") and shall fully protect, defend, hold harmless and indemnify the PURCHASER INDEMNITEES on demand from and against any and all LOSSES by any of them as a result of any breach of the No Infringement Warranty contained in this Article XI. PURCHASER shall give prompt notice in writing of any notice or claim related thereto and PURCHASER agrees to cooperate with SELLER to enable it to make such defense, at SELLER's cost and expense.

XII. RISK OF LOSS

SELLER shall bear risk of loss and damage until the EQUIPMENT shall safely come to rest at the F.O.B. POINT. Thereafter, PURCHASER shall bear risk of loss; provided, however, that SELLER shall bear the risk of loss during any return shipment of EQUIPMENT by PURCHASER to SELLER that does not meet the ACCEPTANCE CRITERIA or relates to a warranty breach.

XIII. INSURANCE

13.1 Prior to Delivery - If PURCHASER has made any payments to SELLER towards design, manufacture, or purchase of the Equipment or has a security interest in the Equipment pursuant to Article IX hereof, then while SELLER has risk of loss, SELLER agrees, at its own expense, to procure and carry suitable fire, sprinkler leakage and extended coverage insurance on material, work-in-process and any furnished items which comprise or will eventually comprise the EQUIPMENT. The amount to be insured shall be the actual replacement value of said material, work-in-process and furnished items. Such insurance shall provide a loss payable clause in favor of PURCHASER as its interest may appear.

13.2 After Delivery - While PURCHASER has risk of loss, PURCHASER agrees to procure and carry as appropriate, in transit, sprinkler leakage, fire and extended coverage on the EQUIPMENT covering the full insurable value of the EQUIPMENT.

13.3 During Presence at PURCHASER's Premises— (a) Should the execution of SELLER's obligations hereunder require SELLER's employees or agents to work on PURCHASER's premises, SELLER shall secure, at its own expense, and prior to such activity: (i) Workers' Compensation insurance with limits required of an employer by law, and Employer's Liability insurance with minimum limits of ONE HUNDRED THOUSAND DOLLARS (\$100,000). In the event that SELLER fails to maintain such insurance as required by law, SELLER acknowledges and agrees that it will not seek or be entitled to any coverage under PURCHASER's insurance. (ii) Commercial General Liability and Commercial Automobile Liability insurance protecting SELLER and PURCHASER against liability from damages because of injuries, including death, suffered by persons other than employees of SELLER and liability from damages to property, arising from and growing out of any operation of the SELLER (including the operation of automobiles, trucks or other vehicles owned or rented) in connection with the performance of this Master Agreement. The Commercial General Liability insurance shall cover Contractual Liability assumed by SELLER under this Master Agreement. Commercial General Liability insurance combined single limit shall not be less than TWO MILLION DOLLARS (\$2,000,000). In the event Owner so specifies, if the WORK involves asbestos abatement and/or lead abatement, SELLER shall provide proof of insurance coverage as applicable with a combined single limit of ONE MILLION DOLLARS (\$1,000,000) per occurrence. Commercial Automobile Liability insurance shall have a combined single limit of not less than ONE MILLION DOLLARS (\$1,000,000).

(b) General Liability policies shall name PURCHASER as additional insured.

(c) SELLER hereby waives and will cause its insurers to waive all rights of subrogation which SELLER or its insurers may have against PURCHASER, PURCHASER's agents, or PURCHASER's employees.

13.4 Certificates - Failure to maintain in full force and effect the insurance required herein shall constitute a breach of this Master Agreement. SELLER shall provide to PURCHASER copies of Certificates of Insurance within ten (10) working days of signing of this Master Agreement, on a form satisfactory to PURCHASER, completed by SELLER's insurance carrier or agent, certifying that minimum insurance coverages, as required above, are in effect and will not be canceled or changed until thirty (30) days after written notice is given to PURCHASER. (Note: For insurance required in Sections 13.1 and 13.2, certificates are required only on written request by the other party.)

XIV. TAXES

(a) SELLER shall assume payment of all duties, tariffs, export fees, excise and other taxes assessed by the Country of Origin and taxes imposed by State or local governments in the Country of Origin (if other than U.S.A.).

(b) PURCHASER shall be responsible to SELLER for any sales tax, use tax or any other federal, state or local tax, measured solely by the CONTRACT PRICE and required to be paid by SELLER by virtue of the sale and delivery of the EQUIPMENT or performance of the WORK

XV. ACCEPTANCE/PERFORMANCE TESTING

15.1 Shop Tests - Prior to shipment SELLER shall conduct shop testing pursuant to standards of the trade and the procedures (if any) outlined in the SPECIFICATIONS. The purpose of these tests shall include, but not be limited to, performance evaluation to identify any mechanical interferences between machine members, improper adjustments made during assembly, and generally to determine that the EQUIPMENT is in good working order. PURCHASER shall have the option to observe said preshipment testing. It is understood that all defects in materials and workmanship identified as a result of said testing will be corrected by SELLER prior to shipment of the EQUIPMENT unless specifically directed by PURCHASER to the contrary. Upon completion of all shop tests, SELLER shall submit to PURCHASER a statement certifying that the EQUIPMENT has passed all required shop tests. SELLER shall promptly provide to PURCHASER all factory or shop test data or reports.

15.2 Failure to Inspect and Accept or Reject. Failure to inspect and accept or reject EQUIPMENT or WORK shall not relieve the SELLER from responsibility for compliance with order requirements nor impose liability on PURCHASER.

15.3 Acceptance Test - Upon completion of the WORK, PURCHASER shall promptly commence the acceptance testing procedure designated in the SPECIFICATIONS, if any. If no such acceptance testing procedure is provided for, acceptance shall be deemed to have occurred when the ACCEPTANCE CRITERIA is otherwise met.

15.4 Certification of Acceptance - On the ACCEPTANCE DATE, PURCHASER shall certify to SELLER, in writing upon request, of its acceptance of the EQUIPMENT and/or the WORK, provided that the EQUIPMENT or WORK shall have demonstrated (during the acceptance procedure) its performance to be in accordance with the SPECIFICATIONS. The acceptance of the EQUIPMENT and/or WORK shall in no way release SELLER of any of its obligations hereunder (warranty or otherwise).

15.5 Provisional Acceptance - In the event that the acceptance procedure identifies areas of performance non-conformance which in PURCHASER's sole

commercial judgment do not materially impair PURCHASER's use of the EQUIPMENT or WORK in the short term, PURCHASER shall have the option to certify its provisional acceptance of the EQUIPMENT or WORK. In this case, PURCHASER shall itemize those areas in which the EQUIPMENT or WORK has failed to perform acceptably. SELLER shall acknowledge said list and inform PURCHASER, in writing, as to when the non-conformance shall be corrected. SELLER agrees that time is of the essence with regard to such modifications. PURCHASER shall have the right to withhold payment of any funds normally due by virtue of acceptance. The amount of the payment withheld shall be determined by PURCHASER and shall be reasonably commensurate with the reduced value of the EQUIPMENT or WORK. Upon completion of the modifications by SELLER, it shall notify PURCHASER of same and the acceptance procedures shall be rerun in their entirety should PURCHASER elect to do so. Should SELLER fail to meet the corrective modification completion date, PURCHASER may, at its option, revoke its provisional acceptance and use any of its remedies as may be provided herein or by the appropriate Uniform Commercial Code.

XVI. SPARE PARTS

If the EQUIPMENT is designed to utilize spare parts, sixty (60) days prior to initial shipment, SELLER shall supply PURCHASER with a recommended Spare Parts List with related data and literature for the EQUIPMENT. SELLER agrees for a period of five (5) years to sell to PURCHASER at prevailing delivery and payment terms, all necessary spare parts required for maintenance of the EQUIPMENT. Spare parts will be at catalog prices. Further, SELLER agrees within the limits of production capability, to provide emergency spare parts within a twenty-four (24) hour period after receipt of the emergency order. Should SELLER no longer support this EQUIPMENT beyond five (5) years, SELLER agrees to supply PURCHASER or some other manufacturer with all manufacturing drawings so that PURCHASER can maintain the EQUIPMENT.

XVII. COMPLIANCE WITH LAWS

17.1 The parties agree that they will perform their respective obligations hereunder in accordance with all applicable federal, state and local laws, rules and regulations now and hereafter in effect. If any term or provision of this Master Agreement shall be found to be illegal or unenforceable then, notwithstanding, this Master Agreement shall remain in full force and effect and such term or provision shall be deemed stricken.

17.2 Equal Employment Opportunity - (Applicable to all agreements of \$10,000 or more. 41 CFR 60-1.4 and 41 CFR 60-741.5.) SELLER is aware of and is fully informed of its responsibilities under Executive Order 11246 (reference to which include amendments and orders superseding in whole or in part) and shall be bound by and agrees to the provisions as contained in Section 202 of said Executive Order and the

Equal Opportunity Clause as set forth in 41 CFR 60-1.4 and 41 CFR 60-741.5(a), which clauses are hereby incorporated by reference.

17.3 Equal Opportunity for Disabled Veterans, Recently Separated Veterans, Other Protected Veterans, and Armed Forces Service Medal Veterans. (Applicable to (a) each contract of \$25,000 or more entered into before December 31, 2003 (41 CFR 60-250.4) or (b) each federal government contract of \$100,000 or more, entered into or modified on or after December 31, 2003 (41 CFR 60-300.4) for the purchase, sale or use of personal property or nonpersonal services (including construction).) If applicable, SELLER agrees that it is, and shall remain, in compliance with the rules and regulations promulgated under The Vietnam Era Veterans Readjustment Assistance Act of 1974, as amended by the Jobs for Veterans Act of 2002, including the requirements of 41 CFR 60-250.5(a) (for orders/contracts entered into before December 31, 2003) and 41 CFR 60-300.5(a) (for orders/contracts entered into or modified on or after December 31, 2003) which are incorporated into this order/contract by reference.

17.4 Notice of Employee's Rights under the National Labor Relations Act. (Applicable to (a) all prime contracts of \$100,000 or more and (b) subcontracts of \$10,000 or more, resulting from solicitations issued on or after June 21, 2010). If applicable, Consultant agrees that it shall comply with Executive Order 13496 (Notification of Employee Rights under Federal Labor Laws) and 29 C.F.R. Part 471 regarding employees' rights under the National Labor Relations Act to form, join and assist a union and to bargain collectively with their employers.

XVIII. CANCELLATION AT PURCHASER'S CONVENIENCE

Without limiting any rights or remedies which PURCHASER may have in the event of any default or failure of performance by SELLER, PURCHASER shall have the right, upon ten (10) days prior written notice to SELLER, to cancel this Master Agreement and/or any outstanding PURCHASE ORDERS at any time and without cause prior to complete delivery. Such cancellation shall be without any obligation or liability to SELLER other than payment to SELLER of (a) any and all costs actually incurred by SELLER in performance of this Master Agreement and/or the applicable PURCHASE ORDERS prior to notice of cancellation hereunder less (b) the salvage value of any materials acquired prior to cancellation. Any progress payments of the CONTRACT PRICE shall be credited against the amount owed hereunder and in the event the payments exceed such amount owed, the excess shall be returned to PURCHASER. SELLER agrees that it has an affirmative duty to mitigate all damages to it upon termination of this Master Agreement or any PURCHASE ORDER for convenience of PURCHASER.

XIX. TERMINATION FOR CAUSE

If SELLER shall fail to comply with the SPECIFICATIONS or drawings referenced therein in any material respect, or if it shall fail substantially to comply with any other provision of this Master Agreement and/or the applicable PURCHASE ORDER, then PURCHASER may, without prejudice to any other right or remedy and upon giving ten (10) days prior written notice, terminate this Master Agreement and/or any PURCHASE ORDER in whole or in part and/or reject all or part of the EQUIPMENT or WORK herein or therein whether or not the manufacture of the EQUIPMENT has been completed or such has been received at the DELIVERY DESTINATION or the WORK has been commenced or completed under a PURCHASE ORDER. Upon notice of termination by PURCHASER, SELLER shall promptly return all monies previously paid to SELLER by PURCHASER for the EQUIPMENT and WORK (if any) and shall pay PURCHASER direct damages equal to: (a) all costs incurred by PURCHASER in preparation for the EQUIPMENT and WORK including but not limited to engineering, systems programming, site preparation, cost of supplies and facilities excepting only such costs which can be applied to EQUIPMENT and/or WORK obtained from any other supplier and, (b) the difference in price between the EQUIPMENT and WORK to be delivered hereunder and the equivalent substitute equipment or services procured by PURCHASER.

XX. BANKRUPTCY

If PURCHASER has made any payments to SELLER towards design, manufacture or purchase of the Equipment or has a security interest in the Equipment pursuant to Article IX hereof, then if SELLER shall be adjudicated bankrupt, or if it should make a general assignment for the benefit of creditors, or if a receiver shall be appointed due to its insolvency, PURCHASER may without prejudice to any other right or remedy terminate this Master Agreement and/or any outstanding PURCHASER ORDERS and at its option may take possession of the EQUIPMENT and finish the manufacture by whatever method PURCHASER may deem expedient. At PURCHASER's request, SELLER will fix appropriate notices or labels on the EQUIPMENT being manufactured under this Master Agreement to indicate ownership of PURCHASER. To the extent reasonably possible, materials and work in process pertaining to the EQUIPMENT shall be stored separately from other stock and marked conspicuously with labels indicating ownership by PURCHASER.

XXI. NOTICES

All notices hereunder must be in writing. These notices shall be deemed duly given upon delivery if delivered by hand (against receipt) or three (3) days after posting, if sent registered mail, return receipt requested to:

In the case of notices given by PURCHASER to SELLER:

SELLER

Address

City, State, Zip Code

Attention: Contact Name, Title

Phone: (000) 000-0000

Fax: (000) 000-0000

Email: _____

In case of notices given by SELLER to PURCHASER:

Hawaiian Electric Company, Inc.

P. O. Box 2750

Honolulu, Hawaii 96840-0001

Attention: Contact Name, Title

Phone: (000) 000-0000

Fax: (000) 000-0000

Email: _____

With copy to:

Hawaiian Electric Company, Inc.

P. O. Box 2750

Honolulu, Hawaii 96840-0001

Attention: Director of Purchasing

Or to whomever else the parties may designate by notice pursuant to this Article XXI.

Non-Legal notices hereunder may be sent by, Email, FAX or Telex to the following:

PURCHASER:

SELLER:

Contact Name: _____

FAX

- (808) 543-5621

- (000) 000-0000

Confirmation

- (808) 543-0000

- (000) 000-0000

Email

XXII. INDEMNIFICATION

SELLER shall indemnify, defend, and hold harmless the PURCHASER INDEMNITEES from and against all LOSSES, based upon or arising out of damage to property, injuries to persons (including death) or other acts caused or contributed to by a defect in the EQUIPMENT or WORK by SELLER or anyone acting under its direction or control or in its behalf in the course of its performance under this Master Agreement; provided, however, that such aforesaid indemnity and hold harmless obligation shall not be applicable to the extent that such liability is based upon the sole negligence, gross negligence or willful misconduct of the PURCHASER INDEMNITEES.

XXIII. WAIVER OF CONSEQUENTIAL DAMAGES

Except with respect to indemnification obligations, claims arising out of breach of confidentiality obligations, or claims due to fraud, gross negligence or willful misconduct of a party, neither PURCHASER nor SELLER, nor any of their respective officers, employees, shareholders, directors or agents, shall be liable to the other in contract, tort (including negligence or strict liability) or otherwise for any special, indirect, incidental, multiple, punitive or consequential damages arising out of or relating to its performance or failure to perform under this Master Agreement.

XXIV. GENERAL TERMS

24.1 Promotion Limitation - SELLER agrees that it will not use PURCHASER's name whether by including reference to PURCHASER in any list of customers advertising that its services or products are used by PURCHASER or otherwise, without written authorization by PURCHASER's authorized representative.

24.2 Survival Beyond Completion - The terms, provisions, representations and warranties contained in this Master Agreement shall survive the delivery of the EQUIPMENT and WORK and the payment of the CONTRACT PRICE.

24.3 Amendments - No amendment to this Master Agreement shall be effective unless it is in writing and signed by duly authorized representatives of both parties.

24.4 Complete Master Agreement - This Master Agreement (including all referenced Attachments) and the PURCHASE ORDERS entered into hereunder represents the entire agreement between the parties with respect to the purchase and sale of the EQUIPMENT and services. All prior agreements, representations, statements, negotiations and undertakings whether oral or written are superseded hereby. In the event there is a conflict between the provisions of the terms and conditions in this Master Agreement, the PURCHASE ORDER or any attachment to either document, this Master Agreement shall have precedence.

24.5 Effect of Waiver - No term or provision hereof shall be deemed waived and no breach excused, unless such waiver on consent shall be in writing and signed

by the party claimed to have waived or consented. Any consent by any party to, or waiver of, a breach by the other, whether express or implied, shall not constitute a consent to, waiver of, or excuse of any other different or subsequent breach. PURCHASER's failure to insist on performance of any term or condition or to exercise any right or privilege, shall not waive any such term, condition, right or privilege.

24.6 Authority - Each party represents that it has full power and authority to enter into and perform this Master Agreement, and the person signing this Master Agreement on behalf of each has been properly authorized and empowered to enter into this Master Agreement, understands it, and agrees to be bound by it.

24.7 Applicable Law/Forum - This Master Agreement is made under and shall be governed by and construed in accordance with the laws of the State of Hawaii. Each party agrees and consents that any dispute arising out of this Master Agreement, however defined, shall be brought in the State of Hawaii in a court of competent jurisdiction; provided, however, that PURCHASER, at its option, may elect to submit any such dispute to binding arbitration pursuant to the commercial arbitration rules of the Dispute Prevention & Resolution, Inc. or its successor then in effect in which case the parties agree that any alternative dispute resolution shall take place in the State of Hawaii.

24.8 Force Majeure – (a) Neither party shall be liable for a delay in the performance of its obligations and responsibilities under this Master Agreement due to causes beyond its control, such as, but not limited to, war, terrorist acts, strikes or lockouts, embargo, national emergency, insurrection or riot, acts of the public enemy, fire, flood, or other natural disaster, provided that said party has taken reasonable measures to notify the other in writing of the delay. Failure of subcontractors and inability to obtain materials shall not be considered as a Force Majeure delay. Non-performance by one party hereunder due to Force Majeure shall excuse performance by the other party until such time as the party relying on Force Majeure is again meeting its obligations under this Master Agreement; provided, the party claiming a Force Majeure delay shall use commercially reasonable efforts to mitigate the impact or consequences of the event on the other party and to recommence performance whenever and to whatever extent possible without delay. The claiming party shall provide the other party with updates as to the status of its efforts to recommence performance and written notice upon conclusion of the Force Majeure delay. PURCHASER shall not pay SELLER any Contract Price in respect of the EQUIPMENT or WORK so affected, provided that PURCHASER shall pay SELLER for the EQUIPMENT and WORK rendered under this Master Agreement prior to such Force Majeure delay.

(b) Notwithstanding any other provision of this Section 24.8, the non-performing party shall not be excused under this Section 24.8 for any non performance of its obligations under this Master Agreement having a greater scope or longer period than as justified by the Force Majeure delay or the performance of obligations that should have been performed prior to the Force Majeure delay.

24.9 Assignment - SELLER shall not assign this Master Agreement or its obligations hereunder to any third party without prior written consent from PURCHASER. PURCHASER shall not assign this Master Agreement or its obligations hereunder to any third party except its First Mortgage Bond Trustee and its subsidiaries or to NextEra Energy, Inc. without prior written consent from SELLER. Neither consent will be unreasonably withheld.

24.10 Regulatory Approval - This Master Agreement is subject to any and all required regulatory conditions and approvals, including those of the Public Utilities Commission.

24.11 Ownership of Materials - Except as otherwise provided, any and all drawings, specifications, technical information and business information of any type whatsoever, whether or not characterized as secret or confidential obtained by SELLER from PURCHASER under this Master Agreement or related to the EQUIPMENT and/or the WORK, whether received or disclosed by written or oral communication or otherwise (except as provided below), are PURCHASER's exclusive property and shall be deemed PURCHASER's confidential information and SELLER shall receive and maintain the same in the strictest confidence. SELLER shall not use such materials or information for any purpose other than for purposes of quotation or performance under this Master Agreement, and shall not otherwise disclose such materials or information to others except with the PURCHASER's consent given in writing. SELLER shall return all copies of all such materials relating to the EQUIPMENT and/or the WORK to PURCHASER upon completion of the WORK.

Documents developed by SELLER hereunder that are specifically identified as deliverables in the PURCHASE ORDER shall belong to PURCHASER, provided, however, that notwithstanding anything to the contrary herein, any and all intellectual property or other proprietary materials, copyrights, know-how, patents, trade secrets, trade and service marks, and other information of SELLER used in the services or imbedded or included in the EQUIPMENT and/or the WORK shall remain SELLER's proprietary property, and shall be considered SELLER's confidential information. However, SELLER grants PURCHASER, its successors, assigns and independent contractors a license to use SELLER's confidential information to the extent necessary to install, service or repair the EQUIPMENT.

24.12 Term of Confidentiality - This requirement under Section XXIV shall remain in effect for as long as such material, information or discoveries have not become generally known in the industry without the PURCHASER's fault or negligence. This requirement shall survive the expiration or termination of this or any other Master Agreement between the PURCHASER and the SELLER whether now or hereafter executed.

24.13 Disputes, Controversies or Claims - SELLER agrees that PURCHASER shall have the sole and exclusive right to decide whether disputes, controversies, or

claims arising out of or relating to this Master Agreement shall be settled in accordance with the rules of the American Arbitration Association or through litigation in a court of competent jurisdiction. Should PURCHASER agree to arbitrate the claim or controversy, the award may be entered in any court having jurisdiction thereof or in the forum of PURCHASER's choosing. Pending any decision, appeal or judgment in such proceedings or settlement of any dispute arising under this Master Agreement, SELLER shall proceed diligently with the performance of this Master Agreement in accordance with PURCHASER's decision.

Any claim against PURCHASER by SELLER must be commenced within one (1) year after the cause of action or claim accrues. All rights of SELLER to commence any court action or proceedings with respect to this Master Agreement shall expire and terminate one (1) year after the cause of action accrues.

24.14 Attorneys' Fees and Costs - If there is a dispute between the parties and either party institutes a lawsuit, arbitration, mediation, or other proceeding to enforce, declare, or interpret the terms of this Master Agreement, then the prevailing party in such proceeding shall be awarded its reasonable attorneys' fees and costs.

24.15 Survival of Indemnity Obligations – All indemnity obligations under this Master Agreement shall survive termination of this Master Agreement.

XXV. COUNTERPARTS CLAUSE

The parties agree that this Master Agreement may be executed in counterparts, each of which shall be deemed an original, and all of which shall together constitute one and the same instrument binding all parties notwithstanding that all of the parties are not signatories to the same counterparts. For all purposes, duplicate unexecuted and unacknowledged pages of the counterparts may be discarded and the remaining pages assembled as one document. This Master Agreement may also be executed by exchange of executed copies via facsimile or other electronic means, such as PDF, in which case, but not as a condition to the validity of the Agreement, each party shall subsequently send the other party by mail the original executed copy. A party's signature transmitted by facsimile or similar electronic means shall be considered an "original" signature for purposes of this Master Agreement.

IN WITNESS WHEREOF, SELLER and PURCHASER by their respective duly authorized representatives hereby accept and agree to be bound by this Master Agreement and the PURCHASE ORDER and SPECIFICATIONS to which they relate.

HAWAIIAN ELECTRIC COMPANY, INC.
("PURCHASER")

Date: _____

By: _____

Print Name: _____

Its: _____

Date: _____

By: _____

Print Name: _____

Its: _____

("SELLER")

Date: _____

By: _____

Print Name: _____

Its: _____

Date: _____

By: _____

Print Name: _____

Its: _____

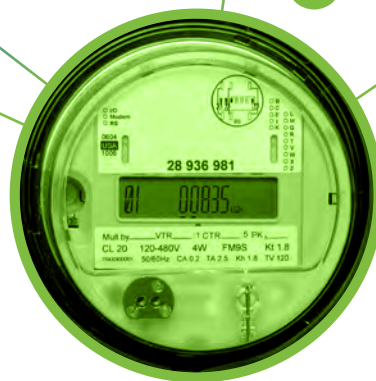
***Attachment C: SSN Product Data Sheet Communications Module for
Electricity Meters***



Attachment C.-
SSN Product Dat...

PRODUCT DATA SHEET

COMMUNICATIONS MODULE FOR ELECTRICITY METERS

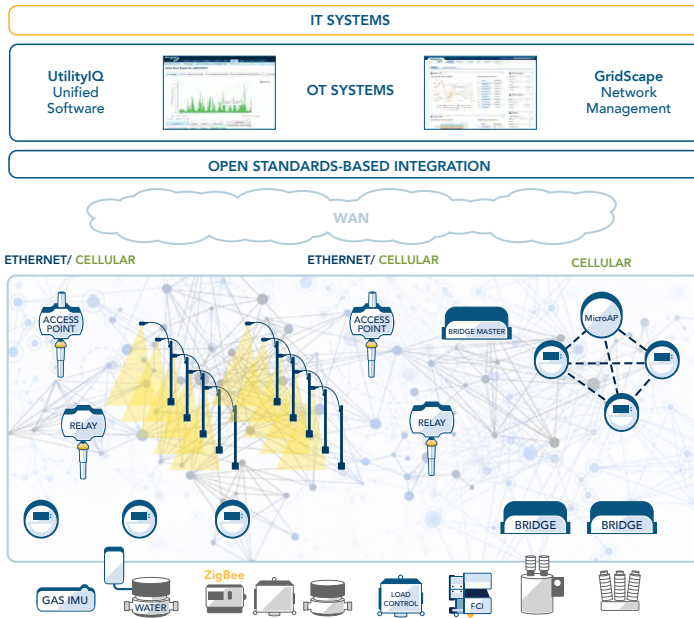


SMART METERING – THE FOUNDATION OF THE SMART GRID

The Silver Spring® Platform combines network infrastructure, software and services to enable a range of smart grid applications. Enabling two-way communications with modern electricity meters is fundamental to building the smart grid.

The Silver Spring Communications Module integrates under glass inside partners' electricity meters to provide wireless networking both back to utility OT/IT systems and into the customer's home. The module easily installs inside these meters and leverages Silver Spring network devices to form a highly resilient mesh network for the utility. The resulting two-way communications network gives utilities greater efficiency, more reliable service delivery, improved customer satisfaction, and a scalable platform for advanced smart grid applications.

The Communications Module accesses demand, consumption, time-of-use and interval data, alarms, and power-quality information from the meter. Its two-way wireless functionality supports remote data acquisition, meter program management, and real-time alerts for meter tampering and outages.



The Silver Spring Platform supports a range of smart grid applications on a single open standards-based network.

Two-Way Wireless Communications For Meters

- » Offers one-watt transmitter to provide full, two-way wireless NAN communications
- » Supports 2.4 GHz HAN communications
- » Integrates with Silver Spring UtilityIQ® application suite to support advanced metering and demand response
- » Enables over-the-air firmware upgrades to reduce operational cost
- » Provides multi-layer security and military-grade encryption to meet rigorous industry standards

LEADING RELIABILITY AND PERFORMANCE

With its full, one-watt transmitter, the Communications Module provides broad reach and robust connectivity in the Neighborhood or Field Area Network (NAN or FAN). In addition to supporting a 900 MHz radio for the NAN, the Communications Module also features an optional 2.4 GHz radio for the Home Area Network (HAN). This radio supports the ZigBee Smart Energy Profile specification to communicate with a wide range of smart devices within the home.

The Communications Module is available in a variety of models to support specific utility needs and geographic regions.

FEATURES

- » Full, two-way communications
- » One-watt transmitter
- » Frequency Hopping Spread Spectrum (FHSS)
- » Multi-layer security and encryption
- » Dynamic network discovery and self healing
- » Scheduled and on-demand meter reads
- » Alarm detection and clearing
- » Network time management
- » Continuous neighbor monitoring and route calculation
- » Over-the-air firmware upgrades and meter programming
- » Power outage and restoration notification
- » Support for a wide range of meters and form factors

COMMUNICATIONS MODULE SPECIFICATIONS

Gen 3 Product Family – General	
PLATFORM	Processor: SoC-based ARM 7 RAM: 4 MB Flash: 8 MB
NAN COMMUNICATIONS	Frequencies: 902 – 928 MHz, 865-880MHz Protocol: IEEE 802.15.4g, Wi-SUN compliant Data rates: 100 kbps Spread spectrum: Frequency hopping Transmitter output: up to 30 dBm (1 W) ¹ Receive sensitivity: -98 dBm for 10% PER
HAN COMMUNICATIONS	Frequency: 2400 – 2480 MHz Protocols: IEEE 802.15.4, ZigBee Smart Energy Profile 1.1 Date rate: 250 kbps Transmitter output: 20 to 23 dBm (100 to 200 mW) ¹ Receive sensitivity: -97 dBm for 1% PER
PROTOCOLS / SECURITY	Addressing: IPv6 Encryption: Advanced Encryption Standard (AES-128 or AES-256) Security: Secure Hash Algorithm 256-bit (SHA-256) and RSA1024 or ECC-256 Key storage: Secure NVRAM with tamper detection and key erasure
ENVIRONMENTAL	Operating temperature: -40°C to +85°C (-40°F to +185°F) Humidity: 0% to 95%, non-condensing
¹ Radio TX output power varies in accordance with local country regulations. Please contact Silver Spring Networks for more information.	

Gen 3 Product Family – North America	
RADIO	Frequency: 902 – 928 MHz Approvals: FCC 15.247, Industry Canada RSS-210
INTERFACES	Meter: ANSI C12.18/C12.19, serial
SUPPORTED METERS	GE I-210+ ² GE I-210+c GE kV2c GE KV2ce Elster A3 ALPHA L+G E330 FOCUS AX L+G E350 AX-SD Single Phase L+G E330 FOCUS AX Polyphase L+G E650 S4e
² indicates Measurement Canada approval.	

Gen 3 Product Family – Australia and New Zealand	
RADIO	Frequency: 915 – 928 MHz Approvals: ANZ/NZ 4268
INTERFACES	Meter: PACT, ANSI C12.18/C12.19, serial
SUPPORTED METERS	Secure i-Credit 500 Secure Sprint 200 Secure Premier L+G E350 – U1200 L+G E350 – U1300 L+G E350 – U3300 L+G E350 – U3350

Gen 3 Product Family – Brazil

RADIO	Frequencies: 902 – 907 MHz, 915 – 928 MHz Approvals: ANATEL
INTERFACES	Meter: ANSI C12.18/C12.19, serial
SUPPORTED METERS	Nansen Spectrum K Elster A3

Gen 4 Product Family – General

PLATFORM	Processor: SoC-based ARM 7 RAM: 4 MB Flash: 8 MB
NAN COMMUNICATIONS	Frequencies: 902 – 928 MHz, 865 – 880 MHz Protocol: IEEE 802.15.4g, Wi-SUN compliant Data rates: 50 – 300 kbps Spread spectrum: Frequency hopping Transmitter output: up to 30 dBm (1 W) ¹ Receive sensitivity: -101 dBm for 10% PER
HAN COMMUNICATIONS	Frequency: 2400 – 2480 MHz Protocols: IEEE 802.15.4, ZigBee Smart Energy Profile 1.1 Data rates: 250 kbps Transmitter output: 20 to 23 dBm (100 to 200 mW) Receive sensitivity: -97 dBm for 1% PER
PROTOCOLS / SECURITY	Addressing: IPv6 Encryption: Advanced Encryption Standard (AES-128 or AES-256) Security: Secure Hash Algorithm 256-bit (SHA-256) and RSA-1024 or ECC-256 Key storage: Secure NVRAM with tamper detection and key erasure
ENVIRONMENTAL	Operating temperature: -40°C to +85°C (-40°F to +185°F) Humidity: 0% to 95%, non-condensing

Gen 4 Product Family – North America

RADIO	Frequency: 902 – 928 MHz Approvals: FCC 15.247, Industry Canada RSS-210
INTERFACES	Meter: ANSI C12.18/C12.19, serial
SUPPORTED METERS	Elster A3 ALPHA GE I-210+ ² GE I-210+c ² GE kV2c GE kV2ce Itron CENTRON II C12.19 L+G E330 FOCUS AX L+G E350 AX-SD Single Phase L+G E330 FOCUS AX Polyphase Tatung ETA Series (ETA-21S, ETA-31S, ETA-32S)

² indicates Measurement Canada approval.

Gen 4 Product Family – Australia and New Zealand

RADIO	Frequency: 915 – 928 MHz, 921 – 928 MHz Approvals: ANZ/NZ 4268
INTERFACES	Meter: ANSI C12.18/C12.19, serial
SUPPORTED METERS	L+G E350 – U1200 L+G E350 – U1300 L+G E350 – U3300 L+G E350 – U3350

Gen 4 Product Family – Brazil

RADIO	Frequencies: 902 – 907 MHz, 915 – 928 MHz Approvals: ANATEL
INTERFACES	Meter: Serial, DLMS-COSEM
SUPPORTED METERS	Itron SL7000

Gen 4 Product Family – Asia Pacific

RADIO	Frequency: 915 – 918 MHz, 917 – 920.8 MHz, 919 – 923 MHz, 920 – 925 MHz, 922 – 924 MHz, 922 – 928 MHz Approvals: ETSI EN 302 208, ETSI EN300 328, ETSI EN301 489, IEC 60950-1, IDA
INTERFACES	Meter: ANSI C12.18/C12.19, serial, DLMS-COSEM
FREQUENCY RANGES	UMTS 800/850 Band VI/V, UMTS 900 Band VIII, UMTS 1800 Band III, UMTS 1900 Band II, UMTS 2100 Band I
SUPPORTED METERS	Secure i-Credit 510 Secure Sprint 210 EDMI 7B EDMI 10E WC EDMI 10E CT LT EDMI 10E CT HT Mirai 3PH CT-HT Mirai 3PH CT-LT Mirai 3PH WC

Accessories – Meter Patch Antenna Coupler

INTERFACES	Antenna connector: N type, Female Antenna types: various Cable length: 15.24 cm (6")
ENVIRONMENTAL	Operating temperature: -40°C to +85°C (-40°F to +185°F) Humidity: 0% to 95%, non-condensing
APPROVALS	FCC: 15.247

Attachment D: Technology and Cybersecurity Requirements



Attachment D --
Technology and...

Information Only	Ideal	Core	Mandatory	<p>Comment: The ability to perform basic data access/edits (e.g. data viewing, simple table editing) shall be provided through a data access utility included as part of the system/application. The utility shall access the data through the data object and shall also incorporate the business rules for data edits. (Note: This is not the same as use of a general third party SQL access tool. In general, data shall not be edited directly through use of such general DB tools. However a system provider provided utility which adheres to the system provider's data edit rules is helpful for data repair such switching a flag in the DB directly.)</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System providers shall provide description of capabilities.</p>	<p>vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>								
				1	Data Import/Export Support								
Information Only	Ideal	Core	Mandatory	<p>Standard: System shall include built-in data import/export utilities.</p> <p>Comment: Package applications shall provide out-of-the box data import/export capabilities. Such input might be accomplished via CSV, spreadsheet or other common formats. Import/export features shall use the data object (see above) to assist with proper data edits. This type of utility enables more flexible automated processes for performing data entry.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall describe the input/export support and indicate if its application uses a data object model. As a plus, the system provider shall provide a way to use object model mapping.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>								
				1	Extract/Transfer/Load (ETL) Capability								
Information Only	Ideal	Core	Mandatory	<p>Standard: System shall support ETL capabilities directly or via close integration with other common ETL tools.</p> <p>Comment: Extract/Transfer/Load (ETL) is a potentially important capability for enabling HE to share data across platforms and across different DBs for Data Warehouse (Business Intelligence (BI)) reporting and for the potential use of one application's data by a different application.</p> <p>Preference: MS SQL Server SSIS or SAP Data Services.</p> <p>Desired Feedback: If system has incorporated ETL capabilities into its package, such capabilities shall be described by the system provider and shall be counted as a plus.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>								
				1	Adherence to Data Labeling and Handling Requirements								
Information Only	Ideal	Core	Mandatory	<p>Standard: System shall allow for designating levels of confidentiality to be associated with data fields such that data users can readily comply with the Data Labeling and Handling Requirements.</p> <p>Comment: HE has specific data handling and labeling requirements associated with particular forms of confidential information. It is important that new systems or applications introduced into the HE environment allow for such confidential data to be identified and that printed reports be flagged and labeled when confidential information appears in the reports.</p> <p>Preference: Support the following data classifications: Public – information made readily available to the public; Internal Use – information for internal use within the Company by all employees and authorized Third Parties; Confidential – sensitive information for authorized employees and Third Parties who have a need-to-know; Confidential – Restricted Distribution – highly sensitive information whose distribution must be carefully controlled.</p> <p>Desired Feedback: System provider shall review the Data Labeling and Handling Requirements and assess whether data in system can be properly identified to meet the requirements.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>								
					Web Content Management Architecture								
				1	Web Data Management Utility								
						Vendors may add any hyperlink to right:							

Application Architecture				Meets	Will	3rd P	Cust	No	Other
Development Environment									
Information Only	Ideal	Core	Mandatory	1	Mainstream Integrated Development Environment				
					Vendors may add any hyperlink to right:				
<p>Standard: Systems developed or maintained within HE shall allow development or maintenance work to be performed using a mainstream Integrated Development Environment (IDE).</p> <p>Comment: Many software packages can be customized using an industry mainstream IDE such as MS Visual Studio, Eclipse, WebSphere Visual Studio, etc. HE prefers applications that can be maintained using a mainstream, industry standard IDE with MS Visual Studio or Eclipse.</p> <p>Preference: MS Visual Studio - .Net, Eclipse for Java, SAP Workbench for SAP ABAP Development. For Source repository, we prefer MS Team Foundation Server for .Net, and CA Harvest for non-.Net.</p> <p>Desired Feedback: System provider shall indicate whether the system can be maintained using one of the industry standard development environments.</p>				<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
Information Only	Ideal	Core	Mandatory	1	Programmatic Interface for Accessing/Modifying System Information.				
					Vendors may add any hyperlink to right:				
<p>Standard: System shall provide an organized, programmatic interface or system development kit (SDK) to perform any system configuration or to access/modify system information or accounts.</p> <p>Comment: HE seeks to avoid systems that do not organize their configuration interfaces and make access to system information obtuse. Interfaces shall be documented and consolidated to logical screen groupings in order to make adjustments easy.</p> <p>Preference: Product shall provide a native SDK.</p> <p>Desired Feedback: System provider shall indicate whether system can be configured and maintained using pre-packaged screens with modern interfaces.</p>				<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
Information Only	Ideal	Core	Mandatory	1	Mainstream Development Language				
					Vendors may add any hyperlink to right:				
<p>Standard: Any user configurable or exposed development language used for product customization and maintenance shall be based on one of the following: .Net, Java, or ABAP.</p> <p>Comment: HE seeks to avoid use of highly proprietary languages for which programming resources are rare and difficult to acquire. System shall use mainstream languages and technologies.</p> <p>Preference: Preference is .Net, Java, ABAP.</p> <p>Desired Feedback: System provider shall indicate whether system can be programmed and maintained in one of the above designated mainstream languages.</p>				<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
Information Only	Ideal	Core	Mandatory	1	Programming Model				
					Vendors may add any hyperlink to right:				
<p>Standard: System/application shall be based on a modern development technology framework such as .Net, ASP.Net, Java EE, or Java Server pages (JSP).</p> <p>Comment: HE seeks to work within modern, web oriented frameworks that employ well established interoperability standards, are industry standard and support a Services Oriented Architecture approach.</p> <p>Preference: Preference is .Net, Java, ABAP.</p> <p>Desired Feedback: System provider shall indicate what, if any, programming model the system is based upon.</p>				<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
Information Only	Ideal	Core	Mandatory	1	Use of Plain Text Configuration or GUI Configuration				
					Vendors may add any hyperlink to right:				
<p>Standard: System customization and other configuration files available to HE developers should make source content available as plain text or through a GUI interface.</p>				<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired.</p>					

				Desired Feedback: System provider shall describe Unit Testing provisions and shall further address whether those provisions can be managed by HPQC/Loadrunner.						
		1		Change and Defect Management						
Information Only	Ideal	Core	Mandatory	<p>Standard: System shall allow for the use of automated change management and defect tracking.</p> <p>Comment: The tracking of custom changes and defect fixes are important and systems within HE shall allow those issues to be tracked from the time that an issue is defined until the subsequent adjustment is designed, developed, tested, accepted, placed into production and successfully used for a period of time.</p> <p>Preference: End User Discovered Post-go-live bugs: Service Now Developers & Release testing: SAP - Solution Mgr, Visual Studio Team Foundation Server, HPQC</p> <p>Desired Feedback: System provider shall indicate if a change and defect management system is used.</p>	Vendors may add any hyperlink to right:					
				At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.						
		1		Enablement and Use of Event Logs for Error Tracking and Debugging						
Information Only	Ideal	Core	Mandatory	<p>Standard: System shall provide for easy use of log files to track events during testing or debugging operations.</p> <p>Comment: The support for the system testing shall include generous use of event logs to record system conditions, messages, logical status and events during testing or debugging. Logs shall allow for optional, progressive disablement during normal operations.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall indicate the extent and use of system log capabilities.</p>	Vendors may add any hyperlink to right:					
				At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.						
		1		Multiple Separate but Consistent Environments						
Information Only	Ideal	Core	Mandatory	<p>Standard: System (under its proposed licensing provisions) can be configured and sized to support multiple environments (including development, staging, and training) that fully emulate the production environment including connectivity to other key systems.</p> <p>Comment: The separate environments shall be configurable to have the same functionality as the production environment to assure that processes created in these no production environments will operate in the production environment as originally developed.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall describe provisions for establishing separate environments and its configuration and deployment alignment with the production environment.</p>	Vendors may add any hyperlink to right:					
				At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.						
		1		Use of Virtual Server Environment for Multiple Environments						
Information Only	Ideal	Core	Mandatory	<p>Standard: System (under its proposed licensing provisions) should allow for the hosting of development, staging, or training versions/implementations of the system on Virtual Server.</p> <p>Implementations of the system should be capable of being loaded on an instance a virtual server for fundamental development, testing or training purposes and should behave on a virtual server consistent with behavior on a dedicated server.</p> <p>Preference: VMWare or AIX-based virtualization (LPAR).</p> <p>Desired Feedback: System provider should indicate if systems support virtualization.</p>	Vendors may add any hyperlink to right:					
				At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.						
		1		Straightforward Production Deployment						
					Vendors may add any hyperlink to right:					

Information Only	Ideal	Core	Mandatory	<p>Standard: System can be deployed from a Test to Production environment by straightforward alteration of path names and connections using executable or msi and/or batch files.</p> <p>Comment: The system shall not require any fundamental re-configuration to deploy from test to production. The movement of code or the updating of connections and the loading of current data shall be the only major technical elements of final production deployment. These shall be accomplished via the use of HEs Operational Team Deploy with no required intervention from the system provider.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall indicate if deployment can be accomplished with no fundamental reconfiguration other than connectivity and data updates or movement of tested code to the production system.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Version Consistency among Environments	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: New system releases can be managed in way that allows for easy and straight forward version control to be maintained consistently among all environments.</p> <p>Comment: Patch and upgrade procedures shall allow for the consistent application of system updates to all environments without undue difficulty.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall indicate how updates are applied to include a relevant environments including a description of tools and processes required.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	N-Tier Application Architecture	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: System shall employ use of application development tiers to separate major functions or layers. Systems must use at least 3-tiers (database, application, client), but may use more than that.</p> <p>Comment: Beyond the simple separation of application from data, the system uses a well defined tier approach to separating major services including separation of the presentation layer from the application layer, separation of web server components from application components as well as providing separate security administration, separate report and print services, etc. See these requirements for related information: Network Security Zones; Data Tier Separation; Segregation of Reporting Services; and Substantial to Full Separation of the Presentation Layer. Each Tier will be in its own security zone.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall describe the tier architecture of the system and describe the separation and integration methods for defining tiers.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Data Tier Separation	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: Data shall be stored in a separate tier distinct from other aspects of the application architecture.</p> <p>Comment: 3-tier to 'n' tier technologies allow more flexible solutions and allow the application to be scaled up to meet higher load levels. At a 3-tier minimum, a separated data tier compliant with the Modeling View Controller (MVC) design pattern is a widely accepted implementation of the standard. If the data is not stored to meet this guideline, the integration, maintenance and reporting functions associated with the application can be problematic.</p> <p>Preference: Data to be stored in a database.</p> <p>Desired Feedback: If system does not meet this standard, what type of data storage approach is used?</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	No Storage/ Maintenance of Data on Web Servers	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: Beyond the separation of data from the application, the system shall specifically avoid storing (other than very short term caching) of any 'content' information on web servers.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired.</p>						
				1	No Storage/ Maintenance of Data on Web Servers	Vendors may add any hyperlink to right:					
Componentization and Service Oriented Architecture (SOA) Support						Meets	Will	3rd P	Cust	No	Other

Information Only	Ideal	Core	Mandatory	<p>Comment: No application or system content information shall ever be stored on a web server as part of an on-going data storage arrangement or strategy. Any temporary cache data must also meet HE standards regarding encryption of data outside a HE firewall.</p> <p>Preference: Data to be stored in SQL DB behind Firewall.</p> <p>Desired Feedback: If system does not meet this standard, describe what type of data storage is maintained at the web server level.</p>	<p>Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	<p>Segregation of Reporting Services</p> <p>Standard: System shall support the segregation of reporting functionality so as to allow use of mainstream external tools for generating reports from the data.</p> <p>Comment: Consistent with the n-tier architecture approach, HE prefers systems or applications architected to allow third party reporting tools such as SAP Business Objects to be used in developing reports from the data.</p> <p>Preference: Preference for SAP Business Objects.</p> <p>Desired Feedback: If system does not meet this standard, what type of data reporting approach is used? If compliant version is planned, provide any information on release date and form of compliance.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
Information Only	Ideal	Core	Mandatory	<p>Substantial to Full Separation of the Presentation Layer</p> <p>Standard: System shall employ substantial to full separation of the presentation layer from the application layer.</p> <p>Comment: Consistent with the n-tier architecture approach, HE prefers systems or applications architected to allow alternative presentation options such as fat vs. thin client options without affecting fundamental system functionality.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall indicate whether the system has multiple presentation modes or whether it allows the presentation mode to be upgraded separately from the application logic. If system does not meet this standard, what options for altering the presentation mode/layer exist? Is the system tied to a particular presentation mode?</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	<p>Application Function Componentization</p> <p>Standard: Individual system functions should be modular, thereby providing individual business functions in a componentized fashion.</p> <p>Comment: Separated program modules should allow the individual modules to be 'called' from one another or from a main program in order to 're-use' functionality across the system.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should describe degree of componentization and whether the system is more fully based on principles of SOA.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
Information Only	Ideal	Core	Mandatory	<p>WSDL or WADL Enabled</p> <p>Standard: System should allow business functions/processes to be defined in WSDL or WADL.</p> <p>Comment: Web Services Description Language (WSDL) is used to define a service within an SOA environment. Applications which are truly Web Services enabled will use this utility. Similarly, Web Application Description Language (WADL) is used to fine services usually within a REST web service.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should indicate if and where WSDL/WADL is used to define common services.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	<p>WSFL Enabled</p>	<p>Vendors may add any hyperlink to right:</p>					

Information Only	Ideal	Core	Mandatory	<p>Standard: When applicable, system should allow workflow attributes to be described in WSFL.</p> <p>Comment: Web Services Flow Language (WSFL) may be used to describe workflow activities within an SOA environment. Applications with workflow attributes may use this utility.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should indicate if and where WSFL is used to define common services.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	SOAP or REST Enabled	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: Important system functions shall be callable via SOAP or REST protocol.</p> <p>Comment: Application functions that can be evoked via SOAP or REST protocol can be leveraged by other applications as a service. In some cases, functions within legacy applications can be wrapped to become "callable" and may use this technique to into a future HE architecture more smoothly.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall indicate what functions, if any, are available to be called via SOAP or REST consistent procedures.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	UDDI Enabled	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: Important system functions can be described using UDDI publishing.</p> <p>Comment: Important application functions may, under certain conditions, be described and published using Universal Discovery, Description and Integration (UDDI) techniques. When used appropriately, these techniques can allow system functions to be more fully exposed and available to other system uses. Appropriate judgment should be used in requiring this standard.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System providers should indicate what functions, if any, are described and/or published using UDDI.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Service Choreography	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: System should be componentized to the point of allowing process functions to be rearranged in order to form a new process flow with different characteristics (i.e., choreographed).</p> <p>Comment: Service Choreography refers to the ability to re-configure business processes using utilities that rearrange the manner and sequence in which SOA enabled program modules (containing business logic) are executed.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should indicate whether choreography management functions have been built into system and how extensive they may be.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1		Vendors may add any hyperlink to right:					

Integration Architecture				Meets	Will	3rd P	Cust	No	Other
Integration Capabilities									
Information Only	Ideal	Core	Mandatory	1	API Extensiveness/Flexibility				
					Vendors may add any hyperlink to right:				
<p>Standard: All user accessible data in the system shall be capable of being accessed via documented APIs (with the preferred method of access being a data access model).</p> <p>Comment: Data transfer in and out of applications is a critical component for evaluation. At a minimum, HE expects applications to have a robust level of Application Program Interfaces (API) or more preferably a data object model that provides flexibility to access the full range of functional data. Testing Excel insertion with paste link to word.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall describe API extensiveness including whether edit controls are applied to APIs and whether a data model is used for outside access to system data. More extensive feedback would include lists of documented APIs or documentation for the data access model.</p>				<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
Information Only	Ideal	Core	Mandatory	1	Integration with Websphere MQ and Message Broker				
					Vendors may add any hyperlink to right:				
<p>Standard: System should support integration with IBM's Websphere MQ and Message Broker.</p> <p>Comment: For applications that communicate with other applications via a messaging process, HE seeks to accommodate such communication within its selected enterprise messaging system which is Websphere MQ. For application to application communication, especially if communication is in real time, HE seeks to perform Enterprise Architecture Integration (EAI) functions using IBM Message Broker.</p> <p>Preference: Websphere MQ and Message Broker</p> <p>Desired Feedback: System provider should indicate if the system support integration with WebSphere MQ and Message Broker.</p>				<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
Information Only	Ideal	Core	Mandatory	1	Native XML Support				
					Vendors may add any hyperlink to right:				
<p>Standard: System should support use of XML natively to present data or to transfer information in and out of the system.</p> <p>Comment: XML is widely accepted by today's IT industry, and it is the fundamental standard for SOA. Both WSDL/WADL and SOAP/REST are all defined in XML format. Native application support for XML is considered ideal with XML compatibility via additional utilities established as a next best alternative.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should describe native provisions for presenting data and whether that includes converting data to an XML format for inter system communication.</p>				<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
Information Only	Ideal	Core	Mandatory	1	XML Compatibility				
					Vendors may add any hyperlink to right:				
<p>Standard: Even if the system does not natively support XML, the system shall be architected to extensively support XML processing through 3rd party XML utilities.</p> <p>Comment: Irrespective of whether the system natively supports XML interchange, does the system interface tightly with third party XML utilities that can be used to either convert system data to XML or take system provided XML data and process it further?</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall explain systems compatibility with 3rd party XML utilities and name its preferred utility if one exists.</p>				<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
Information Only	Ideal	Core	Mandatory	1	Integration at the Web Services Layer				
					Vendors may add any hyperlink to right:				
<p>Standard: System should support use of XML natively to present data or to transfer information in and out of the system.</p> <p>Comment: XML is widely accepted by today's IT industry, and it is the fundamental standard for SOA. Both WSDL/WADL and SOAP/REST are all defined in XML format. Native application support for XML is considered ideal with XML compatibility via additional utilities established as a next best alternative.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should describe native provisions for presenting data and whether that includes converting data to an XML format for inter system communication.</p>				<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					

Information Only	Ideal	Core	Mandatory	<p>Standard: System should support integration flexibility at the web services layer such as allowing XML/WSDL/WADL calls or the interactive use of portlets.</p> <p>Comment: HE seeks functional flexibility among its applications that allow applications to make calls for web services and to receive calls for web services.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should explain the degree to which the system utilizes web services for calling services and for defining services that can be called.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Integration with OData	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: System should support integration with Microsoft's Open Data Protocol (OData).</p> <p>Comment: OData allows for integration of the application data with other applications.</p> <p>Preference: No products specifically preferred</p> <p>Desired Feedback: System provider should explain whether system can be configured to support OData.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Integration ETL Tools	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: For direct DB to DB data consolidation, integration or Extract/Transfer/Load (ETL) functions, the system shall support integration with MS SQL Server Integration Services (SSIS) or SAP Data Services.</p> <p>Comment: When the direct integration of data environments is performed between two MS SQL compliant data bases, HE supports the use of SSIS for performing and monitoring the full Extract/Transfer/Load (ETL) of data from one database to the other. For other system-to-system transfers, SAP Data Services is the desired tool.</p> <p>Preference: Integration with MS SSIS and SAP Data Services.</p> <p>Desired Feedback: For relevant functions, system provider shall describe data integration capabilities and the ability of the system to leverage SSIS or SAP Data Services.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				Interoperability with Key Services Important to HE							
Information Only	Ideal	Core	Mandatory	<p>Standard: For e-mail related functions, system interfaces with or interoperates with MS Exchange 2010 or higher.</p> <p>Comment: For systems or applications that shall interoperate with e-mail to facilitate workflow notifications or other human messaging services, HE expects that such systems will interface with its current implementation of MS Exchange.</p> <p>Preference: Integrate with MS Exchange 2010 & 2012.</p> <p>Desired Feedback: System provider shall indicate the functions and the degree of integration, if any, with MS Exchange.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Interoperability with MS Office SharePoint	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: For relevant services, system shall interface with MS Office SharePoint.</p> <p>Comment: For systems or applications that shall integrate with group collaboration or group office productivity software, HE expects that such systems will interface with its current implementation of SharePoint.</p> <p>Preference: Integrate with SharePoint 2013.</p> <p>Desired Feedback: System provider shall outline functions and levels of interoperation with HE currently supported version of SharePoint.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Interoperability with MS Office desktop productivity suite	Vendors may add any hyperlink to right:					

Information Only	Ideal	Core	Mandatory	<p>Standard: For relevant office productivity integrations at the desktop, system shall interface with MS Office 2010 or higher.</p> <p>Comment: For systems or applications that should interoperate with desktop productivity tools, HE expects that such systems will interface with its current implementation of MS Office 2010 and will migrate with HE to a newer MS Office at an appropriate later date.</p> <p>Preference: Integration with MS Office 2010 or Higher.</p> <p>Desired Feedback: System provider should outline functions and levels of interoperation with MS Office 2010 or Higher.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Interoperability with SAP Business Objects						
Information Only	Ideal	Core	Mandatory	<p>Standard: For selected enterprise reporting services, the system should support use of SAP Business Objects.</p> <p>Comment: This is a stated direction for the future as HE focuses on Business Objects for enterprise reporting.</p> <p>Preference: SAP Business Objects preferred.</p> <p>Desired Feedback: For relevant functions, system provider should describe data reporting compatibility with Business Objects.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
EDI Support						Meets	Will	3rd P	Cust	No	Other
Information Only	Ideal	Core	Mandatory	<p>Native EDI Support</p> <p>Standard: When Electronic Data Interchange (EDI) support is required, system/application should provide native EDI support consistent with industry standard EDI file formats when such formats are applicable.</p> <p>Comment: Because some HE business partners require EDI based file transfer communication, native support of EDI in relevant applications is preferred. EDI is relevant for a small minority of business functions, but for those limited functions, it may be quite important.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should describe EDI features and compliance with relevant industry protocols for standard file formats.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	EDI Support						
Information Only	Ideal	Core	Mandatory	<p>Standard: When Electronic Data Interchange (EDI) support is required and application does not natively support EDI communication, the system should easily allow for EDI support to be applied through integration with 3rd party tools.</p> <p>Comment: If the preferred standard of native EDI support is not included in the system/application, the system should be compatible with use of third party EDI tools by providing convenient file export functions that can be linked fairly seamlessly to third party EDI file management tools.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should describe the form of integration between system and third party tools including the name of recommended tools.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
User Interface (UI) Standards – Cross Platform						Meets	Will	3rd P	Cust	No	Other
Information Only	Ideal	Core	Mandatory	<p>Windows based Web Browser Compatibility – Internal Use</p> <p>Standard: Browser based portions of system shall work with MS Explorer 10.0.</p> <p>Comment: Applications that deliver UI over browser technology shall be compatible with the currently stated HE standard for internal browser compatibility.</p> <p>Preference: Vendor can certify Microsoft Internet Explorer.</p> <p>Desired Feedback: System provider shall state clearly what their browser compatibilities include and/or what their requirements are.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Extended Web Browser Compatibility – Internal Use						
					Vendors may add any hyperlink to right:						

Information Only	Ideal	Core	Mandatory	<p>Standard: Browser based portions of system shall work with MS Explorer 10.0 to be inclusive of all internal users.</p> <p>Comment: Applications that deliver UI over browser technology shall be compatible with the currently stated HE standard for internal browser compatibility.</p> <p>Preference: Vendor can certify Microsoft Internet Explorer.</p> <p>Desired Feedback: System provider shall state clearly what their browser compatibilities include and/or what their requirements are.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	<p>General Web Browser Compatibility – External Use</p> <p>Vendors may add any hyperlink to right:</p>						
Information Only	Ideal	Core	Mandatory	<p>Standard: Browser based portions of system exposed to public facing internet shall work with MS Explorer 10.0 & higher, Firefox 32.0 & higher and Safari 7.0 and higher to be inclusive of all external users.</p> <p>Comment: Applications that deliver UI over browser technology shall be compatible with the currently stated HE standard for external browser (public facing) technology and the separate standard for external browser technology.</p> <p>Preference: Certify Explorer, Firefox & Safari, Chrome.</p> <p>Desired Feedback: System provider shall state clearly what their browser compatibilities include and/or what their requirements are.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	<p>Full Enablement of UI via Browser (without Terminal Services)</p> <p>Vendors may add any hyperlink to right:</p>						
Information Only	Ideal	Core	Mandatory	<p>Standard: When required, web browser can be used as the sole client side access for the application. Native browser support is generally preferred while self-updating plug-ins may be accepted.</p> <p>Comment: The software should have web browser enabled UI (HTML over HTTP) that conducts the user interaction from either an unaided browser, or at minimum, a browser with plug-ins that update automatically. The objective of this standard is to support the application via "thin client" technologies which should not require HE to install any interface application on the user's desktop PC or require use of Terminal Services.</p> <p>Preference: Compatibility on all HE Browsers.</p> <p>Desired Feedback: System provider should indicate level of compliance with all browsers listed in current HE General Web Browser Compatibility standard.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	<p>Web Portal Enablement for External Use</p> <p>Vendors may add any hyperlink to right:</p>						
Information Only	Ideal	Core	Mandatory	<p>Standard: Information and functionality in the system UI can be segmented and presented as components within a web portal.</p> <p>Comment: The ability to have meaningful chunks of software application functionality and information displayed within a Web Portal is consistent with HE direction and is desired in any application in as much as it is reasonable and meaningful. Allowing flexible data exchange among portal segments is also desired.</p> <p>Preference: Integration with Ingeniux.</p> <p>Desired Feedback: System provider should outline the system capabilities for expressing its parts as portal components.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	<p>User Interface (UI) Standards - Windows</p> <p>Vendors may add any hyperlink to right:</p>	Meets	Will	3rd P	Cust	No	Other
Information Only	Ideal	Core	Mandatory	<p>Use of Windows 7 Browsers for Presentation</p> <p>Vendors may add any hyperlink to right:</p>							
				1	<p>Standard: For internally-accessed components, if system will not install as a native client on Windows 7 devices, system can use MS Explorer browser for full presentation and interaction.</p> <p>Comment: At a minimum, systems that must be accessed via Windows PCs must be able to present information and appropriate functionality via the native browser (MS Explorer) features of Windows 7.</p> <p>Preference: MS Explorer 10.</p> <p>Desired Feedback: System provider should indicate how system can be assessed and utilized via Windows 7 workstations.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					

Information Only	Ideal	Core	Mandatory	<p>Standard: System can be recreated and brought back to prior state through manual restoration processes while also using system logs or other outside messaging / broker services to understand which transactions may have failed.</p> <p>Comment: This standard for failover protection is not intended to cover instant or semi-automatic failover services but instead represents a base line standard to validate that the system can at least be restored to a specific 'before failure' state using manual system restore techniques.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: If system is not being protected via other semi automated or fully automated fail over techniques, system provider should describe the steps necessary to restore the system and potentially recover transactions in progress at the point of failure.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Semi Automated Failover Protection	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: System supports semi automated failover protection that allows a replacement platform to be brought up within 15 minutes of failure complete with an audit log of failed transactions.</p> <p>Comment: This standard for failover protection is not intended to cover instant failover involving full transaction recovery and seamless, automated re-processing of transactions. This standard assumes some operator intervention to bring up replacement system and to find, account for and re-process failed transactions.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall verify the steps necessary to provide for system restoration (even if manual) including the steps necessary to identify (and restore transactions in progress at the time of failure.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Unattended High Availability Failover Protection	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: System supports High Availability failover protection that provides for unattended within 1 second with complete transaction recovery and seamless re-processing of failed transactions in progress.</p> <p>Comment: This standard for failover protection assumes near instant failover involving full transaction recovery and seamless, automated re-processing of transactions. This standard assumes no significant operator intervention to bring up replacement system and to find, account for and re-process failed transactions.</p> <p>Preference: Preference is Power HA for AIX, MS clustering for Windows, and Service Guard for Linux.</p> <p>Desired Feedback: System provider shall detail high availability failover protection options.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Response Time Performance – Internal Network	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: Overall Response time for a simple transaction should be consistent with the needs of the application. Internal Client based systems should generally return a query within 1.0 seconds on networks if one assumes a baseline of 50 mbps effective throughput.</p> <p>Comment: Response is difficult to estimate, but in general, response time performance for internally deployed systems operating at an average of 50 mbps should generally fall within 1.0 seconds for simple transactions. HE understands that ultimate responsiveness is heavily influenced by our underlying network and data stores, and HE expects that its systems can support such responsiveness if the application is well constructed.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should estimate system architecture requirements to achieve HE response standards. Provider should also indicate estimated response time.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Response Time Performance – External Facing	Vendors may add any hyperlink to right:					

Information Only	Ideal	Core	Mandatory	<p>Standard: Overall Response time for a simple query should be consistent with the needs of the application. Response to a well powered web client assuming a base overall through put speed of 8 mbps on the network should be within 1.5 seconds. HE understands that ultimate responsiveness is also heavily influenced by our underlying network and data stores, and HE expects that its systems can support such responsiveness if the application is well constructed.</p> <p>Comment: Response is difficult to estimate, but in general, response time performance for web systems that provide external interactions to HE constituents and community members should provide return pages within 1.5 seconds assuming a typical workstation and an 8 mbps download speed to a major ISP.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should estimate system architecture requirements to achieve HE response as stated.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>								
				Network/Communication Architecture				Meets	Will	3rd P	Cust	No	Other
				1	TCP/IP Network Transport Protocol			Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: TCP/IP is the standard HE business network transport protocol.</p> <p>Comment: HE does not support Novell NCP, IPX or other proprietary protocols other than VPN encryptions that continue to use TCP/IP. NetBIOS is not supported as a transport protocol even if it is recognized.</p> <p>Preference: IPv4 required.</p> <p>Desired Feedback: System provider shall describe its network transport protocols.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>								
				1	HTTP and HTTPS Data Transport Protocols			Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: HTTP and HTTPS are the standard HE web data transport protocols.</p> <p>Comment: HTTP is the dominant data transport protocol today and it is a HE mandate for on-line applications. HTTPS is, at a minimum, required for secure data transport but can be replaced by more secure forms of connectivity as needed. See the "Cryptographic System" requirement for additional information.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall describe its data transport protocols.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>								

System Operation, Management and Support Architecture							Meets	Will	3rd P	Cust	No	Other	
System Operation and Management													
Information Only	Ideal	Core	Mandatory	1	Capability to Run in Virtual Environment								
				<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>									
<p>Standard: System is capable of effective operation in a virtual server environment.</p> <p>Comment: System will operate in a virtual server environment such as VMware or IBM LPARS. System functionality in the virtual server environment shall be equal to functionality on a dedicated server.</p> <p>Preference: VMware or AIX LPAR preferred.</p> <p>Desired Feedback: System provider shall indicate in what virtual environments, if any, the system will operate.</p>													
Information Only	Ideal	Core	Mandatory	1	Compatibility with Storage Area Network (SAN)								
				<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>									
<p>Standard: System implementer shall deploy storage services within HE Storage Area Network (SAN) based on 3PAR.</p> <p>Comment: System shall be deployed to operate using a SAN for all system data storage needs other than server based logs or configuration files.</p> <p>Preference: 3PAR preferred.</p> <p>Desired Feedback: System implementer shall be familiar with SAN technologies in order to ensure that the product being implemented is configured correctly to function in a SAN environment.</p>													
Information Only	Ideal	Core	Mandatory	1	Compatibility with Native Fiber Channel for SAN Management								
				<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>									
<p>Standard: System is compatible with the native fiber channel used with Storage Area Network (SAN) management.</p> <p>Comment: System will operate using native fiber channel standards for transmitting hardware commands used to manage remote services on SAN servers and devices.</p> <p>Preference: EMC SAN services using native fiber channel</p> <p>Desired Feedback: System provider shall indicate compatibility with native fiber channel</p>													
Information Only	Ideal	Core	Mandatory	1	Compatibility with On-Line Back-up and Restore Functions								
				<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>									
<p>Standard: System is capable of effective operation in concert with On-Line data back up procedures including awareness of open transactions and files.</p> <p>Comment: System shall allow data and applications to be backed up using on-line back up and restore services. Back-ups shall work from a schedule and the restore functions shall not first require conventional loading of the OS and relevant applications. HE currently uses CommVault software systems to manage its storage management and back-up services.</p> <p>Preference: Preference is eVault i365.</p> <p>Desired Feedback: System provider shall indicate compatibility with eVault i365 and related procedures.</p>													
Information Only	Ideal	Core	Mandatory	1	Compatibility with System Configuration Management software								
				<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>									
<p>Standard: System is capable of effective operation in conjunction with system configuration software.</p> <p>Comment: System software change and configuration management services can be managed using SCCM (for windows) and Uptime (for AIX and Linux).</p> <p>Preference: SCCM management services for Windows, Uptime for AIX & Redhat.</p> <p>Desired Feedback: System provider shall indicate compatibility configuration software.</p>													
Information Only	Ideal	Core	Mandatory	1	Patch Level Compatibility								
				<p>Vendors may add any hyperlink to right:</p>									

Information Only	Ideal	Core	Mandatory	<p>Standard: Applications must be consistent with current HE upgrade and fixpack levels for the HE Operating Environment.</p> <p>Comment: Most software packages are designed and implemented based on certain patch and upgrade levels within the IT environment. (e.g., .Net, J2EE or JVM level, Operating system version and fix pack level, etc.) Quite often, when people purchase different packages (even from the same system provider), there is a version/specification level conflict. It is important to resolve compatibility issues before packages are purchased or deployed.</p> <p>Preference: Product must maintain compatibility with current platform versions.</p> <p>Desired Feedback: System provider shall state policy to maintain software compatibility with underlying system patches.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	System Management Utilities	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: Systems and applications shall be supported by system management utilities commensurate with the management needs of the product.</p> <p>Comment: Systems management requirements must be established to meet the specific needs of the application and its environment. Major categories of requirements will include: (1) system utilities, (2) backup/recovery and (3) routine system management/operational procedures.</p> <p>Preference: Preferences are MS System Center Operations Manager and AIX (native tool).</p> <p>Desired Feedback: System provider shall state compatibility with stated system management utilities.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Compatibility with Application Performance Management (APM)	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: System supports and is tolerant of Application Performance Management (APM) monitoring.</p> <p>Comment: System should not show ill effects, slow or otherwise be intolerant of APM modules running on the network to provide information on the performance of systems operating from network servers.</p> <p>Preference: SCOM management services.</p> <p>Desired Feedback: System provider should indicate compatibility with SCOM capabilities.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Low Intervention Maintenance Requirements	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: System shall have no to low system intervention needs requiring operator initiated or assisted maintenance activities such as purging of log files, data integrity checks, indexing or similar activities.</p> <p>Comment: System management requirements shall be capable of being automated where reasonable and the number of manual or operator initiated interventions shall be small to non-existent.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall outline all maintenance functions requiring regular intervention by system operators.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Service Lifecycle and Upgrade Schedules	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: Software product service lifecycle and upgrade schedules should be consistent with HE expectations for system life (upgrades on the average of four years, with expected product life on the order of ten to twelve years).</p> <p>Comment: This standard is highly discretionary and is included for fundamental data gathering and overall assessment as opposed to strict quantitative evaluation.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should describe and service lifecycle and upgrade schedules.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1		Vendors may add any hyperlink to right:					

Security and Privacy Architecture				Meets	Will	3rd P	Cust	No	Other
User Access Management									
		1	Authentication and Identification						
Information Only	Ideal	Core	Mandatory	Vendors may add any hyperlink to right:					
				<p>Standard: System shall provide or allow for user authentication and identification.</p> <p>Comment: System integrated into the HE environment must provide user ID management and logon functions as well as provide or interface with measures designed to guard against fraudulent transmission and imitative communication deception by establishing the validity of the transmission, message, station or individual. System shall provide authentication and identification for employees and customers.</p> <p>Preference: MS Active Directory preferred.</p> <p>Desired Feedback: System provider shall describe authentication and ID capabilities.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				
		1	Use of Integrated Windows Authentication for Web Services						
Information Only	Ideal	Core	Mandatory	Vendors may add any hyperlink to right:					
				<p>Standard: If system uses web based components, system shall interface with Integrated Windows Authentication (IWA) to provide for user authentication and identification.</p> <p>Comment: Any new software package must provide user ID management and logon functions and HE desires that its systems use in as much as appropriate, the features of MS Integrated Windows Authentication.</p> <p>Preference: MS Active Directory preferred.</p> <p>Desired Feedback: System provider shall describe the extent of IWA capabilities.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				
		1	LDAP Integration						
Information Only	Ideal	Core	Mandatory	Vendors may add any hyperlink to right:					
				<p>Standard: The system operates in conjunction with standard LDAP services.</p> <p>Comment: LDAP is the most widely accepted protocol for maintaining a directory of authenticated users and while a software package may provide its own authentication service, the capability of using 3rd party authentication using LDAP information is critical for raising security services to an enterprise level and using services such as single sign on (SSO).</p> <p>Preference: MS Active Directory preferred. LDAP where Active Directory not supported.</p> <p>Desired Feedback: System provider shall describe the extent of LDAP integration.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				
		1	Internal and External Password Management						
Information Only	Ideal	Core	Mandatory	Vendors may add any hyperlink to right:					
				<p>Standard: System must be capable of enforcing strong password handling for all external customer users and for HE users (employees or contractors), and the ability to enforce different rules based on account type (e.g. internal, customer, supervisor, administrator)</p> <p>Comment: Vendor system must support the following: - Must have capability to have passwords expire on a configurable timeline based on account/user role, with 90-days being the default for internal system users and no expiration date for customers. - Must have configurable complexity requirements based on account/user role, including the ability to require: - passwords for internal system accounts must contain three or more of the following groups: --- Upper case letters; --- Lower case letters; --- Numbers; --- Special characters (ex: \$, @, #, %, etc.); - At least eight (8) characters long; - Must not be common words or combinations of common words; - Must not be the same as the user ID, nor an anagram or variation of the user ID. - Cannot reuse the last (configurable number) passwords by user type, with 10 being the default for internal system users and no re-use restriction for customers.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				

Information Only	Ideal	Core	Mandatory	<p>Desired Feedback: System provider shall indicate what ports and services are not required.</p>	<p>Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				<p>Version/Patch utility</p>	<p>Vendors may add any hyperlink to right:</p>						
Information Only	Ideal	Core	Mandatory	<p>Standard: All versions for software, configurations, firmware, scripts, macros and enabled ports and services shall be accessible and reported through a utility.</p> <p>Comment: Application utility needs to aggregate and report on existing versions/patches by module or executable file.</p> <p>The Supplier shall provide documentation of software/firmware that supports the procured product, including scripts and/or macros, run time configuration files and interpreters, databases and tables, and all other included software (identifying versions, revisions, and/or patch levels, as delivered). The listing shall include all ports and authorized services required for normal operation, emergency operation, or troubleshooting. This documentation must include user guide(s); system installation and maintenance documentation; application flow diagrams and descriptions; data file schema; back-up procedures; and recommended security and user test procedures.</p> <p>Preference: Native to the product (no third party).</p> <p>Desired Feedback: System provider shall confirm that it can provide a full inventory of software, firmware, scripts, ports, etc. supporting procured product and that unnecessary items will be removed or disabled during implementation.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				<p>Connection and Data Transport Security</p>							
Information Only	Ideal	Core	Mandatory	<p>Web browser session protection</p>	<p>Vendors may add any hyperlink to right:</p>						
				<p>Standard: For web based components, the system supports the Transport Layer Security (TLS) protocol for internet session security.</p> <p>Comment:</p> <ol style="list-style-type: none"> 1) For web browser based components, the system must support the Transport Layer Security (TLS) protocol for internet browser session security, but the vendor is free to recommend alternative encryption methods as well. 2) Unless otherwise agreed to during system implementation, set a default of using TLS for all web browser pages handling non-public data. 3) Use HTTP Strict Transport Security (HSTS) and the Secure Cookie flag for all browser sessions handling non-public data. 4) Do not include Hawaiian Electric Company non-public data as part of any URL. <p>Preference: TLS v1.2.</p> <p>Desired Feedback: System provider shall verify that system uses TLS where appropriate.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
Information Only	Ideal	Core	Mandatory	<p>SSH File Transfer Protocol</p>	<p>Vendors may add any hyperlink to right:</p>						
				<p>Standard: System shall support large file transfer utilizing a SSH (Secure Shell) File Transfer Protocol (SFTP) Server.</p> <p>Comment: SFTP is the current industry standard for secure file transfer and is a HE mandate for open transfer of HE information.</p> <p>Preference: See "Cryptographic System" requirement for algorithm.</p> <p>Desired Feedback: System provider shall verify system uses SFTP where appropriate.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
Information Only	Ideal	Core	Mandatory	<p>Inter-process Communication</p>	<p>Vendors may add any hyperlink to right:</p>						
				<p>Standard: The system shall enforce security policies from the critical side when interprocess communication is initiated from a less privileged application.</p> <p>Comment: Separation of privileges between different applications is critical for minimizing the extent of system vulnerability if a particular application is compromised.</p> <p>Preference: No products specifically preferred.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						

				Desired Feedback: System provider shall verify its ability to configure interprocess communication and privilege separation.	may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.						
			1	Secure Transport of Company non-Public Data							
Information Only	Ideal	Core	Mandatory	Standard: System shall support secure transmission of all non-public data.	Vendors may add any hyperlink to right:						
				Comment: All non-public data must be encrypted in accordance with the standard depicted in the "Cryptographic System" requirement . Preference: See "Cryptographic System" requirement for algorithm. Desired Feedback: System provider shall specify the algorithms used for secure transports.	At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.						
			1	Network Security Zones							
Information Only	Ideal	Core	Mandatory	Standard: Vendor must document all data flows required to traverse any electronic security perimeter (ESP), whether between multiple internal ESPs or between internal and external ESPs. Requirements for Medium Impact BES Cyber Systems found in NERC CIP-005-5 Electronic Security Perimeters shall be followed.	Vendors may add any hyperlink to right:						
				Comment: The network shall be segmented into multiple network security zones, and methods shall be in place to restrict communication between zones. Also see the "System Interfaces" requirement. Preference: No products specifically preferred. Desired Feedback: System provider shall describe its proposed network architecture and methods for controlling communication between network security zones. Vendor must provide this information regardless of whether the security zone interface devices are provided or maintained by the vendor.	At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.						
			1	Wireless Technology							
Information Only	Ideal	Core	Mandatory	Standard: Where wireless links are used in the implemented system, the system shall support wireless technologies while remaining compliant with security standards. System shall support link or end-to-end encryption independent of data transmission carrier.	Vendors may add any hyperlink to right:						
				Comment: The system shall be compatible with other wireless equipment and shall minimize the potential for signal interception. The system shall be resilient to high-level threats including denial of service, eavesdropping, man-in-the-middle, masquerading, message modification, message replay, and traffic analysis. The system provider shall provide documentation regarding capabilities, requirements, limitations, and security of the system's wireless communication devices. Preference: See "Cryptographic System" requirement for algorithm. WPA-2 Enterprise for 802.11 for authentication. Desired Feedback: System provider shall describe the wireless protocols that are compatible with the provider's devices and demonstrate that known attacks do not compromise receiving devices. Describe their link or end-to-end encryption method and how it is independent of a data provider encryption (e.g. cellular data or microwave).	At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.						
			1	Network Intrusion Detection							
Information Only	Ideal	Core	Mandatory	Standard: The system shall allow means to document that network traffic is monitored, filtered, and alarmed (e.g., alarms for unexpected traffic through network security zones) and provide filtering and monitoring rules on a 24x7x365 basis.	Vendors may add any hyperlink to right:						
				Comment: The system shall be configured with an intrusion detection system (IDS), which may be either host-based or network-based. The system provider shall provide recommendations for optimal IDS configuration which will enable HE to monitor traffic. Preference: Supports integration with HE network IDS. Desired Feedback: System provider shall describe its proposed network intrusion detection system architecture and monitoring conditions.	At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.						
Data Storage Security						Meets	Will	3rd P	Cust	No	Other
			1	Elimination of 'Cached' Data							
					Vendors may add any hyperlink to right:						

Information Only	Ideal	Core	Mandatory	<p>Standard: The system shall be able to report real time on all active users outlining all of their permissions and roles.</p> <p>Comment: The system shall understand who is accessing the system at all times and be able to provide an immediate and on-going report of those users complete with all permissions granted, permissions being used, task roles granted and task roles being used.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall verify and explain provisions for tracking and understanding the actions of active users.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>								
			1	Audit History of Access and Changes									
Information Only	Ideal	Core	Mandatory	<p>Standard: The system shall support tracking of new access, modification of access and security permissions for a configurable period.</p> <p>Comment: The system shall enable HE to define specific permissions for individual users, modify permissions over configurable period, and track access by new users.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: The system provider shall describe options for defining permissions and verify the ability to modify these permissions.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>								
			1	Customizable Audit Logging and Reports									
Information Only	Ideal	Core	Mandatory	<p>Standard: The system shall provide customizable audit logs and produce customizable reports detailing user and administrator activities and security events. Event logging must be enabled.</p> <p>Comment: Administrative and user activities can be flagged for logging (and subsequent reporting) based on preferences set by HE. Bidder shall provide information on audit logging sufficient for regulatory requirements such as Sarbanes Oxley (SOX), as well as NERC CIP compliance, normal malware/attack indicators, and for analysis toward detection of Advanced Persistent Threats (APT). While NERC CIP compliance is not a regulatory requirement, its provisions are good practice and are used as guidance at HE.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall describe audit capabilities and associated report capabilities. In particular, provide information on their recommended logging for user/administrator activity, detection of standard malware/attack activity as well as APT.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>								
			1	User Alert Regarding Prior Log-On									
Information Only	Ideal	Core	Mandatory	<p>Standard: The system shall be able to alert user as to the time and location of previous Log-on(s).</p> <p>Comment: Upon any log-in to the system, a notification shall appear showing the user the last date, time and source IP of the prior log-in(s).</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should describe what information the system provides to users regarding prior log-in(s).</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>								
System Integrity Assurance							Meets	Will	3rd P	Cust	No	Other	
			1	Resistance to Denial of Service									
Information Only	Ideal	Core	Mandatory	<p>Standard: The system and or its infrastructure should be designed to resist 'Denial of Service' attacks.</p> <p>Comment: System should employ methods that minimize the impact and risks from 'Denial-of-Service' attacks (e.g., load balancing, packet filtering, connection throttling, etc.).</p> <p>Preference: Application should be configured to limit session.</p> <p>Desired Feedback: System provider should describe architecture components that help mitigate the risks from 'Denial of Service' attempts.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>								
			1	Protection via Security Devices									
				Vendors may add any hyperlink to right:									

Information Only	Ideal	Core	Mandatory	<p>Standard: The system shall manage and track customer Opt-outs. (Applies only to systems with which customers directly interact.)</p> <p>Comment: In particular, customer Opt-Out shall store an effective date to provide an audit trail and clarity of the customer's choice at any given period of time.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: The system provider shall verify that customer opt-out, at a minimum, stores an effective date of opt-out. The system provider shall describe how the opt-out works.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Customer Data Control	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: The system shall allow for customers to exercise meaningful control over their data. (Applies only to systems with which customers directly interact.)</p> <p>Comment: Specifically, customers shall be permitted to opt-out of providing secondary data use; and, customers shall be permitted to retrieve and update their data as desired.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall describe how the system provides for ad hoc data retrieval and updating as well as use of secondary data opt-out.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Customer Authentication	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: The system should allow flexibility and choice with respect to customer authentication.</p> <p>Comment: Customers should be able to use 2 factor authentication for their accounts if they desire.</p> <p>Preference: SAML support.</p> <p>Desired Feedback: System provider should describe how the system affords multiple authentication optionality for customers.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	System Backup	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: The system shall implement a rigorous data backup practice.</p> <p>Comment: For systems to be hosted at or managed by Hawaiian Electric, vendor system must be compliant with and integrated into the existing Hawaiian Electronic data backup systems and procedures. For systems hosted at external sites managed by the vendor or vendor's agent, vendor must ensure proper ongoing backup and storage of electronic data records.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System providers shall Describe how they have a defined a standard and enforced practice for system backup.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Encryption Key Exchange	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: The system should employ Ephemeral Key Exchange.</p> <p>Comment: Describe how your system can be used with ephemeral key exchanges for all key exchanges protecting transmission of highly sensitive data (Hawaiian Electric Confidential, Confidential-Restricted data, and control data) which traverses both an electronic and a physical security perimeter. Describe any performance or support implications of the use of Ephemeral Key Exchanges for your implementation.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should describe its cryptographic methods, how these support ephemeral key exchange.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Cryptographic System	Vendors may add any hyperlink to right:					
				<p>Standard: The system shall employ cryptographic system with Validated and Acceptable encryption and key management features.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but</p>						
Security Compliance						Meets	Will	3rd P	Cust	No	Other

Information Only	Ideal	Core	Mandatory	<p>Comment: 1. Encryption must be "Validated" per FIPS 140-2 and currently "Acceptable" per NIST SP800-131(series). 2. Product must provide a method to remotely update encryption certificates on an acquirer-defined and configurable frequency without disrupting normal system operation. 3. Product must provide a method of updating the encryption method (algorithm/primitive) to maintain a NIST SP800-131(series) "Acceptable" encryption method throughout the service life of the device, without replacing the entire device. Vendor support must include provision for delivering these updates when needed.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: Vendor shall describe its cryptographic methods, how these support the availability, integrity, confidentiality, authentication and non-repudiation of information processed by their system, and describe the process for key management throughout the system life cycle.</p> <p>Vendor shall provide information on commercial Cryptographic Key Management Systems (CKMS) their product is already integrated with, and provide information about their recommended CKMS.</p>	<p>vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Interactive Remote Access	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: The system must adhere to remote access standards found in NERC "Guidance for Secure Interactive Remote Access" and NERC CIP-005-5 R2 as if these systems were Medium Impact BES Cyber Systems.</p> <p>Comment: System shall comply with HE remote access policies and NERC recommendations. While NERC CIP compliance is not a regulatory requirement, its provisions are good practice and are used as guidance at HE.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider must describe how remote access standards are defined and followed.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	OWASP Top Ten	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: Vendor must document its design and testing regimen with respect to how each of the issues on the current version of the Open Web Application Security Project (OWASP) Top Ten vulnerabilities are addressed.</p> <p>Comment: OWASP Top Ten is a known and respected level of testing to ensure applications and application implementations are free from well known vulnerabilities. In addition, OWASP provides many configuration guides and 'cheat sheets' for various implementations. Vendor shall describe its utilization of these tools.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider must verify that OWASP Top Ten vulnerabilities are tested for and designed out of their systems and system implementations.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Cyber Asset Reuse and Disposal	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: Vendor shall ensure that any cyber asset containing HE information which is re-used or disposed of during or at the end of the project shall ensure compliance with NERC CIP-011-5 R2.</p> <p>Comment: Cyber assets containing HE non-public information shall be protected and information deleted by strong methods before being disposed of or re-used. While NERC CIP compliance is not a regulatory requirement, its provisions are good practice and are used as guidance at HE.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: Describe how vendor systems and processes ensure compliance with NERC CIP-011-5 R2.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Configuration Change Management	Vendors may add any hyperlink to right:					
ily				<p>Standard: Vendor shall ensure that change management processes are in place and utilized which adhere to NERC CIP-010-1 R1 and R2 requirements of Medium-Impact BES Cyber Assets.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired.</p>						

Information Only	Ideal	Core	Mandatory	<p>Comment: Cyber assets shall be assumed by the vendor to require compliance with NERC CIP-010-1 R2 & R2 requirements for Medium-impact BES Cyber Systems. While NERC CIP compliance is not a regulatory requirement, its provisions are good practice and are used as guidance at HE.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: Describe how vendor systems and processes ensure compliance with NERC CIP-011-5 R1 and R2.</p>	<p>Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>							
			1	<p>Vulnerability Assessments</p>								
Information Only	Ideal	Core	Mandatory	<p>Standard: Vendor shall ensure their development, test and product delivery environments and systems provide for vulnerability assessments consistent with NERC CIP-010-1 R3 requirements of Medium-Impact BES Cyber Systems.</p> <p>Comment: Vendor lifecycle management must ensure products and services are managed in an environment which provides appropriate assurance of product integrity. This is shown by doing vulnerability assessments consistent with NERC CIP-010-1 R3 requirements of Medium-Impact BES Cyber Assets. While NERC CIP compliance is not a regulatory requirement, its provisions are good practice and are used as guidance at HE.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: Describe how vendor conducts vulnerability assessments within its own environment, and mitigates identified risks, in a manner consistent with NERC CIP-010-1 R3.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>							
			1	<p>Systems Security Management</p>								
Information Only	Ideal	Core	Mandatory	<p>Standard: Vendor shall ensure their systems and system implementation provide for compliance with all requirements of NERC CIP-007-5.</p> <p>Comment: While NERC CIP compliance is not a regulatory requirement, its provisions are good practice and are used as guidance at HE. CIP-007-5 provides guidelines for vendor products and their implementations.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: Vendor shall describe how their system and its implementation provides sufficient security controls to ensure NERC CIP-007-5 compliance at the level required for Medium-Impact BES Cyber Systems.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>							
			1	<p>Employee Mobile Device Applications</p>								
Information Only	Ideal	Core	Mandatory	<p>Standard: Any applications intended for use by employees on mobile devices must be compatible with Hawaiian Electric's mobile device management suite.</p> <p>Comment: Testing must be done by selected vendor to confirm compatibility.</p> <p>Preference: Afaria for applications used by HE employees.</p> <p>Desired Feedback: System provider must describe how the mobile applications are compatible with HE security suite.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>							
			1	<p>Masking of Sensitive Data</p>								
Information Only	Ideal	Core	Mandatory	<p>Standard: Regulated data, such as SSNs, financial account numbers, driver's license, and PHI shall be masked when presented on user screens and reports. Masking rules shall be configurable by user type. PINS and passwords should be stored hashed and never in clear text.</p> <p>Comment: Sensitive data such as, but not limited to, Social Security Numbers, Financial Account Numbers, drivers license numbers, Protected Health Information, etc.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider must describe how sensitive data will be masked, and how that masking varies by user type.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>							
<p>Process Requirements</p>						Meets	Will	3rd P	Cust	No	Other	
			1	<p>Vendor Support Access</p>								
				<p>Vendors may add any hyperlink to right:</p>								

Information Only	Ideal	Core	Mandatory	<p>Standard: The vendor shall ensure support personnel working on HE systems or handling HE information have had background checks and been trained in cyber security guidelines & policies.</p> <p>Comment: Proper cybersecurity training, background checks, and staffing updates are necessary to avoid compromising any sensitive information. The background checks and cyber security training shall be consistent with High & Medium BES Cyber System requirements in NERC CIP-004-5.1. While NERC CIP compliance is not a regulatory requirement, its provisions are good practice and are used as guidance at HE.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: The system provider shall describe its cybersecurity training and awareness procedures and frequency, and the provider shall agree to perform appropriate background checks on employees involved in the development, deployment and support of the proposed product.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Patches and Updates	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: All software components shall be updated in a timely manner with proof of adequate testing and documentation to install the updates and patches. See NERC CIP-007-5 R2 for standard.</p> <p>Comment: The system provider shall continue, on an ongoing basis, to identify and address any system vulnerabilities or other required fixes. These updates shall be tested and then shared with HE in a timely manner. While NERC CIP compliance is not a regulatory requirement, its provisions are good practice and are used as guidance at HE.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall explain the process by which updates and patches will be developed, tested, and deployed.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Protection of Audit Logs	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: The system shall allow for the protection of audit logs via back-up and provisions to prevent and detect tampering with logs.</p> <p>Comment: The system shall safeguard audit logs against tampering and shall further record the administrator identify, time and impact of any modification to the logs or their settings. Log server shall reside on an isolated network segment.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall describe provisions for protection of audit logs.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Incident Response Policy	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: The system provider must provide Hawaiian Electric a copy of its cyber-security incident response plan which address issues in a rapid, thorough manner and ensures compliance with relevant US Federal and state regulations, and coordination of response with Hawaiian Electric and other business partners as needed."</p> <p>Comment: Processes must be in place to ensure that any security breach is handled in manner that complies with relevant US Federal and state regulations. These include Hawaii Revised Statute 487N (Security Breach of Personal Information), which requires customer notification. Any breach of the system provider's system which may compromise HE data, any unauthorized disclosure of HE data, must be reported to HE within 24 hours of incident discovery.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall verify that it will comply with relevant regulations in the case of a cyber-security incident that may compromise HE data. Additionally, the provider shall describe its incident response plan, how frequently the plan is tested and revised, the core response team, processes and timeline for informing customers, any associated service level agreements (SLAs), and any financial or legal commitments to HE in the case of a data breach.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Security Built into Life Cycle QA	Vendors may add any hyperlink to right:					

Information Only	Ideal	Core	Mandatory	<p>Standard: Vendor must describe how security QA is built into the system development lifecycle (SDLC) and is tested as part of the overall QA process.</p> <p>Comment: Effective security testing requires that appropriate assessments and tests be performed through out the SDLC before security flaws in early stage development are built into system foundations.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should verify that potential security flaws are identified and security testing is performed during the SDLC process. Description should include what stages of SDLC include security testing and what types of assessments are performed (e.g., source code review, static assessment, dynamic testing, fuzz testing, scanning for malware, etc.).</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
			1	Data Return Compliance	<p>Vendors may add any hyperlink to right:</p> <p>Standard: In compliance with HI state law, the system provider either returns or destroys all HE data at the end of its contract.</p> <p>Comment: Destruction or return of HE data at the end of the service contract is required by HI state law. See Hawaii Revised Statute 487J (Personal Information Protection), 487N (Security Breach of Personal Information), and 487R (Destruction of Personal Information Records).</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall verify that it will return or destroy all HE data at the end of its contract.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
			1	Data Confidentiality and Company Privacy Policy	<p>Vendors may add any hyperlink to right:</p> <p>Standard: Vendor must provide and describe their privacy policies in place that govern data collection, sharing, and sale and will not collect, share, or sell any HE data without prior written consent.</p> <p>Comment: All HE data shall be considered confidential. If the system provider wishes to collect, share, or sell any HE data, it may only do so after receiving expressed consent through the appropriate, authorized HE personnel.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall verify that it will not collect, share, or sell any HE with prior written consent from authorized HE personnel. The provider shall also describe its company's privacy policy, particularly regarding data collection, storage, and sale.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
			1	Company Compliance Program	<p>Vendors may add any hyperlink to right:</p> <p>Standard: The system provider has programs in place to ensure that its systems are compliant with all relevant US Federal and state privacy laws.</p> <p>Comment: In addition to other privacy laws explicitly addressed in these requirements, the system provider must ensure that its systems are compliant with all other applicable US Federal and state laws.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall verify that it is compliant with US Federal and state privacy laws. In addition, the provider shall describe the internal policies and programs that it has in place to ensure that it identifies and complies with all relevant privacy regulations.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
			1	Internet Domain Name Registration	<p>Vendors may add any hyperlink to right:</p> <p>Standard: All Internet Domain Name Registrations are purchased and registered by Hawaiian Electric's ITS department.</p> <p>Comment: If new Internet domain name registrations are required these must be procured through HE, not by the vendor directly. If not applicable, bidder shall note that and describe why it is not applicable.</p> <p>Preference: No products specifically preferred.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					

			Desired Feedback: System provider must verify that they comply with Internet Domain name registration best practices.	may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.	
		1	System Interfaces		
Information Only	Ideal	Core	Mandatory	Standard: System Interfaces must be fully documented.	Vendors may add any hyperlink to right:
				<p>Comment: For all functions requiring integration of data between systems, provide interface details including packets types/protocols, packet sizes, expected data flow frequency and volume, source & destination systems, latency requirements, and a description of the information being transferred (payload). Also document whether data flows are unidirectional out from system being proposed, unidirectional into the system being proposed, bidirectional initiated by the system being proposed, or bidirectional initiated by systems other than the system being proposed.</p> <p>Preference: No products specifically preferred for documentation.</p> <p>Desired Feedback: Provide required interface documentation, regardless of whether the integrated systems are within the same security zone or in different security zones.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>

Remote Host and Application Service Provider (ASP) Architecture (IF APPLICABLE)							Meets	Will	3rd P	Cust	No	Other	
Remote Security													
Information Only	Ideal	Core	Mandatory	1	Determination of Security Trust Level		Vendors may add any hyperlink to right:						
					<p>Standard: The remote host or ASP system shall be covered by a Type II SAS70 SysTrust/WebTrust or else the host/ASP can provide an independent security assessment (attestation) report by a reputable reporting agency (e.g., PCI) that covers the ASP's application and infrastructure.</p> <p>Comment: Some independent evidence or report shall be provided to HE showing that the provider's security meets professional standards or has otherwise been evaluated. Attestation reports by a qualified professional assessment firm are preferred.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall provide copies or links to attestation reports if available.</p>		<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
Information Only	Ideal	Core	Mandatory	1	Data Preservation Provisions		Vendors may add any hyperlink to right:						
					<p>Standard: The remote host or ASP shall provide Service Level Agreements (SLAs) regarding the frequency and assuredness of data back-ups along with the provisions and timeliness of restoration/recovery procedures.</p> <p>Comment: Documentation of service levels pertaining to data preservation shall be built into the contract or other agreement documents such as SLAs.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall provide detailed descriptions of data protection and preservation procedures.</p>		<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
Information Only	Ideal	Core	Mandatory	1	System Access & Performance Requirements		Vendors may add any hyperlink to right:						
					<p>Standard: The remote host or ASP shall provide Service Level Agreements (SLAs) regarding the availability of the system and the required performance of the system when it is available.</p> <p>Comment: Documentation of service levels pertaining to up-time and performance requirements shall be built into the contract or other agreement documents such as SLAs.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall provide detailed commitments to mutually agreeable up-time and performance standards.</p>		<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						

Attachment E: Meter Requirements



Attachment E -
Meter Requirements...

	A	B	C	D	F	G	J	K	L	M	N	O	P	Q	R	S	T	U					
1	Hawaiian Electric Functional Requirements Questionnaire												Vendor Response Options										
2	Smart Grid Smart Meter												XYZ, Inc.										
3	Vendor Name: XYZ, Inc.												Spreadsheet Template Version is: 1.0 as of 09/23/2014										
4	Project: Smart Grid Smart Meter																						
5	Date Questionnaire Released:																						
6	Date Questionnaire Due:																						
7	Date of Last Assessment Ratings Added by The Companies:																						
8	Information Only	Ideal	Core	Mandatory	<p align="center">Hawaiian Electric Smart Grid Smart Meter Functional Requirements</p>												Enter the numeric value "1" (not text) as the flag values in the yellow highlighted response options. Do not flag more than 1 (one) box per row. Use Grouping controls on far left side of this spreadsheet to fully open all text and response options. Use beige areas in expanded rows to enter any desired hyperlinks or additional explanation text.	System as Proposed Meets Standard	System will meet standard in scheduled upcoming release	System can meet standard using 3rd Party products	System can meet standard with customization	System as proposed does not meet standard	Other
9																							
10																							
11																							
12																							
13																							
14																							
15																							
16																							
17																							
18	Communications																						
19	The requirements below describe the meter specifications necessary to communicate through The Companies' AMI system with meters and other devices.																						
20													Meets	Will	3rd P	Cust	No	Other					
21	a	b	c	d	f	g	j	k	l	m	n	o	p	q	r	s	t	u					
22			1			1.01.01	LAN communications: Meters must support LAN communication at 902-928 MHz frequencies using IEEE 802.15.4g and Wi-SUN compliant protocol.																
23			1			1.01.02	HAN communications: Meters must support HAN communication at 2400-2480 MHz frequencies using IEEE 802.15.4 and ZigBee version SEP 1.1 and above.																
24			1			1.01.03	Network Interface Controller: Meters must provide a network interface controller (NIC) that is compatible with The Companies' Silver Spring Networks AMI system.																
29																							
30	Interoperability & Standards																						
31	The requirements below describe the specifications that meters must support in order to support system integration and basic functionality.																						
32													Meets	Will	3rd P	Cust	No	Other					
33			1			2.01.01	Data model: Data model must be compatible with Common Interface Model (CIM) standards.																
34		1				2.01.02	Vendor participation in standard development: Vendor should be an active participant in communications, interoperability, or Smart Grid standards organizations or committees.																
35						2.01.03	ANSI standards: Meters must comply with ANSI standards for electric meters, including but not limited to C12.1, C12.10, C12.19, C12.20, C12.21, and C12.22																
36		1				2.01.04	UL compliance: Meters should comply with UL 2735 electrical safety standards.																
37						2.01.05	Meter communication standards: Meters must support IEEE 802.15.4 e/g communications standards.																
38			1			2.01.06	Customer portal: Meters must support integration with the customer portal via standard HAN protocols for in-home communications by providing them or providing an additional NIC slot which a HAN protocol card can be inserted.																
43																							
44	Security & Data Integrity																						
45	The requirements below describe the specifications that meters must support in order to maintain security and data integrity.																						
46													Meets	Will	3rd P	Cust	No	Other					
47			1			3.01.01	Information Exchange Security: Meters must support the IEC 62351 security standards for power systems management and associated information exchange.																

Attachment F: Detailed Pricing Sheet



Attachment F -
Detailed Pricing...

Meter Form	Form 15	Form 25	Form 25	Form 25	Form 125	Form 35	Form 455	Form 365	Form 95	Form 165	Cost
Meter Class	Class 100	Class 200	Class 320	Class 20	Class 200	Class 20	Class 20	Class 20	Class 20	Class 200	Cost
Meter Feature 1 - Disconnect Switch	Disconnect Switch	Disconnect Switch	Disconnect Switch	Disconnect Switch	Disconnect Switch	Disconnect Switch	Disconnect Switch	Disconnect Switch	Disconnect Switch	Disconnect Switch	
Meter Feature 2 - TOU Enabled	TOU Enabled	TOU Enabled	TOU Enabled	TOU Enabled	TOU Enabled	TOU Enabled	TOU Enabled	TOU Enabled	TOU Enabled	TOU Enabled	
Meter Feature 3 - Demand Enabled	Demand Enabled	Demand Enabled	Demand Enabled	Demand Enabled	Demand Enabled	Demand Enabled	Demand Enabled	Demand Enabled	Demand Enabled	Demand Enabled	
Meter Feature 4 - NEM Enabled	NEM Enabled	NEM Enabled	NEM Enabled	NEM Enabled	NEM Enabled	NEM Enabled	NEM Enabled	NEM Enabled	NEM Enabled	NEM Enabled	
Meter Feature 5 - Load Profile	Load Profile	Load Profile	Load Profile	Load Profile	Load Profile	Load Profile	Load Profile	Load Profile	Load Profile	Load Profile	
Meter Feature 6 - Reactive KVAR	Reactive KVAR	Reactive KVAR	Reactive KVAR	Reactive KVAR	Reactive KVAR	Reactive KVAR	Reactive KVAR	Reactive KVAR	Reactive KVAR	Reactive KVAR	
Meter Feature 7 - Power Quality	Power Quality	Power Quality	Power Quality	Power Quality	Power Quality	Power Quality	Power Quality	Power Quality	Power Quality	Power Quality	
Meter Feature 8 - Event Logging	Event Logging	Event Logging	Event Logging	Event Logging	Event Logging	Event Logging	Event Logging	Event Logging	Event Logging	Event Logging	
Meter Feature 9 - Super Cap	Super Cap	Super Cap	Super Cap	Super Cap	Super Cap	Super Cap	Super Cap	Super Cap	Super Cap	Super Cap	
Meter Feature 10 - Battery	Battery	Battery	Battery	Battery	Battery	Battery	Battery	Battery	Battery	Battery	
Cover Option 1 - Optical Port	Optical Port	Optical Port	Optical Port	Optical Port	Optical Port	Optical Port	Optical Port	Optical Port	Optical Port	Optical Port	
Cover Option 2 - Demand Reset	Demand Reset	Demand Reset	Demand Reset	Demand Reset	Demand Reset	Demand Reset	Demand Reset	Demand Reset	Demand Reset	Demand Reset	
Cover Option 3 - Reconnect Button	Reconnect Button	Reconnect Button	Reconnect Button	Reconnect Button	Reconnect Button	Reconnect Button	Reconnect Button	Reconnect Button	Reconnect Button	Reconnect Button	
Cover Option 4 - Short Cover Profile	Short Cover/Low Profile	Short Cover/Low Profile	Short Cover/Low Profile	Short Cover/Low Profile	Short Cover/Low Profile	Short Cover/Low Profile	Short Cover/Low Profile	Short Cover/Low Profile	Short Cover/Low Profile	Short Cover/Low Profile	
Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Meter Quantity	756	394242	810	57692	188	2377	5014	3334	21582		
Extended Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Instructions:

Fill in the orange highlighted boxes where applicable.
 Do not fill in gray boxes.
 The box for the base price is on top of each column.
 Meters will either have a Super Capacitor or a Battery, not both.
 Battery is preferred over the Super Capacitor.

Attachment G: Monthly Invoice Template



~~Attachment G -
Monthly Invoice...~~

Attachment H: Customer and Meter Counts



Attachment H -
Customer and ...

Attachment H: Customer and Meter Counts

Based on 2013 SAP-CIS data

Tri-Company Total

Form	Class	Total	Total + 5% spares
1S	CL100	728	764
2S	CL200	379525	398501
2S	CL320	779	818
12S	CL200	55539	58316
3S	CL20	181	190
45S (5S/35S)	CL20	2288	2402
36S (6S)	CL20	4827	5068
9S (8S/946S)	CL20	3209	3369
16S (14S/15S)	CL200	20776	21815
Total		467852	491243

Hawaiian Electric

Form	Class	Total
1S	CL100	618
2S	CL200	244940
2S	CL320	302
12S	CL200	40859
3S	CL20	145
45S (5S/35S)	CL20	907
36S (6S)	CL20	2598
9S (8S/946S)	CL20	2786
16S (14S/15S)	CL200	13288
Total		306443

Maui Electric

Form	Class	Total
1S	CL100	40
2S	CL200	55643
2S	CL320	197
12S	CL200	9352
3S	CL20	8
45S (5S/35S)	CL20	565
36S (6S)	CL20	1119
9S (8S/946S)	CL20	179
16S (14S/15S)	CL200	3971
Total		71074

Hawaii Electric Light

Form	Class	Total
1S	CL100	65
2S	CL200	78981
2S	CL320	287
12S	CL200	4993
3S	CL20	27
45S (5S/35S)	CL20	835
36S (6S)	CL20	1116
9S (8S/946S)	CL20	221
16S (14S/15S)	CL200	3475
Total		90000

Attachment I: Smart Meter Deployment History



**Attachment I -
Smart Meter De...**

Attachment J: Meter Test File Format



Attachment J - Meter
File Test Format.pdf

Vendor Requirements for Company Meter ADD File

The purpose of this document is to provide instruction to Company vendors on how to format the Meter ADD File spreadsheet in Microsoft Excel. The table below provides a line by line description for the requirements of each field. It defines what each field is, its column position within the spreadsheet, describes the format for field, and provides an example for each entry. **All alpha characters shall be capitalized. This file shall be submitted in .csv format.**

Field name	Column	Comments	Sample Fields
Transaction Type	1	A = Add	A
Record Type	2	M = Meter	M
Company Code	3	Select from list: P = HECO M = MECO H = HELCO	P
Meter Type	4	X = Regular meter	X
Utility Meter Number	5	Numeric, 9 digit maximum 9-digits (with leading zeroes)	000805130
Meter Manufacturer	6	Select two letter code from list: <i>(Leave blank if not applicable)</i> AB = ABB GE = GENERAL ELECTRIC IT = ITRON LG = LANDIS+GYR SE = SCHWEITZER ENGINEERING LAB SL = SCHNEIDER ELECTRIC TD = TRANSDATA	LG
Meter Model	7	Select from list (only L&G meters listed): FOCUS-AX FOCUS-AXSD FOCUS-AXWR FOCUS-RXR FOCUSALF FOCUSALF-C	FOCUS-AXWR
Secondary Mfg. Code	8	Select two letter code from list: <i>(Leave blank if not applicable)</i> AB = ABB GE = GENERAL ELECTRIC IT = ITRON LG = LANDIS+GYR SL = SCHWEITZER ENGINEERING LAB SE = SCHNEIDER ELECTRIC TD = TRANSDATA	

Secondary Meter Model	9	Select from list (only L&G meters listed): <i>(Leave blank if not applicable)</i> FOCUS-AX FOCUS-AXSD FOCUS-AXWR FOCUS-RXR FOCUSALF FOCUSALF-C	
Field name	Column	Comments	Sample Fields
Manufacturer Serial Number	10	Text - 30 character maximum	126 125 768
Manufacturer Catalog	11	Text - 20 character maximum	00GM2A0M3T
AEP Barcode	12	Text - 17 character maximum	TEAPX000805130
Advanced Meter Communication ID #1	13	Text - 30 character maximum <i>(Leave blank if not applicable)</i>	00135003004A794E
Advanced Meter Communication ID #2	14	Text - 30 character maximum <i>(Leave blank if not applicable)</i>	
Advanced Meter Communication ID #3	15	Text - 30 character maximum <i>(Leave blank if not applicable)</i>	
Meter Form	16	Select from list: 001S 002S 003S 005S 006S 009S 012S 016S 035S 036S 045S 046S 946S	016S
ANSI Class	17	Select from list: 1 = Class 100 2 = Class 200 3 = Class 320 4 = Class 20 5 = Class 10	2
Meter Build	18	Select from list: 3 = KWH 4 = KWH, KW 5 = KWH, KW, KVARH 6 = KWH, KWH NET 7 = KWH, KWH NET, KW	4
Advanced Meter Communication Type	19	Select from list: 0 = None 1 = ERT (1-ch) 2 = TURTLE 3 = ERT (3-ch) 4 = FLEXNET	8

		5 = OPENWAY 6 = SILVER SPRINGS DO NOT USE 7 = NIGHTHAWK 8 = SILVER SPRINGS NETWORK AMI (AMR/AMI IDs not list to be submitted to HECO)	
Specials (Optional)	20	None = Leave blank U = Software/Soft-key upgradable (NEM, TOU, VAR, etc.)	U
Transformer Rated	21	Y or N	N

Field name	Column	Comments	Sample Fields
Test Amps	22	If transformer rated (column 21)= Y Then: 2.5 If transformer rated (column 21)= N Then select from below: 15.0 30.0 50.0	30.0
Number Wires	23	Select from list: 2 3 4	4
Number Elements	24	Select from list: 1.0 2.0 2.5 3.0	3.0
Detent	25	Y or N	N
Number Meter Phase(s)	26	1 or 3	3
Meter Voltage	27	Numeric, 3 digit maximum Select from list: 120 240 332 (<i>multi-voltage excluding 480 delta</i>) 528 (<i>multi-voltage</i>)	332
Nameplate Kh constant (Wh/Rev)	28	Select from list: 1.0 1.2 1.8 3.6 7.2 14.4 21.6	21.6
Demand Full Scale (Kw)	29	Select from list:	166.2

		1S = 12.0 2S = 48.0 3S = 4.8 5S = 8.3 6S = 16.6 9S = 16.6 12S = 48.0 16S = 166.2	
Loss Compensation	30	Y or N	N
Modem	31	Y or N	N
Load Profile	32	Y or N	Y
Load Profile Ke (nameplate)	33	Numeric, N.NNN Format Required if Load Profile field (column 32) = Y	1.800

Field name	Column	Comments	Sample Fields
KYZ (for pulse metering only)	34	Y or N	N
KYZ Ke	35	Numeric, N.NNN Format If KYZ = Y Then KYZ Ke = Load Profile Ke (column 33) Else leave blank	
Battery Date	36	Battery date (MMDDYYYY) Else leave blank	
Meter program ID and/or description	37	Text, 30 character maximum If meter is factory programmed Then utility specified meter program # Else leave blank	Z0041
Purchase Date	38	Date format: MMDDYYYY	02282014
Purchase Cost	39	Numeric, NNNNN.NN Format Omit leading zeroes	228.11
Purchase Order Number	40	Text, 11 character maximum	X37757

Vendor Requirements for Company Meter TEST File

The purpose of this document is to provide instruction to Company vendors on how to format the Meter TEST File spreadsheet in Microsoft Excel. The table below provides a line by line description for the requirements of each field. It defines what each field is, its column position within the spreadsheet, describes the format for field, and provides an example for each entry. **All alpha characters shall be capitalized. This file shall be submitted in .csv format.**

Field Name	Column	Comments	Sample Fields
Transaction Type	1	T = Test	T
Record Type	2	M = Meter	M
Company Code	3	Select from list below: P = HECO M = MECO H = HELCO	P
Meter Type	4	X = Regular Meter	X
Utility Meter Number	5	Numeric, 9 digit maximum (with leading zeroes)	000617037
Test Date	6	Date format: MMDDYYYY (with leading zeroes)	01202014
Tested by	7	Select two letter code from list below: AB = ABB GE = GENERAL ELECTRIC IT = ITRON LG = LANDIS+GYR SB = SCHLUMBERGER SE = SCHNEIDER ELECTRIC SL = SCHWEITZER ENGINEERING LAB TD = TRANSDATA	SB
Test Location	8	FACT = Factory	FACT
Lifecycle	9	N = New	N
Shop Test	10	Leave Blank	
Tampered	11	Leave Blank	
Damaged	12	Leave Blank	
Bad Seal	13	Leave Blank	
Factory Test	14	X = Tested	X
Field Defect	15	Leave Blank	
High Bill	16	Leave Blank	
Removed	17	Leave Blank	
Retired	18	Leave Blank	
Repaired	19	Leave Blank	

Field Name	Column	Comments	Sample Fields
Calibrated	20	Leave Blank	
ANSI	21	Leave Blank	
As Found FL	22	Numeric, 5 digit maximum , 2 decimal places	100.02
As Found LL	23	Numeric, 5 digit maximum , 2 decimal places	100.01
As Found 50% PF	24	Numeric, 5 digit maximum , 2 decimal places	99.99
As Left FL	25	Numeric, 5 digit maximum , 2 decimal places	100.02
As Left LL	26	Numeric, 5 digit maximum , 2 decimal places	100.01
As Left 50% PF	27	Numeric, 5 digit maximum , 2 decimal places	99.99
Demand Reset Count	28	Leave Blank	
Demand Test Duration, Minute part	29	Leave Blank	
Demand Test Duration, Second part	30	Leave Blank	
True Demand (KW)	31	Leave Blank	
Actual Demand (KW)	32	Leave Blank	
Remarks	33	Leave Blank	

Attachment K: EPMO Standards and Sample Templates

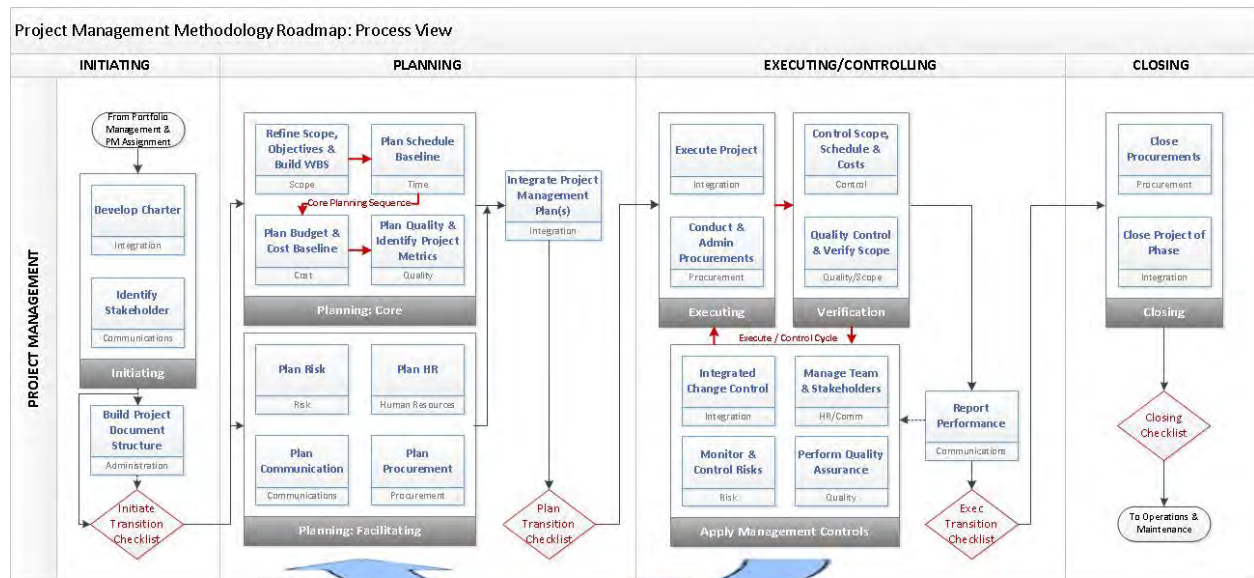


Attachment K -
EPMO Standards.pdf

The following components from the HECO EPMO will be reviewed and adjusted as needed per collaborative agreements made between both parties in the project management phase. Note that for this Project many of the templates will be systematized in Solution Manager. This document is provided purely as a sampling of EPMO standards. The full EPMO standards are housed in HECO's online PM Resource Center.

High Level Project Management Methodology

The EPMO Project Methodology is based on the Project Management Institute (PMI) PM Book Of Knowledge (collectively referred to as the HECO PMBOK). This framework is specifically adjusted to fit the HECO business model and current organization capability maturity level. Below is the high level general process cycle for the applied project management methodology:



Project Charter

The following template is the current HECO Project Charter template version to be used for recording and obtaining overall project initiation approval.

Contents

PROJECT IDENTIFICATION 1
PROJECT OVERVIEW 1
STRATEGIC GOALS / INITIATIVE 2
PROJECT GOVERNANCE 2
INITIAL RISK ASSESSMENT 3
PROJECT MAJOR MILESTONES & DELIVERABLES 3
PROJECT BUDGET..... 3
MAJOR STAKEHOLDERS 4
LABOR RESOURCE EXPECTATIONS 4
OTHER NOTES 4
APPROVALS 5

PROJECT IDENTIFICATION			
Project Name		Project Number	
Project Description <i>Describe the project in one paragraph with one to four sentences</i>			
Project Sponsor	Title	Project Sponsor Representative	Title
Project Manager		Target In Service Date	
Company (HECO, HELCO, MECO)		Responsible Process Area	

PROJECT OVERVIEW
Current Situation <i>Important Historical Background and "As-is" situation</i>
Proposed Solution <i>Describe the "To Be" situation – What the project will deliver; the solution to the functional/operating need.</i>
Project Assumptions
<ul style="list-style-type: none"> •

PROJECT OVERVIEW	
Project Constraints	
	•
Project Scope and Description <i>EXECUTIVE SUMMARY OF PURPOSE AND FUNCTION</i>	
Out of Scope	

STRATEGIC GOALS / INITIATIVE	
<i>Describe the specific Strategic goals that this project is aligned to.</i>	
Aligned with the following goals and objectives of Hawaiian Electric's "Embracing Change" strategy.	
	<ul style="list-style-type: none"> ▪ ▪ ▪

PROJECT GOVERNANCE	
<i>The Project shall be governed in compliance with existing policies, processes, and procedures. Outline the decision rights / authority of the Executive Steering Group (if any), the Sponsor, the Sponsor Rep (if any) and the Project Manager.</i>	
Executive Steering Group (if applicable to the project) Level	<ul style="list-style-type: none"> ▪ ▪
Sponsor Level	<ul style="list-style-type: none"> ▪ ▪
Sponsor Rep (if applicable to the project) Level	<ul style="list-style-type: none"> ▪ ▪
Project Manager Level	<ul style="list-style-type: none"> ▪ ▪

INITIAL RISK ASSESSMENT	
<i>Major Risks with High Impact and Medium/High Probability</i>	
Project Internal Risks (in Scope, Design, Labor Resources, Cost, Schedule)	
<ul style="list-style-type: none"> ▪ ▪ 	
External Risks (such as Regulatory, Permitting, Community Considerations and other Inter-dependencies)	
<ul style="list-style-type: none"> ▪ ▪ 	

PROJECT MAJOR MILESTONES & DELIVERABLES	
<i>Indicate the major deliverables</i>	
Project Definition and Description	Deliverables
▪	▪
▪	▪
▪	▪
▪	▪
▪	▪
▪	▪

PROJECT BUDGET	
<i>Overview of estimated costs by project.. Projects are not empowered to spend funds until appropriate policies and procedures have been followed and the funds are authorized. The authorized amounts may vary significantly from the estimates below.</i>	
PUC Expectations and Recovery of Costs	
Project / Category	Estimated Costs
Total	

MAJOR STAKEHOLDERS

Major groups which may be involved in, affected by, or show an interest in the project.

-

LABOR RESOURCE EXPECTATIONS

Labor resource plan (i.e. internal, external, billable) as well as anticipated issues/conflicts

-

OTHER NOTES

Other References or Pertinent Information not included above

-

APPROVALS			
Name	Project Title	Date	Signature
	Project Sponsor		
	Project Sponsor Rep.		
	Project Manager		

Integrated Project Plan

The following template is the current HECO Integrated Project Plan template version to be used for the execution of the overall project management plan.

INTEGRATED PROJECT MANAGEMENT PLAN

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1. PROJECT IDENTIFICATION			
Project Name		Project Number	
Project Description <i>Describe the project in one paragraph with one to four sentences</i>			
32T			
Project Manager		Target In-Service Date	
Project Sponsor	Title	Project Sponsor Representative (if any)	Title
Company (HECO, HELCO, MECO)		Responsible Process Area / Department / Division	

2. PROJECT OVERVIEW	
Background & Current Situation <i>Summarize the historical background and "as-is" situation in one paragraph.</i>	
Project Objectives <i>Describe the project's objectives.</i>	
<ul style="list-style-type: none"> • • 	
Strategic Alignment <i>Describe what strategic goals will be supported by these project objectives.</i>	
<ul style="list-style-type: none"> • • 	
Project Approach & Proposed Solutions <i>Summarize the proposed project approach and solutions in one paragraph.</i>	

--

3. SCOPE MANAGEMENT

3.1 Project Scope Statement

Describe the scope of the project

- The Project Scope Statement is a standalone document. The location address is:
- The Project Scope Statement is described below.

Scope Description

Describe the major characteristics of the product or services the project will deliver in one paragraph.

--

Out of Scope

Call out what will not be included in the scope of the current project or phase to help clarify the boundary of the project scope.

<ul style="list-style-type: none">••

Project Assumptions

Describe assumptions of the project if any. All assumptions should be verified during the planning process, and reviewed during risk identification.

<ul style="list-style-type: none">••

Project Constraints

Describe known constraints (e.g. time, budget, regulations, or safety) of the project if any. Known constraints become part of the boundary of the project scope.

<ul style="list-style-type: none">••

Major Deliverables

Describe the major deliverables or categories of deliverables of the project.

<ul style="list-style-type: none">••

3.2 SCOPE Management Plan

Describe how the scope of the project will be planned, managed and controlled.

- The Scope Management Plan is a standalone document. The location address is:
 The Scope Management Plan is described below.

4. TIME MANAGEMENT

4.1 Work Breakdown Structure (WBS)

All the work required to complete the project, including the deliverables and all activities required to produce each deliverable. The approved WBS will become the Scope Baseline of the project.

- The WBS is a standalone document. The location address is:
 The WBS is described below.

WBS No.	Description
1	
1.1	
1.2	
1.3	
1.4	
2	
2.1	
2.2	
2.3	
2.4	
3	
3.1	
3.2	
3.3	

3.4	
4	
4.1	
4.2	
4.3	

4.2 Schedule

The schedule for all activities and milestones of the project, including the sequence, duration and resources of the activities, in order to produce the project deliverables. The approved Schedule will become the Schedule Baseline of the project.

The Schedule is a standalone document. The location address is:

The Schedule is described below.

WBS No.	WBS Description	Resource Name	Target Start Date	Target End Date	Predecessor WBS No. (if any)	Status	% Complete
1							
1.1							
1.2							
1.3							
1.4							
2							
2.1							
2.2							
2.3							
2.3							
3							
3.1							
3.2							
3.3							
3.4							
4							

4.1							
4.2							
4.3							

4.3 SCHEDULE Management Plan

Describe how the schedule of the project will be developed, managed and controlled.

The Schedule Management Plan is a standalone document. The location address is:

The Schedule Management Plan is described below.

5. COST MANAGEMENT

5.1 COST Management Plan

Describe how the costs and budget of the project are estimated, managed and controlled.

The Cost Management Plan is a standalone document. The location address is:

The Cost Management Plan is described below.

5.2 Cost Estimates and Proposed Budget

Summarize the project cost and budget. The approved Budget will become the Cost Baseline of the project.

The Cost Estimates and Proposed Budget are a standalone document. The location address is:

The Cost Estimates and Proposed Budget are described below.

WBS Category	Estimated Cost (\$)	Risk Assessed?	Adjustment for Risk Included?
1 WBS Category Description		<input type="checkbox"/>	<input type="checkbox"/>
2 WBS Category Description		<input type="checkbox"/>	<input type="checkbox"/>
3 WBS Category Description		<input type="checkbox"/>	<input type="checkbox"/>
4 WBS Category Description		<input type="checkbox"/>	<input type="checkbox"/>

		<input type="checkbox"/>	<input type="checkbox"/>
Total Budget			
PUC Expectations and Recovery of Costs			
<i>Describe whether PUC approval is required and how the project cost will be recovered</i>			

1. RISK MANAGEMENT					
1.1 RISK Management Plan					
<i>Describe how the risks of the project will be identified, mitigated, monitored and accounted for.</i>					
<input type="checkbox"/> The Risk Management Plan is a standalone document. The location address is: <input type="checkbox"/> The Risk Management Plan is described below.					
1.2 Risk Register					
<i>Document the list of risks that may impact the scope, schedule, cost and quality of the project, and each risk's priority ranking, probability (%), cost or schedule impact, response strategy and any adjustment for risk</i>					
<input type="checkbox"/> The Risk Register is a standalone document. The location address is: <input type="checkbox"/> The Risk Register is described below.					
Risk Description	Risk Category	Priority Ranking	Risk Response Strategy	Risk Response Included in Scope?	Adjustment for Risk Amount if any
				<input type="checkbox"/>	
				<input type="checkbox"/>	
				<input type="checkbox"/>	
				<input type="checkbox"/>	

2. QUALITY MANAGEMENT

2.1 QUALITY Management Plan

Describe how the quality of the project will be planned, managed and controlled. Include the quality standards and success criteria that will be used to measure the quality, as well as how quality will be built into the process.

- The Quality Management Plan is a standalone document. The location address is:
 The Quality Management Plan is described below.

Deliverable	Quality Standards and Success Criteria	Quality Control Owner	Quality Control Included in WBS?
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>

3. HUMAN RESOURCE MANAGEMENT

3.1 HUMAN RESOURCE Plan

Describe how the internal and outside labor resources will be planned, utilized and managed for the project. Also summarize the labor resource needs of the project.

- The Human Resource Plan is a standalone document. The location address is:
 The Human Resource Plan is described below.

3.2 Roles and Responsibilities Matrix

Define the roles and responsibilities of Project Manager, Sponsor and team members

- The Roles and Responsibilities Matrix is a standalone document. The location address is:
 The Roles and Responsibilities Matrix is described below.

3.5 Project Organizational Chart

Describe all members of the project team and the structure in a graphical format.

- The Project Organizational Chart is a standalone document. The location address is:
 - The Project Organizational Chart is described below.

4. COMMUNICATIONS MANAGEMENT

4.1 Stakeholder Register

Identify all stakeholders who may be negatively or positively impacted by the project, and to whom communication about the project needs to be provided

- The Stakeholder Register is a standalone document. The location address is:
 - The Stakeholder Register is described below.

Stakeholder	How will the stakeholder be impacted by the project	How the stakeholder should be managed and communicated to	Contact Info

4.2 COMMUNICATIONS Management Plan

Describe all project communication events and the 'what', 'to whom', format, 'how often', 'from whom' of each communicate event.

- The Communications Plan is a standalone document. The location address is:
 - The Communications Plan is described below.

Communication Event	To Whom (Stakeholder)	Communication Format	How Often	From Whom

5. PROCUREMENT MANAGEMENT

5.1 PROCUREMENT Management Plan

Identify the areas in the scope where external materials, labor resources or services will be used for the project, and how the procurement of them will be planned, executed and managed.

The Procurement Management Plan is a standalone document. The location address is:

The Procurement Management Plan is described below.

5.2 Links to Other Procurement Documents

Add links to important procurement documents such as Statement of Work or Request for Proposals, as appropriate.

Store the procurement documents in the proper location in the project documentation structure and include the location address to them below. Add more rows to the table as appropriate.

Name of Procurement Document	Location Address

6. CHANGE MANAGEMENT PLAN

Describe how changes to the project Scope, Schedule and Cost Baselines will be monitored, controlled, reviewed and approved. Also describe how project performance and status will be reported.

- The Change Management Plan is a standalone document. The location address is:
- The Change Management Plan is described below.

7. LINKS TO OTHER PROJECT DOCUMENTS

Add links to any other project documents that should be made part of the Integrated Project Management Plan, as appropriate.

Store the project documents in the proper locations in the project documentation structure and include the location address to them below. Add more rows to the table as appropriate.

Name of Project Document	Location Address

8. APPROVAL SIGNATURES OF INTEGRATED PROJECT MANAGEMENT PLAN

Add more rows to the table as appropriate.

Role	Name	Title	Signature	Date
Project Manager				
Sponsor				

--	--	--	--	--

Project Issue Log

The following template is the current HECO Project Issue Log template version for the tracking and documentation of project issues.

Project Change Request

The following template is the current HECO Project Change Request (PCR) template version to be used for the execution of the overall project change requests.

A. General Information

Project Name:	<i><Insert Project Name></i>		
Title of CR:			
Date Submitted:	35T	Change Request ID:	CR-xxx
Requested by:	Your Name/CR initiator	Sponsor:	Sponsor Name
Submitted by:	person writing this request	Assigned Owner:	Owner identified by PM
Priority:			

B. Change Request Information

The requester provides information concerning the requested change along with any supporting documentation.

Proposed Change Description:
Describe the proposed change - a summary version of this is entered into the Change Control Log in "Summary Description." The requester provides the information in this section concerning the requested change along with any supportive documentation.
Proposed Change Justification & Impact of Not Implementing Proposed Change:
Provide a justification for the proposed change and explain the impact of not implementing the proposed change - a summary version of this is entered into the Change Control Log in "Summary Impact if not implemented."
Alternatives:
Identify other actions that may be taken as an alternative to making the proposed change.

C. Change Request Analysis

The change requester or designated owner provides an explanation of the impact that this change will have on the project.

Impact on Budget (Implementation Estimate in Dollars):
Detail the impact of implementing the change to the Project Budget.
Impact on Schedule (Implementation Estimate in Days):
Detail the impact of implementing the change to the Project Schedule.
Describe Impact on other Project Resources:
Detail the impact of implementing the change to other project resources; include other interdependencies within the project or program and additional risks that may result because of the change.

D. Change Request Review

The Project Manager, Program Manager, or other designated Manager acting as the Project Manager conducts an initial review with the project team and subject matter experts and makes a recommendation(s) regarding the implementation of the request before it is proposed to the established Change or Configuration Management Review Body. Results and recommendations based on the review are provided in this section.

Review Date:	35T		
Project Manager:	name		
Review Team Members:	name		
Review Recommendation:			
<input type="checkbox"/> APPROVE	<input type="checkbox"/> DEFER	<input type="checkbox"/> CANCEL	<input type="checkbox"/> REJECT
Rational for Recommendation:			

E. Change or Configuration Management Review Body Decision

The Change or Configuration Management Review Body conducts a final review with the Project Manager and decides to approve or disapprove the request. In the blocks below record and authenticate the decision.

Approval or Disapproval and Special Instructions:					
Final Decision:					
<input type="checkbox"/> APPROVE	<input type="checkbox"/> DEFER	<input type="checkbox"/> CANCEL	<input type="checkbox"/> REJECT		
Change or Configuration Management Reviewing Body Attendees:					
Name:		Position:		Signature/Date:	
Name:		Position:		Signature/Date:	
Name:		Position:		Signature/Date:	
Name:		Position:		Signature/Date:	
Name:		Position:		Signature/Date:	
Name:		Position:		Signature/Date:	

Project Management Document Updates:
Identify the project management documentation that will be updated to incorporate the change, exclude the Change Log as this should always be updated.

Project Status Report

The following template is the current HECO Project Status Report (PSR) template version to be used for the execution of the overall project status reporting; which includes Earned Value Management (EVM) reporting.

<p>Project title</p> <p>Hawaiian Electric Company (HECO)</p> <p>as of 1/27/2012</p>		<p>Program Manager:</p> <p>N/A</p>	<p>Program Manager:</p> <p>N/A</p>
<p>Program Name (if Applicable):</p> <p>N/A</p>		<p>Grandparent Proj No.:</p> <p>N/A</p>	
<p>Program Description:</p> <p>N/A</p>		<p>Project Manager:</p> <p>Project No.:</p>	
<p>Project Sponsor:</p> <p>N/A</p>		<p>Project Sponsor Rep:</p> <p>N/A</p>	
<p>Overall</p> <p>Enter comment on overall performance.</p> <p>↑↑↑↑</p>		<p>Time</p> <p>Enter comment on Time performance.</p> <p>↑↑↑↑</p>	
<p>Cost (\$M)</p> <p>Enter comment on Cost performance.</p> <p>↑↑↑↑</p>		<p>Project Milestones</p> <p>Enter Milestone Info here</p> <p>Target Date</p> <p>xx/xx/xxxx</p> <p>Milestone 1</p> <p>xx/xx/xxxx</p> <p>Milestone 2</p> <p>xx/xx/xxxx</p> <p>Milestone 3</p> <p>xx/xx/xxxx</p> <p>Milestone 4</p> <p>xx/xx/xxxx</p> <p>Milestone 5</p> <p>xx/xx/xxxx</p> <p>Milestone 6</p> <p>xx/xx/xxxx</p>	
<p>Quality</p> <p>Enter comment on Quality management.</p> <p>↑↑↑↑</p>		<p>Risk</p> <p>Enter comment on Risk management status.</p> <p>↑↑↑↑</p>	
<p>Project Description</p> <p>Strategic Goal 01 - Renewables</p> <p>Initiative</p> <p>Energy Delivery</p> <p>Responsible Area</p> <p>Capital Project/Program</p> <p>Project Funding</p> <p>Implementation/Construction</p> <p>Authorization</p> <p>PUC Status</p> <p>Application Discovery / IR</p> <p>Project Phase</p> <p>Executing</p> <p>Project Activity</p> <p>Active</p>		<p>Schedule Variance / Time & Dependency Comments</p> <p>% Complete</p> <p>Sched. Perf. Index (SPI)</p> <p>PUC Approval Date</p> <p>xx/xx/xxxx</p> <p>PRC Authorized Date</p> <p>xx/xx/xxxx</p> <p>PUC Plan In-Service</p> <p>xx/xx/xxxx</p> <p>Actual Construct. Start</p> <p>xx/xx/xxxx</p> <p>Forecasted In-Service</p> <p>xx/xx/xxxx</p> <p>Actual In-Service</p> <p>xx/xx/xxxx</p>	
<p>Budget Variance / Cost Comments</p> <p>Actual cost as of</p> <p>xx/xx/xxxx</p> <p>PUC Amount</p> <p>Additional</p> <p>Total Budget</p> <p>Est. at Compl. (EAC)</p> <p>EAC Formula</p> <p>Comments on Cost</p>		<p>Misc.</p> <p>Enter comment on Misc. issues.</p> <p>↑↑↑↑</p>	
<p>New News This Month</p>		<p>New News This Month</p>	

Project Earned Value Management (EVM)

HECO EPMO requires that all projects are evaluated based on a quantitative industry standard project performance measure. EVM provides a quantitative basis for estimating actual completion time and actual cost at completion. Definitions provided below. It is expected that EVM be used in this project to show project progress.

Metric	Abbrev.	Interpretation	Description	Formula/Value
Budget at Completion	BAC	How much did you BUDGET for the TOTAL JOB?	Baseline cost for 100% of project.	N/A
Actual Cost of Work Performed or Actual Costs	ACWP or AC	What is the actual cost incurred?	Total costs actually incurred so far.	N/A
Budgeted Cost of Work Performed or Earned Value	BCWP or EV	What is the estimated value of the work actually accomplished?	Amount of budget earned so far based on physical work accomplished, without reference to actual costs.	N/A
Budgeted Cost of Work Scheduled or Planned Value	BCWS or PV	What is the estimated value of the work planned to be done?	The budget for the physical work scheduled to be completed by the end of the time period.	N/A
Cost Variance	CV	What is the dollar amount variance?	Measure of cost overrun. The difference between the budget for the work actually done so far and the actual costs so far.	Budgeted Cost of Work Performed–Actual Cost of Work Performed BCWP-ACWP
Cost Performance Index	CPI	What percent of cost is the project performing at?	Cost efficiency ratio. A CPI of 1.00 means that the costs so far are exactly the same as the budget for work actually done so far.	Budgeted Cost of Work Performed/ Actual Cost of Work Performed BCWP/ACWP
Schedule Variance	SV	What is the measure of time variance?	Measure of schedule slippage. The difference between the budget for the work actually done so far and the budgeted cost of work scheduled.	Budgeted Cost of Work Performed–Budgeted Cost of Work Scheduled BCWP-BCWS
Schedule Performance Index	SPI	What percent of schedule is the project performing at?	The schedule efficiency ratio. An SPI of 1.0 means that the project is exactly on schedule.	BCWP/BCWS
Estimate to Completion	ETC	From this point on, how much MORE do we expect it to cost to finish the job?	The expected additional cost to complete.	Estimate at Completion–Actual Cost Work Performed EAC-ACWP
Estimate at Completion	EAC	What do we currently expect the TOTAL project to cost?	Expected total cost based on the current cost efficiency ratio.	BAC/CPI ¹ AC + BAC - EV ² AC + (BAC - EV) / CPI ³ AC + ETC ⁴
Variance at Completion	VAC	How much over or under budget do we expect to be?	Estimated cost overrun at the end of project.	Budget at Completion–Estimate at Completion BAC-EAC
Status		calculation of the current status in time	Average of CPI & SPI.	(Cost Performance Index+Schedule Performance Index)/2 (CPI+SPI)/2
			GREEN = On track	>1.0
			YELLOW = Slightly behind schedule or budget	>0.85
			RED = Needs immediate attention	>0.65
			BLACK = Killed or Restore	<0.65

¹Used if no variances from the BAC have occurred

²Actual to date plus remaining budget. Used when current variances are atypical.

³Actual to date plus remaining budget modified by performance. When current variances are typical.

⁴Actual plus a new estimate for remaining work. Used when original estimate was fundamentally flawed.

Attachment 2

Smart Grid Foundation Project

Exhibit E

Smart Meter Installation Request for Proposal



SMART METER INSTALLATION

REQUEST FOR PROPOSALS

RFP NO. 031914-03

Issued Date: March 3, 2015

FREEDOM OF INFORMATION ACT (FOIA) NOTICE: This document contains trade secrets and/or proprietary, commercial, or financial information not generally available to the public. It is considered privileged and proprietary to The Companies in confidence with the understanding that its contents are specifically exempted from disclosure under the Freedom of Information Act [5 USC Section 552 (b) (4)] and shall not be disclosed by the recipient [whether it be Government (local, state, federal, or foreign), private industry, or non-profit organization] and shall not be duplicated, used, or disclosed, in whole or in part, for any purpose except to the extent in which portions of the information contained in this document are required to permit evaluation of this document, without the expressed written consent of The Companies.

Hawaiian Electric Company, Inc.

**Smart Meter Installation
Request for Proposal
031914-03**

EXECUTIVE SUMMARY

The Hawaiian Electric Company, Inc. (Hawaiian Electric) is an energy utility, regulated by the State of Hawaii's Public Utilities Commission (PUC), providing electric generation, transmission, and distribution services. Hawaiian Electric is a wholly owned subsidiary of Hawaiian Electric Industries, Inc., which is a publicly owned corporation. Hawaiian Electric has two subsidiaries, Maui Electric Company, Ltd. (Maui Electric), and Hawaii Electric Light Company, Inc. (Hawaii Electric Light). Hawaiian Electric, Maui Electric, and Hawaii Electric Light are collectively referred to for purposes in this document as "The Companies."

The Companies are currently seeking proposals for the installation of approximately 490,000 single-phase, residential self-contained smart meters. The purpose of this installation is to enable the continued rollout of The Companies' smart grid.

The Contract scope of work of the successful Meter Installer, upon bid award, includes the Installation of up to 490,000 smart meters, including receipt, tracking, testing, and inventory management of the meters. Additionally, The Companies expect the Meter Installer to attend technical and safety training provided by The Companies. Finally, in order for bidders to submit a complete proposal, a complete response to the Installation Requirements spreadsheet (Attachment E) is required to verify the bidder's compatibility with the needs of The Companies.

Bidders shall also submit the Detailed Pricing Sheet (Attachment F) to offer The Companies the opportunity to evaluate and compare pricing.

The capital project identified in this request for proposal (RFP) is targeted to start in 2016 and be completed (installed) by 2019. Training work is expected to begin in late 2015 but may fall into 2016 if deemed necessary by time constraints.

Toni Mitobe-Shuster (A.Mitobe-Shuster@hawaiianelectric.com) shall be the main point of contact and lead the coordination of the bidding and procurement process.

The Hawaiian Electric AMI Division shall be the main point of contact and lead the coordination of this project after bid award.

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1.0 Request for Proposal

1.1 *Proprietary Rights and Confidentiality*

This request for proposal (RFP) has been prepared exclusively for Hawaiian Electric and is proprietary in nature. Hawaiian Electric reserves all copyrights for this document and its constituent parts and prohibits any unauthorized use or reproduction hereof. All portions of this RFP and Attachments are designated as confidential (“Confidential Information”). Confidential Information shall not be disclosed to third parties without Hawaiian Electric’s prior written consent, except that the bidder may disclose Confidential Information to its consultants, affiliates, attorneys or potential subcontractors who need the Confidential Information for purposes of preparing a responsive proposal, and provided that such recipient is advised of the confidentiality of the Confidential Information and is bound by the Non-Disclosure Agreement (NDA) currently executed with Hawaiian Electric for this RFP.

1.2 *Proposal Schedule*

The Smart Meter Installation Project (“the Project”) has the following bid schedule:

RFP Issue	Tuesday, March 3, 2015
Intent to Submit Bid Form Due	Monday, March 9, 2015 2:00 PM
Deadline for Bid 1 st Round of Questions	Wednesday, March 11, 2015, 2:00 PM
Bidder’s Conference	Tuesday, March 17, 2015
Deadline for Questions	Monday, March 23, 2015
Bids Due	Monday, March 30, 2015, 2:00 PM
Notification of Down Selected Vendors	Friday, April 24, 2015
Vendor Demonstration Call	April 28-30, 2015
Award Condition to Positive D&O	Thursday, May 7, 2015

(Hawaii Standard Times [HST])

1.3 *Intent to Submit Bid Form*

Please submit the “Intent to Submit Bid” form (Attachment A) to the contact person specified in Section 1.5 of this RFP **by 2:00 PM HST, Monday, March 10, 2015**. This confirms your intention to submit a proposal. The Companies reserve the right not to consider any proposal from a potential bidder who does not provide timely confirmation.

1.4 Bid Submittals

Bids are due on or before 2:00 PM HST on Monday, March 30, 2015 (the Proposal Due Date). The Companies in their sole discretion may cancel or postpone the Proposal Due Date at any time by providing notice to each potential bidder, which notice shall be deemed an amendment of this RFP.

One (1) hard copy of the proposal shall be delivered to and received by The Companies at the following addresses on or before the Proposal Due Date:

Via U.S. Postal Service

Hawaiian Electric Company, Inc.

PO Box 2750

Honolulu, HI 96840-0001

Attn: Toni Mitobe-Shuster, Hawaiian Electric Purchasing (CP11-VP)

Via overnight mail or hand delivery

Hawaiian Electric Company, Inc.

820 Ward Avenue

Honolulu, HI 96814

Attn: Toni Mitobe-Shuster, Hawaiian Electric Purchasing (CP11-VP)

Hawaiian Electric Purchasing will record the date and time of receipt of proposals. Hawaiian Electric Purchasing's record of receipt will be deemed controlling in the event of any dispute whatsoever relating to the delivery of a proposal. The Companies may reject Proposals that are delivered after the Proposal Due Date, or otherwise not in conformity with the requirement of this RFP, at The Companies' sole discretion and without notice to bidder.

The proposal shall be signed and dated by one having authority to contractually obligate the bidder by the terms of the proposal.

The hardcopy proposal shall be contained in a sealed envelope with the following information shown on the package:

**Response to Smart Meter Procurement
RFP No. 031914-03
Confidential Sealed Bid Proposal
Deliver to Toni Mitobe-Shuster**

The bidder's company name and address shall also be noted on the package.

An electronic copy of the proposal may also be submitted (but not in place of the hard copies) to a.mitobe-shuster@Hawaiianelectric.com.

1.5 Bid Validity Period

All bids submitted shall be valid for a period of twelve (12) months after the Proposal Due Date.

1.6 Bid Proposal

Bid proposals as noted in Section 3.0 shall include the following:

Transmittal Letter
Executive Summary
Scope of Work
Detailed Project Schedule & Detailed Work Plan
Experience, Qualifications and References
Detailed Pricing
Installation Requirements Response (See Attachment E)
Technology and Cybersecurity Requirements Response (See Attachment D)
Acceptance of, or exceptions taken to, the Purchase Contract (“Contract”)
Exceptions taken, if any, to the RFP

1.7 Additional Information

After the receipt of the proposals, The Companies may request additional information to clarify the bidder’s proposals via email or a conference call. Failure by a bidder to provide the additional information or to participate in such requested meeting without an excused reason acceptable to The Companies in their sole discretion shall be cause for disqualification. The Companies may negotiate with one or more bidders, as The Companies may determine in their sole discretion.

1.8 Bidder's Responsibilities

Each bidder has the sole responsibility for carefully reviewing the RFP and all attachments and for thoroughly investigating and informing themselves with respect to all matters pertinent to this RFP, its proposal, and its anticipated performance under the Contract.

Each bidder is responsible for proposing all terms, conditions, agreements and services that will be required for its successful completion of the smart meter installation.

In preparing and submitting proposals, bidders shall not rely upon any oral statements made by The Companies' employees, consultants, or agents.

Each bidder shall be solely responsible for and shall bear all costs incurred in its preparation of its proposal and/or its participation in this RFP, including, but not limited to, all costs incurred with respect to the review of the RFP documents, site visits, third party consultant consultation, and investigation and informing itself with respect to matters pertaining to its proposal and this RFP, and same shall not be reimbursed by The Companies to any bidder, including the selected Meter Installer.

Each bidder should clearly identify each page in their bids that they consider confidential or proprietary. Regardless of the confidentiality of any information submitted, all such information may be subject to review by the Hawaii Public Utilities Commission (PUC) or any other governmental authority with jurisdiction relating to these matters and may be subject to discovery in legal proceedings. Under such regulatory and legal circumstances, The Companies will make reasonable efforts to preserve bidders' confidential information, including that such information be filed under seal.

1.9 Modification of Proposal

A proposal may be modified at any time prior to the Proposal Due Date.

In order to modify its proposal, the bidder shall submit a revised proposal, clearly identified as such, which expressly supersedes and replaces the earlier proposal from the bidder; the revised proposal shall identify the date of the earlier proposal that it is superseding and replacing.

Revised proposals are subject to all requirements of this RFP, shall not incorporate or rely upon the proposal that it is superseding and replacing and shall be delivered to or received by The Companies on or before the Proposal Due Date.

A proposal may not be modified or revised after the Proposal Due Date.

1.10 Withdrawal of Proposal

A proposal may be withdrawn at any time prior to the Proposal Due Date.

A proposal will be deemed withdrawn upon receipt by The Companies of a hardcopy “Withdrawal of Proposal” notice delivered to the office identified in Section 1.5 above, on or before the Proposal Due Date.

Proposals that have been withdrawn pursuant to this section will not be considered by The Companies and may be discarded.

Proposals may not be withdrawn after the Proposal Due Date for any reason, including, but not limited to, errors or mistakes.

1.11 Correction of Errors in Proposal

A bidder may correct errors in its proposal prior to the Proposal Due Date by modification or withdrawal of a proposal pursuant to Sections 1.10 or 1.11, above.

After the Proposal Due Date, only The Companies is authorized to correct errors in the proposals.

Minor errors in a proposal that The Companies detect after the Proposal Due Date may be deemed waived, or the bidder may be allowed to correct such error if The Companies determines it is in their best interest to do so.

The Companies may correct errors in proposals after the Proposal Due Date, when the error is patent and the correct information is evident. Examples of such errors may include typographical errors, errors in extending unit prices, arithmetical errors, and transposition errors.

1.12 Opening of Proposal

The Companies will open proposals on or after the Proposal Due Date as The Companies, in their sole judgment and discretion, deem appropriate. Bidders are not entitled to be present for The Companies’ opening of proposals.

1.13 Evaluation of Proposal

Proposals will be considered in conjunction with information submitted by other bidders as well as any additional information as The Companies, in their sole discretion, deem appropriate.

The evaluation of proposals will be based upon criteria that The Companies, in their sole judgment and discretion, believe to be in the best interest of The Companies and their customers. Bidders shall not be entitled to disclosure of The Companies' evaluation criteria or information pertaining to The Companies' actual evaluation and analysis of proposals.

The Companies shall have the right to reject any proposal, which The Companies, in their sole judgment and discretion, believe to be unsatisfactory or unresponsive, and may, as well, at any time up to the award of the Contract, withdraw this RFP and elect not to award the Contract.

Subject to the foregoing, and other factors in their best interest, The Companies will review, evaluate, and recommend selection of a winning proposal based on the following evaluation criteria:

- **Cost Proposal**

The bidder's proposal shall provide a meter receipt, tracking, inventory management and installation cost in accordance with the Installation Requirements (Attachment E). The bidder will be compensated for expenses incurred under this Contract on a time and expenses basis, with monthly invoicing requirements as described in Section 2.6.

- **Responsiveness to Bid Specifications and Requirements**

Bids initially will be screened for completeness and compliance with the Bid Proposal Requirements as described in Section 3.0.

- **Bidder Experience and Qualifications**

The bidder's experience is another evaluation criterion.

- **Acceptance of Contract Terms & Conditions**

This refers to the acceptance of the Contract terms by the bidder. Any proposed modifications to, or disagreements with, the Contract will be evaluated here.

1.14 Vendor Demonstration

The Companies will notify the down-selected Meter Installers to demonstrate the meter install methodology including but not limited to the install process, software tools used and project management approach. A proposed agenda for the demonstration is shown below:

Meter Installation Demonstration Agenda:

Mode: Conference Call

Duration: 3 hours

- Introductions, related background and experience
- Installation process flow
- Tools and accelerators (Work order, Customer database, etc.)
- Project management approach
- Tools demonstration
- Conclusion & Questions

1.15 Award

The Companies reserve the right to award the Contract to the bidder that, in The Companies' sole judgment and discretion, has provided a proposal that is in the best interests and provides the best value to The Companies and their customers.

The Companies reserve the right to award the Contract to other than the lowest bidder.

The Companies reserve the right to determine not to award the Contract, or to re-bid, restate, revise, or cancel this RFP or any project related to the RFP.

The Companies shall not be required to identify to any bidder the basis upon which it awarded the Contract to the selected bidder and/or rejected the proposals of any other bidder.

This RFP will be awarded to the successful bidder as a whole package, or in partial.

1.16 Notification of Award

The Companies will notify the bidder of its selection, by phone, electronic mail or other means.

The selection is provisional until execution of a Contract by The Companies and the selected bidder. Until such time, The Companies may revoke or change their selection for any reason, including but not limited to failure of The Companies and the selected bidder to agree on final terms for the Contract.

1.17 Protest of Appeal of Award

No bidder shall have the right to protest or appeal the award of the Contract made by The Companies.

2.0 Project Background and Objectives

2.1 *Hawaiian Electric*

Hawaiian Electric is a wholly owned subsidiary of Hawaiian Electric Industries, Inc., which is a publicly owned corporation. Hawaiian Electric has two subsidiaries, Maui Electric and Hawaii Electric Light. Hawaiian Electric, Maui Electric, and Hawaii Electric Light are collectively referred to for purposes in this document as “The Companies”.

Additional information can be found at www.heco.com or will be made available upon request.

2.2 *Smart Meter Installation*

Smart grid modernizes the electric grids, enables more renewable energy, reduces outage times, increases the efficiencies of our operation, reduces costs, and, most importantly, delivers tangible benefits to our customers. The Companies propose to implement smart grid on all five islands served (Oahu, Maui, Lanai, Molokai, and Hawaii).

The Companies’ overarching goal is to successfully implement a smart grid that brings the greatest benefit to customers: implementing a smart grid, efficiently and cost-effectively. Smart grid brings enormous changes for The Companies, for The Companies’ customers, and for the state of Hawaii. The Companies’ plans reflect their understanding of the complexity of this undertaking. As the Hawaii PUC requested, The Companies have developed a roadmap and business case. As such, The Companies have based their roadmap and business case on a review of other smart grid implementations and on carefully specified fundamental assumptions, documented in The Companies’ Smart Grid Roadmap and Business Case.¹

This RFP is designed to identify the most suitable bidder to provide The Companies with smart meter installations for integration with the Silver Spring Networks’ (SSN’s) advanced metering infrastructure (AMI), as part of The Companies’ smart grid initiative. The meters are fundamental to the overall initiative.

2.3 *Project Objectives*

The key objectives of the Smart Meter Installation effort include the following:

- Meter receipt and installation preparation

¹ A PDF of The Companies’ Smart Grid Roadmap and Business Case is available here:
<http://www.solari.net/documents/portfolio/Solari-Smart-Grid-Roadmap-&-Business-Case.pdf>

- Replacement of all existing residential self-contained, single-phase meters with smart meters, conforming to safety and field visit training provided by The Companies
- Replacement of assigned commercial & industrial self-contained, single-phase meters with smart meters, conforming to safety and field visit training provided by The Companies
- Tracking and Inventory of all meters and consumables at each stage of the delivery and installation process
- Safe and secure removal of any meters Hawaiian Electric Companies authorizes for disposal
- Provide Hawaiian Electric with old meters of certain types that Hawaiian Electric will specify such as but not limited to meters with cracked glass as well as broken meters
- One hundred eighty-day (180-day) warranty for the smart meters installation, with any rework to be reimbursed to The Companies or to be done at the Meter Installer's own cost as appropriate to limit multiple customer visits

As stated in the Executive Summary, this Project is tentatively targeted to start by August 2016 and be completed (installed) by the end of 2019. Training will take place in 2015 and may be adjusted as needed.

2.4 *Pre-Bid Responsibilities*

This section provides a description of what The Companies anticipate a Meter Installer shall do in advance of providing a proposal. The following tasks are not included as part of the *contract* deliverables, but shall be submitted as *part of the proposal*:

1. Complete Installation Requirements Assessment
2. Complete Technical Requirements Assessment

2.5 *Contract Task Descriptions and Deliverables*

This Section provides a description of the minimum tasks that the successful bidder ("Meter Installer") shall perform to meet the Contract functional and technical requirements and meter quantities.

a. Task 1: Status Reporting

The Companies expect the Meter Installer to provide The Companies with weekly status reporting containing (but not limited to) the following information:

- Status of remaining inventory
- Installations completed in current week
- Year-to-date installations
- Life of Project installations
- Tamper detection report
- Emergency repairs
- Expected installations in subsequent month

b. Task 2: Training and Installation Dry Run

All Meter Installers are required to attend the following training, provided by The Companies:

- Safety training (half-day)
- Field visit training (half-day)
- Customer service training (half-day)
- Tamper-detection training (half-day)

In addition to these training sessions, the Meter Installers' resources shall complete and pass a full-day dry run installation session led by The Companies.

c. Task 3: Inventory Management

Meter Installers are responsible for the ongoing management of inventory for all meters throughout the duration of the Project.

The Meter Installer will be responsible for securing its own staging areas. The Companies will have all meters shipped to The Companies' meter shops on Oahu, Maui, and Hawaii. Each meter shop will perform sample residential single-phase, self-contained meter testing with the battery connected, after which the Meter Installer will be responsible for retrieving the meters from the meter shops and placing them into its own secure facility. The Meter Installer shall be responsible for the security of the meters, including, but not limited to, keeping the facility locked and secured at all times, utilizing security guards, utilizing security cameras, tracking meter serial numbers, maintaining meter seal integrity, and returning meter serial numbers that are not used. The Companies reserve the right to inspect the Meter Installer's facility prior to the meters' shipment and when the meter shipment arrives at the facility. The Companies will inspect the facility and provide an opinion whether the facility is adequately secure. If the facility is not deemed adequately secure, The Companies may advise the Meter Installer to change location or to improve security. The Meter Installer will be responsible to secure the vehicles used for installation. The vehicles must be locked and secure when storing or transporting new

smart meters and the old meters that were removed from the customer's premise. The Companies reserve the right to inspect the Meter Installer's vehicles for adequate security.

In addition to being responsible for the receipt of all meters, the Meter Installer, in alignment with the anticipated installations schedule, shall dictate the shipment schedule for each island.

Once received, the Meter Installer will be responsible for the following:

1. Warehouse Staging

The Meter Installer shall stage the meters prior to installation, at the Meter Installer's premises.

The intent of the Warehouse Staging is to ensure that the meters are ready for installation.

Requirements:

- a. The Meter Installer will provide all necessary personnel needed to conduct Warehouse Staging. Any deviations and will be resolved at the Meter Installer's expense, including any return trips required by The Companies' personnel.

2. Meter Tracking

The Meter Installer shall track all meters at every stage of the installation life cycle, from receipt to installation and disposal (of replaced meters).

Requirements:

- a. The Meter Installer shall assign meters and seals to individuals and require that installers sign out the meters to keep track of inventory.
- b. The Meter Installer shall track installation progress and maintain this information in a database; reports are to be shared with The Companies as requested.
- c. The Meter Installer shall record the following information when checking meters in and out: meter type, meter number, origin code, date, and personnel name. Check-in form should also include

nameplate information and register readings. Check-in and check-out forms shall be submitted to The Companies' point of contact as specified during onboarding.

The Companies expect the following total meter quantities for each island:

Island	Quantity
Oahu	300,000
Maui, Molokai, Lanai	100,000
Hawaii	As many as 85,000

d. Task 4: Meter Installations

The Meter Installer will be responsible for several aspects of the installation life cycle, including all aspects of the Installation Requirements found in Attachment E. The overall installation process consists of scheduling, workforce management, installation, supervision, and meter disposal.

Scheduling, Work Order Management System (WOMS), Supervision, and Disposal

The Meter Installer shall coordinate with The Companies' meter reading schedule in order to develop a daily meter installation schedule. In doing so, the Meter Installer shall also correspondingly assign, manage, and supervise its own workforce. Finally, once the meters have been installed, the Meter Installer will also be responsible for the safe disposal of replaced or removed meters.

Requirements

- a. The Meter Installer shall manage scheduling/rescheduling customer visits with the customers directly and will ensure avoidance of conflicts with scheduled meter readings, outages, maintenance, billing cycles, etc.
- b. The Meter Installer will handle the installation of meters for special customers (e.g. Life Support Customers) according to The Companies' special customer care procedures.
- c. The Companies will notify customers about meter replacements at the outset of the Project; the Meter Installer shall provide customer notifications via letter or postcard to service address at least two (2) weeks prior to entering the neighborhood. The postcard shall contain a phone number the customer can use to resolve scheduling issues. The

Companies' corporate communications division prior to being sent by the Meter Installer shall create the content of this correspondence.

- d. The Meter Installer shall retry customer contact and scheduling at least three (3) times, spread out over several weeks, before assigning the customer to The Companies for reassignment or follow-up.
- e. The Meter Installer shall meet The Companies' meter installation schedule: 24 months for Maui (3,000/month) and Hawaii (3,500/month); 24-36 months for Oahu (8,333/month) as specified by the Companies.
- f. The Meter Installer shall track installation progress and maintain this information in a database; reports are to be shared with The Companies as requested.
- g. The Meter Installer shall document any signs of tampering on existing meters and meter sockets, hold, and label tampered meters and meter sockets, report suspected tampering to designated Company personnel, and transport the meters and meter sockets to The Companies' meter shop.
- h. For the non-smart meters that The Companies request the Meter Installer to dispose of, the Meter Installer shall ensure digital meter's metrology boards are destroyed during disposal and electromechanical meters are rendered useless.
- i. The Meter Installer shall provide sufficient supervision of its installer to ensure quality installation processes.
- j. The Meter Installer shall manage the workforce and installation process for all assigned meters until installation is complete.
- k. The Meter Installer's WOMS shall be constrained to sequential installation, rather than grouping.
- l. The Meter Installer shall follow The Companies' meter installation process. A sample of what that process may look like is described below:
 1. Upon reaching the residence, politely knock on the door to let the customer know you are on-site to change the meter and they will experience a brief outage
 2. Look at the existing meter that is installed. Check for signs of tampering, safety issues, significant rust or corrosion. If the site is unsafe to install, do not proceed with the installation. Note that this site is not suitable for installation. This information should be transmitted back to the utility to address

3. If the existing meter looks suitable, take a picture of the existing meter read and record the final read in the Meter Installer's WOMS. Pictures of the existing meter read should be stored and catalogued by the Meter Installer
 4. Pull meter
 5. Check voltage. If not within 120V +/- 7.5%, note the voltage
 6. Scan barcode of the new AMI Meter
 7. The Companies will provide instructions for meters that were removed during the installation process later. The Meter Installer is expected to temporarily store these meters, until it can be transported to The Companies; facilities, which could occur as frequently as weekly to monthly basis.
- m. The Meter Installer shall be able to provide its own vehicles necessary for the installation of the meters. These vehicles shall be able to be secured if equipment and/or tools will be stored in them. The Companies reserve the right to inspect the vehicles and provide an opinion whether the vehicles are adequately secure. If the vehicles are not deemed adequately secure, The Companies may advise the Meter Installer to improve security
 - n. The Meter Installer shall be able to provide all the tools, equipment, and professional service necessary for the installation process (e.g., meter pullers, pallet trucks, forklifts, hand trucks, lock cutters, software, back-office systems, etc.).
 - o. The Meter Installer shall comply with personal protection requirements in Hawaiian Electric's safety manual.
 - p. The Meter Installer shall comply with the installation process defined by The Companies. A sample of the potential process is described in Task 4, section I above.
 - q. The Meter Installer is responsible for any emergency repairs encountered during the installation if a customer premise loses power during the meter exchange. The Meter Installer is expected to call the Meter Installation Project Manager prior to proceeding with any repairs. The repairs will be done, at the Companies expense. The Meter Installer shall process and assume responsibility for retroactive permitting.
 - r. The Meter Installer shall provide the data that is required by The Companies' Customer Information System (CIS), SAP-CIS, to complete meter replacement transactions. The required data are the following:

1. Replacement Date
2. Old Meter Number
3. Old Meter Read (Out Reads/Removal Reads)
4. New Meter Number
5. New Meter Read (In Reads/Install Read)
6. Latitude GPS Coordinates (WGS84 format)
7. Longitude GPS Coordinates (WGS84 format)
8. Other/Comments

This information shall be delivered to The Companies no later than 12 midnight of the replacement date.

- s. The Meter Installer shall be able to provide photos of the removal reads (out reads) for every meter that is replaced. This information shall be easily accessible from their WOMS. These photos shall be archived, cataloged with customer reference, or made available to The Companies at any time during the installation (period).
- t. The Meter Installer shall update its daily deployment route based on updated information received from the SAP-CIS. Updates from The Companies to the Meter Installer may be weekly or as frequently as daily.
- u. The Meter Installer will deactivate meter installation work orders for those customers who have decided not to have their meters replaced. The Meter Installer shall notify The Companies of any customer opt-outs. The procedure for opt-out notification will be provided later.

Installation of Commercial and Industrial meters

The Meter Installer shall provide adequate qualification and references to show expertise in installing commercial and Industrial (C&I) meters. Should The Meter Installer have enough experience, they shall provide The Companies pricing details to install C&I meters. All applicable requirements for meter installations listed above shall be followed along with the process identified below currently in use by The Companies.

1. Notify occupants of the meter change. Whenever possible, get approval to turn off customer main switch prior to changing the meter even if commercial test by-pass facility exists. If no by-pass facility, inform the occupant of the short outage.
2. Take the meter read. Record readings of all registers.
3. Apply all required personal protective equipment (PPE) and proceed in accordance with The Companies' Safety & Health Manual.

4. Remove the seals.
5. Put bypass links on if commercial test by-pass facility exists (self-contained C&I customers should not experience an outage during the meter installation, contractor must have adequate expertise and experience to install jumpers or activate the bypass switches).
6. Remove the sealing bands and covers.
7. Open the main circuit breaker if commercial test by-pass facility does not exist.
8. Remove the meter.
9. Inspect meter socket. Ensure there is no socket damage, loose connection, or foreign object present.
10. Test the voltages to make sure they are as you would expect.
11. Put in the new meter.
12. Remove the commercial bypass links if applied earlier.
13. Close the main circuit breaker if opened in an earlier step.
14. Make sure power is flowing as you expect.
15. Make sure that the meter is operating correctly.
16. Put the covers and sealing bands on.
17. Apply the seals.

Testing

Once the Meter Installer has installed the meters, the Meter Installer shall perform a simple, post-installation test to ensure that the meters are functional.

Requirements

- a. Failed meter activation tests will be documented, corrected, and re-tested. All defective meters will be replaced and re-tested. Defective equipment that cannot be corrected will be replaced at the expense of the Meter Supplier. All tests where the results may be affected by the corrective actions will be repeated.
- b. Meter testing procedures shall comply with American National Standards Institute (ANSI) C12 standards.
- c. The Meter Installer shall be able to provide its own equipment for any post-installation testing.

Quality Assurance and Control

The Project calls for the highest quality installation process, especially in that the Meter Installer will be interacting directly with The Companies' customers. As such, the Meter Installer shall propose Quality

Assurance/Quality Control processes in order to ensure an optimal public presence and quality of installations.

Requirements:

- a. The Meter Installer shall provide sufficient supervision of its installer to ensure quality installation processes.
- b. The Meter Installer shall comply with The Companies' quality control processes, which may be performed by an external contractor and may occur during or after installation.
- c. The Meter Installer shall operate its own CIS and WOMS.

e. Task 5: Customer Support

The Meter Installer is required to provide customer service resources for The Companies' customers in order to respond to questions about installation scheduling.

Requirements

- a. The Meter Installer's customer service resources shall attend a half-day customer service training session.
- b. The Meter Installer shall provide a call center that operates during normal business hours: 7:00 AM–6:00 PM HST, Monday through Friday, excluding holidays.
- c. The Meter Installer shall be able to hot-swap calls to the advanced metering infrastructure (AMI) hotline or The Companies' centralized call center and enable AMI hotline or the Companies' centralized call center to forward calls to the Meter Installer's customer service line.
- d. The Meter Installer shall provide The Companies' call center with copies of initial outreach materials provided by The Companies and sent to customers from The Companies customer relations as well as subsequent outreach materials sent by the Meter Installer and generated by The Companies' corporate communications.

2.6 Invoicing

The Meter Installer shall submit to The Companies three (3) copies of a monthly status report and invoice, broken down by task and subtask. The status report will include a brief description of the task, the work completed for the current reporting period (the 1st through 30th/31st of the previous month), work projected for the following reporting

period, project schedule updates, hours expended and hours remaining on the Contract for each task. The Company may require the Meter Installer to submit one monthly status report and invoice to Hawaiian Electric (with Hawaiian Electric, Maui Electric, and Hawaii Electric Light breakdowns) or The Company may require three separate reports and invoices submitted directly to each operating company.

Payment for labor and expenses will be processed on a monthly basis.

Important: The Meter Installer shall *mail* the *original* hardcopy of invoice and status report to the following address:

Hawaiian Electric Company
Attn: Accounts Payable (CP11-AD)
P.O. Box 2750
Honolulu, Hawaii 96840-0001

When the invoice is mailed, the Meter Installer shall also send an email with electronic copy of the invoice and Status report to a designated representative for the Companies, which will be determined and communicated to the Meter Installer later.

All invoices will be submitted to and paid by The Companies.

3.0 Bid Proposal Requirements

The Smart Meter Installation is targeted to start on or about August, 2016 and be completed (equipment in-service) on or about August 31, 2019.

Each proposal shall include the items listed in this section.

3.1 *Cover Letter*

Provide a cover letter that contains the identity of the individual(s) authorized to commit the company to a contract, identity of the individuals(s) who can be contacted regarding proposal content, identity of the validity period of the offer, etc.

It shall also contain a statement that the proposal meets the specifications of each subsection of the RFP.

An officer of the bidder shall sign the letter.

3.2 *Executive Summary*

Include an executive summary that briefly and concisely conveys what the bidder sees as the most important messages of the proposal, the factors of differentiation, and the critical points that The Companies should consider in their evaluation. Please explain how the bidder's approach will benefit The Companies from immediate and long-term perspectives.

3.3 *Scope of Work*

a. Methodology, Scope, and Approach

1. Describe the bidder's service delivery methodology and approach for performing the services requested within Section 2.5 of this RFP .
2. Include a description of each of the key phases for assuming responsibility of the services requested based upon the requirements of this RFP.

b. In-scope and Out-of-scope

Based on the information that The Companies provided in this RFP, identify all of the elements the bidder considers in-scope and out-of-scope for this Project. Include a matrix of what the bidder considers in-scope and out-of-scope as an appendix to the proposal.

c. Proposed Timeline and Key Milestones

Identify the proposed timeline, key milestones, and major tasks associated with providing the inventory management, scheduling, installation, and disposal services.

Include a full description of the tasks and identify the party responsible for completion of each task (i.e., primary responsible).

Provide the requested baseline installation options and duration timelines.

Provide alternative timeline and schedule based on the bidder's experience.

Timelines and schedules shall be delivered in Microsoft Project 2010. Additional formats for presentation purposes will also be accepted.

d. Acceptance Process

- a. Identify the acceptance process and general acceptance criteria that The Companies will utilize to measure the quality and achievement of milestones.
- b. Provide an acknowledgement that the bidder's performance will be measured based on The Companies' approval of achieved milestones.

e. Equipment Fabrication and Configuration

- a. Identify specific steps to be taken in order to prepare the meters for installation.

f. Reuse Knowledge

Describe the bidder's ability to leverage internal knowledge base and reuse knowledge capital from prior engagements of a similar nature.

g. Project Tools and Templates

Based on the Technical Requirements that The Companies indicated, outline the bidder's experience and capabilities in using the following:

- a. MS Project
- b. Project-specific tools
- c. Microsoft SharePoint

Identify all additional tools and templates that the bidder proposes to utilize for reporting, collaboration, performance dashboards, etc. Include best practice templates and

accelerators that demonstrate the bidder's ability to be innovative, productive and efficient while understanding how to work with The Companies' business culture.

For these additional tools identified, provide an acknowledgement that The Companies will have a perpetual worldwide royalty-free license to use such tools during and upon expiration/termination of the Project. Please clearly identify any existing and/or ongoing support maintenance fees.

h. Internal Knowledge Transfer and Transition

1. Describe the bidder's approach to internal knowledge transfer and transition management.
2. Describe the bidders's commitment to maintaining staff/consultant continuity for the duration of the Project. In the event of unplanned turnover, describe the bidder's process for managing turnover.

i. Organizational Change Management

Describe the proposed change management approach for the Project.

Identify the bidder's change management philosophy, methodology, management framework, and deliverables necessary for organizational change.

j. Data Sharing

The bidder shall provide a proposed methodology for data sharing, as explained in Section 2.5. Specifically, the following represent the data-sharing requirements related to the Meter Installation Project:

1. Meter Installer WOMS shall have the ability to import batch The Companies' customer data from SAP-CIS on a weekly basis.
2. Meter Installer CIS and WOMS shall have the ability to update its daily deployment route based on updated information received from The Companies' SAP-CIS.
3. Appropriate frequency of the following high-level data objects for data transfer/integration into The Companies' existing allocation systems:
 - a. Customer Object (from The Companies to Meter Installer)
 - b. Location Object (from The Companies to Meter Installer)
 - c. Meter Object (from Meter Installer to The Companies)
 - d. Work Order Object (from Meter Installer to The Companies)

k. Reporting

The bidder shall provide report template and proposed delivery formats for the following required reports:

1. Weekly status report
2. Meter reads and:
 - a. Replacement Date
 - b. Old Meter Number
 - c. Old Meter Read (Out Reads)
 - d. New Meter Number
 - e. New Meter Read (In Reads)
 - f. Latitude GPS Coordinates (WGS84 format)
 - g. Longitude GPS Coordinates (WGS84 format)
 - h. Other
3. This information shall be delivered to The Companies no later than 12 midnight of the replacement date.
4. Meter integration status with location information (daily)
5. Test results (shall be SAP-compatible)
6. Weekly summary reports from its customer database
7. Pre-replacement functional or operational anomalies prior to pulling meters and inform The Companies as part of the daily replacement report
8. Tamper report
9. Failed customer retries (after three [3] retries)
10. Ad-hoc Meter Installation reports
11. Meter sign-in sheets

3.4 Project Schedule and Detailed Work Plan

The Companies require the bidder to assume the prime contractor role and assume responsibility for project management. Furthermore, The Companies require the bidder to include a proposed integrated project plan and schedule for the services requested in this RFP as an *attached appendix* to its response.

a. Project Management

The Companies require that this Project be managed utilizing rigorous, complex level project management standards, conformant to the Project Management Institute's (PMI's) standards for project management (as documented in The Companies' Project Management Book of Knowledge [PMBOK]).

Please note that the Meter Installer shall provide one project manager for each island's Meter Installation effort.

EPMO Project Management Standards

It is expected that the bidder will conform to the EPMO standards and recommend changes that will benefit a project of this scope and size, as needed.

See Attachment K – EPMO Standards and Sample Templates for details.

Earned Value Management (EVM)

The Companies require EVM tracking and reporting on this Project. The Meter Installer will manage and maintain the master Project schedule that will include all resources working on the Project.

Change Control

The Companies expect the Meter Installer to provide and employ a standardized change control procedure and methodology across all Project phases. This includes a detailed description of all required steps to submit, review, and approve/reject change requests, as well as guidelines for the steering committee to follow for any escalation or dispute resolution. Summarized below are examples of the change control processes that the Meter Installer will be responsible for managing in collaboration with The Companies.

Project Change Control

Process utilized to manage all material changes (scope, timeline, resources, or cost) that impact the Project. The process is performed when the Project Team is aware of a change to the then approved Project Schedule Baseline and/or associated documents.

Scope Change Control

Process utilized to perform the day-to-day management of scope changes that the Project Team, stakeholders, and/or end-users will request, including:

- *Process* – Addition or reduction of business processes included
- *Deliverable* – Addition or removal of deliverables as requested
- *Function* – Addition or removal of functions
- *Resource* – Addition or removal of resources

Contractual Change Control

Process utilized to request the significant removal, addition or change to any major item not explicitly defined or covered within the original Contract or SOW (Statement of Work). Normally, this process is executed for items that could not be resolved or have to be escalated from the scope change control procedure.

Quality Assurance Expectations

In general, The Companies will be engaging external parties to perform three (3) types of quality assurance activities on this Project. The bidder is expected to collaboratively work with these external parties in order to ensure a successful implementation. Additionally, stage gate deliverables of the bidder will be directly related to meeting the expected quality assurance targets that are set and mutually agreed to at the start of the Project.

Systems Integrator Safe Guarding

The Companies may be employing third party Systems Integrator (SI) to perform safeguarding throughout the Project's lifecycle. The SI safeguarding services for implementation may include planning, feasibility, technical integration, operations competence and go-live checks. This is to ensure that the implementation results in a quality delivery both from a technical and functional business perspective. It is expected that the bidder will collaborate and work with SI personnel when needed as outlined by the safe guarding process.

Project Management Quality Assurance

The Companies will be employing personnel either directly from the EPMO or externally contracted by the EPMO in order to conduct quality assurance activities on the Project for ensuring the appropriate level of project management rigor. This will include but is not limited to review of the Project's charter, integrated project management plan, schedule, budget, risk and issues log, reporting, change control procedures and log, project management information system, and earned value management tracking. It is expected that the bidder will collaborate and work with the EPMO personnel/contractor in order to complete this process.

SOX Controls Implementation Audit

The Companies will be employing a third-party vendor to conduct SOX control evaluations and audits in order to ensure that the Project will conform to The Companies' required SOX compliance. It is expected that the bidder will collaborate and work with the third-party vendor in order to complete this process.

3.5 Bidder Company Information, Experience and References

The bidder shall provide a brief overview and history of its company, including the following:

- a. Company mission statement
- b. Organizational chart that provides an overview of the company structure (business unit and industry alignment, if applicable) to include the names and titles of the corresponding executives
- c. A brief description of the bidder's core portfolio service offerings that align with The Companies' immediate and longer-term objectives
- d. Financial viability, include audited financial statements for the past three (3) years
- e. A summary of any pending litigation(s)
- f. Contact person(s) and the following contact information for the Project:
 - Name
 - Title
 - Telephone
 - Email
- g. Installation History
- h. Project Managers

As noted above, the bidder shall designate a Project manager for each island's Meter Installation effort.

- i. Installation Resources

Finally, the bidder is required to provide a list of installers assigned to this Project. In addition to the resource list, the bidder shall comply with the following requirements:

- Consent to background checks for each installer.
- Provide a resume of each installer's training and experience.
- Provide documentation verifying that all installers are licensed electricians in the State of Hawaii.

3.6 Pricing

The bidder's proposal shall provide a not-to-exceed value for the installation of Smart Meters in accordance with the Installation Requirements, the Project tasks identified in Section 2.5, and the delivery schedule depicted in this RFP. Please complete the Detailed Pricing Sheet (Attachment F) to reflect all costs described below.

The bidder shall provide pricing details for installation of Commercial and Industrial meters as a separate option.

Estimated costs should be itemized and include all labor and non-labor costs deemed necessary to successfully complete the Project and its deliverables as stated in Section 2.5. The proposal shall include costs for all meter receipt, preparation, tracking, inventory management, and the safe disposal of all replaced meters. The bidder shall capture the estimated cost of repairs when meter pull causes an outage.

These costs should include all management and delivery of work order management data as well as customer support and the mailing of installation informational materials.

Labor pricing should be provided for union and non-union labor, with designation as to Hawaii-based resources and non-Hawaii-based resources.

The Installer will be required to provide pricing options for:

1. Performing work with no restrictions on resources for doing the work
2. Performing work if Hawaiian Electric specified that unionized labor (an International Brotherhood of Electrical Workers-IBEW local) needed to be utilized
3. Performing work if Hawaiian Electric specified that the labor utilized needed to have a Hawaii Electricians License.

The cost proposal shall also include a fee associated with mandatory training, provided by The Companies.

All labor hourly rates for each job classification will remain valid for one year after the execution of the Contract.

Finally, estimated costs should include travel expenses. Travel expenses for this Project should be based upon the most economical, direct, coach air travel from the point of origin to Honolulu or other island destinations and utilize moderate-level hotel accommodations whenever possible. The estimated travel expenses shall not exceed 15 percent of the total Project cost. The Companies' Standard Business Travel and Expense Terms are included in Attachment I and shall be followed by the selected Meter Installer.

Hawaii General Excise Tax, if applicable, shall be listed as a separate line item. The estimated labor and non-labor costs can be summarized in tables similar to the template provided in Attachment G.

3.7 *Bidder Exceptions to the Contract*

Following the RFP process, The Companies and the selected Meter Installer will execute a General Services Master Agreement ("Contract") in accordance with the standard general contract requirements provided as Attachment B of this RFP (see note below). The Contract will be based in part on the selected Meter Installer's proposal and other information, if any, that the Meter Installer submitted during the RFP process. Other terms and conditions may be included in the Contract by mutual agreement of The Companies and the selected Meter Installer.

The bid proposal shall affirmatively state that the Contract terms contained in Attachment B are acceptable to the Meter Installer, or, the Meter Installer shall identify specifically in its bid proposal which such terms and conditions are unacceptable and shall propose substitute language that is acceptable to the Meter Installer. Terms and conditions with respect to which a bidder does not identify exceptions shall be deemed acceptable to the Bidder. Bidders should not enclose a copy of its own standard terms and say see "enclosure" as this will be considered non-responsive. The Companies shall have the right in their sole judgment and discretion to reject any proposal or evaluate it unfavorably based on exceptions taken.

Note: The Contract will be provided to all bidders prior to the bid due date.

3.8 *Bidder Exceptions to the RFP*

The bidder shall state any exceptions to the specifications and requirements of this RFP clearly in the bidder's proposal. Each exception shall be stated separately, shall identify

the relevant specification or requirement, shall identify the reason(s) for taking the exception, and shall propose a clearly stated alternative. No other exceptions shall be allowed.

The Companies shall have the right in their sole judgment and discretion to reject any proposal or evaluate it unfavorably based on exceptions taken.

3.9 Installation Requirements Assessment

The bidder shall complete Attachment E – Installation Requirements and submit as an attachment to the proposal submittal.

3.10 Technical Requirements Assessment

The bidder shall complete Attachment D – Technology and Cybersecurity Requirements and submit as an attachment to the proposal submittal.

3.11 Bidder Change-Orders after Bid Award

The Companies understand that work that the successful Meter Installer may consider above and beyond what is included in this RFP will constitute a Change Order. The Meter Installer shall submit any Change Order requests to The Companies, and The Companies may approve or disapprove, in its sole discretion, said Change Order requests. An approved Change Order request is required before the Meter Installer may conduct any work under said Change Order.

4.0 Appendices

Attachment A: Intent to Submit Bid Form

Intent To Submit Bid Form

Request For Proposal (RFP) # 031914-03

Specification Number - Smart Meter Installation

BIDDER must complete this form and return it via email to Toni Mitobe-Shuster, Purchasing Contract Manager, (a.mitobe-shuster@HawaiianElectric.com), no later than Monday, March 9, 2015.

If no proposal will be submitted, then the reason must be indicated by completing the requested data below. In addition, the inquiry documents must be returned with the completed form.

Failure to comply may render the Potential Supplier ineligible for future solicitations for the type of material(s) or service(s) involved.

Receipt of Request for Proposal No. 031914-03 covering the Installation of Smart Meters:

(Please check and complete the following as applicable)

- A) Receipt of this Request for Proposal is hereby acknowledged and we () will,
() will not, submit a proposal on or before the due date specified.

If a proposal will not be submitted, then check or complete the following as applicable:

- a. () Cannot comply with Specifications or Statement of Work.
- b. () Cannot meet delivery or performance requirement.
- c. () Do not currently manufacture or sell the type of item(s) or service(s) involved.
- d. () Other: _____
- e. We () do, () do not; desire to be considered for future solicitations for the type of item(s) or service(s) involved.

Name, address (include zip code) and telephone number (include area code) of company:

Company Name: _____

Address: _____

Company Representative Name: _____

Position/Title: _____

Phone Number: _____

FAX Number: _____

Electronic Mail Address: _____

Signature _____ Date _____

Attachment B: Sample General Services Master Agreement



Attachment B -
Sample General Servi



Exhibit: J -- G.pdf

SERVICE ORDER NO. _____
CONTRACT NO. _____

GENERAL SERVICES MASTER AGREEMENT

THIS GENERAL SERVICES MASTER AGREEMENT (the "Master Agreement" or "Agreement") is made on _____, 20____, by and between HAWAIIAN ELECTRIC COMPANY, INC. and its subsidiaries HAWAII ELECTRIC LIGHT COMPANY INC. (HELCO) and MAUI ELECTRIC COMPANY, LIMITED (MECO)] (hereinafter collectively the "Companies"), and

_____ (hereinafter "Contractor"), a _____ corporation, whose principal place of business is _____, _____, and whose mailing address is _____, doing business in Hawaii. The Companies and Contractor may be referred to individually as a "Party" and collectively as the "Parties" to this Master Agreement.

W I T N E S S E I T H :

WHEREAS, The Companies are in the business of generation, transmission, and distribution of electrical power in Hawaii; and

WHEREAS, The Companies require certain services to be accomplished in order to maintain reliable electrical power for its customers; and

WHEREAS, Contractor represents that it is equipped and has the expertise and qualifications (including required licenses, if any) necessary to perform the particular Work (as defined herein) required under this Master Agreement; and

NOW, THEREFORE, in consideration of these premises and of the mutual promises herein contained, the Companies and Contractor hereby agree that Contractor will perform the Work for the Companies under the following terms and conditions:

I. **APPLICATION OF THE MASTER AGREEMENT**

1.1 **Purpose of Master Agreement** - The purpose of this Master Agreement is to set forth the terms and conditions applicable to the Work to be provided by Contractor pursuant to Work Authorizations issued hereunder. However, the Companies shall have no obligation to issue any Work Authorization under this Master Agreement

1.2 **Term of Master Agreement** - This Master Agreement shall terminate on _____, 20____; provided, however, that said Master Agreement shall

continue to be effective as to any outstanding Work under a Work Authorization issued prior to that date unless otherwise terminated pursuant to the terms of such Work Authorization or this Master Agreement.

II. SPECIFIC CONTRACTS; WORK AUTHORIZATION PROCESS

2.1 Request for Quote - During the term of this Master Agreement, the Companies may from time to time issue a Request for Quote in the form of Appendix A, Section I for certain Work to be performed by Contractor under the terms and conditions contained herein.

2.2 Contractor's Proposal - If Contractor desires to do the requested Work, Contractor will fill out Section II of Appendix A, and propose a price or price structure for the Work. Such a price quote shall constitute an affirmative representation by Contractor that it is equipped and has the expertise and qualifications (including required licenses, if any) necessary to perform the Work requested in the Request for Quote.

2.3 Work Authorization - If the Companies desire to have the Work done by Contractor, the Companies will issue a Work Authorization by executing Section III of Appendix A and delivering it to Contractor.

2.4 Specific Contract - Each executed Work Authorization shall constitute a specific contract, which shall be governed by the particular Work Authorization terms and this Master Agreement. In addition, the Companies' request for Work under a Verbal Work Authorization and the start of Work thereunder by Contractor shall also constitute a specific contract and all Work thereby performed shall be governed by the terms and conditions of this Master Agreement.

2.5 Authority to Issue - The following are the only Companies' individuals authorized to sign Section III of Appendix A and thereby issue Work Authorizations hereunder and may do so only up to the stated limits for each Work Authorization:

Manager -	(Up to \$100,000)
Officer -	(Up to \$250,000)
Two Officers -	(Greater than \$250,000)

2.6 Verbal Work Authorizations - In emergency or other similar time-critical situations, Work may be authorized by the Companies under a verbal Work Authorization by an individual listed in Section 2.5 above; provided that a written Work Authorization (Appendix A) is completed for such Work within 24 hours of the start of such Work; and, provided further, that Contractor invoices the Companies no more than the amount it would charge its best customer for the same Work.

2.7 The Companies-Generated Purchase Orders – For Work to be performed for **\$10,000 or less only**, the Work may be authorized by delivery of a the Companies-

generated Purchase Order issued with express reference to this Master Agreement, provided that the scope and pricing for the Work is included in the Purchase Order or an Appendix thereto. The Purchase Order shall be signed by Contractor to signify acceptance (however, Contractor hereby agrees that its performance or beginning of performance of any Work with respect to a Purchase Order issued hereunder shall constitute acceptance of the Purchase Order and the applicability and governance of these Master Agreement to the Work even if the Purchase Order was not signed by Contractor). Each Purchase Order issued under this section shall constitute a separate contract which shall be governed by the terms of this Master Agreement. For purposes of applying this Master Agreement to Work performed in accordance with this paragraph, the term "Work Authorization" as used herein shall be construed as including such Purchase Orders.

III. SCOPE OF WORK

3.1 Work Description - Contractor agrees to furnish all labor, tools, materials, equipment, transportation, and supervision necessary to complete the work and tasks described in Section I of each executed Work Authorization ("Work").

3.2 Schedule of Work - The Work in each Work Authorization shall start and be completed as provided therein.

3.3 Change of Scope – No change in the scope of Work shall be effective unless documented in a written Amendment to the applicable Work Authorization duly executed by both Parties. A sample of the form that may be used for such an amendment is attached hereto as Appendix B.

IV. COMPENSATION

4.1 Price - Compensation for Work performed and expenses incurred under each Work Authorization shall be as set forth in such Work Authorization. Unless otherwise agreed, the Companies shall only pay travel expenses consistent with its Standard Business Travel and Expense Terms.

4.2 Invoicing - For each Work Authorization, Contractor shall submit its invoice for all Work rendered as set forth therein or on a monthly basis (the "billing period"). Failure to submit invoices on a timely basis shall be grounds to deny payment of such invoices. Such invoice shall be in a form approved by the Companies and shall at a minimum show: (a) the total hours of Work for the applicable billing period by each Contractor employee; (b) the hourly rate for each Contractor employee; (c) a description of the Work performed; and (d) an itemized list of all allowable expenditures made during the month. Upon request by the Companies, Contractor shall provide supporting documentation, including but not limited to invoices and receipts, as evidence of such expenditures. The invoice shall reference the Companies' Designated Representative, the Companies' purchase or service order number, if any, the Contract Number, the

Work Authorization Number and any additional information required as part of the Scope of Work hereunder. All invoices should be addressed as follows:

Hawaiian Electric Company, Inc.
P. O. Box 2750
Honolulu, Hawaii 96840-0001
Attention: Accounts Payable

Service Order No. _____
Contract No. _____

Service Order No. _____
Contract No. _____

NOTE: Do not include the name of the Companies' Designated Representative in the address. The ORIGINAL invoice, without Appendices, must be sent directly to the Accounts Payable address listed above. ALL REQUIRED SUPPORTING DOCUMENTATION must be sent SEPARATELY to the Companies' Designated Representative. Failure to follow this procedure may cause a delay in payment.

4.3 Payments - Payment to Contractor shall be made as follows:

4.3.1 - Electronic Payments – For Contractors participating in the Companies' electronic payment program, the Companies will pay properly submitted invoices within fifteen (15) days after receipt and approval.

4.3.2 - Manual Payments – For Contractors not participating in the Companies' electronic payment program, the Companies will pay properly submitted invoices within thirty (30) days after receipt and approval.

Regardless of the payment method, the Companies may withhold from each such payment a retention of ten percent (10%) of the amount invoiced ("Retained Amounts") until such time as the Final Payment is made. The Companies may require partial lien releases, in the form attached as Appendix C, as a condition of payment of Contractor's invoices.

4.4 Final Payment - Final payment of all remaining amounts due Contractor, including any and all Retained Amounts, shall be paid within sixty (60) days after all Work is completed, Acceptance of the Work by the Companies, and a proper final invoice and request for final payment and release of claims forms submitted; provided, however, that payment shall be made within thirty (30) days if the Companies are satisfied by bond or otherwise that there are no outstanding claims against the Work.

4.5 Withholding of Payments; Set-off - All payments, including the final payment, are subject to adjustment during or after termination of the Work on the basis of any final accounting which may be made by the Companies. The Companies may withhold from any payment, including the final payment: (1) any amount incorrectly invoiced; (2) any amount in dispute either because the Companies have found the invoice excessive, or the Work performed unacceptable; or (3) an amount sufficient to completely protect the Companies from any loss, damage or expense arising out of assertions by other Parties of any claim or lien against the Companies because of Contractor's performance of this Master Agreement. The Companies further reserve the right to set-off any amounts due from Contractor to the Companies against any amounts payable at any time by the Companies in connection with this Master Agreement or any Work Authorization issued hereunder.

4.6 Acceptance – For purposes of this Master Agreement, “Acceptance” shall be considered to occur upon completion of all of the Work to the reasonable satisfaction of the Companies, including any and all punch list items or previously unaccepted Work, the submittal of documentation and as-built drawings, and any other requirements as required by the Work Authorization, and when the Work covered by the Work Authorization shall have been approved in writing by the Companies for final payment. Final payment shall not itself be deemed to constitute Acceptance.

Acceptance of the Work and final payment by the Companies shall not waive any rights and remedies which the Companies have or may have under the “Warranty” and other applicable provisions of this Contract or under the law or in equity.

V. STATUS OF THE PARTIES

5.1 Independent Contractor - Contractor shall act solely as an independent contractor of the Companies, and not as the Companies' agent or servant for any purpose, maintaining complete control over and responsibility for its own employees and operations and those of its subcontractors.

5.2 Subcontracts and Assignment – The Contractor shall not sell, assign, transfer, or subcontract any of the Contractor's duties, obligations, or interests under this Master Agreement or any Work Authorization issued hereunder, either by power of attorney or otherwise, without the prior written consent of the Companies, and any such sale, assignment, transfer or subcontracting, without such consent of the Companies, shall be voidable at the option of the Companies. Contractor shall ensure that the general terms and conditions of this Master Agreement, any Work Authorization issued hereunder, and any amendments thereto regarding the Work to be performed are incorporated into and attached to any subcontract or assignment. Contractor shall indemnify and hold the Companies harmless from any Losses caused by a failure of Contractor to comply with the provisions of this Section 5.2. Notwithstanding the Companies' consent granted under this section, Contractor shall remain responsible for all Work, and Contractor shall be as fully responsible to the Companies for the acts and omissions of its subcontractors, their agents, representatives and persons directly or

indirectly employed by them as it is for the acts and omissions of Contractor's own employees.

VI. POINTS OF CONTACT

6.1 The Companies' Designated Representative "The Companies' Designated Representative" shall be appointed for each Work Authorization. The Companies' Designated Representative shall be the point of contact for and have the authority to speak on behalf of the Companies concerning all matters related to such Work Authorization, except that the Companies' Designated Representative shall not have the authority to amend this Master Agreement or Work Authorization.

6.2 Contractor's Designated Representative - A "Contractor's Designated Representative" shall be appointed for each Work Authorization. Such Representative shall be the point of contact for and have the authority to speak on behalf of Contractor concerning all matters related to the Work Authorization, except that he shall not have the authority to amend this Master Agreement or the Work Authorization.

VII. PERFORMANCE STANDARDS

7.1 Performance Standards - In selecting employees to undertake the Work under a Work Authorization, Contractor shall select only those persons who are qualified by the necessary education, training and experience to provide high quality performance of the particular Work for which each such employee is responsible. Contractor shall accomplish all Work in a professional and workmanlike manner and to the reasonable satisfaction of the Companies. Unless a higher standard is specified in an applicable Work Authorization, Contractor's personnel shall exercise that degree of skill and care required in accordance with the generally accepted standards for such Work in Contractor's field.

7.2 Technological Developments and Remedies - Contractor shall promptly advise the Companies of all reasonably available technological advances and remedies which are known or become known to Contractor over the course of performance of its obligations under the applicable Work Authorization which would likely result in the Work having added value (i.e. better performance, design, material, longer useful life, etc.) to the Companies. Should the Companies elect to incorporate such advances it shall do so pursuant to an amendment to the Work Authorization mutually agreeable to the Parties.

7.3 Materials and Equipment - All materials and equipment used by Contractor in the performance of Work under a Work Authorization shall be guaranteed by Contractor to be fit for the specific purpose for which the materials and equipment are used.

7.4 Warranty; Correction of Defective or Substandard Work - Contractor acknowledges its absolute responsibility for insuring that the materials, equipment and procedures used in the performance of each Work Authorization are sufficient to satisfactorily accomplish the Work, and that review and approval by the Companies of any drawings, specifications or other documents prepared by Contractor in the performance of the Work shall not relieve Contractor or any of its subcontractors or vendors of its professional responsibility for the Work. Contractor agrees that it shall promptly correct or replace without expense to the Companies all defective or substandard materials, equipment or workmanship furnished by Contractor and correct any failures of materials, equipment or workmanship to meet the standards established in this Article VII. Contractor shall make such corrections of defective Work upon written notice thereof anytime such defects appear within one (1) year of the Companies' Acceptance of the Work performed hereunder ("Warranty Period"), even after the termination of this Master Agreement. Contractor shall also remedy and make the Companies whole with respect to any consequences of Contractor's defective or substandard work.

The Companies will give the Contractor prompt written notice of any defective Work following discovery of such defective Work. The Contractor shall commence corrective work within twenty-four (24) hours following notification and shall continuously and vigorously pursue correction of such work to completion without expense to the Companies until such Work is completed to the reasonable satisfaction of the Companies. In addition to any other rights granted to the Companies hereunder, if the Contractor fails to perform corrective work in the manner and within the time stated, the Companies may take over the Work and perform the same to completion at Contractor's expense, by contract or otherwise, and may take possession of, and utilize in completing the Work, the materials and equipment as may be on the work site. The Companies shall be entitled to recover from Contractor any and all costs for corrective work as well as reasonable attorneys' fees, consultants' fees, and costs necessarily incurred by the Companies in relation to the Contractor's refusal to complete the Work.

7.5 Right to Reject - Due to the critical nature of the Companies' operations, Contractor agrees that if the Companies, in their sole discretion and after reasonable consultation with Contractor, determine that any Contractor employee or subcontractor provided under a Work Authorization is unsuitable for the performance of the Work, or that the continued presence of such employee on the Companies' property is not consistent with the best interests of the Companies, then in such an instance the Companies may request that Contractor remove such employee or subcontractor from the Work and Contractor shall forthwith comply with such request. Contractor will then immediately replace such person with a person who fully meets the standards under this Master Agreement and applicable Work Authorization and will do so at no additional cost to the Companies.

7.6 Performance Bond – If required by the Companies, Contractor shall provide a Performance Bond for the Work in an amount specified in the applicable Work Authorization. The Performance Bond shall be in a form and be issued by a surety

acceptable to the Companies and shall guarantee Contractor's full compliance with the warranty and other provisions of this Master Agreement and the Work Authorization.

VIII. INSURANCE AND INDEMNITY

8.1 Workers' Compensation – (a) Contractor and anyone acting under its direction or control or on its behalf shall at its own expense procure and maintain in full force at all times during the term of each Work Authorization, Workers' Compensation and other similar insurance required by state or federal laws. In the event that Contractor fails to maintain such insurance as required by law, Contractor acknowledges and agrees that it will not seek or be entitled to any coverage under Owner's insurance. Permissible self-insurance will be acceptable subject to submission of a copy of appropriate governmental authorization and qualification by Contractor.

(b) In addition, if Workers' Compensation is required, Contractor and anyone acting under its direction or control or on its behalf shall at its own expense procure and maintain in full force at all times during the term of each Work Authorization, Employers Liability insurance with minimum limits for bodily injury from accident of FIVE HUNDRED THOUSAND DOLLARS (\$500,000) - each accident; for bodily injury from disease of FIVE HUNDRED THOUSAND DOLLARS (\$500,000) - each employee; and for bodily injury from disease of FIVE HUNDRED THOUSAND DOLLARS (\$500,000) - each policy limit.

(c) If there is an exposure for injury to Contractor's employees under the U.S. Longshoremen's and Harbor Workers' Compensation Act, the Jones Act or other laws, regulations or statutes applicable to maritime employees, coverage shall be included for such injuries or claims.

8.2 Commercial General Liability Insurance - Contractor and anyone acting under its direction or control or on its behalf shall at its own expense procure and maintain in full force at all times during the term of each Work Authorization, Commercial General Liability insurance with a bodily injury and property damage combined single limit of liability of at least TWO MILLION DOLLARS (\$2,000,000) for any occurrence. Such insurance will include coverage in like amount for products/completed operations, contractual liability, and personal and advertising injury. "Claims made" policies are not acceptable under this Section 8.2.

8.3 Automobile Liability Insurance - Contractor and anyone acting under its direction or control or on its behalf shall at its own expense procure and maintain in full effect at all times during the term of each Work Authorization, Automobile Liability insurance with a bodily injury and property damage combined single limit of at least ONE MILLION DOLLARS (\$1,000,000) per accident.

8.4 Contractor's Pollution Liability Insurance and/or Asbestos Abatement Liability Insurance and/or Lead Abatement Liability Insurance - In the event that the Companies so specify or as Contractor may determine based upon Contractor's

assessment of the Work, if the Work involves Pollution Cleanup Services, Asbestos Abatement and/or Lead Abatement, the Contractor shall provide proof of insurance coverage as applicable with a combined single limit of at least ONE MILLION DOLLARS (\$1,000,000) per occurrence.

8.5 Marine Insurance - If Contractor and anyone acting under its direction or control or on its behalf charters a marine vessel for performance during the term of each Work Authorization, Contractor shall first provide to the Companies proof of Charterers Legal Liability Insurance to be in effect during the term of the charter and insuring liabilities arising out of charter agreements on form CL 345 N/E or equivalent, with limits of liability of at least FIVE MILLION DOLLARS (\$5,000,000).

8.6 Waiver of Subrogation - Contractor and anyone acting under its direction will cause its insurers (except for Workers' Compensation insurance) to waive all rights of subrogation which Contractor or its insurers may have against the Companies, the Companies' agents, or the Companies' employees.

8.7 The Companies as Additional Insured - Insurance policies (except Workers' Compensation and Automobile Liability) providing the insurance coverage required in this Article will name the Companies, the Companies' agents, and/or the Companies' employees as an additional insured, as appropriate. Coverage must be primary in respect to the additional insured. Any other insurance carried by the Companies will be excess only and not contribute with this insurance.

8.8 Certificates of Insurance – Concurrent with the execution of this Master Agreement, Contractor shall provide the Companies with a certificate of insurance (“COI”) certifying that each of the foregoing insurance coverages is in force. If the COI is not affixed to this Master Agreement, then Contractor shall provide a copy of the COI (and any subsequent updates) to the Companies’ Legal Department (at: PO Box 2750, Honolulu HI 96840-001). The COI MUST reference this Master Agreement contract number and the date of this Master Agreement and it shall reference Contractor by name. Contractor will immediately provide written notice to the Companies should any of the insurance policies required herein be cancelled, limited in scope, or not renewed upon expiration. Receipt of any certificate showing less coverage than requested is not a waiver of the Contractor's obligation to fulfill the requirements.

8.9 Indemnity - Performance of Work - Contractor shall indemnify, defend and hold harmless the Companies and the Companies’ officers, directors and employees (and each of their heirs, successors and assigns) (the “Indemnified Parties”) from and against all judgments, settlements, awards, damages, losses, charges, liabilities, penalties, interest claims (including taxes and all related interest and penalties incurred directly with respect thereto), however described or denominated, and all related reasonable costs, expenses and other charges (including all reasonably attorneys’ fees and reasonable internal and external costs of investigation, litigation, hearings, proceedings, document and data productions and discovery, settlement, judgment, award, interest and penalties), however described or denominated (the “Losses”) based

upon or arising out of damage to property or injuries to persons (including death) caused or contributed to by the negligence, gross negligence, willful misconduct or other tortious acts or omissions of Contractor or anyone acting under its direction or control or in its behalf (including subcontractors) in the course of or related to its performance under each Work Authorization (including use of any the Companies equipment to perform the Work); provided Contractor's aforesaid indemnity and hold harmless obligation shall not be applicable to any liability based upon the sole negligence, gross negligence or willful misconduct of the Companies.

8.10 Indemnity - From Liens - Contractor shall indemnify, defend and hold harmless the Indemnified Parties against Losses arising from claims, liens or demands asserted by Contractor's subcontractors or suppliers. The Companies may also require evidence satisfactory to them from Contractor that all materials, equipment and parts thereof supplied, work in progress, work done, finished work delivered, or service performed, for which the Companies have made a payment, are free and clear of mechanics or other liens, attachments, claims and demands, charges or other encumbrances.

IX. STATUS OF MATERIALS AND INFORMATION; CONFIDENTIALITY

9.1 Ownership of Materials and Information - Any and all drawings, specifications, technical information, reports, studies, documents, deliverables, materials and business information of any type whatsoever (the "Materials") provided to Contractor by the Companies, or prepared or developed by Contractor for or on behalf of the Companies in the performance of this Master Agreement, are the Companies' exclusive property. Any restrictions or claims to ownership or rights included on or within the Materials delivered by Contractor to the Companies as part of the Work that conflict or are inconsistent with this Section 9.1 are null and void. Upon the Companies' request, Consultant shall return to the Companies all copies of all the Companies materials relating to the Work. Notwithstanding the foregoing, Contractor retains all of its pre-existing intellectual property rights that may be incorporated in any Materials provided to the Companies.

9.2 Confidentiality and Non-Disclosure. (a) Each Party may have a proprietary interest or other need for confidentiality in information that may be furnished to the other pursuant to this Master Agreement or any Work performed hereunder ("Confidential Information"). The Party disclosing such information shall be referred to in this section as the "Disclosing Party," and the Party receiving such information shall be referred to as the "Receiving Party."

(b) The Receiving Party will hold in confidence and, without the consent of the Disclosing Party, will not use, reproduce, distribute, transmit, or disclose, directly or indirectly, the Confidential Information of the Disclosing Party except as permitted herein. The Receiving Party may only disclose the Confidential Information to its officers, directors, employees, professional advisors and independent contractors and subcontractors with a direct need to know the information for the implementation or

exercise of rights and/or performance of obligations under or arising from this Master Agreement, provided that such persons/entities are bound by written confidentiality agreements with terms and conditions that are no less restrictive than those contained in this section. Without limiting the foregoing, the Receiving Party agrees that it will exercise at least the same standard of care in protecting the confidentiality of the Disclosing Party's Confidential Information as it does with its own Confidential Information of a similar nature, but in any event, no less than reasonable care.

(c) Confidential Information for purposes of this Master Agreement shall not include information if and only to the extent that the Receiving Party establishes that the information: (i) is or becomes a part of the public domain through no act or omission of the Receiving Party; (ii) was in the Receiving Party's lawful possession prior to the disclosure and had not been obtained by the Receiving Party either directly or indirectly from the Disclosing Party; or (iii) is lawfully disclosed to the Receiving Party by a third Party without restriction on disclosure. Confidential Information may also be disclosed by the Receiving Party pursuant to a requirement of a governmental agency, regulatory body or by operation of law, provided that the recipient shall disclose only that part of the Confidential Information that it is required to disclose and shall notify the Disclosing Party prior to such disclosure in a timely fashion in order to permit the Disclosing Party to lawfully attempt to prevent or restrict such disclosure should it so elect, and shall take all other reasonable and lawful measures to ensure the continued confidential treatment of the same by the Party to which the Confidential Information is disclosed.

(d) Any provision herein to the contrary notwithstanding, the Companies may disclose Confidential Information, as necessary and appropriate, to the State of Hawaii Public Utilities Commission ("Commission") and/or State of Hawaii Consumer Advocate ("CA") (including their respective staffs) provided that such disclosure is made under a protective order entered in the docket or proceeding with respect to which the disclosure will be made or any general protective order entered by the Commission.

X. TERMINATION FOR CAUSE

10.1 Conditions Allowing Termination - The Companies shall have the right to terminate this Master Agreement and/or any or all Work Authorizations executed hereunder, in whole or in part, if at any time during the term hereof Contractor:

- (a) Fails or becomes unable to perform its obligations under the Master Agreement or Work Authorization;
- (b) Fails to commence correction of defective Work immediately after notification of defect and to continuously and vigorously pursue correction of defect until cured;
- (c) Makes a general assignment for the benefit of its creditors;
- (d) Has a receiver appointed for it; or

- (e) Becomes insolvent or files bankruptcy or has a petition for involuntary bankruptcy filed against it.

Unless otherwise agreed, termination of this Master Agreement shall automatically result in termination of all outstanding Work Authorizations.

10.2 Notice Required Before Termination - Before terminating a Work Authorization or the Master Agreement for cause, the Companies shall give written notice to Contractor of the existence of grounds ("default") allowing termination for cause and of the Companies' intention to exercise its termination rights if the default is not cured to the satisfaction of the Companies within fifteen (15) days of such notice or such other time as shall be stated in the notice. Contractor shall have the right to cure the default during the stated time period.

10.3 The Companies' Rights Upon Termination - If Contractor fails to cure the default within fifteen (15) days or such other time as has been specified, the Companies may terminate the Work Authorization or the Master Agreement, or both, and secure such substitute Work as it deems necessary to complete the Work under the Work Authorization. In the event the Companies acquire substitute Work under this provision, Contractor agrees to pay the Companies upon demand, the difference between what the substitute Work actually costs the Companies and what Contractor would have been paid had it completed the Work itself. This provision shall survive termination of each Work Authorization and the Master Agreement.

XI. TERMINATION FOR CONVENIENCE

11.1 The Companies' Rights - Notwithstanding Article X above, the Companies shall have the right to terminate a Work Authorization or the Master Agreement or both at any time for the Companies' convenience, which shall include any reason or no reason at all, by giving written notice of such to Contractor. Termination of the Master Agreement shall automatically result in termination of all outstanding Work Authorizations. Upon receiving notice of termination, Contractor shall discontinue the Work on the date and to the extent specified in the notice and place no further orders for services except as needed to continue any portion of the Work that was not terminated. Contractor shall also make every reasonable effort to cancel, upon terms satisfactory to the Companies, all orders or subcontracts related to the terminated Work.

11.2 Termination Prior to Commencement of Work - If a Work Authorization or the Master Agreement is terminated prior to Contractor's having commenced any Work or preparation for Work, no payment shall be made to Contractor.

11.3 Termination After Commencement of Work - If a Work Authorization or the Master Agreement is terminated for the Companies' convenience after Contractor has commenced any Work, mobilization or other off-site activities under a Work Authorization, Contractor will be paid its actually incurred costs, including administrative

and general overhead costs and demobilization costs, determined in accordance with generally accepted accounting principles consistently applied, provided that, if compensation under a Work Authorization is on a time and materials basis, Contractor will be compensated at the rates and profit level specified in the Work Authorization for Work actually accomplished prior to the notice of termination. Notwithstanding the above, the Companies shall not pay for time, and/or costs which, as determined solely in the Companies' reasonable discretion, are excessive, given the total Work actually completed prior to notice of termination.

11.4 Contractor's Duty to Mitigate - Contractor agrees that it has an affirmative duty to mitigate all damages to it upon termination of a Work Authorization or the Master Agreement for convenience of the Companies.

XII. FORCE MAJEURE

12.1 Excuse of Performance - Notwithstanding anything in this Master Agreement to the contrary, a Party unable to perform its obligations due solely to a Force Majeure shall be excused from performance of those obligations for such time as the Force Majeure prevents performance. Such affected Party shall make reasonable efforts to resume performance in the shortest possible time. During any time in which a Party is relying on Force Majeure to excuse its performance of obligations, the other Party shall be excused from its corresponding obligations hereunder. A Party asserting Force Majeure shall immediately, or as soon as reasonably possible, notify the other Party of its inability to perform, the basis for the same, and shall provide an estimate of when it expects to be able to resume performance (and shall periodically update such estimate while the Force Majeure persists).

12.2 Definition - The term "Force Majeure" as used herein shall mean any cause which is beyond the control and without the fault or negligence of the Party affected and which condition was not reasonably foreseeable by the Party at the time this Master Agreement was entered into and which by reasonable efforts the Party affected is unable to overcome, including without limitation the following: acts of God; fire, flood, landslide, lightning, earthquake, hurricane, tornado, storm or volcanic eruption; strike; theft; casualty; war; invasion; civil disturbance; explosion; acts of public enemies; or sabotage.

XIII. RESPONSIBILITY FOR WORK

13.1 Risk of Loss During Work - Contractor is responsible for and shall bear all risk of loss or damage to Work, and all materials, tools and equipment delivered to the Work site, until completion and Acceptance of Work by the Companies, unless the loss or damage results solely from the negligence of the Companies. The Companies are not responsible for any loss or damage to the Work, or to materials, tools and equipment of Contractor resulting from a tortious action of any other contractor. Contractor shall look to such other contractor for any right or relief in these cases.

13.2 Precautions Against Damage - Contractor shall be responsible for taking all precautions necessary to prevent damage or injury to the work of Contractor, the Companies, or its contractors, and to the property of Contractor, the Companies, other contractors, or any of their employees, and members of the general public. These measures shall include, but not be limited to, laying drop cloths, constructing shields and guard fences, and any other precautionary measures which may be warranted.

13.3 Cleanup - Contractor shall be responsible for keeping the area where its employees are working clean and for removing all rubbish, waste, debris and unused materials from the worksite upon completion of the Work. If Contractor fails to perform these obligations, the Companies may elect to perform them or have them performed by another contractor and Contractor shall be responsible to the Companies for the reasonable costs incurred in doing so. If the Companies perform these obligations itself, Contractor shall be responsible for the Companies' costs multiplied by a factor sufficient to cover the Companies' administrative and general overhead costs. In either event, The Companies may deduct such amount from any amount owed to Contractor.

13.4 Maintenance of Contractor Vehicles, Tools and Equipment – Contractor shall properly maintain any of its vehicles, tools and equipment to be utilized in performing the Work so that they operate safely and will not leak onto or otherwise cause damage or harm to the Companies' premises and property. Contractor shall ensure that such vehicles, tools and equipment are in good working order and condition before bringing them onto the Companies premises or the worksite if outside of the Companies premises. Except for emergency maintenance, Contractor shall not maintain vehicles, tools and equipment on the Companies premises without prior written authorization from the Companies. For the purposes of this section, the terms "maintain" and "maintenance" shall include, without limitation, washing vehicles, tools and equipment.

XIV. PLANS, DRAWINGS, SPECIFICATIONS AND DOCUMENTATION

14.1 Prior to Work Beginning - Contractor shall not begin any part of the Work which requires Contractor to perform in accordance with plans, drawings, specifications or documentation until such documents are in the possession of Contractor's Designated Representative. Contractor shall keep one (1) copy of the documents at the Work site at all times and shall produce the copy upon request of the Companies' Designated Representative.

14.2 Upon Work Completion - Upon Acceptance of the Work, Contractor shall return all plans, drawings, specifications and documentation to the Companies, after having indicated on them any changes from them in the "as built" condition of the Work.

14.3 Discrepancies - Any discrepancy, contradiction or ambiguity between the provisions of this Master Agreement and any applicable Work Authorization or other materials incorporated and made a part of such Work Authorization, shall be immediately referred to the Companies' Designated Representative. The Companies'

Designated Representative will determine which shall control and the decision of the Companies' Designated Representative shall be final. In all cases, figures will take precedence over scale measurements on drawings, but where obvious discrepancies exist; Contractor shall consult with the Companies' Designated Representative and abide by his decisions.

XV. LAWS, REGULATIONS AND PUBLIC ORDINANCES

15.1 Compliance -Contractor shall comply with applicable federal, state, and local statutes, regulations and public ordinances of any nature governing the Work, including without limitation, those statutes specifically referred to in this Article. In addition, Contractor, at its expense, shall obtain any and all licenses and permits required for the performance of the Work. Contractor shall indemnify and defend the Companies from any Losses arising from Contractor's failure to comply with this Article.

15.2 Taxes – Contractor shall comply with all applicable federal and State of Hawaii tax laws and regulations. Contractor assumes exclusive liability for all contributions, taxes or payments required to be made by any existing or future law because of persons hired, employed or paid by Contractor for Work performed under this Master Agreement. Sales or excise taxes applicable to the value of the services or use of any property incorporated, furnished, or otherwise supplied by Contractor hereunder shall be stated separately from the price or rates specified in Article IV (COMPENSATION), and shall not be included in any computation of profit allowed by this Contract. Contractor assumes exclusive liability for all sales or excise taxes charged or chargeable upon any services or materials provided by Contractor under this Master Agreement.

15.3 Safety and Health Regulations - Contractor shall comply with all federal, state and local laws and regulations pertaining to health, safety, sanitary facilities, and waste disposal. Contractor shall meet all requirements of the Occupational Safety and Health Act of 1970 (OSHA) including all amendments. Contractor shall also comply with any standards, rules, regulations and orders promulgated under OSHA and particularly with the agreement for State development and enforcement of Occupational Health and Safety Standards as authorized by Section 18 of the Act.

15.4 Federal Contracts – To the extent applicable, Contractor shall comply with the following:

(a) Equal Employment Opportunity - (Applicable to all contracts of \$10,000 or more in the whole or aggregate. 41 CFR 60-1.4 and 41 CFR 60-741.5(a).) Contractor is aware of and is fully informed of Contractor responsibilities under Executive Order 11246 (reference to which include amendments and orders superseding in whole or in part) and shall be bound by and agrees to the provisions as contained in Section 202 of said Executive Order and the Equal Opportunity Clause as set forth in 41 CFR 60-1.4 and 41 CFR 60-741.5(a), and

for construction contracts, 41 CFR 60-4.3, which clauses are hereby incorporated by reference.

(b) Equal Opportunity for Disabled Veterans, Recently Separated Veterans, Other Protected Veterans, and Armed Forces Service Medal Veterans. (Applicable to each federal government contract of \$100,000 or more (41 CFR 60-300.4) for the purchase, sale or use of personal property or non-personal services (including construction).) If applicable, Contractor agrees that it is, and shall remain, in compliance with the rules and regulations promulgated under The Vietnam Era Veterans Readjustment Assistance Act of 1974, as amended by the Jobs for Veterans Act of 2002, including the requirements of 41 CFR 60-300.5(a) which are incorporated herein by reference.

(c) Notice of Employee's Rights under the National Labor Relations Act. (Applicable to (a) all prime contracts of \$100,000 or more and (b) subcontracts of \$10,000 or more, resulting from solicitations issued on or after June 21, 2010). If applicable, Contractor agrees that it shall comply with Executive Order 13496 (Notification of Employee Rights under Federal Labor Laws) and 29 C.F.R. Part 471 regarding employees' rights under the National Labor Relations Act to form, join and assist a union and to bargain collectively with their employers.

15.5 Environmental Compliance – (a) Contractor shall comply with all applicable environmental laws. "Environmental Laws" means all applicable federal, state and local laws, statutes, ordinances, codes, rules, regulations, standards, directives, interpretations, and conditions of approval, all legislative, administrative or judicial orders, decrees, requirements, rulings or judgments and all guidelines, permits, licenses, authorizations, approvals or entitlements or rules of common law which currently are in effect or which in the future may be enacted, adopted, issued, amended or modified, pertaining to the protection of the environment or human health or safety.

(b) At all times during the performance of the Work, Contractor shall be solely responsible and liable for the clean-up of all fuel spillage and leakage, and the removal, remediation, or cleanup of, and any other necessary response to all Hazardous Substances used or released during or in connection with the Work. Any claim for fines or costs assessed by any government entity for clean-up of the Companies' property, or the removal, remediation, or cleanup of, and any other necessary response to Hazardous Substances associated or in connection with Contractor's Work shall be paid by Contractor. "Hazardous Substances" means and includes any chemical, substance, material, object, condition, waste, living organism or combination thereof which is or may be hazardous to human health or safety or to the environment due to its radioactivity, ignitability, corrosivity, reactivity, explosivity, toxicity, carcinogenicity, mutagenicity, phytotoxicity, infectious or other harmful or potentially harmful properties or effects. "Hazardous Substances" also includes without limitation petroleum hydrocarbons, including crude oil or any fraction thereof, asbestos, radon, polychlorinated biphenyls ("PCBs"), methane and all substances which now or in the future may be defined as "Hazardous Substances", Hazardous Waste", "Extremely

Hazardous Waste”, Hazardous Material” or “Toxic Substances”, or any similar substances which are otherwise listed, defined or regulated in any manner pursuant to any Environmental Law.

15.6 Drawings and Specifications - It is the intent of the Companies to have all drawings and specifications for the Work comply with all applicable Laws, including but not limited to, statutes, regulations, general orders of the State of Hawaii, the Companies Tariff and ordinances. If Contractor discovers any discrepancy or conflict between the drawings and specifications and applicable legal requirements, Contractor shall immediately report the problem in writing to the Companies' Designated Representative for the applicable Work Authorization.

15.7. Compliance With Laws, Codes, and Regulations Required for Work on the Honolulu Rail Transit Project. Where Contractor is retained pursuant to a Purchase Order or Work Authorization for the purpose of providing services and/or materials on the Honolulu Rail Transit Project, Contractor expressly agrees to be bound by the laws, codes, and regulations contained in Appendix D attached hereto. Contractor shall be notified pursuant to the Purchase Order or Work Authorization issued by Hawaiian Electric to Contractor as to whether the services and/or materials provided by Contractor fall under this provision. Specifically, Hawaiian Electric will ensure that the Purchase Order or Work Authorization includes the reference “Honolulu Rail Transit Project” in the Purchase Order or Work Authorization. Contractor shall be solely responsible for compliance with all laws, codes, and regulations provided in Appendix D. Contractor agrees to defend, indemnify, and hold harmless Hawaiian Electric from and against any liability arising from or related to Contractor’s failure to comply with the same.

15.8 Compliance With Laws, Codes, and Regulations Required for Work on Projects Subject to Federal and/or State Funding Regulations. Where Contractor is retained pursuant to a Purchase Order or Work Authorization for the purpose of providing services and/or materials on a project subject to federal and/or state funding regulations, Contractor expressly agrees to be bound by the laws, codes, and regulations contained in Appendix D hereto, as made applicable under those laws by the nature and scope of the work. Contractor shall be notified pursuant to the Purchase Order or Work Authorization issued by Hawaiian Electric to Contractor as to whether the services and/or materials provided by Contractor fall under this provision. Specifically, Hawaiian Electric will ensure that the Purchase Order or Work Authorization includes the reference “Subject to Federal and/or State Funding Regulations”. Contractor shall be solely responsible for compliance with all laws, codes, and regulations provided in Appendix D, as made applicable under those laws due to the nature and scope of the work. Contractor agrees to defend, indemnify, and hold harmless Hawaiian Electric from and against any liability arising from or related to Contractor’s failure to comply with the same.

XVI. LIQUIDATED DAMAGES

16.1 Liquidated Damages – A Work Authorization may include a provision for liquidated damages. Where liquidated damages are included in a Work Authorization, the Parties recognize that proving the actual loss suffered by the Companies if the Work is not completed on time is extremely difficult or impossible. Accordingly, instead of requiring any such actual proof, the Companies and Contractor agree that the liquidated damages specified in the Work Authorization are not a penalty, but rather represent the parties' best reasonable estimate of fair compensation for the losses that may reasonably be anticipated from a delay or failure of performance.

XVII. MISCELLANEOUS

17.1 Patents and Copyrights - Contractor agrees that in performing Work under each Work Authorization, it will not use any process, program, design, device, or material which infringes on any United States patent or copyright or any trade secret agreement. Contractor agrees to indemnify, defend and hold harmless the Companies from and against all losses, damages, claims, fees and costs, including but not limited to reasonable attorney's fees and costs, arising from or incident to any suit or proceeding brought against the Companies for patent, copyright or trade secret infringement arising out of Contractor's Work. The Companies shall promptly notify Contractor of any such suit or proceeding and shall assist Contractor in defending the action by providing any necessary information.

17.2 Security and The Companies Rules - When on the Companies premises or carrying out Contractor's duties for the Companies, Contractor's personnel shall comply with all applicable provisions of The Companies' Corporate Code of Conduct, the Companies' security regulations, the Companies' information resource policies, the Companies' Safety and Health Manual (in the event of any inconsistency between any portion of this and Contractor's applicable policies, the more stringent of the two provisions shall apply), and all other of the Companies' policies, practices, and procedures that the Companies personnel and Contractors are now or during the Work, are asked to follow. Such policies, practices and procedures are available via the following electronic links:

Code of Conduct

<http://hawaiianelectric.com/vcmcontent/StaticFiles/pdf/CodeOfConduct.pdf>

Information Resource Policies

<http://hawaiianelectric.com/vcmcontent/StaticFiles/pdf/InformationResourcePolicies.pdf>

Safety & Health Manual

<http://hawaiianelectric.com/vcmcontent/StaticFiles/pdf/SafetyAndHealthManual.pdf>

Security Requirements

<http://hawaiianelectric.com/vcmcontent/StaticFiles/pdf/SecurityRequirements.pdf>

Alternatively, a hard copy shall be provided to Contractor upon Contractor's request. Contractor shall advise its employees of these policies, practices, and procedures and secure their employees' consent to abide by these policies, practices, and procedures prior to the commencement of Work. Unless otherwise agreed, Contractor's personnel shall observe the working hours of the Companies while working on the Companies' premises. Contractor agrees to cooperate fully and to provide any assistance necessary to the Companies in investigation of any security breaches which may involve Contractor or Contractor's employees or subcontractors.

17.3 Amendments - This Master Agreement and any Work Authorization issued hereunder may be amended or supplemented only by written instrument duly executed by each of the Parties. Appendix B is an example of an acceptable form for an amendment.

17.4 Severability of Provisions - In the event a court or other tribunal of competent jurisdiction at any time holds that any provision of this Master Agreement is invalid, the remainder of this Master Agreement shall not be affected thereby and shall continue in full force and effect.

17.5 Entire Agreement - This Master Agreement and any executed Work Authorization hereunder shall constitute the entire understanding between the Parties, superseding any and all previous understandings, oral or written, pertaining to the subject matter contained therein. The Parties have entered into this Master Agreement in reliance upon the representations and mutual undertakings contained herein and not in reliance upon any oral or written representation or information provided to one Party by any representative of the other Party.

17.6 Applicable Law/Forum - This Master Agreement and all Work Authorizations hereunder are made under and shall be governed by and construed in accordance with the laws of the State of Hawaii. Each Party agrees and consents that any dispute arising out of this Master Agreement, however defined, shall be brought in the State of Hawaii in a court of competent jurisdiction; provided, however, that the Companies, at its option, may elect to submit any such dispute to binding arbitration pursuant to the arbitration rules of the Dispute Prevention & Resolution, Inc. or the American Arbitration Association then in effect in which case the Parties agree that any alternative dispute resolution shall take place in the State of Hawaii.

17.7 No Waiver - The failure at any time of either Party to enforce any of the provisions of this Master Agreement or any Work Authorization, or to require at any time performance by the other Party of any of the provisions thereof, shall in no way be construed to be a waiver of such provisions, nor in any way construed to affect the

validity of this Master Agreement or any Work Authorization or any part hereof, or the right of any Party thereafter to enforce each and every such provision.

17.8 Access to Records - Upon request, Contractor shall make available for inspection and audit by the Companies in Honolulu, Hawaii any and all records and/or documents relating to Work performed under this Master Agreement during the performance of the Work and for a period of up to two (2) years from the completion of all Work under a Work Authorization. The right to audit shall not extend to the derivation of overhead costs.

17.9 Regulatory Approvals - This Master Agreement and any Work Authorization issued hereunder shall be contingent upon any and all required governmental and regulatory approvals, including those of the Public Utilities Commission.

17.10 Gender and Number - The terms "The Companies" and "Contractor," as and when used herein, or any pronouns used in place thereof, shall mean and include the masculine, feminine and neuter, the singular or plural number, individuals, partnerships, trustees or corporations and their and each of their respective successors, heirs, personal representatives, successors in trust and assigns, according to the context thereof. All covenants and obligations undertaken by two or more persons shall be deemed to be joint and several unless a contrary intention is clearly expressed elsewhere herein.

17.11 Attorneys' Fees and Costs - If there is a dispute between the parties and either party institutes a lawsuit, arbitration, mediation, or other proceeding to enforce, declare, or interpret the terms of this Master Agreement, the prevailing party shall be awarded its reasonable attorneys' fees and costs.

17.12 Notices - Any notice required or permitted to be given in writing under this Master Agreement or Work Authorization shall be: (a) mailed by U.S. certified mail, postage prepaid, return receipt requested; (b) personally delivered to a designated representative of the receiving Party; or (c) sent by email (provided receipt thereof is confirmed via email or in writing by the recipient) Any such notice shall be deemed given: (i) three business days after being deposited in the U.S. mail, certified, postage prepaid and return receipt requested; (ii) when received if personally delivered; or (iii) when received if sent in an email, the receipt of which has been confirmed by the recipient. All such communications shall be mailed, sent or delivered, addressed to the Party for whom it is intended, using the contact information provided below or such other contact information as the Parties may designate from time to time:

If to The Companies:

HAWAIIAN ELECTRIC COMPANY, INC.

[ADDRESS]

Attention:

Telephone:
Facsimile
Email:

With a copy to:

Hawaiian Electric Company, Inc.
PO Box 2750
Honolulu, Hawaii 96840
Attention: Vice President & General Counsel, Susan Li
Facsimile: 808- 543-7302
Email: susan.li@heco.com

If to Contractor:
Name of Contractor:
[ADDRESS]
Attention:
Telephone:
Facsimile:
Email:

17.13 Survival of Obligations – All The following provisions shall survive the expiration or termination of this Master Agreement: Article VII (Performance Standards); Article VIII (Insurance, Indemnity), Article IX (Status Of Materials and Information; Confidentiality), Section 11.4 (Contractor's Duty to Mitigate), Section 13.3 (Cleanup), Section 15.1 (Compliance), Section 15.2 (Taxes), Article XVI (Liquidated Damages), Article XVII (Miscellaneous), and Article XVIII (Counterparts Clause).

XVIII. COUNTERPARTS CLAUSE

The Parties agree that this Master Agreement and any Work Authorizations issued hereunder may be executed in counterparts, each of which shall be deemed an original, and all of which shall together constitute one and the same instrument binding all Parties notwithstanding that all of the Parties are not signatories to the same counterparts. For all purposes, duplicate unexecuted and unacknowledged pages of the counterparts may be discarded and the remaining pages assembled as one document. This Agreement (and any Work Authorizations) may also be executed by exchange of executed copies via facsimile or other electronic means, such as PDF, in which case, but not as a condition to the validity of the Master Agreement or Work Authorization, each Party shall subsequently send the other Party by mail the original executed copy. A Party's signature transmitted by facsimile or similar electronic means shall be considered an "original" signature for purposes of this Master Agreement and any Work Authorizations.

IN WITNESS WHEREOF, the hereto have caused this Master Agreement to be signed by appropriate representatives of each as of the date indicated.

HAWAIIAN ELECTRIC COMPANY, INC.
MAUI ELECTRIC COMAPNY, LTD.
HAWAII ELECTRIC LIGHT COMPANY, INC.
("The Companies")

By: _____ By: _____

Print Name: _____ Print Name: _____

Title: _____ Title: _____

Date: _____ Date: _____

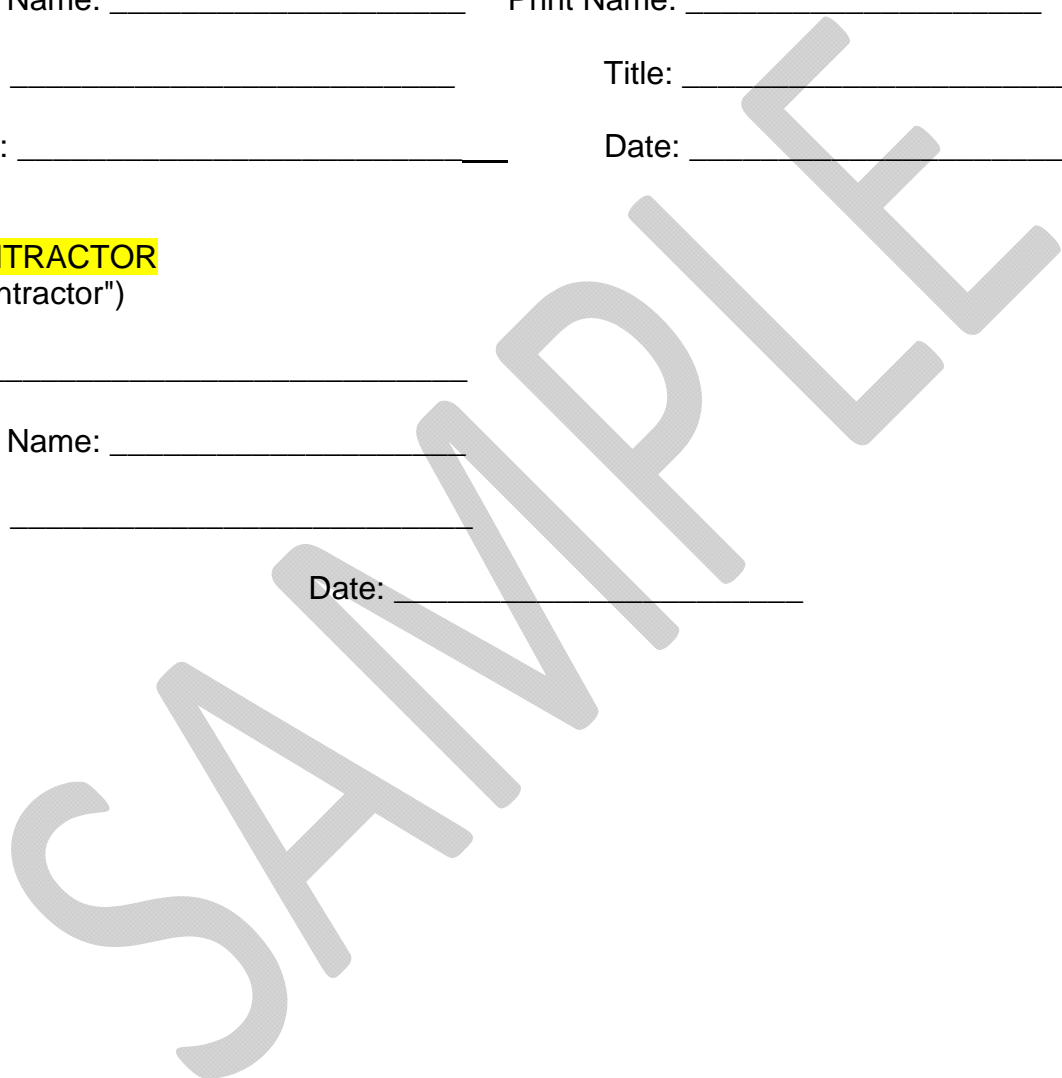
CONTRACTOR
("Contractor")

By: _____

Print Name: _____

Title: _____

Date: _____



APPENDIX A

WORK AUTHORIZATION NO.
UNDER PURCHASE ORDER NO. /CONTRACT NO.

I. Request for Quote

Under the terms and conditions of the General Services Master Agreement, dated _____, 20__, by and between _____ ("Contractor") and HAWAIIAN ELECTRIC COMPANY, INC. and its subsidiaries HAWAII ELECTRIC LIGHT COMPANYCOMPANY, INC. and MAUI ELECTRIC COMPANY, LIMITED] ("The Companies"), the Companies hereby request a proposal from Contractor to perform the following Work:

Dated: _____
_____ The Companies

II. Contractor's Proposal

Contractor hereby proposes to perform the Work described above in Section I, under said terms and conditions, for the following amount:

Total estimated cost is _____. Total estimated man-hours required are _____.

Work will begin no later than _____ and be completed on or before _____.

_____ will act as Contractor's Designated Representative during the performance of this Work.

Dated: _____
_____ Contractor

III. Work Authorization

Contractor's foregoing Proposal is accepted. Contractor is authorized to perform the Work as proposed. The Companies' Designated Representative for this Work Authorization shall be _____.

HAWAIIAN ELECTRIC COMPANY, INC.
MAUI ELECTRIC COMPANY, LTD.
HAWAII ELECTRIC LIGHT COMPANY, INC.

By: _____ By: _____

Title: _____ Title: _____

Date: _____

Date: _____

APPENDIX B

AMENDMENT NO. __ TO WORK AUTHORIZATION NO. _____

UNDER CONTRACT NO. _____

HAWAIIAN ELECTRIC COMPANY, INC. and its subsidiaries or HAWAII ELECTRIC LIGHT COMPANYCOMPANYTHE COMPANIES, INC. and/or MAUI ELECTRIC COMPANY, LIMITED] (“the Companies”)and _____ (“Contractor”) agree to amend Authorization No. ____ of the General Services Master Agreement No. _____, dated _____ (“Master Agreement”) as follows:

Previous total not-to-exceed amount \$ _____
for Authorization No. ____

Total (not-to-exceed) cost for \$ _____
Amendment No. ____ work

New total not-to-exceed amount for \$ _____
Authorization No. ____

_____ is the Companies’ Designated Representative for this Work.

Except as provided herein, the terms of said Master Agreement shall remain in full force and effect and are incorporated by reference herein.

Please sign both copies of this document and return both to HAWAIIAN ELECTRIC COMPANY, which will endorse and return one copy to you for your files.

THE ABOVE AMENDMENT IS ACCEPTED BY:

HAWAIIAN ELECTRIC COMPANY, INC.
MAUI ELECTRIC COMPANY, LTD.
HAWAII ELECTRIC LIGHT COMPANY, INC.

By: _____ By: _____

Title: _____ Title: _____

Date: _____ Date: _____

CONTRACTOR

By: _____

Title: _____

Date: _____

APPENDIX C

**CONTRACTOR'S REQUEST FOR FINAL PAYMENT
AND RELEASE OF CLAIMS**

TO: _____ (the "the Companies")

FROM: _____ (the "Releasor")

PROJECT: _____ (the "Project")

Releasor does hereby request Final Payment in the amount indicated below. In consideration of the payment in full to the undersigned Releasor of such Final Payment and all progress payments due and payable to Releasor on account of labor, materials, equipment and supplies furnished by Releasor in the improvement of the real property ("Project") described above, Releasor does hereby release and waive all liens and claims which it now has, or may hereafter have, for furnishing such labor, materials, equipment and supplies. Such liens and claims shall include, but shall not be limited to: (1) any mechanic's or materialman's liens against the leasehold or fee simple title in and to such real property and Project; (2) any right to assert or claim any such mechanic's or materialman's liens; (3) any equitable liens; (4) any right to assert a claim under any labor or material payment bond, if any, issued for the benefit of the Companies or any other person or entity in connection with the Project; and (5) any right, if any, to assert a claim to any construction funds held by the Companies or its Banker. This release and waiver is for the benefit of, and may be relied upon by the Companies and the owner of the fee simple title in and to such real property (if not he Companies) and their respective successors and assigns.

For the foregoing consideration, Releasor further warrants and represents that it has fully and duly paid for all labor, materials, equipment and supplies used or furnished by it in connection with the Project to all persons or entities who have furnished labor or materials on the Project under it (including, without limitation, all subcontractors, lower level subcontractors, materialmen, and material supply houses), and hereby covenants and agrees to indemnify Companies and the owner of the fee simple property (if not the Companies), and each of them, for and against any and all loss, liability, or expenses (including reasonable attorneys' fees) which may be sustained or incurred by any of them for any failure of Releasor to make such payments. Releasor has attached hereto copies of Lien Releases executed by each person or entity who has furnished labor or materials on the Project, evidencing the extent of payments made to date and any outstanding balance owed.

This Release does not impose or create any contractual duties or obligations on the Companies in favor of any subcontractor, materialman, supply house, or any other person or entity who is working for or has contracted with persons other than the Companies.

Dated: [City /County] _____, Hawaii, this _____ day of _____, 20____.

Name of Contractor/Releasor
By _____
Its

Amount Paid to Date: \$ _____

Final Payment Due: \$ _____

APPENDIX D

FEDERAL AND STATE LEGAL REQUIREMENTS

The Contractor understands that Federal and State laws, regulations, policies, and related administrative practices applicable to this Agreement on the date signed may be modified from time to time. The Contractor agrees that the most recent of such Federal and State requirements will govern the administration of the Agreement at any particular point in time, except if Hawaiian Electric issues a written determination otherwise. To achieve compliance with changing Federal and State requirements, the Contractor agrees to include notice in each subcontract that Federal and State requirements may change and that the changed requirements will apply to the subcontract as required. Contractor agrees that it is Contractor's sole and exclusive obligation to determine the applicability of and compliance with all Federal and State laws, regulations, policies, and related administrative practices applicable to this Agreement.

To the extent any of the Federal or State laws, regulation, policies, and related administrative practices conflict with the terms of the General Master Services Agreement, the terms of the applicable Federal or State laws, regulation, policies, and related administrative practices control.

1. No Government Obligation to Third Parties

(a) The Contractor acknowledges and agrees that, notwithstanding any concurrence by the Federal Government in or approval of the solicitation or award of the underlying Agreement, absent the express written consent by the Federal Government, the Federal Government is not a party to this Agreement and shall not be subject to any obligations or liabilities to the Contractor or any other party (whether or not a party to that Agreement) pertaining to any matter resulting from the underlying Agreement.

(b) The Contractor agrees to include the above clause in each subcontract. It is further agreed that the clause shall not be modified, except to identify the subcontractor who will be subject to its provisions.

2. Program Fraud and False or Fraudulent Statements and Related Acts

(a) The Contractor acknowledges that the provisions of the Program Fraud Civil Remedies Act of 1986, as amended, 31 U.S.C. §§ 3801 et seq. and U.S. DOT regulations, "Program Fraud Civil Remedies," 49 C.F.R. Part 31, apply to its actions pertaining to this Project. Upon execution of the underlying Agreement, the Contractor certifies or affirms the truthfulness and accuracy of any statement it has made, it makes, it may make, or causes to be made, pertaining to the underlying Agreement or the FTA assisted project for which this Agreement work is being performed. In addition to other penalties that may be applicable, the Contractor further acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification, the Federal Government reserves the right to impose the penalties of the Program Fraud Civil Remedies Act of 1986 on the Contractor to the extent the Federal Government deems appropriate.

(b) The Contractor also acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification to the Federal Government under an Agreement connected with a project that is financed in whole or in part with Federal assistance originally awarded by FTA under the authority of 49 U.S.C. Chapter 53, the Federal Government reserves the right to impose the penalties of 18 U.S.C. § 1001 and 49 U.S.C. § 5323(l) on the Contractor, to the extent the Federal Government deems appropriate.

(c) The Contractor shall include the above two clauses in each subcontract. It is further agreed that the clauses shall not be modified, except to identify the subcontractor who will be subject to the provisions.

3. Access to Records and Reports

(a) The Contractor shall provide the Federal Government, State Government, the Comptroller General of the United States, Hawaiian Electric, or any of their authorized representative's access to any books, documents, papers and records of the Contractor which are directly pertinent to this Agreement for the purposes of making audits, examinations, excerpts and transcriptions. The Contractor shall, pursuant to 49 C.F.R. § 633.17, provide the FTA Administrator or his authorized representatives, including any Project Management Oversight Contractor, access to the Contractor's records and construction sites pertaining to a major capital project, defined at 49 U.S.C. § 5302(a)(l), which is receiving federal financial assistance through the programs described at 49 U.S.C. §§ 5307, 5309 or 5311.

(b) The Contractor shall permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.

(c) The Contractor shall maintain all books, records, accounts and reports required under this Agreement for a period of not less than three (3) years after the date of termination or expiration of this Agreement, except in the event of litigation or settlement of claims arising from the performance of this Agreement, in which case the Contractor shall maintain the same until Hawaiian Electric, the FTA Administrator, the Comptroller General of the United States, or any of their duly authorized representatives, have disposed of all such litigation, appeals, claims or exceptions related thereto.

4. Federal Changes

With respect to the Honolulu Rail Transit Project, the Contractor shall at all times comply with all applicable FTA regulations, policies, procedures and directives, including without limitation those listed directly or by reference in the Master Agreement between the City and the FTA, as they may be amended or promulgated from time to time during the term of this Agreement. The Contractor's failure to so comply shall constitute a material breach of this Agreement.

5. Civil Rights Requirements

The Contractor shall comply with the following requirements and include the following requirements in each subcontract, modified only if necessary to identify the affected parties:

(a) Nondiscrimination. In accordance with Title VI of the Civil Rights Act, as amended, 42 U.S.C. § 2000d, section 303 of the Age Discrimination Act of 1975, as amended, 42 U.S.C. § 6102, section 202 of the Americans with Disabilities Act of 1990, 42 U.S.C. § 12132, and Federal transit law at 49 U.S.C. § 5332, the Contractor shall not discriminate against any employee or applicant for employment because of race, color, creed, national origin, sex, age, or disability. In addition, the Contractor shall comply with applicable Federal implementing regulations and other implementing requirements FTA may issue.

(b) Equal Employment Opportunity. The following equal employment opportunity requirements apply to the underlying Agreement:

(1) Race, Color, Creed, National Origin, Sex. In accordance with Title VII of the Civil Rights Act, as amended, 42 U.S.C. § 2000e, and Federal transit laws at 49 U.S.C. § 5332, the Contractor shall comply with all applicable equal employment opportunity requirements of U.S. Department of Labor (U.S. DOL) regulations, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor," 41 C.F.R. Parts 60 et seq., (which implement Executive Order No. 11246, "Equal Employment Opportunity," as amended by Executive Order No. 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," 42 U.S.C. § 2000e), and with any applicable Federal statutes, executive orders, regulations, and Federal policies that may in the future affect construction activities undertaken in the course of the Project. The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, creed, national origin, sex, or age. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. In addition, the Contractor shall comply with any implementing requirements FTA may issue.

(2) Age. In accordance with section 4 of the Age Discrimination in Employment Act of 1967, as amended, 29 U.S.C. § 623 and Federal transit law at 49 U.S.C. § 5332, the Contractor shall refrain from discrimination against present and prospective employees for reason of age. In addition, the Contractor shall comply with any implementing requirements FTA may issue.

(3) Disabilities. In accordance with section 102 of the Americans with Disabilities Act, as amended, 42 U.S.C. § 12112, the Contractor shall comply with the requirements of the U.S. Equal Employment Opportunity Commission, "Regulations to Implement the Equal Employment Provisions of the Americans with Disabilities Act," 29 C.F.R. Part 1630, pertaining to employment of persons

with disabilities. In addition, the Contractor shall comply with any implementing requirements FTA may issue.

(4) Access for Individuals with Disabilities. The Contractor shall comply with 49 U.S.C. § 5301(d), which states the Federal policy that elderly individuals and individuals with disabilities have the same right as other individuals to use public transportation services and facilities, and that special efforts shall be made in planning and designing those services and facilities to implement transportation accessibility rights for elderly individuals and individuals with disabilities.

6. Disadvantaged Business Enterprises (DBE)

(a) DBE Assurances. The Contractor and its subcontractors shall not discriminate on the basis of race, color, national origin, or sex in the performance of this Contract. The Contractor shall carry out applicable requirements of 49 C.F.R. Part 26 in the award and administration of U.S. DOT-assisted Agreements. Failure by the Contractor to carry out these requirements is a material breach of this Agreement, which may result in termination of this Agreement or such other remedy, as Hawaiian Electric deems appropriate.

The above paragraph shall be included in each subcontract the Contractor signs with a subcontractor.

(b) Prompt Payment. The Contractor shall pay all subcontractors (DBEs and non-DBEs) for satisfactory performance of their subcontracts no later than ten (10) days from receipt of payment by Hawaiian Electric. Full and prompt payment by the Contractor to all subcontractors shall include retainage, if applicable.

(c) DBE Goal. The Honolulu Authority for Rapid Transportation has established a race neutral overall DBE goal of 13.00% for the duration of this Agreement and a separate contract goal has not been established for this procurement. DBE firms and small businesses shall have an equal opportunity to participate in the Agreement. The Contractor shall adhere to the following requirements:

(1) Take affirmative steps to use as many of the race-neutral means of achieving DBE participation identified at 49 C.F.R. § 26.51(b) as practicable to afford opportunities to DBEs to participate in the Agreement. A race-neutral measure is one that is, or can be, used to assist all small businesses.

(2) A DBE firm must perform a commercially useful function, i.e., must be responsible for the execution of a distinct element of the work and must carry out its responsibility by actually performing, managing and supervising the work; and

(3) A DBE firm must be certified by the Hawai'i State Department of Transportation before its participation is reportable under paragraph (d) below;

(d) Reports to Hawaiian Electric. The Contractor shall report its DBE participation obtained through race-neutral means throughout the period of performance. The Contractor shall submit the "DBE PARTICIPATION REPORT" reflecting payments made by the Contractor to DBE subcontractors. Payments to the Contractor may not be processed if the DBE PARTICIPATION REPORT is not properly completed and attached..

(e) Records. On request, the Contractor shall make available for inspection, and assure that its subcontractors make available for inspection:

(1) Records of prompt payments made in accordance with Section 1.6(b), above;

(2) The names and addresses of DBE subcontractors, vendors, and suppliers under this Agreement;

(3) The dollar amount and nature of work of each DBE subcontractor;

(4) The social/economic disadvantaged category of the DBE firms, i.e. Black American, Hispanic American, Native American, Subcontinent Asian American, Asian Pacific American, Non-Minority Women, or Other; and

(5) Other related materials and information.

(f) The Contractor shall promptly notify Hawaiian Electric, whenever a DBE subcontractor performing work related to this Agreement is terminated or fails to complete its work. The Contractor shall also promptly notify Hawaiian Electric of a DBE subcontractor's inability or unwillingness to perform and provide reasonable documentation.

7. Government-Wide Debarment and Suspension (Nonprocurement)

(a) This Agreement is a covered transaction for purposes of 2 C.F.R. § 180.220(b) and 2 C.F.R. § 1200.220. As such, the Contractor is required to verify that none of the Contractor, its principals, as defined at 2 C.F.R. § 180.995, or affiliates, as defined at 2 C.F.R. § 180.905, are excluded or disqualified as defined at 2 C.F.R. § 180.940 and 2 C.F.R. § 180.935.

(b) The Contractor is required to comply with 2 C.F.R. § 180, Subpart C, as supplemented by 2 C.F.R. § 1200, Subpart C, and must include the requirement to comply with 2 C.F.R. § 180, Subpart C, as supplemented by 2 C.F.R. § 1200, Subpart C, in any lower tier covered transaction equal to or exceeding \$25,000 it enters into. By signing the Agreement, the Contractor certifies as follows:

The certification in this clause is a material representation of fact relied upon by Hawaiian Electric. If it is later determined that the Contractor knowingly rendered an erroneous certification, in addition to remedies available to Hawaiian Electric, the Federal Government may pursue available remedies, including but not limited to suspension and/or

debarment. The Contractor agrees to comply with the requirements of 2 C.F.R. § 180, Subpart C, as supplemented by 2 C.F.R. § 1200, Subpart C, throughout the Agreement period. The Contractor further agrees to include a provision requiring such compliance in its lower tier covered transactions equal to or exceeding \$25,000.

8. Lobbying

The Contractor and its subcontractors at every tier shall comply with U.S. DOT regulations, "New Restrictions on Lobbying," 49 C.F.R. Part 20, modified as necessary by 31 U.S.C. § 1352, which requires that no Federal appropriated funds shall be used to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal Agreement, grant, or any other award covered by 31 U.S.C. § 1352. Each tier shall also disclose the name of any registrant under the Lobbying Disclosure Act of 1995 who has made lobbying contacts on its behalf with non-Federal funds with respect to that Federal contract, grant, or award covered by 31 U.S.C. § 1352. Such disclosures are forwarded from tier to tier up to Hawaiian Electric.

9. Clean Air Requirements

(a) The Contractor shall comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. §§ 7401 et seq. The Contractor shall report each violation to Hawaiian Electric and understands and agrees that Hawaiian Electric will, in turn, report each violation as required to FTA and the appropriate EPA Regional Office.

(b) The Contractor shall include the above clause in each subcontract exceeding \$100,000.

10. Clean Water Requirements

(a) The Contractor shall comply with all applicable standards, orders or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. §§ 1251 et seq. The Contractor shall report each violation to Hawaiian Electric and understands and agrees that Hawaiian Electric will, in turn, report each violation as required to FTA and the appropriate EPA Regional Office.

(b) The Contractor shall include the above clause in each subcontract exceeding \$100,000.

11. Fly America Requirements

(a) The Contractor shall comply with 49 U.S.C. § 40118 (the "Fly America Act") in accordance with the General Services Administration's regulations at 41 C.F.R. Parts 301-10, which provide that recipients of Federal funds and their consultants are required to use U.S. Flag air carriers for U.S. Government-financed international air

travel and transportation of their personal effects or property, to the extent such service is available, unless travel by foreign air carrier is a matter of necessity, as defined by the Fly America Act. The Contractor shall submit, if a foreign air carrier was used, an appropriate certification or memorandum adequately explaining why service by a U.S. flag air carrier was not available or why it was necessary to use a foreign air carrier and shall, in any event, provide a certificate of compliance with the Fly America requirements.

(b) The Contractor shall include the requirements of this section in all subcontracts that may involve international air transportation.

12. Buy America Requirements

The Contractor shall comply with 49 U.S.C. § 5323(j) and 49 C.F.R. Part 661, which provide that Federal funds may not be obligated unless steel, iron, and manufactured products used in FTA-funded projects are produced in the U.S., unless a waiver has been granted by FTA or the product is subject to a general waiver. General waivers are listed in 49 C.F.R. § 661.7.

13. Cargo Preference Requirements

(a) The Contractor shall use privately owned U.S. flag commercial vessels to ship at least fifty percent (50%) of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to the underlying Agreement to the extent such vessels are available at fair and reasonable rates for U.S. flag commercial vessels.

(b) The Contractor shall furnish within twenty (20) working days following the date of loading for shipments originating within the U.S. or within thirty (30) working days following the date of loading for shipments originating outside the U.S., a legible copy of a rated, "on-board" commercial ocean bill-of-lading in English for each shipment of cargo described in the preceding paragraph to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, D.C. 20590 and to Hawaiian Electric (through the Contractor in the case of a subcontractor's bill-of-lading).

(c) The Contractor shall include these requirements in all subcontracts issued pursuant to this Agreement when the subcontract may involve the transport of equipment, material, or commodities by ocean vessel.

14. Energy Conservation Requirements

(a) The Contractor shall comply with mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act.

(b) The Contractor shall include the above clause in each subcontract at every tier. It is further agreed that the clause shall not be modified, except to identify the subcontractor who will be subject to the provisions.

15. Recycled Products

The Contractor agrees to comply with all the requirements of Section 6002 of the Resource Conservation and Recovery Act as amended (42 U.S.C. § 6962), including but not limited to the regulatory provisions of 40 C.F.R. Part 247, and Executive Order 12873, as they apply to the procurement of the items designated in Subpart B of 40 C.F.R. Part 247.

16. Davis-Bacon, Copeland Anti-Kickback Acts, and Hawaii Revised Statutes Chapter 104

The following requirements of the Davis-Bacon, Copeland Anti-Kickback Acts, and Hawaii Revised Statutes Chapter 104, together with Exhibits 1-6 attached hereto, are provided as follows:

(1) Minimum wages. (i) All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account [except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3) or the Director of the Hawaii Department of Labor and Industrial Relations ("Director DLIR") under Hawaii Revised Statutes "HRS" Chapter 104], the full amount of wages including overtime, accrued to not more than five working days prior to the time of payment, and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the DLIR wage bulletin and the Department of Labor ("DOL") wage determination which are attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act, 40 U.S.C. § 3141 et seq., and HRS Chapter 104 on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided herein with regard to treatment of apprentices and trainees. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, that the Contractor's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) and DLIR Notice to Workers HI04-1 shall be posted at all times by the Contractor and its subcontractors at the site of the work in a

prominent and easily accessible place at the job site where it can be easily seen by the workers. A copy of the DLIR and DOL rates of wages required to be posted shall be given to each laborer and mechanic employed under the Agreement between Hawaiian Electric and Contractor ("contract" or "Agreement") by the Contractor at the time each laborer and mechanic is employed, except that where the covered individual employee's wages, hours and other terms and conditions of employment are governed by a collective bargaining agreement the Contractor does not have to provide the employees the DLIR wage rate schedules.

(ii)(A) The Companies shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the Agreement shall be classified in conformance with the wage determination. The Companies shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

- (1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
- (2) The classification is utilized in the area by the construction industry; and
- (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(ii)(B) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the Companies agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the Companies to the contracting officer on the Prime Contract, who shall in turn shall send a report of its consideration and action to the Director, DLIR and the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or the Director DLIR, or their authorized representatives, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer on the Prime Contract, or will notify the contracting officer on the Prime Contract within the 30-day period that additional time is necessary.

(ii)(C) In the event the Contractor, the laborers or mechanics to be employed in the classification or their representatives, and the Companies' Designated Representative do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the Companies' Designated Representative shall refer the questions, including the views of all interested parties and the recommendation of the Companies' Designated Representative, to the contracting officer on the Prime Contract who in turn shall submit its recommendations to the Administrator and the Director DLIR for determination. The Administrator, or Director DLIR or their authorized representatives will issue a determination within 30 days of

receipt and so advise the contracting officer on the Prime Contractor or will notify the contracting officer on the Prime Contract within the 30-day period that additional time is necessary.

(ii)(D) The wage rate (including fringe benefits where appropriate) determined pursuant to this section, shall be paid to all workers performing work in the classification under this Agreement from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the Agreement for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor or the Director DLIR has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act and/or Chapter 104, HRS have been met. The Secretary of Labor may require the Contractor to set aside in a separate account, assets for the meeting of obligations under the plan or program.

(2) Withholding.

(i) Federal Requirements. The Honolulu Authority for Rapid Transportation (“HART”) shall upon its own action or upon written request of an authorized representative of the U.S. Department of Labor or Director DLIR, withhold or cause to be withheld from the Contractor under this Agreement or any other Federal, State or County contract with the same Contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same Contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the Agreement. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the Agreement, the (Agency) may, after written notice to the Contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(ii) State Requirements. HART shall within sixty (60) days of a written request by the Director of the DLIR, either:

(ii)(A) Pay or cause to be paid directly to laborers and mechanics or the Director any wages or overtime compensation found to be due, or any penalty assessed, under the terms of the State-assisted contract subject to HRS Chapter 104;

(ii)(B) Order any contractor to pay any wages or overtime compensation which the contractor or any subcontractor should have paid to any laborer or mechanic, or any penalty assessed and due to the Director, under any contract subject to HRS Chapter 104.

(3) Payrolls and basic records. (i)(A) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act or HRS Chapter 104), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor or the Director DLIR has found under 29 CFR 5.5(a)(1)(iv) or HRS Chapter 104 that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act or HRS Chapter 104, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(i)(B) The Contractor shall submit weekly for each week in which any work under the Agreement is performed, a copy of all payrolls to the Companies for transmission to HART. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i) or HRS Chapter 104, except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired but must include all information outlined herein and HRS § 104-3. The Hawaii DAGS-ECP "Certification Payroll Report" is available at <http://hawaii.gov> or its successor site. The Companies is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to HART, the Contractor, the Department of Labor or the DLIR for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for the Companies to require a subcontractor to provide addresses and social security numbers to the Companies for its own records, without weekly submission to HART.

(i)(C) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his or her agent who pays or

supervises the payment of the persons employed under the Agreement and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, and HRS § 104-3, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5 and HRS Chapter 104, and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the Agreement during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3 or HRS § 104-3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the Agreement.

(i)(D) The weekly submission of a properly executed certification set forth on Hawaii DAGS-ECP "Certified Payroll Report" shall satisfy the requirement for submission of the "Statement of Compliance" required by this section.

(i)(E) The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code and/or relevant provisions of Hawaii Revised Statutes.

(ii) Additional State Requirements.

(ii)(A) Payrolls and basic records relating thereto shall be maintained by the Contractor and all subcontractors during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. In addition to the information required under this section, such records shall also contain total weekly straight-time earnings, total weekly overtime earnings, total weekly gross earnings, the amount and purpose of each deduction, total net wages paid and date paid, and the itemized fringe benefit reporting form. Such records need not include the social security number of each worker.

(ii)(B) The Contractor shall submit weekly for each week in which any work under the Agreement is performed a certified copy of all payrolls and a certified copy of a fringe benefit reporting form supplied by the department or any certified form that contains all of the required fringe benefit information shall be submitted weekly to the governmental contracting agency for review. Optional Form "Statement of Compliance & DAGS-ECP for Payroll Affidavits" is available for this purpose from the DAGS Web

site at <http://hawaii.gov/pwd/Members/ib/forms/payrollaff.xls> or its successor site. The fringe benefit reporting form shall itemize the cost of fringe benefits paid by the Contractor or subcontractor for:

- (1) Health and welfare benefits;
- (2) Pension and annuity benefits;
- (3) Vacation benefits;
- (4) Continuing education and training benefits; and
- (5) Other fringe benefit costs paid by the Contractor or subcontractor.

The Contractor shall be responsible for the submission of certified copies of the payrolls of all subcontractors. The certification shall affirm that the payrolls are correct and complete, that the wage rates contained therein are not less than the applicable rates contained in the wage determination decision of the Director DLIR attached to the Agreement, and that the classifications set forth for each laborer or mechanic conform with the work the laborer or mechanic performed. Any certification discrepancy found by shall be reported to the Contractor and the Director to effect compliance.

(iii) The Contractor or subcontractor shall make the records required under this section available for inspection, copying, or transcription by authorized representatives of the HART, the Director DLIR, or the U.S. Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, HART, US DOL, or DLIR may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to relevant federal and/or Hawaii laws and rules. The Contractor or subcontractor shall make any records requested by the HART, Director of the DLIR, or any of their authorized representatives available within ten (10) days of a written request.

(4) Apprentices and trainees. (i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on

the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

(5) Compliance with Copeland Act requirements. The Contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this Agreement.

(6) Subcontracts. The Contractor or subcontractor shall insert in any subcontracts the clauses contained herein and such other clauses as HART may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The Contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the Agreement clauses herein.

(7) Violation of State requirements and Federal Contract Termination: Debarment.

(i) A breach of the Agreement clauses herein may be grounds for termination of this Agreement, and for debarment as a contractor and a subcontractor in accordance with federal and Hawaii state laws and rules.

(ii) In addition, the DLIR may impose the following penalties for violations of HRS Chapter 104:

(ii)(A) Where the DLIR finds that a first violation of HRS Chapter 104 has been committed:

- (1) The DLIR shall order the person or firm in violation to pay a penalty equal to ten per cent (10%) of the amount of back wages found due or \$25 per offense, whichever is greater; and
- (2) The person or firm shall be immediately suspended from doing any work on any public work of a governmental contracting agency until all wages and penalties are paid in full;

(ii)(B) Where the DLIR finds that a second violation of HRS Chapter 104 has been committed, whether on the same contract or another, within two years of the first notification of violation:

- (1) The DLIR, after proper notice and opportunity for hearing, shall order the person or firm in violation to pay a penalty equal to the amount of back wages found due or \$100 for each offense, whichever is greater; and
- (2) The person or firm shall be immediately suspended from doing any work on any public work of a governmental contracting agency until all wages and penalties are paid in full;

(ii)(C) Where the DLIR finds that a third violation of HRS Chapter 104 has been committed, whether on the same contract or another, within two years of the second notification of violation, the DLIR, after proper notice and opportunity for hearing, shall order the person or firm in violation:

- (1) To pay a penalty equal to two times the amount of back wages found due or \$200 for each offense, whichever is greater; and
- (2) To be suspended from doing any new work on any public work of a governmental contracting agency for a period of three years except as provided in HRS § 104-25(a)(2). If after the three year suspension period the wages due or penalties assessed are still unpaid the suspension shall remain in force until payment is made in full. "New work on any public work" includes any public works project in which the suspended person or firm has not begun work at the job site as of the date of the suspension order.

(ii)(D) A first, second, or third violation refers to each project in which the department finds that Contractor has failed to comply with this chapter.

(ii)(E) For purposes of this section, "offense" means each section of this chapter under which the Contractor is cited; provided that, with respect to prevailing wage and overtime citations under section 104-2, each employee and each project shall be considered a separate offense.

(8) Compliance with Davis-Bacon and Related Act and HRS Chapter 104 requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this Agreement. All rulings and interpretations of HRS Chapter 104 and HAR Title 12, Chapter 22 are also incorporated by reference in this Agreement.

(9) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this Agreement shall not be subject to the general disputes clause of this Agreement. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7, or HRS Chapter 104 and implementing rules. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and HART, the U.S. Department of Labor, the DLIR, or the employees or their representatives.

(10) Certification of eligibility. (i) By entering into this Agreement, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm, is a person or firm ineligible to be awarded Government contracts by virtue of any provision of federal or state laws.

(ii) No part of this Agreement shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of federal or state laws.

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. § 1001.

(11) Hawaii State overtime requirements. No laborers or mechanics shall be required or permitted to work on Saturday, Sunday, legal holidays of the State of Hawaii, or in excess of eight hours a day, or in excess of forty hours per week unless

such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay.

In any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in §5.1, the Agency Head shall cause or require the Companies to insert a clause requiring that the Contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the Agreement for all laborers and mechanics, including guards and watchmen, working on the Agreement. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the records to be maintained under this paragraph shall be made available by the Contractor or subcontractor for inspection, copying, or transcription by authorized representatives of HART, the DLIR and the Department of Labor, and the Contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

17. Contract Work Hours and Safety Standards

(a) Overtime requirements – No Contractor or subcontractor contracting for any part of the Agreement work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty (40) hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one (1) and one-half (1/2) times the basic rate of pay for all hours worked in excess of forty (40) hours in such workweek.

(b) Violation; liability for unpaid wages; liquidated damages – In the event of any violation of the clause set forth in paragraph (a) of this section the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such Contractor and subcontractor shall be liable to the United States for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (a) of this section, in the sum of ten dollars (\$10.00) for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty (40) hours without payment of the overtime wages required by the clause set forth in paragraph (a) of this section.

(c) Withholding for unpaid wages and liquidated damages – Hawaiian Electric shall upon its own action or upon written request of an authorized representative of the U.S. DOL withhold or cause to be withheld, from any moneys payable on account of work performed by the Contractor or subcontractor under any such contract or any other Federal contract with the Contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same Contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b) of this section.

(d) Subcontracts – The Contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs (a) through (d) of this section and also a clause requiring the subs to include these clauses in any lower tier subcontracts. The Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1) through (4) of this section.

18. ADA Access

The Contractor shall comply with the Americans with Disabilities Act of 1990 (ADA), as amended, 42 U.S.C. §§ 12101 et seq., which requires that accessible facilities and services be made available to individuals with disabilities; and with the Architectural Barriers Act of 1968, as amended, 42 U.S.C. §§ 4151 et seq., which requires that buildings and public accommodations be accessible to individuals with disabilities, and any subsequent amendments to these laws. In addition, the Contractor agrees to comply with all applicable implementing Federal regulations and directives and any subsequent amendments thereto.

19. Text Messaging While Driving

In accordance with Executive Order No. 13513, Federal Leadership on Reducing Text Messaging While Driving, October 1, 2009, 23 U.S.C.A. § 402 note, and DOT Order 3902.10, Text Messaging While Driving, December 30, 2009, the Contractor is encouraged to comply with the terms of the following:

(a) Definitions.

(1) "Driving" means operating a motor vehicle on a roadway, including while temporarily stationary because of traffic, a traffic light, stop sign, or otherwise. "Driving" does not include being in your vehicle (with or without the motor running) in a location off the roadway where it is safe and legal to remain stationary.

(2) "Text Messaging" means reading from or entering data into any handheld or other electronic device, including for the purpose of short message service texting, e-mailing, instant messaging, obtaining navigational information, or engaging in any other form of electronic data retrieval or electronic data communication. The term does not include the use of a cell phone or other electronic device for the limited purpose of entering a telephone number to make an outgoing call or answer an incoming call, unless the practice is prohibited by State or local law.

(b) Safety. The Contractor is encouraged to:

(1) Adopt and enforce workplace safety policies to decrease crashes caused by distracted drivers including policies to ban text messaging while driving:

(i) Contractor -owned or Contractor -rented vehicles or Government-owned, leased or rented vehicles;

- (ii) Privately-owned vehicles when on official Project related business or when performing any work for or on behalf of the Project; or
 - (iii) Any vehicle, on or off duty, and using an employer supplied electronic device.
- (2) Conduct workplace safety initiatives in a manner commensurate with the Contractor's size, such as:
 - (i) Establishment of new rules and programs or re-evaluation of existing programs to prohibit text messaging while driving; and
 - (ii) Education, awareness, and other outreach to employees about the safety risks associated with text messaging while driving.
- (3) Include this Special Provision in its subagreements with its subrecipients and third party contracts and also encourage its subrecipients, lessees, and third party contractors to comply with the terms of this Special Provision and include this clause in each subagreement, lease, and subcontract at each tier financed with Federal assistance provided by the Federal Government.

20. Sensitive Security Information

The Contractor, as a third party contractor must protect, and take measures to ensure that its subcontractors at each tier protect "sensitive security information" made available during the administration of a third party contract or subcontract to ensure compliance with 49 U.S.C. § 40119(b) and implementing DOT regulations, "Protection of Sensitive Security Information," 49 C.F.R. Part 15, and with 49 U.S.C. § 114(r) and implementing Department of Homeland Security regulations, "Protection of Sensitive Security Information", 49 C.F.R. Part 1520.

21. Incorporation of FTA Terms for the Honolulu Rail Transit Project.

(a) This document includes, in part, certain Standard Terms and Conditions required by the U.S. DOT, whether or not expressly set forth in the preceding contract provisions. All contractual provisions required by the U.S. DOT, as set forth in FTA Circular 4220.1F are hereby incorporated by reference. Anything to the contrary herein notwithstanding, all FTA mandated terms shall be deemed to control in the event of a conflict with other provisions contained in this Agreement. The Contractor shall not perform any act, fail to perform any act, or refuse to comply with any Hawaiian Electric requests which would cause Hawaiian Electric or the City to be in violation of the FTA terms and conditions.

(b) The Contractor shall include the above clause in each subcontract financed in whole or in part with Federal assistance provided by FTA, modified only if necessary to identify the affected parties.

Exhibit 1

Wage Rate Schedule Bulletin Issued Under Hawaii
Revised Statutes Chap. 104 by the Director, Department of
Labor and Industrial Relations, State of Hawaii

State of Hawaii
DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS
Princess Ruth Ke`elikolani Building
830 Punchbowl Street
Honolulu, Hawaii 96813



September 16, 2013
WAGE RATE SCHEDULE BULLETIN NO. 482

This schedule of wage rates contained herein is recognized by the Director of Labor and Industrial Relations to be prevailing on public construction work for the purposes of Chapter 104, Hawaii Revised Statutes. The schedule of wage rates determines the applicable wage determination for each classification and does not impose any staffing requirements for any classification. The schedule of wage rates is applicable only to those laborers and mechanics employed at the site of work.

As required by law, future wage rates for laborers and mechanics are incorporated into this bulletin based on available information and are subject to change. Whenever the Director determines that the prevailing wage has increased as shown in the wage rate schedule, the contractor must increase the wages accordingly during the performance of the contract. For addenda or additional wage rate schedules, please consult the Internet at <http://labor.hawaii.gov/rs>.

The Apprentice Schedule is available on the Internet or upon request from the Research and Statistics Office. Pursuant to Section 12-22-6 (1), Hawaii Administrative Rules, the Apprentice Schedule is applicable only to apprentices who are parties to apprenticeship agreements registered with or recognized by the Department of Labor and Industrial Relations.

Questions on the schedule should be referred to the Research and Statistics Office at (808) 586-9019.

The next regular schedule will be issued on or about February 15, 2014.

DWIGHT TAKAMINE
Director

STATE OF HAWAII
NEIL ABERCROMBIE, Governor

DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS
DWIGHT TAKAMINE, Director
AUDREY HIDANO, Deputy Director

RESEARCH AND STATISTICS OFFICE
PHYLLIS DAYAO, Research & Statistics Officer

OPERATIONS MANAGEMENT INFORMATION STAFF
Elienne Yoshida, Supervisor
Myra Oshiro
Janet Kaya
Mirasol Valdez

In cooperation with:
WAGE STANDARDS DIVISION
PAMELA MARTIN, Administrator

WAGE RATE SCHEDULE BULLETIN NO. 482

Classification	Current						2013			2014			2015			Remarks See Pg 6-7
	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate	
* ASPHALT PAVING GROUP:																
Asphalt Concrete Material Transfer	\$65.49	\$37.42	\$28.07	-	-	-	-	-	-	-	-	-	-	-	-	-
Asphalt Raker	\$64.53	\$36.46	\$28.07	-	-	-	-	-	-	-	-	-	-	-	-	-
Asphalt Spreader Operator	\$66.01	\$37.94	\$28.07	-	-	-	-	-	-	-	-	-	-	-	-	-
Laborer, Hand Roller	\$51.78	\$33.69	\$28.07	-	-	-	-	-	-	-	-	-	-	-	-	-
Roller Operator (5 tons and under)	\$64.26	\$36.19	\$28.07	-	-	-	-	-	-	-	-	-	-	-	-	-
Roller Operator (over 5 tons)	\$65.69	\$37.62	\$28.07	-	-	-	-	-	-	-	-	-	-	-	-	-
Screed Person	\$65.49	\$37.42	\$28.07	-	-	-	-	-	-	-	-	-	-	-	-	-
EQUIPMENT OPERATOR:																
Combination Loader/Backhoe (over 3/4 cu. yd.)	\$64.53	\$36.46	\$28.07	-	-	-	-	-	-	-	-	-	-	-	-	-
Combination Loader/Backhoe (up to 3/4 cu. yd.)	\$63.55	\$35.48	\$28.07	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete saws and/or Grinder (self-propelled unit on streets, highways, airports and canals)	\$65.49	\$37.42	\$28.07	-	-	-	-	-	-	-	-	-	-	-	-	-
Grader, Soil Stabilizer, Cold Planer	\$66.32	\$38.25	\$28.07	-	-	-	-	-	-	-	-	-	-	-	-	-
Loader (2-1/2 cu. yds. and under)	\$65.49	\$37.42	\$28.07	-	-	-	-	-	-	-	-	-	-	-	-	-
Loader (over 2-1/2 cu. yds. to and including 5 cu. yds.)	\$66.81	\$37.74	\$28.07	-	-	-	-	-	-	-	-	-	-	-	-	-
TRUCK DRIVER:																
Assistant to Engineer	\$64.26	\$36.19	\$28.07	-	-	-	-	-	-	-	-	-	-	-	-	-
Oil Tanker (double), Hot Liquid Asphalt Tanker	\$65.81	\$37.74	\$28.07	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Trailer, Semi-Dump, Asphalt Distributor	\$65.49	\$37.42	\$28.07	-	-	-	-	-	-	-	-	-	-	-	-	-
Slip-in or Pup	\$65.81	\$37.74	\$28.07	-	-	-	-	-	-	-	-	-	-	-	-	-
Single or Rock Cans Tandem Dump Truck	\$64.53	\$36.46	\$28.07	-	-	-	-	-	-	-	-	-	-	-	-	-
Single or Rock Cans Tandem Dump Truck (8 cu. yds. & under, water level)	\$64.84	\$36.77	\$28.07	-	-	-	-	-	-	-	-	-	-	-	-	-
Single or Rock Cans Tandem Dump Truck (over 8 cu. yds., water level)	\$65.92	\$37.85	\$28.07	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor, Trailer (hauling equipment)	\$64.26	\$36.19	\$28.07	-	-	-	-	-	-	-	-	-	-	-	-	-
Utility, Flatbed				-	-	-	-	-	-	-	-	-	-	-	-	-
BOILERMAKER																
	2/18/13	\$62.88	\$27.68	-	-	-	-	-	-	-	-	-	-	-	-	-
* CARPENTER:																
Carpenter, Patent Scaffold Erector (Over 14 feet);	9/16/13			-	-	-	-	-	-	-	-	-	-	-	-	-
Piledriver, Pneumatic Nailor	\$61.17	\$40.75	\$20.42	-	-	-	-	-	-	-	-	-	-	-	-	1
Milwright	\$61.42	\$41.00	\$20.42	-	-	-	-	-	-	-	-	-	-	-	-	1
Power Saw Operator (2 h.p. & above)	\$61.32	\$40.90	\$20.42	-	-	-	-	-	-	-	-	-	-	-	-	1
* CEMENT FINISHER:																
Cement Finisher, Curb Setter, Precast Panel Setter	9/16/13			-	-	-	-	-	-	-	-	-	-	-	-	-
Manhole Builder	\$60.27	\$36.80	\$23.47	-	-	-	-	-	-	-	-	-	-	-	-	2
Trowel Machine Operator	\$60.42	\$36.95	\$23.47	-	-	-	-	-	-	-	-	-	-	-	-	2
CHAIN-LINK FENCE ERECTOR																
	2/18/13	\$25.75	\$9.00	9/30/13	\$18.00	\$11.17	\$29.17	-	-	-	-	-	-	-	-	13
* CHLORINATOR																
	9/16/13	\$27.74	\$25.31					-	-	-	-	-	-	-	-	-

WAGE RATE SCHEDULE BULLETIN NO. 482

Classification	Current			2013			2014			2015			Remarks See Pg. 6-7		
	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate			
*DIVER:	9/16/13														
Diver (Aqua Lung) (Scuba) - Up to a depth of 30 feet	\$78.64	\$51.13	\$27.51	-	-	-	-	-	-	-	-	-			
Diver (Aqua Lung) (Scuba) - Over a depth of 30 feet	\$88.01	\$60.50	\$27.51	-	-	-	-	-	-	-	-	-			
Stand-By Diver (Aqua Lung) (Scuba)	\$69.26	\$41.75	\$27.51	-	-	-	-	-	-	-	-	-	3		
Diver (Other than Aqua Lung)	\$88.01	\$60.50	\$27.51	-	-	-	-	-	-	-	-	-	3		
Stand-By Diver (Other than Aqua Lung)	\$69.26	\$41.75	\$27.51	-	-	-	-	-	-	-	-	-			
Tender (Other than Aqua Lung)	\$86.23	\$38.72	\$27.51	-	-	-	-	-	-	-	-	-			
*DRAPERY INSTALLER	9/16/13														
	\$21.64	\$19.93	\$1.71	-	-	-	-	-	-	-	-	-			
*DRYWALL INSTALLER	9/16/13														
	\$61.42	\$41.00	\$20.42	-	-	-	-	-	-	-	-	-			
*ELECTRICIAN: (Note: 2 increases per year)	8/25/13														
Cable Splicer (inside/outside)	\$72.60	\$45.71	\$26.89	-	-	-	2/23/14	\$73.34	\$46.09	\$27.25	2/22/15	\$75.03	\$46.92	\$28.11	4
Ground Worker (outside)	\$53.59	\$31.16	\$22.43	-	-	-		\$54.20	\$31.43	\$22.77		\$55.53	\$31.99	\$23.54	4
Heavy Equipment Operator (outside)	\$61.75	\$37.40	\$24.35	-	-	-		\$62.40	\$37.71	\$24.69		\$63.89	\$38.39	\$25.50	4
Line Installer (outside); Wire Installer (inside)	\$67.17	\$41.55	\$25.62	-	-	-		\$67.88	\$41.90	\$25.98		\$69.46	\$42.65	\$26.81	4
Technician (inside/outside)	\$68.79	\$42.80	\$25.99	-	-	-		\$69.52	\$43.16	\$26.36		\$71.13	\$43.93	\$27.20	4
Cable Splicer (inside/outside)	-	-	-	-	-	-	8/24/14	\$74.27	\$46.53	\$27.74	8/23/15	\$75.89	\$47.36	\$28.53	4
Ground Worker (outside)	-	-	-	-	-	-		\$54.94	\$31.73	\$23.21		\$56.22	\$32.29	\$23.93	4
Heavy Equipment Operator (outside)	-	-	-	-	-	-		\$63.22	\$38.07	\$25.15		\$64.66	\$38.75	\$25.91	4
Line Installer (outside); Wire Installer (inside)	-	-	-	-	-	-		\$68.75	\$42.30	\$26.45		\$70.27	\$43.05	\$27.22	4
Technician (inside/outside)	-	-	-	-	-	-		\$70.40	\$43.57	\$26.83		\$71.95	\$44.34	\$27.61	4
Telecommunication Worker	9/1/13														
Licensed Technician	\$37.04	\$25.60	\$11.44	-	-	-									
Technician / Splicer	\$95.63	\$24.38	\$11.25	-	-	-									
ELEVATOR CONSTRUCTOR MECHANIC	2/18/13														
	\$76.395	\$51.21	\$26.185	-	-	-									
EQUIPMENT OPERATOR:	9/16/13														
Group 1	\$63.95	\$36.44	\$27.51	-	-	-								5	
Group 2	\$64.06	\$36.55	\$27.51	-	-	-								5	
Group 3	\$64.23	\$36.72	\$27.51	-	-	-								5	
Group 4	\$64.50	\$36.99	\$27.51	-	-	-								5	
Group 5	\$64.81	\$37.30	\$27.51	-	-	-								5	
Group 6	\$65.45	\$37.95	\$27.51	-	-	-								5	
Group 7	\$65.78	\$38.27	\$27.51	-	-	-								5	
Group 8	\$65.89	\$38.38	\$27.51	-	-	-								5	
Group 9	\$66.00	\$38.49	\$27.51	-	-	-								5	
Group 9A	\$66.23	\$38.72	\$27.51	-	-	-								5	
Group 10	\$66.29	\$38.78	\$27.51	-	-	-								5	
Group 10A	\$66.44	\$38.93	\$27.51	-	-	-								5	
Group 11	\$66.59	\$39.08	\$27.51	-	-	-								5	
Group 12	\$66.95	\$39.44	\$27.51	-	-	-								5	
Group 12A	\$67.31	\$39.80	\$27.51	-	-	-								5	

WAGE RATE SCHEDULE BULLETIN NO. 482

Classification	Current				2013				2014				2015				Remarks See Pg 6-7
	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate		Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate		Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate		Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate		
FENCE ERECTOR (CHAIN-LINK TYPE) See Chain-Link Fence Erector	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
* FLOOR LAYER (CARPET, LINOLEUM & SOFT TILE)	9/16/13 \$52.05	\$29.14	\$22.91	-	-	-	-	-	-	-	-	-	-	-	-	-	12
* GLAZIER	9/16/13 \$59.73	\$33.65	\$28.08	-	-	-	-	-	-	-	-	-	-	-	-	-	6
* HELICOPTER WORK: Airborne Hoist Operator	9/16/13 \$67.81	\$40.30	\$27.51	-	-	-	-	-	-	-	-	-	-	-	-	-	
Co-Pilot	\$67.95	\$40.44	\$27.51	-	-	-	-	-	-	-	-	-	-	-	-	-	
Pilot	\$68.12	\$40.61	\$27.51	-	-	-	-	-	-	-	-	-	-	-	-	-	
INSULATOR	3/3/13 \$61.05	\$37.65	\$23.40	-	-	-	-	-	-	-	-	-	-	-	-	-	7
IRONWORKER: Reinforcing, Structural	9/17/12 \$63.16	\$34.75	\$28.41	-	-	-	-	-	-	-	-	-	-	-	-	-	8
LABORER: Driller	9/2/13 \$49.26	\$33.30	\$15.96	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Gunite Operator	\$48.76	\$32.80	\$15.96	-	-	-	-	-	-	-	-	-	-	-	-	-	1
High Scaler (Working Suspended)	\$48.76	\$32.80	\$15.96	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Laborer I	\$48.26	\$32.30	\$15.96	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Laborer II	\$45.66	\$29.70	\$15.96	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Light Clean-up (Janitorial) Laborer	\$35.47	\$23.70	\$11.77	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Powder Blaster	\$49.26	\$33.30	\$15.96	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Window Washer (Outside) (On bosun's chair, cable-suspended scaffold or work platform)	\$47.76	\$31.80	\$15.96	-	-	-	-	-	-	-	-	-	-	-	-	-	
LANDSCAPER: Landscape & Irrigation Laborer A	9/2/13 \$32.18	\$22.65	\$9.51	-	-	-	-	9/1/14 \$33.31	\$23.20	\$10.11	-	-	-	-	-	-	
Landscape & Irrigation Laborer B	\$32.66	\$23.15	\$9.51	-	-	-	-	\$33.81	\$23.70	\$10.11	-	-	-	-	-	-	
Landscape & Irrigation Maintenance Laborer	\$28.66	\$19.15	\$9.51	-	-	-	-	\$29.81	\$19.70	\$10.11	-	-	-	-	-	-	
* LATHER	9/16/13 \$61.42	\$41.00	\$20.42	-	-	-	-	-	-	-	-	-	-	-	-	-	
* MASON, Bricklayer; Cement Blocklayer, Stone Mason, Precast Sill Setter	9/16/13 \$60.32	\$36.85	\$23.47	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Pointer-Caulker-Weatherproofer	\$60.57	\$37.10	\$23.47	-	-	-	-	-	-	-	-	-	-	-	-	-	2
* PAINTER: Painter, Spray Painter, Sandblaster or Waterblaster	9/16/13 \$60.15	\$34.10	\$26.05	-	-	-	-	7/1/14 \$60.40	\$34.35	\$26.05	-	-	-	-	-	-	12
Painter, Spray Painter; Sandblaster or Waterblaster	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12
Painter, Spray Painter; Sandblaster or Waterblaster	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12

WAGE RATE SCHEDULE BULLETIN NO. 482

Classification	Current				2013				2014				2015				Remarks See Pg 6-7
	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate		Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate		Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate		Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate		
* PLASTER	9/16/13 \$61.11	\$37.64	\$23.47		-	-	-		-	-	-		-	-	-		2
* PLUMBER: Plumber; Pipefitter; Refrigeration Fitter, Heating & Air Conditioning Fitter, Sprinkler Fitter, Steamfitter	7/7/13 \$61.86	\$38.10	\$23.76		-	-	-		1/5/14 \$62.11	\$38.35	\$23.76		-	-	-		9, 12
ROOFER: Shingle, Tile, Built-up Roofing Coal Tar Pitch	9/1/13 \$63.98 \$91.08	\$37.10 \$74.20	\$16.88 \$16.88		-	-	-		9/7/14 \$55.23 \$93.33	\$38.10 \$76.20	\$17.13 \$17.13		9/6/15 \$55.98 \$94.83	\$38.85 \$77.70	\$17.13 \$17.13		12 12
SANDBLASTER OR WATERBLASTER: Use wages of craft to which sand or water blasting is incidental.																	
* SHEETMETAL WORKER	9/16/13 \$59.98	\$37.25	\$22.73		-	-	-		-	-	-		-	-	-		10
TAPER	2/18/13 \$58.65	\$40.00	\$18.65		-	-	-		-	-	-		-	-	-		12
* TERMITE TREATER	9/16/13 \$17.20	\$13.85	\$3.35		-	-	-		-	-	-		-	-	-		
* TERRAZZO: Terrazzo Setter Terrazzo Base Grinder Certified Terrazzo Floor Grinder and Tender Terrazzo Floor Grinder	9/16/13 \$60.57 \$58.76 \$67.21 \$65.71	\$37.10 \$35.29 \$33.74 \$32.24	\$23.47 \$23.47 \$23.47 \$23.47		-	-	-		-	-	-		-	-	-		2 2 2 2
* TILE SETTER: Ceramic Hard Tile; Marble Setter Certified Ceramic Tile & Marble Helper	9/16/13 \$60.57 \$57.21	\$37.10 \$33.74	\$23.47 \$23.47		-	-	-		-	-	-		-	-	-		2 2
* TRUCK DRIVER: Concrete Mixer Concrete Mixer/Booster Dump Truck, 8 cu. yds. & under (water level); Water Truck (up to & including 2,000 gallons) Flatbed, Utility, etc. End Dump, Unlicensed (Euclid, Mack, Caterpillar, or similar); Tractor Trailer (hauling equipment) Semi-Trailer, Rock Cans, or Semi-Dump Slip-in or Pup Tandem Dump Truck, over 8 cu. yds. (water level); Water Truck (over 2,000 gallons)	9/16/13 \$34.62 \$43.05 \$64.50 \$64.23 \$65.89 \$65.46 \$65.78 \$64.81	\$28.87 \$30.53 \$36.99 \$36.72 \$38.38 \$37.95 \$38.27 \$37.30	\$5.75 \$12.52 \$27.51 \$27.51 \$27.51 \$27.51 \$27.51 \$27.51		-	-	-		-	-	-		-	-	-		

WAGE RATE SCHEDULE BULLETIN NO. 482

Classification	Current						2013			2014			2015			Remarks See Pg 6-7	
	9/17/13		9/16/13		9/16/13		9/16/13		9/16/13		9/16/13		9/16/13		9/16/13		
	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate		
UNDERGROUND LABORER:																	
Worker in a raise, shaft, or tunnel.																	
Group 1	\$48.86	\$32.90	\$15.96	-	-	-	-	-	-	-	-	-	-	-	-	-	
Group 2	\$50.36	\$34.40	\$15.96	-	-	-	-	-	-	-	-	-	-	-	-	-	
Group 3	\$50.86	\$34.90	\$15.96	-	-	-	-	-	-	-	-	-	-	-	-	-	
Group 4	\$51.86	\$35.90	\$15.96	-	-	-	-	-	-	-	-	-	-	-	-	-	
Group 5	\$52.11	\$36.15	\$15.96	-	-	-	-	-	-	-	-	-	-	-	-	-	
Group 6	\$52.21	\$36.25	\$15.96	-	-	-	-	-	-	-	-	-	-	-	-	-	
Group 7	\$52.46	\$36.50	\$15.96	-	-	-	-	-	-	-	-	-	-	-	-	-	
Group 8	\$52.91	\$36.95	\$15.96	-	-	-	-	-	-	-	-	-	-	-	-	-	
*WATER FRONT CONSTRUCTION (DREDGING):																	
CLAMSHELL OR DIPPER DREDGES:																	
Clamshell or Dipper Operator	\$66.95	\$39.44	\$27.51	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mechanic; Welder; Watch Engineer	\$66.29	\$38.78	\$27.51	-	-	-	-	-	-	-	-	-	-	-	-	-	
Deckmate; Bargemate	\$65.89	\$38.38	\$27.51	-	-	-	-	-	-	-	-	-	-	-	-	-	
Fire Person; Oiler; Deckhand; Barge Worker	\$64.23	\$36.72	\$27.51	-	-	-	-	-	-	-	-	-	-	-	-	-	
HYDRAULIC SUCTION DREDGES:																	
Lever Operator	\$66.59	\$39.08	\$27.51	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mechanic; Welder	\$66.29	\$38.78	\$27.51	-	-	-	-	-	-	-	-	-	-	-	-	-	
Watch Engineer (steam or electric)	\$66.44	\$38.93	\$27.51	-	-	-	-	-	-	-	-	-	-	-	-	-	
Dozer Operator	\$66.23	\$38.72	\$27.51	-	-	-	-	-	-	-	-	-	-	-	-	-	
Deckmate	\$65.89	\$38.38	\$27.51	-	-	-	-	-	-	-	-	-	-	-	-	-	
Winch Operator (stem winch on dredge)	\$65.78	\$38.27	\$27.51	-	-	-	-	-	-	-	-	-	-	-	-	-	
Fire Person; Oiler; Deckhand (can operate anchor scow under direction of deckmate); Levee Operator	\$64.23	\$36.72	\$27.51	-	-	-	-	-	-	-	-	-	-	-	-	-	
DERRICKS:																	
Operator; Derrick, Piledriver, Crane	\$66.95	\$39.44	\$27.51	-	-	-	-	-	-	-	-	-	-	-	-	-	
Deckmate; Saurman Type Dragline (up to & including 5 yds.)	\$65.89	\$38.38	\$27.51	-	-	-	-	-	-	-	-	-	-	-	-	-	
Saurman Type Dragline (over 5 cu. yds.)	\$66.29	\$38.78	\$27.51	-	-	-	-	-	-	-	-	-	-	-	-	-	
Fire Person; Oiler; Deckhand	\$64.23	\$36.72	\$27.51	-	-	-	-	-	-	-	-	-	-	-	-	-	
BOAT OPERATORS:																	
Master Boat Operator	\$66.59	\$39.08	\$27.51	-	-	-	-	-	-	-	-	-	-	-	-	-	
Boat Operator	\$66.44	\$38.93	\$27.51	-	-	-	-	-	-	-	-	-	-	-	-	-	
Boat Deckhand	\$64.23	\$36.72	\$27.51	-	-	-	-	-	-	-	-	-	-	-	-	-	
*WATER WELL DRILLER:																	
Water Well Driller	\$32.90	\$28.00	\$4.90	-	-	-	-	-	-	-	-	-	-	-	-	-	
Water Well Driller Helper	\$24.58	\$20.00	\$4.58	-	-	-	-	-	-	-	-	-	-	-	-	-	
WELDER:																	
Use wages of craft to which welding is incidental, except for Chain-Link Fence Erector. See remark.																13	

Comments: Overtime must be paid at one and one-half times the basic hourly rate plus the hourly cost of required fringe benefits.
* Indicates a wage, fringe benefit, remark, or title change from the previous bulletin.

WAGE RATE SCHEDULE BULLETIN NO. 482

REMARKS

1. Carpenter, Laborer (excluding High Scaler, Window Washer): \$.50 per hour shall be added to the regular straight-time rate for height pay for each hour while working from a bosun's chair and/or from a cable-suspended scaffold or work platform which is free swinging (not attached to building) for each hour worked on said rig.
2. Cement Finisher, Mason, Plasterer, Terrazzo, Tile Setter: \$1.00 per hour shall be added to the regular straight-time rate for height pay for each hour while working from a bosun's chair and/or from a cable-suspended scaffold or work platform which is free swinging (not attached to building) for each hour worked on said rig.
3. Diver (Other than Aqua Lung), Stand-By Diver (Other than Aqua Lung):
 - A. On any dive exceeding 50 feet, the diver shall in addition be paid the following amount of "depth money":

50 feet to 100 feet	\$1.50 per foot in excess of 50 feet
100 feet to 150 feet	\$100.00 plus \$2.00 per foot in excess of 100 feet
150 feet to 200 feet	\$200.00 plus \$3.00 per foot in excess of 150 feet
 - B. When it is necessary for a Diver to enter any pipe, tunnel or other enclosure, the said Diver shall in addition to the hourly rate, receive a premium in accordance with the following schedule for distance traveled from the entrance of the pipe, tunnel or other enclosure:
 - 1) When able to stand erect, but in which there is no vertical ascent:

5 feet to 50 feet	\$5.00 per day
50 feet to 100 feet	\$7.50 per day
100 feet to 150 feet	\$12.50 per day
 - 2) When unable to stand erect and in which there is no vertical ascent:

5 feet to 50 feet	\$5.00 per day
50 feet to 100 feet	\$7.50 per day
100 feet to 150 feet	\$12.50 per day
150 feet to 200 feet	\$36.75 per day
200 feet to 300 feet	\$1.00 per foot
300 feet to 450 feet	\$1.50 per foot
450 feet to 600 feet	\$2.50 per foot
4. Electrician:
 - A. One and one-half times the straight-time rate while working in a tunnel under construction; under water with aqualung equipment; in a completed tunnel which has only one entrance or exit providing access to safety and where no other personnel are working; or in an underground structure having no access to safety or where no other personnel are working.
 - B. Double the straight-time rate shall be paid for the following types of hazardous work regardless if fall prevention devices are used:
 - 1) While working from poles, trusses, stacks, towers, tanks, bosun's chairs, swinging or rolling scaffolds, supporting structures, and open platforms, over 70 feet from the ground where the employee is subject to a free fall; provided, however, that when work is performed on stacks, towers or permanent platforms where the employees are on a firm footing within an enclosure, a hazardous condition does not exist regardless of height.
 - 2) While working outside of a railing or enclosure, or temporary platforms extending outside of a building, or from scaffolding or ladder within an enclosure where an employee's footing is within one foot of the top of such railing, and the employee is subject to a free fall of over 70 feet;
 - 3) Working on buildings while leaning over the railing or edge of the building, and is subject to a free fall of 70 feet; or
 - 4) Two hours minimum hazardous pay per day shall be paid while climbing to a stack, tower or permanent platform which exceeds 70 feet from the ground but where the employee is on a firm footing within an enclosure.
 - C. Five percent per hour shall be added to the hourly wage for height pay while working above 9,000 feet elevation.

WAGE RATE SCHEDULE BULLETIN NO. 482

REMARKS

5. Equipment Operator:
 Operators and Assistants to Engineer (climbing a boom) of cranes (under 50 tons) with booms of eighty feet or more (including jib) or of cranes (under 50 tons) with leads of one hundred feet or more, shall receive additional premium according to the following schedule:

Booms of 80 feet up to, or leads of 100 feet up to, but not including 130 feet	Per Hour
Booms and/or leads of 130 feet up to, but not including 180 feet	\$0.50
Booms and/or leads of 180 feet up to and including 250 feet	\$0.75
Booms and/or leads over 250 feet	\$1.15
Operators and Assistants to Engineer (climbing a boom) of cranes (50 tons and over) with booms of 180 feet or more (including jib) shall receive additional premium according to the following schedule:	\$1.50

 - Booms of 180 feet up to and including 250 feet

Per Hour	\$1.25
Booms over 250 feet	\$1.75
 - Note: The boom shall be measured from the center of the heel pin to the center of the boom or jib point sheave.
 - \$1.25 per hour shall be added to the hourly wage while operating a rig suspended by ropes or cables or to perform work on a Yo-Yo Cat.
 - In a raise or shaft, a premium of \$.40 per hour will be paid in addition to the regular straight time wage.
 - A raise is defined to be an underground excavation (lined or unlined) whose length exceeds its width and the inclination of the grade from the excavation is greater than 20 degrees from the horizontal.
 - A shaft is defined to be an excavation (lined or unlined) made from the surface of the earth, generally vertical in nature, but may decline up to 75 degrees from the vertical, and whose depth is greater than 15 feet and its largest horizontal dimension. Includes an underground silo.
 - In a tunnel, a premium of \$.30 per hour will be paid in addition to the regular straight time wages.
 - A tunnel is defined to be an underground excavation (lined or unlined) whose length exceeds its width and the inclination of the grade from the excavation is no greater than 20 degrees from the horizontal.
6. Glazier: Effective 9/16/13 - \$1.00 per hour shall be added to the hourly wage for height pay for exterior glazing work performed in a walking/working surface with an unprotected side or edge 10 feet or more above a lower level which requires protection from fall hazards by guardrail systems, safety net systems, personal fall arrest systems, position devise systems, fall restraint systems, perimeter safety cables or controlled decking zones.
7. Insulator: Six percent per hour shall be added to the hourly wage for hazardous pay while working from a boatswain chair, staging or free standing scaffolding erected from the ground up or mezzanine floor subject to a free fall and skylimber suspended from a permanent structure and when working above 40 feet.
8. Ironworker: \$.50 per hour shall be added to the hourly wage while working in tunnels or coffer dams. \$1.00 per hour shall be added to the hourly wage while working under or covered with water (submerged), or on the summits of Mauna Kea, Mauna Loa or Haleakala.
9. Plumber: One and one-half times the straight-time rate for height pay while working from OSHA approved trusses, stacks, towers, tanks, bosun's chair, swinging or rolling scaffolding, supporting structures or on open platforms where the employee is subject to a direct fall of 40 feet or more. Provided, however, that when said work is performed where the employee is on a firm footing within an enclosure, a hazardous condition does not exist regardless of height. \$1.00 per hour shall be added to the straight-time rate while working with flame cutting or any type of welding equipment on any galvanized material or product for at least an hour.
10. Sheetmetal Worker: Add \$.01 to the total fringe benefit hourly rate per Hawaii Revised Statutes, Section 104-2 (b)(2).
11. Water Front Construction: Clamshell or Dipper Operator: \$.50 per hour shall be added to the straight-time rate while working with boom (including jib) over 130 feet.
12. Possible wage/fringe option increases:

Floor Layer: Effective 3/2/14 - \$1.75; 3/1/15 - \$2.00
Painter: Effective 7/1/14 - \$.025; 1/1/15 - \$.050; 7/1/15 - \$.075
Plumber: Effective WRS 483 - \$.025
Roofier: Effective 9/6/15 - \$.040
Taper: Effective WRS 483 - \$2.00
13. Chain-Link Fence Erector: \$1.00 per hour shall be added to the hourly wage while performing welding services.

Exhibit 2

Wage Determination issued under the Construction Wage
Rate Requirements statute by the Administrator, Wage and
Hour Division, Employment Standards Administration,
U.S. Department of Labor

General Decision Number: HI140001 01/03/2014 HI1

Superseded General Decision Number: HI20130001

State: Hawaii

Construction Types: Building, Heavy (Heavy and Dredging),
Highway and Residential

Counties: Hawaii Statewide.

BUILDING CONSTRUCTION PROJECTS; RESIDENTIAL CONSTRUCTION
PROJECTS (consisting of single family homes and apartments up
to and including 4 stories); HEAVY AND HIGHWAY CONSTRUCTION
PROJECTS AND DREDGING

Modification Number	Publication Date
0	01/03/2014

ASBE0132-001 08/29/2010

	Rates	Fringes
Asbestos Workers/Insulator Includes application of all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems. Also the application of firestopping material for wall openings and penetrations in walls, floors, ceilings and curtain walls.....	\$ 36.65	22.24

BOIL0627-005 01/01/2013

	Rates	Fringes
BOILERMAKER.....	\$ 35.20	27.35

BRHI0001-001 09/03/2012

	Rates	Fringes
BRICKLAYER Bricklayers and Stonemasons.	\$ 35.35	22.92
Pointers, Caulkers and Weatherproofers.....	\$ 35.60	22.92

BRHI0001-002 09/02/2013

	Rates	Fringes
Tile, Marble & Terrazzo Worker		

Terrazzo Base Grinders.....	\$ 35.29	23.22
Terrazzo Floor Grinders and Tenders.....	\$ 32.24	23.22
Tile, Marble and Terrazzo Workers.....	\$ 37.10	23.22

CARP0745-001 09/02/2013

	Rates	Fringes
Carpenters:		
Carpenters; Hardwood Floor Layers; Patent Scaffold Erectors (14 ft. and over); Piledrivers; Pneumatic Nailers; Wood Shinglers and Transit and/or Layout Man.....	\$ 40.75	20.42
Millwrights and Machine Erectors.....	\$ 41.00	20.42
Power Saw Operators (2 h.p. and over).....	\$ 40.90	20.42

CARP0745-002 09/02/2013

	Rates	Fringes
Drywall and Acoustical Workers and Lathers.....	\$ 41.00	20.42

ELEC1186-001 08/23/2013

	Rates	Fringes
Electricians:		
Cable Splicers.....	\$ 45.71	26.89
Electricians.....	\$ 41.55	25.69
Telecommunication worker....	\$ 23.20	17%+6.35

ELEC1186-002 08/23/2013

	Rates	Fringes
Line Construction:		
Cable Splicers.....	\$ 45.71	26.89
Groundmen/Truck Drivers....	\$ 31.16	22.43
Heavy Equipment Operators...\$	37.40	24.35
Linemen.....	\$ 41.55	25.69
Telecommunication worker....\$	23.20	17%+\$6.35

ELEV0126-001 01/01/2013

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 51.21	25.185+a+b

a. VACATION: Employer contributes 8% of basic hourly rate for 5 years service and 6% of basic hourly rate for 6 months to 5 years service as vacation pay credit.

b. PAID HOLIDAYS: New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, the Friday after Thanksgiving Day and Christmas Day.

ENGI0003-002 09/02/2013

	Rates	Fringes
Diver (Aqua Lung) (Scuba)		
Diver (Aqua Lung) (Scuba)		
(over a depth of 30 feet)...	\$ 60.50	26.98
Diver (Aqua Lung) (Scuba)		
(up to a depth of 30 feet)...	\$ 51.13	26.98
Stand-by Diver (Aqua Lung)		
(Scuba).....	\$ 41.75	26.98
Diver (Other than Aqua Lung)		
Diver (Other than Aqua Lung)	\$ 60.50	26.98
Diver Tender (Other than Aqua Lung)	\$ 38.72	26.98
Stand-by Diver (Other than Aqua Lung)	\$ 41.75	26.98
Helicopter Work		
Airborne Hoist Operator for Helicopter	\$ 40.30	26.98
Co-Pilot of Helicopter	\$ 40.44	26.98
Pilot of Helicopter	\$ 40.61	26.98
Power equipment operator - tunnel work		
GROUP 1.....	\$ 36.74	26.98
GROUP 2.....	\$ 36.85	26.98
GROUP 3.....	\$ 37.02	26.98
GROUP 4.....	\$ 37.29	26.98
GROUP 5.....	\$ 37.60	26.98
GROUP 6.....	\$ 38.25	26.98
GROUP 7.....	\$ 38.57	26.98
GROUP 8.....	\$ 38.68	26.98
GROUP 9.....	\$ 38.79	26.98
GROUP 9A.....	\$ 39.02	26.98
GROUP 10.....	\$ 39.08	26.98
GROUP 10A.....	\$ 39.23	26.98
GROUP 11.....	\$ 39.38	26.98
GROUP 12.....	\$ 39.74	26.98
GROUP 12A.....	\$ 40.10	26.98
Power equipment operators:		
GROUP 1.....	\$ 36.44	26.98
GROUP 2.....	\$ 36.55	26.98
GROUP 3.....	\$ 36.72	26.98
GROUP 4.....	\$ 36.99	26.98
GROUP 5.....	\$ 37.30	26.98
GROUP 6.....	\$ 37.95	26.98
GROUP 7.....	\$ 38.27	26.98
GROUP 8.....	\$ 38.38	26.98
GROUP 9.....	\$ 38.49	26.98
GROUP 9A.....	\$ 38.72	26.98
GROUP 10.....	\$ 38.78	26.98
GROUP 10A.....	\$ 38.93	26.98
GROUP 11.....	\$ 39.08	26.98
GROUP 12.....	\$ 39.44	26.98

GROUP 12A.....	\$ 39.80	26.98
GROUP 13.....	\$ 36.72	26.98
GROUP 13A.....	\$ 36.99	26.98
GROUP 13B.....	\$ 37.30	26.98
GROUP 13C.....	\$ 37.95	26.98
GROUP 13D.....	\$ 38.27	26.98
GROUP 13E.....	\$ 38.38	26.98

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Fork Lift (up to and including 10 tons); Partsman (heavy duty repair shop parts room when needed).

GROUP 2: Conveyor Operator (Handling building material); Hydraulic Monitor; Mixer Box Operator (Concrete Plant).

GROUP 3: Brakeman; Deckhand; Fireman; Oiler; Oiler/Gradechecker; Signalman; Switchman; Highline Cableway Signalman; Bargeman; Bunkerman; Concrete Curing Machine (self-propelled, automatically applied unit on streets, highways, airports and canals); Leveeman; Roller (5 tons and under); Tugger Hoist.

GROUP 4: Boom Truck or dual purpose "A" Frame Truck (5 tons or less); Concrete Placing Boom (Building Construction); Dinky Operator; Elevator Operator; Hoist and/or Winch (one drum); Straddle Truck (Ross Carrier, Hyster and similar).

GROUP 5: Asphalt Plant Fireman; Compressors, Pumps, Generators and Welding Machines ("Bank" of 9 or more, individually or collectively); Concrete Pumps or Pumpcrete Guns; Lubrication and Service Engineer (Grease Rack); Screedman.

GROUP 6: Boom Truck or Dual Purpose "A" Frame Truck (over 5 tons); Combination Loader/Backhoe (up to and including 3/4 cu. yd.); Concrete Batch Plants (wet or dry); Concrete Cutter, Groover and/or Grinder (self-propelled unit on streets, highways, airports, and canals); Conveyor or Concrete Pump (Truck or Equipment Mounted); Drilling Machinery (not to apply to waterliners, wagon drills or jack hammers); Fork Lift (over 10 tons); Loader (up to and including 3 and 1/2 cu. yds); Lull High Lift (under 40 feet); Lubrication and Service Engineer (Mobile); Maginnis Internal Full Slab Vibrator (on airports, highways, canals and warehouses); Man or Material Hoist; Mechanical Concrete Finisher (Large Clary, Johnson Bidwell, Bridge Deck and similar); Mobile Truck Crane Driver; Portable Shotblast Concrete Gleaning Machine; Portable Boring Machine (under streets, highways, etc.); Portable Crusher; Power Jumbo Operator (setting slip forms, etc., in tunnels); Rollers (over 5 tons); Self-propelled Compactor (single engine); Self-propelled Pavement Breaker; Skidsteer Loader with attachments; Slip Form Pumps (Power driven by hydraulic, electric, air, gas, etc., lifting device for concrete forms); Small Rubber Tired Tractors; Trencher (up to and including 6 feet); Underbridge Personnel Aerial Platform (50 feet of platform or less).

GROUP 7: Crusher Plant Engineer, Dozer (D-4, Case 450, John

Deere 450, and similar); Dual Drum Mixer, Extend Lift; Hoist and/or Winch (2 drums); Loader (over 3 and 1/2 cu. yds. up to and including 6 yards.); Mechanical Finisher or Spreader Machine (asphalt), (Barber Greene and similar) (Screedman required); Mine or Shaft Hoist; Mobile Concrete Mixer (over 5 tons); Pipe Bending Machine (pipelines only); Pipe Cleaning Machine (tractor propelled and supported); Pipe Wrapping Machine (tractor propelled and supported); Roller Operator (Asphalt); Self-Propelled Elevating Grade Plane; Slusher Operator; Tractor (with boom) (D-6, or similar); Trencher (over 6 feet and less than 200 h.p.); Water Tanker, (pulled by Euclids, T-Pulls, DW-10, 20 or 21, or similar); Winchman (Stern Winch on Dredge).

GROUP 8: Asphalt Plant Operator; Barge Mate (Seagoing); Cast-in-Place Pipe Laying Machine; Concrete Batch Plant (multiple units); Conveyor Operator (tunnel); Deckmate; Dozer (D-6 and similar); Finishing Machine Operator (airports and highways); Gradesetter; Kolman Loader (and similar); Mucking Machine (Crawler-type); Mucking Machine (Conveyor-type); No-Joint Pipe Laying Machine; Portable Crushing and Screening Plant; Power Blade Operator (under 12); Saurman Type Dragline (up to and including 5 yds.); Stationary Pipe Wrapping, Cleaning and Bending Machine; Surface Heater and Planer Operator; Tractor (D-6 and similar); Tri-Batch Paver; Tunnel Badger; Tunnel Mole and/or Boring Machine Operator Underbridge Personnel Aerial Platform (over 50 feet of platform).

GROUP 9: Combination Mixer and Compressor (gunite); Do-Mor Loader and Adams Elegrader; Dozer (D-7 or equal); Wheel and/or Ladder Trencher (over 6 feet and 200 to 749 h.p.).

GROUP 9A: Dozer (D-8 and similar); Gradesetter (when required by the Contractor to work from drawings, plans or specifications without the direct supervision of a foreman or superintendent); Push Cat; Scrapers (up to and including 20 cu. yds); Self-propelled Compactor with Dozer; Self-Propelled, Rubber-Tired Earthmoving Equipment (up to and including 20 cu. yds) (621 Band and similar); Sheep's Foot; Tractor (D-8 and similar); Tractors with boom (larger than D-6, and similar).

GROUP 10: Chicago Boom; Cold Planers; Heavy Duty Repairman or Welder; Hoist and/or Winch (3 drums); Hydraulic Skooper (Koehring and similar); Loader (over 6 cu. yds. up to and including 12 cu. yds.); Saurman type Dragline (over 5 cu. yds.); Self-propelled, rubber-tired Earthmoving Equipment (over 20 cu. yds. up to and including 31 cu. yds.) (637D and similar); Soil Stabilizer (P & H or equal); Sub-Grader (Curries or other automatic type); Tractors (D-9 or equivalent, all attachments); Tractor (Tandem Scraper); Watch Engineer;

GROUP 10A: Boat Operator; Cable-operated Crawler Crane (up to and including 25 tons); Cable-operated Power Shovel, Clamshell, Dragline and Backhoe (up to and including 1 cu. yd.); Dozer D9-L; Dozer (D-10, HD41 and similar) (all attachments); Gradall (up to and including 1 cu. yd.); Hydraulic Backhoe (over 3/4 cu. yds. up to and including 2

cu. yds.); Mobile Truck Crane Operator (up to and including 25 tons) (Mobile Truck Crane Driver Required); Self-propelled Boom Type Lifting Device (Center Mount) (up to and including 25 tons) (Grove, Drott, P&H, Pettibone and similar); Trencher (over 6 feet and 750 h.p. or more); Watch Engineer (steam or electric).

GROUP 11: Automatic Slip Form Paver (concrete or asphalt); Band Wagon (in conjunction with Wheel Excavator); Cable-operated Crawler Cranes (over 25 tons but less than 50 tons); Cable-operated Power Shovel, Clamshell, Dragline and Backhoe (over 1 cu. yd. up to 7 cu. yds.); Gradall (over 1 cu. yds. up to 7 cu. yds.); DW-10, 20, etc. (Tandem); Earthmoving Machines (multiple propulsion power units and 2 or more Scrapers) (up to and including 35 cu. yds., "struck" m.r.c.); Highline Cableway; Hydraulic Backhoe (over 2 cu. yds. up to and including 4 cu. yds.); Leverman; Lift Slab Machine; Loader (over 12 cu. yds.); Master Boat Operator; Mobile Truck Crane Operator (over 25 tons but less than 50 tons); (Mobile Truck Crane Driver required); Pre-stress Wire Wrapping Machine; Self-propelled Boom-type Lifting Device (Center Mount) (over 25 tons m.r.c.); Self-propelled Compactor (with multiple-propulsion power units); Single Engine Rubber Tired Earthmoving Machine (with Tandem Scraper); Tandem Cats; Trencher (pulling attached shield).

GROUP 12: Clamshell or Dipper Operator; Derricks; Drill Rig; Multi-Propulsion Earthmoving Machines (2 or more Scrapers) (over 35 cu. yds "struck" m.r.c.); Operators (Derricks, Piledrivers and Cranes); Power Shovels and Draglines (7 cu. yds. m.r.c. and over); Self-propelled rubber-tired Earthmoving equipment (over 31 cu. yds.) (657B and similar); Wheel Excavator (up to and including 750 cu. yds. per hour); Wheel Excavator (over 750 cu. yds. per hour).

GROUP 12A: Dozer (D-11 or similar or larger); Hydraulic Excavators (over 4 cu. yds.); Lifting cranes (50 tons and over); Pioneering Dozer/Backhoe (initial clearing and excavation for the purpose of providing access for other equipment where the terrain worked involves 1-to-1 slopes that are 50 feet in height or depth, the scope of this work does not include normal clearing and grubbing on usual hilly terrain nor the excavation work once the access is provided); Power Blade Operator (Cat 12 or equivalent or over); Straddle Lifts (over 50 tons); Tower Crane, Mobile; Traveling Truss Cranes; Universal, Liebherr, Linden, and similar types of Tower Cranes (in the erection, dismantling, and moving of equipment there shall be an additional Operating Engineer or Heavy Duty Repairman); Yo-Yo Cat or Dozer.

GROUP 13: Truck Driver (Utility, Flatbed, etc.)

GROUP 13A: Dump Truck, 8 cu.yds. and under (water level); Water Truck (up to and including 2,000 gallons).

GROUP 13B: Water Truck (over 2,000 gallons); Tandem Dump Truck, over 8 cu. yds. (water level).

GROUP 13C: Truck Driver (Semi-trailer, Rock Cans, Semi-Dump or Roll-Offs).

GROUP 13D: Truck Driver (Slip-In or Pup).

GROUP 13E: End Dumps, Unlicensed (Euclid, Mack, Caterpillar or similar); Tractor Trailer (Hauling Equipment); Tandem Trucks hooked up to Trailer (Hauling Equipment)

BOOMS AND/OR LEADS (HOURLY PREMIUMS):

The Operator of a crane (under 50 tons) with a boom of 80 feet or more (including jib), or of a crane (under 50 tons) with leads of 100 feet or more, shall receive a per hour premium for each hour worked on said crane (under 50 tons) in accordance with the following schedule:

Booms of 80 feet up to but not including 130 feet or Leads of 100 feet up to but not including 130 feet	0.50
Booms and/or Leads of 130 feet up to but not including 180 feet	0.75
Booms and/or Leads of 180 feet up to and including 250 feet	1.15
Booms and/or Leads over 250 feet	1.50

The Operator of a crane (50 tons and over) with a boom of 180 feet or more (including jib) shall receive a per hour premium for each hour worked on said crane (50 tons and over) in accordance with the following schedule:

Booms of 180 feet up to and including 250 feet	1.25
Booms over 250 feet	1.75

ENGI0003-004 09/02/2013

	Rates	Fringes
Dredging: (Boat Operators)		
Boat Deckhand.....	\$ 36.72	26.98
Boat Operator.....	\$ 38.93	26.98
Master Boat Operator.....	\$ 39.08	26.98
Dredging: (Clamshell or Dipper Dredging)		
GROUP 1.....	\$ 39.44	26.98
GROUP 2.....	\$ 38.78	26.98
GROUP 3.....	\$ 38.38	26.98
GROUP 4.....	\$ 36.72	26.98
Dredging: (Derricks)		
GROUP 1.....	\$ 39.44	26.98
GROUP 2.....	\$ 38.78	26.98
GROUP 3.....	\$ 38.38	26.98
GROUP 4.....	\$ 36.72	26.98
Dredging: (Hydraulic Suction Dredges)		
GROUP 1.....	\$ 39.08	26.98

GROUP 2.....	\$ 38.93	26.98
GROUP 3.....	\$ 38.78	26.98
GROUP 4.....	\$ 38.72	26.98
GROUP 5.....	\$ 37.88	26.76
Group 5.....	\$ 38.38	26.98
GROUP 6.....	\$ 37.77	26.76
Group 6.....	\$ 38.27	26.98
GROUP 7.....	\$ 36.22	26.76
Group 7.....	\$ 36.72	26.98

CLAMSHELL OR DIPPER DREDGING CLASSIFICATIONS

- GROUP 1: Clamshell or Dipper Operator.
- GROUP 2: Mechanic or Welder; Watch Engineer.
- GROUP 3: Barge Mate; Deckmate.
- GROUP 4: Bargeman; Deckhand; Fireman; Oiler.

HYDRAULIC SUCTION DREDGING CLASSIFICATIONS

- GROUP 1: Leverman.
- GROUP 2: Watch Engineer (steam or electric).
- GROUP 3: Mechanic or Welder.
- GROUP 4: Dozer Operator.
- GROUP 5: Deckmate.
- GROUP 6: Winchman (Stern Winch on Dredge)
- GROUP 7: Deckhand (can operate anchor scow under direction of Deckmate); Fireman; Leverman; Oiler.

DERRICK CLASSIFICATIONS

- GROUP 1: Operators (Derricks, Piledrivers and Cranes).
- GROUP 2: Saurman Type Dragline (over 5 cubic yards).
- GROUP 3: Deckmate; Saurman Type Dragline (up to and including 5 yards).
- GROUP 4: Deckhand, Fireman, Oiler.

ENGI0003-044 09/02/2013

	Rates	Fringes
Power Equipment Operators (PAVING)		
(10) Cold Planer.....	\$ 38.25	26.98
(10) Loader (2 1/2 cu. yds. and under).....	\$ 37.42	26.98
(10) Soil Stabilizer.....	\$ 38.25	26.98
(11) Loader (over 2 1/2 cu. yds. to and including 5 cu. yds.).....	\$ 37.74	26.98
(3) Roller Operator (five tons and under).....	\$ 36.19	26.98
(5) Screed Person.....	\$ 37.42	26.98
(6) Combination Loader/Backhoe (up to 3/4 cu.yd.).....	\$ 35.48	26.98
(6) Concrete Saws and/or Grinder (self-propelled unit on streets, highways, airports and canals).....	\$ 37.42	26.98

(6) Roller Operator (over five tons).....	\$ 37.62	26.98
(7) Combination Loader/Backhoe (over 3/4 cu.yd.).....	\$ 36.46	26.98
(8) Asphalt Plant Operator..	\$ 37.89	26.98
Asphalt Concrete Material Transfer.....	\$ 37.42	26.98
Asphalt Raker.....	\$ 36.46	26.98
Asphalt Spreader Operator..	\$ 37.94	26.98
Grader.....	\$ 38.25	26.98
Laborer, Hand Roller.....	\$ 35.96	26.98

IRON0625-001 09/01/2013

	Rates	Fringes
Ironworkers:.....	\$ 34.75	28.41
a. Employees will be paid \$.50 per hour more while working in tunnels and coffer dams; \$1.00 per hour more when required to work under or are covered with water (submerged) and when they are required to work on the summit of Mauna Kea, Mauna Loa or Haleakala.		

LABO0368-001 09/02/2013

	Rates	Fringes
Laborers:		
Driller.....	\$ 33.30	15.96
Final Clean Up.....	\$ 23.70	11.77
Guniting Operator & High Scaler.....	\$ 32.80	15.96
Laborer I.....	\$ 32.30	15.96
Laborer II.....	\$ 29.70	15.96
Powderman.....	\$ 33.30	15.96
Window Washer (bosun chair)..	\$ 31.80	15.96

LABORERS CLASSIFICATIONS

Laborer I: Asbestos Removal Worker (EPA certified workers); Asphalt Laborer, Ironer, Raker, Liteman, and Handroller, and all types of Asphalt Spreader Boxes; Asphalt Shovelers; Assembly and Installation of Multiplates, Liner Plates, Rings, Mesh, Mats; Batching Plant (portable and temporary); Boring Machine Operator (under streets and sidewalks); Buggymobile; Burning, Welding, Signalling, Choke Setting, and Rigging in connection with Laborers' work (except demolition); Chainsaw, Faller, Logloader, and Bucker; Compactors (Jackson Jumping Jack and similar); Concrete Bucket Dumpman; Concrete Chipping; Concrete Chuteman/Roseman (pouring concrete) (the handling of the chute from ready-mix trucks for such jobs as walls, slabs, decks, floors, foundations, footings, curbs, gutters, and sidewalks); Concrete Core Cutter (Walls, Floors, and Ceiling); Concrete Grinding or Sanding; Concrete: Hooking on, signaling, dumping of concrete for treme work over water on caissons, pilings, abutments, etc.; Concrete: Mixing, handling, conveying, pouring, vibrating, otherwise placing of concrete or aggregates or by any other process;

Concrete: Operation of motorized wheelbarrows or buggies or machines of similar character, whether run by gas, diesel, or electric power; Concrete Placement Machine Operator: operation of Somero Hammerhead, Copperheads, or similar machines; Concrete Pump Machine (laying, coupling, uncoupling of all connections and cleaning of equipment); Concrete and/or Asphalt Saw (Walking or Handtype) (cutting walls or flatwork) (scoring old or new concrete and/or asphalt) (cutting for expansion joints) (streets and ways for laying of pipe, cable or conduit for all purposes); Concrete Shovelers/Laborers (Wet or Dry); Concrete Screeding for Rough Strike-Off: Rodding or striking-off, by hand or mechanical means prior to finishing; Concrete Vibrator Operator; Coring Holes: Walls, footings, piers or other obstructions for passage of pipes or conduits for any purpose and the pouring of concrete to secure the hole; Curbing (Concrete and Asphalt); Curing of Concrete (impervious membrane and form oiler) mortar and other materials by any mode or method; Cut Granite Curb Setter (setting, leveling and grouting of all precast concrete or stone curbs); Cutting and Burning Torch (demolition); Dri Pak-It Machine; Felling, bucking, yarding, loading or burning of all trees or timber on construction site; Forklift (9 ft. and under); Grating and Grill work for drains or other purposes; Green Cutter of concrete or aggregate in any form, by hand, mechanical means, grindstone or air and/or water; Grout: Spreading for any purpose; Guinea Chaser (Grade Checker) for general utility trenches, sitework, and excavation; Headerboard Man (Asphalt or Concrete); Heat Welder of Plastic (Laborers' AGC certified workers) (when work involves waterproofing for waterponds, artificial lakes and reservoir, or heat welding for sewer pipes); Heavy Highway Laborer (Rigging, signaling, handling, and installation of pre-cast catch basins, manholes, curbs and gutters); High Pressure Nozzleman - Hydraulic Monitor (over 100# pressure); Installation of lightweight backfill; Jackhammer Operator; Jacking of slip forms: All semi and unskilled work connected therewithin; Laying of all multi-cell conduit or multi-purpose pipe; Lead base paint abatement laborers (EPA certified workers); Magnesite and Mastic Workers (Wet or Dry) (including mixer operator); Mason Tender; Mortar Man; Mortar Mixer (Block, Brick, Masonry, and Plastering); Nozzleman (Sandblasting and/or Water Blasting): handling, placing and operation of nozzle; Operation, Manual or Hydraulic jacking of shields and the use of such other mechanical equipment as may be necessary; Pavement Breakers; Paving, curbing and surfacing of streets, ways, courts, under and overpasses, bridges, approaches, slope walls, and all other labor connected therewith; Pilecutters; Pipe Assessment in place, bolting and lining up of sectional metal or other pipe including corrugated pipe; Pipelayer performing all services in the laying and installation of pipe from the point of receiving pipe in the ditch until completion of operation, including any and all forms of tubular material, whether pipe, metallic or non-metallic, conduit, and any other stationary-type of tubular device used for conveying of any substance or element, whether water, sewage, solid, gas, air, or other product whatsoever and without regard to the nature of

material from which tubular material is fabricated; No-joint pipe and stripping of same, Pipewrapper, Caulker, Bander, Kettleman, and men applying asphalt, Laykold, treating Creosote and similar-type materials (6-inch) pipe and over); Piping: resurfacing and paving of all ditches in preparation for laying of all pipes; Pipe laying of lateral sewer pipe from main or side sewer to buildings or structure (except Contactor may direct work be done under proper supervision); Pipe laying, leveling and marking of the joint used for main or side sewers and storm sewers; Laying of all clay, terra cotta, ironstone, vitrified concrete or other pipe for drainage; Placing and setting of water mains, gas mains and all pipe including removal of skids; Plaster Mortar Mixer/Pump; Pneumatic Impact Wrench; Portable Sawmill Operation; Choker setters, off bearers, and lumber handlers connected with clearing; Posthole Digger (Hand Held, Gas, Air and Electric); Power Broom Sweepers (Small); Preparation and Compaction of roadbeds for railroad track laying, highway construction, and the preparation of trenches, footings, etc., for cross-country transmission by pipelines, electrical transmission or underground lines or cables (by mechanical means); Raising of structure by manual or hydraulic jacks or other methods and resetting of structure in new locations, including all concrete work; Ramming or compaction; Riprap, Stonepaver, and Rock Slinger (includes placement of stacked concrete, wet or dry and loading, unloading, signaling, slinging and setting of other similar materials); Rotary Scarifier (including multiple head concrete chipping Scarifier); Salamander Heater, Drying of plaster, concrete mortar or other aggregate; Scaffold Erector Leadman; Scaffolds (Swing and hanging) including maintenance thereof; Scaler; Septic Tank/Cesspool and Drain Fields Digger and Installer; Shredder/Chipper (tree branches, brush, etc.); Stripping and Setting Forms; Stripping of Forms: Other than panel forms which are to be re-used in their original form, and stripping of forms on all flat arch work; Tampers (Barke, Wacker, and similar type); Tank Scaler and Cleaners; Tarman; Tree Climbers and Trimmers; Trencher (includes hand-held, Davis T-66 and similar type); Trucks (flatbed up to and including 2 1/2 tons when used in connection with on-site Laborers' work); Trucks (Refuse and Garbage Disposal) (from job site to dump); Vibra-Screed (Bull Float in connection with Laborers' work); Well Points, Installation of or any other dewatering system.

Laborer II: Air Blasting; Appliance Handling (job site) (after delivery and unloading in storage area); Asphalt Plant Laborer; Backfilling, Grading and all other labor connected therewith; Boring Machine; Bridge Laborer; Burning of all debris (crates, boxes, packaging waste materials); Chainman, Rodmen, and Grade Markers; Cleaning and Clearing of all debris; Cleaning, clearing, grading and/or removal for streets, highways, roadways, aprons, runways, sidewalks, parking areas, airports, approaches, and other similar installations; Cleaning or reconditioning of streets, ways, sewers and waterlines, all maintenance work and work of an unskilled and semi-skilled nature; Cleanup of Grounds and Buildings (other than "Light Clean-Up") (Janitorial Laborer); Clean-up of right-of-way;

Clearing and slashing of brush or trees by hand or mechanical cutting; Concrete Bucket Tender (Groundman) hooking and unhooking of bucket; Concrete Forms; moving, cleaning, oiling and carrying to the next point of erection of all forms; Concrete Products Plant Laborers; Conveyor Tender (conveying of building materials); Cribbers, Shorer, Lagging, Sheeting, and Trench Jacking and Bracing, Hand-Guided Lagging Hammer Whaling Bracing; Crushed Stone Yards and Gravel and Sand Pit Laborers and all other similar plants; Demolition, Wrecking and Salvage Laborers: Wrecking and dismantling of buildings and all structures, with use of cutting or wrecking tools, burning or cutting, breaking away, cleaning and removal of all masonry, wood or metal fixtures for salvage or scrap. All hooking, unhooking, signaling of materials for salvage or scrap removed by crane or derrick; Digging under streets, roadways, aprons or other paved surfaces; Chuck Tender, Outside Nipper; Dry-packing of concrete (plugging and filling of she-bolt holes); Excavation, Preparation of street ways and bridges; Fence and/or Guardrail Erector: Dismantling and/or re-installation of all fence; Finegrader; Firewatcher; Flagman (Coning, preparing, establishing and removing portable roadway barricade devices); Signal Men on all construction work defined herein, including Traffic Control Signal Men at construction site; Garbage and Debris Handlers and Cleaners; Gas, Pneumatic, and Electric Tools, not listed Group I (except Rototiller); General Clean-up: sweeping, cleaning, washdown, wiping of construction facility, and equipment (other than "Light Clean-up" [Janitorial] Laborer); General Excavation and Grading (all labor connected therewith); Digging of trenches, ditches and manholes and the leveling, grading and other preparation prior to laying pipe or conduit for any purpose; Excavations and foundations for buildings, piers, foundations and holes, and all other construction; General Laborer; Ground and Soil Treatment Work (Pest Control); Junk Yard Laborers (same as Salvage Yard); Landscape Nursery Laborers; Laser Beam "Target Man" in connection with Laborers' work; Layout Person for Plastic (when work involves waterproofing for waterpools, artificial lakes and reservoirs); Limbers, Brush Loaders, and Pilers; Loading, Unloading, carrying, distributing and handling of all rods and material for use in reinforcing concrete construction (except when a derrick or outrigger operated by other than hand power is used); Loading, unloading, sorting, stockpiling, handling and distribution of water mains, gas mains and all pipes; Loading and unloading of all materials, fixtures, furnishings and appliances from point of delivery to stockpile to point of installation; hooking and signalling from truck, conveyance or stockpile; Material Yard Laborers; Pipelayer Tender; Pipewrapping Caulker, Bander, Kettlemen, and men applying asphalt, Laykold, Creosote, and similar-type materials (pipe under 6 inches); Plasterer Laborer (including Hod Carrier); Preparation, construction and maintenance of roadbeds and sub-grade for all paving, including excavation, dumping, and spreading of sub-grade material; Prestressed or precast concrete slabs, walls, or sections: all loading, unloading, stockpiling, hooking on of such slabs, walls or sections;

Quarry Laborers; Railroad, Streetcar, and Rail Transit Maintenance and Repair; Removal of surplus material; Roustabout; Rubbish Trucks in connection with Building Construction Projects (excluding clearing, grubbing, and excavating); Salvage Yard: All work connected with cutting, cleaning, storing, stockpiling or handling of materials, all cleanup, removal of debris, burning, back-filling and landscaping of the site; Sandblasting (Pot Tender): Hoses and pots or markers; Scaffolds: Erection, planking and removal of all scaffolds used for support for lathers, plasterers, brick layers, masons, and other construction trades crafts; Scaffolds: (Specially designed by carpenters) laborers shall tend said carpenter on erection and dismantling thereof, preparation for foundation or mudsills, maintenance; Scraping of floors; Screeds: Handling of all screeds to be reused; handling, dismantling and conveyance of screeds; Setting, leveling and securing or bracing of metal or other road forms and expansion joints; Sheeting Piling/trench shoring (handling and placing of skip sheet or wood plank trench shoring); Ship Scales; Sign Erector (subdivision traffic, regulatory, and street-name signs); Sloper; Slurry Seal Crews (Mixer Operator, Applicator, Squeegee Man, Shuttle Man, Top Man); Snapping of wall ties and removal of tie rods; Soil Test operations of semi and unskilled labor such as filling sand bags; Striper (Asphalt, Concrete or other Paved Surfaces); Tagging and Signaling of all building materials into high-rise units; Tool Room Attendant (Job Site); Traffic Delineating Device Applicator; Underpinning, lagging, bracing, propping and shoring, loading, signaling, right-of-way clearance along the route of movement, The clearance of new site, excavation of foundation when moving a house or structure from old site to new site; Utilities employees; Water Man; Waterscape/Hardscape Laborers; Wire Mesh Pulling (all concrete pouring operations); Wrecking, stripping, dismantling and handling concrete forms an false work.

LAB00368-002 09/02/2013

	Rates	Fringes
Landscape & Irrigation Laborers		
GROUP 1.....	\$ 22.65	9.51
GROUP 2.....	\$ 23.15	9.51
GROUP 3.....	\$ 19.15	9.51

LABORERS CLASSIFICATIONS

GROUP 1: Installation of non-potable permanent or temporary irrigation water systems performed for the purposes of Landscaping and Irrigation architectural horticultural work; the installation of drinking fountains and permanent or temporary irrigation systems using potable water for Landscaping and Irrigation architectural horticultural purposes only. This work includes (a) the installation of all heads, risers, valves, valve boxes, vacuum breakers (pressure and non-pressure), low voltage electrical lines

and, provided such work involves electrical wiring that will carry 24 volts or less, the installation of sensors, master control panels, display boards, junction boxes, conductors, including all other components for controllers, (b) and metallic (copper, brass, galvanized, or similar) pipe, as well as PVC or other plastic pipe including all work incidental thereto, i.e., unloading, handling and distribution of all pipes fittings, tools, materials and equipment, (c) all soldering work in connection with the above whether done by torch, soldering iron, or other means; (d) tie-in to main lines, thrust blocks (both precast and poured in place), pipe hangers and supports incidental to installation of the entire irrigation system; (e) making of pressure tests, start-up testing, flushing, purging, water balancing, placing into operation all irrigation equipment, fixtures and appurtenances installed under this agreement, and (f) the fabrication, replacement, repair and servicing of landscaping and irrigation systems, Operation of hand-held gas, air, electric, or self-powered tools and equipment used in the performance of Landscape and Irrigation work in connection with architectural horticulture; Choke-setting, signaling, and rigging for equipment operators on job-site in the performance of such Landscaping and Irrigation work; Concrete work (wet or dry) performed in connection with such Landscaping and Irrigation work. This work shall also include the setting of rock, stone, or riprap in connection with such Landscape, Waterscape, Rockscape, and Irrigation work; Grubbing, pick and shovel excavation, and hand rolling or tamping in connection with the performance of such Landscaping and Irrigation work; Sprigging, handseeding, and planting of trees, shrubs, ground covers, and other plantings and the performance of all types of gardening and horticultural work relating to said planting; Operation of flat bed trucks (up to and including 2 1/2 tons):

GROUP 2. Layout of irrigation and other non-potable irrigation water systems and the layout of drinking fountains and other potable irrigation water systems in connection with such Landscaping and Irrigation work. This includes the layout of all heads, risers, valves, valve boxes, vacuum breakers, low voltage electrical lines, hydraulic and electrical controllers, and metallic (coppers, brass, galvanized, or similar) pipe, as well as PVC or other plastic pipe. This work also includes the reading and interpretation of plans and specifications in connection with the layout of Landscaping, Rockscape, Waterscape, and Irrigation work; Operation of Hydro-Mulching machines (sprayman and driver), Drillers, Trenchers (riding type, Davis T-66, and similar) and fork lifts used in connection with the performance of such Landscaping and Irrigation work; Tree climbers and chain saw tree trimmers, Sporadic operation (when used in connection with Landscaping, Rockscape, Waterscape, and Irrigation work) of Skid-Steer Loaders (Bobcat and similar), Cranes (Bantam, Grove, and similar), Hoptos, Backhoes, Loaders, Rollers, and Dozers (Case, John Deere, and similar), Water Trucks, Trucks requiring a State of Hawaii Public Utilities Commission Type 5 and/or type 7 license, sit-down type and "gang" mowers, and other

self-propelled, sit-down operated machines not listed under Landscape & Irrigation Maintenance Laborer; Chemical spraying using self-propelled power spraying equipment (200 gallon capacity or more).

GROUP 3: Maintenance of trees, shrubs, ground covers, lawns and other planted areas, including the replanting of trees, shrubs, ground covers, and other plantings that did not "take" or which are damaged; provided, however, that re-planting that requires the use of equipment, machinery, or power tools shall be paid for at the rate of pay specified under Landscape and Irrigation Laborer, Group 1; Raking, mowing, trimming, and rining; including the use of "weed eaters", hedge trimmers, vacuums, blowers, and other hand-held gas, air, electric, or self-powered tools, and the operation of lawn mowers (Note: The operation of sit-down type and "gang" mowers shall be paid for at the rate of pay specified under Landscape & Irrigation Laborer, Group 2); Guywiring, staking, propping, and supporting trees; Fertilizing, Chemical spraying using spray equipment with less than 200 gallon capacity; Maintaining irrigation and sprinkler systems, including the staking, clamping, and adjustment of risers, and the adjustment and/or replacement of sprinkler heads, (Note: the cleaning and gluing of pipe and fittings shall be paid for at the rate of pay specified under Landscape & Irrigation Laborer (Group 1); Watering by hand or sprinkler system and the performance of other types of gardening, yardman, and horticultural-related work.

LAB00368-003 09/02/2013

	Rates	Fringes
Underground Laborer		
GROUP 1.....	\$ 32.90	15.96
GROUP 2.....	\$ 34.40	15.96
GROUP 3.....	\$ 34.90	15.96
GROUP 4.....	\$ 35.90	15.96
GROUP 5.....	\$ 36.25	15.96
GROUP 6.....	\$ 36.50	15.96
GROUP 7.....	\$ 36.95	15.96

GROUP 1: Watchmen; Change House Attendant.

GROUP 2: Swamper; Brakeman; Bull Gang-Muckers, Trackmen; Dumpmen (any method); Concrete Crew (includes rodding and spreading); Grout Crew; Reboundmen

GROUP 3: Chucktenders and Cabletenders; Powderman (Prime House); Vibratorman, Pavement Breakers

GROUP 4: Miners - Tunnel (including top and bottom man on shaft and raise work); Timberman, Retimberman (wood or steel or substitute materials thereof); Blasters, Drillers, Powderman (in heading); Microtunnel Laborer; Headman; Cherry Pickerman (where car is lifted); Nipper; Grout Gunmen; Grout Pumpman & Potman; Gunite, Shotcrete Gunmen & Potmen; Concrete Finisher (in tunnel); Concrete Screed Man; Bit Grinder; Steel Form Raisers & Setters; High Pressure

Nozzleman; Nozzleman (on slick line); Sandblaster-Potman
(combination work assignment interchangeable); Tugger

GROUP 5: Shaft Work & Raise (below actual or excavated ground
level); Diamond Driller; Gunite or Shotcrete Nozzleman;
Rodman; Groundman

GROUP 6: Shifter

GROUP 7: Shifter (Shaft Work & Raiser)

PAIN1791-001 05/01/2013

	Rates	Fringes
Painters:		
Brush.....	\$ 34.10	25.95
Sandblaster; Spray.....	\$ 34.10	25.95

* PAIN1889-001 07/01/2013

	Rates	Fringes
Glaziers.....	\$ 33.65	26.08

PAIN1926-001 02/24/2013

	Rates	Fringes
Soft Floor Layers.....	\$ 29.14	22.91

PAIN1944-001 01/01/2013

	Rates	Fringes
Taper.....	\$ 40.00	18.65

PLAS0630-001 09/03/2012

	Rates	Fringes
PLASTERER.....	\$ 36.14	22.92

PLAS0630-002 09/03/2012

	Rates	Fringes
Cement Masons:		
Cement Masons.....	\$ 35.30	22.72
Trowel Machine Operators.....	\$ 35.45	22.72

PLUM0675-001 07/07/2013

	Rates	Fringes
Plumber, Pipefitter, Steamfitter & Sprinkler Fitter...	\$ 38.10	23.76

* ROOF0221-001 09/01/2013

	Rates	Fringes
Roofers (Including Built Up, Composition and Single Ply).....	\$ 37.10	16.88

 SHEE0293-001 09/01/2013

	Rates	Fringes
Sheet metal worker.....	\$ 37.25	22.79

 SUHI1997-002 09/15/1997

	Rates	Fringes
Drapery Installer.....	\$ 13.60	1.20
FENCE ERECTOR (Chain Link Fence).....	\$ 9.33	1.65

 WELDERS - Receive rate prescribed for craft performing
 operation to which welding is incidental.

 Unlisted classifications needed for work not included within
 the scope of the classifications listed may be added after
 award only as provided in the labor standards contract clauses
 (29CFR 5.5 (a) (i) (ii)).

 The body of each wage determination lists the classification
 and wage rates that have been found to be prevailing for the
 cited type(s) of construction in the area covered by the wage
 determination. The classifications are listed in alphabetical
 order of "identifiers" that indicate whether the particular
 rate is union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with
 characters other than "SU" denotes that the union
 classification and rate have been found to be prevailing for that
 classification. Example: PLUM0198-005 07/01/2011. The first
 four letters, PLUM, indicate the international union and the
 four-digit number, 0198, that follows indicates the local union
 number or district council number where applicable, i.e.,
 Plumbers Local 0198. The next number, 005 in the example, is
 an internal number used in processing the wage determination.
 The date, 07/01/2011, following these characters is the
 effective date of the most current negotiated rate/collective
 bargaining agreement which would be July 1, 2011 in the above
 example.

Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rates.

0000/9999: weighted union wage rates will be published annually each January.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union majority rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request

review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

Exhibit 3

Certified Payroll Forms

(Rev. 06/10)

STATEMENT OF COMPLIANCE - Initial
(Certification Under Penalty of Perjury)

Date: at:

- I, do certify under penalty of perjury:
- 1) That all of the information in this report is true and correct.
 - 2) That I pay or supervise the payment of the persons employed by on the for all work in performance of our contract during the duration of the project; that all persons employed on said project will be paid the full weekly wages earned; that no rebates have been or will be made either directly or indirectly from the full wages earned by any person, other than permissible deductions, as described below:
FICA(Social Security), Medicare, Federal Income Taxes, State Income Taxes, State Disability (SDI), Court-ordered Wage Attachments.
 - 3) That any payrolls otherwise under this contract required to be submitted are correct and complete; that the wage rate for laborers or mechanics contained therein are not less than the applicable wage rates contained in any wage determination incorporated into the contract; that the classifications set forth therein for each laborer or mechanic conform with the work performed.
 - 4) That my apprentices employed on the above project are duly registered in a bona fide apprenticeship program registered with, or recognized by, a state apprenticeship agency.
 - 5) That:
 - a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS
In addition to the basic hourly wage rates paid to each laborer or mechanic listed in the above-referenced payroll, payments of fringe benefits as listed in the contract have been or will be made to the appropriate programs for the benefit of such employees.

Following is a breakdown of the HOURLY fringe benefit contributions: See COMMENTS - RED @ box corner for help

	Classification	Pension/Annuity	Health & Welfare	Vacation/Holiday	Training	Total OTHER *	Total Fringes /hr
a						\$0.00	\$0.00
b							\$0.00
c						\$0.00	\$0.00
d						\$0.00	\$0.00
e						\$0.00	\$0.00
f						\$0.00	\$0.00
g						\$0.00	\$0.00
h						\$0.00	\$0.00
i						\$0.00	\$0.00
j						\$0.00	\$0.00

*	Classification	(Type)	(Type)	(Type)	(Type)	(Type)	Total OTHER
a							\$0.00
b							\$0.00
c							\$0.00
d							\$0.00
e							\$0.00
f							\$0.00
g							\$0.00
h							\$0.00
i							\$0.00
j							\$0.00

b) Remarks

Trade/Craft Classification	Explanation

I reaffirm the intent of our company to comply with the requirements of HRS chapter 104, and all applicable federal and State laws during performance of the contract.

Note: If using an ELECTRONIC signature, then the initial submittal must contain both the INKED and ELECTRONIC signatures. Subsequent weeks need only contain the ELECTRONIC one.

Name	Title

Signature and Date - INKED

Signature and Date - ELECTRONIC

Exhibit 4

Davis-Bacon Poster (WH-1321)

EMPLOYEE RIGHTS UNDER THE DAVIS-BACON ACT

FOR LABORERS AND MECHANICS EMPLOYED ON FEDERAL OR FEDERALLY ASSISTED CONSTRUCTION PROJECTS

THE UNITED STATES DEPARTMENT OF LABOR WAGE AND HOUR DIVISION

PREVAILING WAGES You must be paid not less than the wage rate listed in the Davis-Bacon Wage Decision posted with this Notice for the work you perform.

OVERTIME You must be paid not less than one and one-half times your basic rate of pay for all hours worked over 40 in a work week. There are few exceptions.

ENFORCEMENT Contract payments can be withheld to ensure workers receive wages and overtime pay due, and liquidated damages may apply if overtime pay requirements are not met. Davis-Bacon contract clauses allow contract termination and debarment of contractors from future federal contracts for up to three years. A contractor who falsifies certified payroll records or induces wage kickbacks may be subject to civil or criminal prosecution, fines and/or imprisonment.

APPRENTICES Apprentice rates apply only to apprentices properly registered under approved Federal or State apprenticeship programs.

PROPER PAY If you do not receive proper pay, or require further information on the applicable wages, contact the Contracting Officer listed below:

[Empty box for Contracting Officer contact information]

or contact the U.S. Department of Labor's Wage and Hour Division.



For more information:

1-866-4-USWAGE



WWW.WAGEHOUR.DOL.GOV

Exhibit 5

DLIR Notice to Workers H1I04-1

NOTICE TO WORKERS

WAGE INFORMATION

This project is subject to State Law, Chapter 104. Every laborer and mechanic employed on this job site must be:

1. PAID not less than the prevailing wage for the job classification - See schedules below. (Note: The Wage Rate Schedule may also be downloaded at - <http://labor.hawaii.gov/rs>)
2. PAID overtime at not less than time and one-half for all hours worked after 8 hours each day, and for all hours worked on Saturdays, Sundays, and legal State holidays.
3. PAID fringe benefits for all hours worked, including overtime.
4. PAID every week, within five working days after the end of the payperiod.
5. GIVEN a copy of the applicable rate schedules (see below), unless covered by a collective bargaining agreement.

If You Don't Receive the Above, Report to:

Project Representative/Inspector: _____ Phone: _____

For more information, contact the Department of Labor and Industrial Relations, Wage Standards Division:

OAHU (Honolulu) 830 Punchbowl Street Room 340 Phone: (808) 586-8777	HAWAII (Hilo) 75 Aupuni Street Room 108 Phone: (808) 974-6464	WEST HAWAII (Kealahou) Post Office Building Phone: (808) 322-4808	KAUAI (Lihue) State Building 3060 Eiwa Street Room 202 Phone: (808) 274-3351	MAUI (Wailuku) 2264 Aupuni Street Phone: (808) 243-5322
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Exhibit 6

DLIR 104 Guidelines- Publication # H104-2



Wage Standards Division
Department of Labor and
Industrial Relations

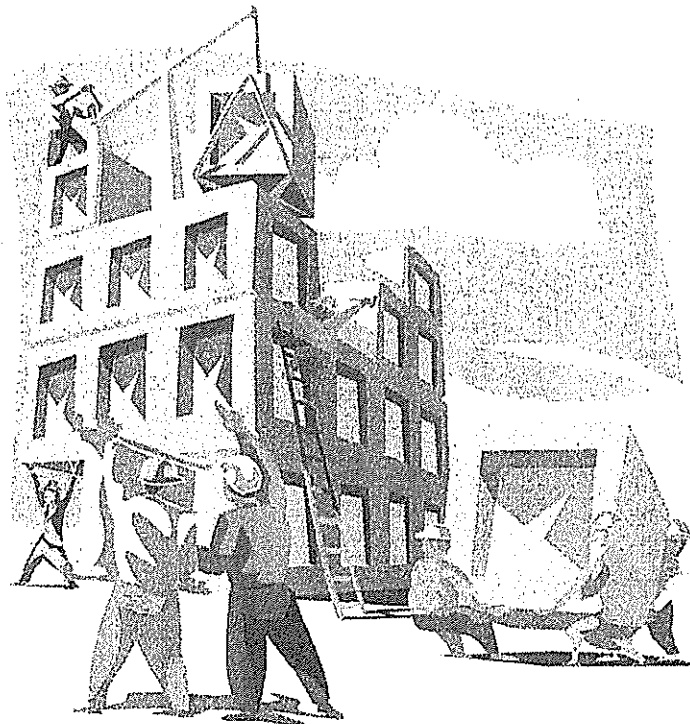
Frequently Asked Questions About

Chapter 104

Hawaii Revised Statutes
Wages and Hours of
Employees on Public Works Law

A Guide for

- Contractors
- Government Contracting Agencies
- Workers

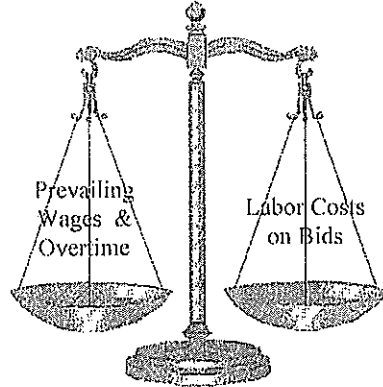




This publication has been compiled solely for convenient reference purposes by the Department of Labor and Industrial Relations (DLIR).

It is the policy of the DLIR that no person shall on the basis of race, color, sex, marital status, religion, creed, ethnic origin, national origin, age, disability, ancestry, arrest/court record, sexual orientation, and National Guard participation be subjected to discrimination, excluded from participation in, or denied benefits of the department's services, programs, activities, or employment.

Auxiliary aids and services are available upon request from DLIR's Wage Standards Division, Intake and Certification Branch, at (808) 586-8777, (808) 586-8857 (TTY), and 1-888-569-6859 (TTY neighbor islands).



INTRODUCTION

In order to create a fair and equitable public bidding process for all contractors, the 1955 Legislature passed a law patterned after the federal Davis-Bacon Act. The Hawaii law, **Wages and Hours of Employees on Public Works**, provided for determination of prevailing wage rates and required contractors to pay prevailing wages to laborers and mechanics.

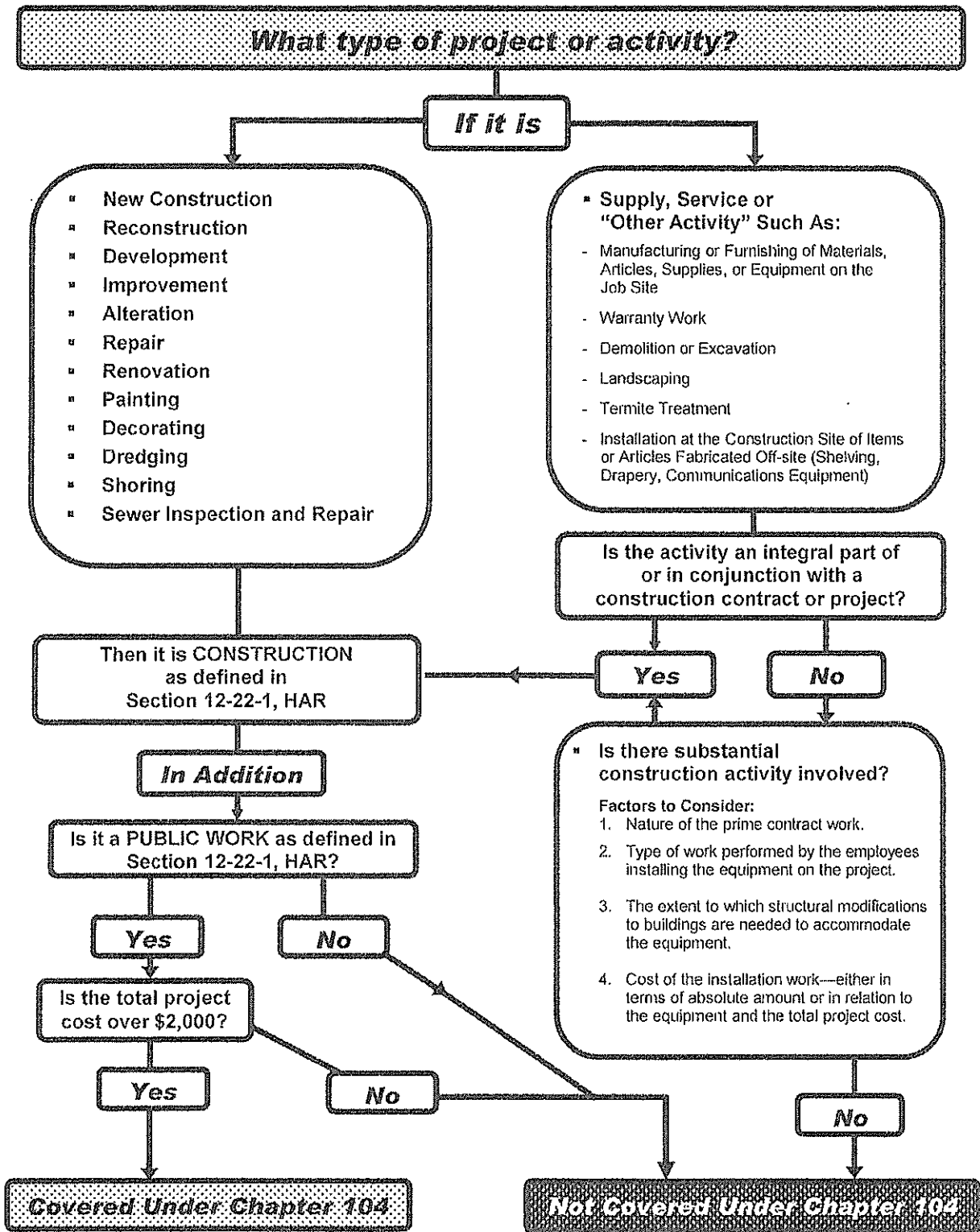
As declared in the Senate Labor Committee Report:

"This bill, like the Federal Davis-Bacon Act, has as its guiding principle that bids for construction of public works should be based on the relative skill and efficiency of the contractors concerned and not on a difference in wages paid. To state the principle another way, government money, coming from the taxes of all of us, should not be used to subsidize contractors who are depressing the wages of some of us." (Standing Committee Report No. 318)

Chapter 104, Hawaii Revised Statutes, (originally Chapter 9A, Revised Laws of Hawaii) has been amended several times since 1955, and continues to protect the standards of workers on State and county public works construction projects.

This guide is a compilation of answers to frequently asked questions regarding Chapter 104, Hawaii Revised Statutes, to assist contractors, contracting agencies, workers, and other parties involved in a public works construction project in complying with the law. This information is provided to contractors so that the appropriate labor construction costs can be considered prior to the submission of bids.

DETERMINATION OF COVERAGE UNDER CHAPTER 104, HRS



Under §12-22-1, Hawaii Administrative Rules (HAR):

"Construction of public work" includes without limitation new construction, reconstruction, development, improvement, alteration, repair, renovation, painting, decorating, dredging, shoring, simultaneous sewer inspection and repair, and any other activity performed by a laborer or mechanic employed at the site of a public work or at any property used by the contractor, dedicated for the performance of the contract, such as batch plants, borrow pits, fabrication plants, mobile factories, job headquarters, and tool yards. As used in this section, "other activity performed by a laborer or mechanic employed at the site" includes the following if the activity is an integral part of or is in conjunction with a construction contract, or if there is substantial construction activity involved in a supply, service, or other type of non-construction contract:

- 1) Manufacturing or furnishing of materials, articles, supplies, or equipment on the job site;
- 2) Warranty work except when done by the manufacturer on defective products or equipment;
- 3) Demolition or excavation;
- 4) Landscaping;
- 5) Termite treatment; and
- 6) Installation at the construction site of items or articles fabricated off-site, such as shelving, drapery, and communications equipment.

"Public work" shall be as defined in section 104-2(a), Hawaii Revised Statutes, and includes without limitation:

- 1) Any building, structure, road, or real property, the construction of which is undertaken:
 - (A) By authority of; and
 - (B) Through the use of funds, grants, loans, special purpose revenue bonds, land, or other resources of the State or any county, board, bureau, authority, commission, or other agency or instrumentality thereof, to serve the interest of the general public, regardless of whether title thereof is held by a state or county agency. However, subsequent construction to fixtures or appurtenances attached to the assigned space of an individual occupant, lessee, or tenant of the building or structure, contracted by other than a state or county agency or instrumentality thereof, shall not be subject to chapter 104, Hawaii Revised Statutes.
- 2) Any building or structure constructed under private contract under the following conditions:
 - (A) The property is privately owned, but 50 percent of the assignable square feet of a project is leased or assigned to the State or a political subdivision; and
 - (B) The lease or agreement between the lessor and the State or political subdivision, as lessee, was entered into prior to the construction contract; or
 - (C) The construction work is performed according to plans, specifications, or criteria of the State or political subdivision.

FREQUENTLY ASKED QUESTIONS

Updated March 2009

COVERAGE

1. What is Chapter 104, the public works law?
2. What does Chapter 104 cover?
3. What is the difference between the State and the federal public works laws?
4. Does Chapter 104 apply if federal funds are used?
5. What is the difference between construction and supply or maintenance contracts in regard to Chapter 104?

CLASSIFICATION

6. How is the appropriate job classification determined?
7. What is prevailing area practice?
8. What can be done when there seems to be no appropriate job classification in the wage rate schedule for the work performed on the project?
9. How should job classifications be shown on certified payrolls?
10. Does the law allow "summer hires" or "helpers"?
11. When can a contractor use apprenticeship/trainee wage rates?

PREVAILING WAGES

12. What wages are required by Chapter 104?
13. What is a "prevailing wage"?
14. What is the "applicable" prevailing wage?
15. If there is an increase in the prevailing wage, is the contractor required to increase the wages of laborers and mechanics engaged in the performance of the contract on the job site?
16. What is a fringe benefit?
17. Does a contractor need a breakdown of the fringe benefit rate in the wage rate schedule?

18. How can a contractor meet the prevailing wage requirement?
19. How can a contractor take credit for allowable fringe benefits?
20. If warranty work is covered under Chapter 104, what is the applicable prevailing wage?

PAYDAYS

21. How often do laborers and mechanics have to be paid?

WAGE RATE SCHEDULE

22. What is a wage rate schedule?
23. Does a contractor have to provide a wage rate schedule to each laborer and mechanic?

OVERTIME

24. When must overtime be paid under Chapter 104?
25. How is overtime computed?
26. On which holidays must overtime be paid?

CERTIFIED PAYROLLS AND RECORDKEEPING

27. What is a certified payroll?
28. What information should be on a certified payroll?
29. How long should certified and original payroll records be kept?

ENFORCEMENT

30. Who enforces Chapter 104?
31. What can a governmental contracting agency do if a contractor violates Chapter 104?
32. What are the penalties if a contractor violates Chapter 104?

COVERAGE

1. What is Chapter 104, the public works law?

Chapter 104, HRS, is the wage and hour law on State and county public works construction projects. Major requirements of the law include the payment of prevailing wages and overtime to laborers and mechanics working on the project; submission of weekly certified payrolls; record keeping; and posting and notification to employees of the prevailing wage rates.



2. What does Chapter 104 cover?

Every public works construction project over \$2,000, involving a State or county governmental contracting agency, is covered, whether it is in the form of a contract awarded through a formal bid process, purchase order, voucher, or lease arrangement. Warranty work performed by a contractor/subcontractor is covered, whereas warranty work performed by a manufacturer on defective products or equipment is not covered.

The law applies to work performed at the public work job site by any laborer or mechanic, including owner-operators.

It also applies to transporting of materials, supplies or equipment:

- (a) to or from a public work site; or
- (b) between a public work site and another public work site or a dedicated site;

when performed by a laborer or mechanic employed at the job site.

See pages 2 and 3 for more information on what is covered under Chapter 104.

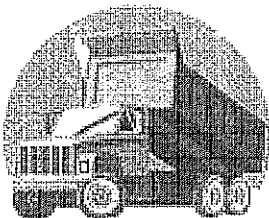
3. What is the difference between the State and the federal public works laws?

- State law (Chapter 104--sometimes called "Little Davis-Bacon") applies to work done on State and county construction projects.
- Federal law (Davis-Bacon Act) applies to work done on federal construction projects.

4. Does Chapter 104 apply if federal funds are used?

Yes, if the State or a county is the contracting agency.

5. What is the difference between construction and supply or maintenance contracts in regard to Chapter 104?



Public works construction projects are subject to Chapter 104.

Supply and service contracts are covered by Chapter 103, HRS, but may also be subject to Chapter 104 if the activity is an integral part of a construction contract or project, or if substantial construction work is involved. (Refer to the Determination of Coverage chart.)

CLASSIFICATION

6. How is the appropriate job classification determined?

A contractor must identify the appropriate classification from the applicable wage rate schedule for all work to be performed by laborers and mechanics on the project. Proper classification must conform to prevailing area practice.

7. What is prevailing area practice?

Prevailing area practice refers to the classification of work used by contractors whose wage rates were found to be prevailing in the area and published in the wage rate schedule.

If the Department of Labor and Industrial Relations (DLIR) determines that the prevailing wage for a particular trade is derived from a collective bargaining agreement, the DLIR is responsible to ensure that the work performed by a laborer or mechanic is classified according to the job content upon which the wage rates are based. Accordingly, all contractors performing work in the particular trade will be required to use the appropriate job classification and pay the applicable prevailing wage.

For prevailing area practice information, contact the Wage Standards Division of the DLIR.

8. What can be done when there seems to be no appropriate job classification in the wage rate schedule for the work performed on the project?

The contractor is required to use the closest existing classification in the applicable wage rate schedule. The contracting agency should be consulted when there seems to be no appropriate class. If there is disagreement on the appropriate class, a written request may be submitted to the DLIR by the governmental contracting agency or any interested party. The written request should include:



- project name and number
- contracting agency
- specific duties or the work performed
- type(s) of materials specified
- tools used for performing the work
- a recommendation from the contracting agency or the contractor about what the proper classification should be.

9. How should job classifications be shown on certified payrolls?

Certified payrolls must show the specific job classification as listed in the wage rate schedule, which conform to the work performed by the laborer or mechanic on the job site.

Examples: Equipment Operator (Group No.), Laborer 1 or II, and Roofer Apprentice (level, percentage or step).

10. Does the law allow “summer hires” or “helpers”?

No. The “summer hire” classification is not recognized under Chapter 104. If a contractor hires any temporary summer help, these workers must be classified and paid according to the work performed, using the closest existing job classification in the wage rate schedule. Only the helper classifications listed in the wage rate schedule are allowed.

11. When can a contractor use apprenticeship/trainee wage rates?

Apprentice or trainee wage rates shown in the wage rate schedule apply only to:

- (1) apprentices/trainees in programs registered with or recognized by the Workforce Development Division of the DLIR, and
- (2) the number of apprentices or trainees within the allowable ratio to journeyworkers for the same craft classification on any public works project.



However, a registered or recognized apprentice receiving the journeyworker wage will not be considered a journeyworker to meet the ratio requirements for another apprentice.

PREVAILING WAGES

12. What wages are required by Chapter 104?

A contractor must pay the minimum prevailing wages for each class of laborers and mechanics on State or county public works construction projects, as determined by the Director of Labor and published in the wage rate schedules.

13. What is a “prevailing wage”?

The prevailing wage is the basic hourly rate and the cost to an employer of providing a laborer or mechanic with fringe benefits.

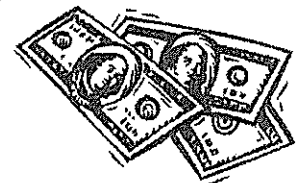
Example - Prevailing Wage:	
Basic hourly rate:	\$28.30
Fringe benefit:	<u>+12.05</u>
Prevailing wage:	\$40.35

14. What is the “applicable” prevailing wage?

The applicable prevailing wage is determined by proper classification. A contractor/subcontractor is required to classify every laborer or mechanic on the project in the closest existing classification listed in the applicable wage rate schedule.

15. If there is an increase in the prevailing wage, is the contractor required to increase the wages of laborers and mechanics engaged in the performance of the contract on the job site?

Yes, whenever the Director of Labor determines that the prevailing wage has increased as shown in the wage rate schedule, the contractor must increase the wages accordingly.



16. *What is a fringe benefit?*

A fringe benefit is a contribution irrevocably made by a contractor to a trustee or to a third person according to a fund, plan or program in providing benefits to a laborer or mechanic, such as medical, insurance and pension.

17. *Does a contractor need a breakdown of the fringe benefit rate in the wage rate schedule?*

No, because the contractor may pay any combination of allowable fringe benefits in order to meet the prevailing wage. See question #18.

18. *How can a contractor meet the prevailing wage requirement?*

A contractor can pay any of the following combinations of the basic hourly rate and fringe benefits, which must be not less than the prevailing wage total reflected in the wage rate schedule:

- (a) By paying the basic hourly rate and by making contributions for the fringe benefits in the amount specified in the wage rate schedule;*
- (b) By paying the basic hourly rate and an additional cash payment in lieu of the fringe benefits directly to the laborer or mechanic; or*
- (c) By paying an hourly rate, partly in cash and partly in fringe benefits.*

19. *How can a contractor take credit for allowable fringe benefits?*

The contractor may take credit for contributions paid for benefits such as a medical plan or insurance policy. The allowable hourly fringe benefit credit is determined by dividing the monthly contribution rate by 173 hours (average straight-time hours per month). Since the hourly credit for fringe benefits is based on straight time hours, credit may not be applied to overtime hours.

Example of how to compute hourly fringe benefit credit:

The monthly contribution/premium paid to a medical plan is \$320.05.

$\$320.05 \div 173 = \$1.85 \text{ per hour credit}$

<i>Prevailing wage:</i>	<i>\$40.35</i>	
<i>Hourly credit for medical fringe benefit:</i>	<i><u>-1.85</u></i>	←
<i>Hourly rate due:</i>	<i>\$38.50</i>	

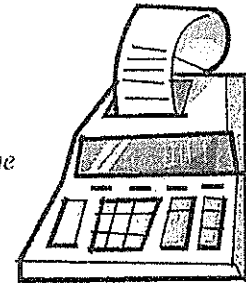
20. *If warranty work is covered under Chapter 104, what is the applicable prevailing wage?*

Prevailing wages in the most current wage rate schedule must be paid.

PAYDAYS

21. How often do laborers and mechanics have to be paid?

They must be paid weekly and within five working days after the end of the pay period.



WAGE RATE SCHEDULE

22. What is a wage rate schedule?

A wage rate schedule is a publication of job classifications and corresponding wage rates determined by the Director of Labor to be prevailing based on surveys of the construction industry and determinations made by the United States Department of Labor. The schedules are issued on or about February 15 and September 15 of each year.

Sample Wage Rate Schedule

Classification	WAGE RATE SCHEDULE BULLETIN NO. 465												Remarks See Pg. 0-7
	Current			2009			2010			2011			
	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate	
CARPENTER:													
Carpenter, Patent Scaffold Erector (Over 14 feet)	011600			011600			010610			012011			
Piledriver, Pneumatic Nailer	\$55.22	\$36.20	\$19.02	\$94.67	\$27.45	\$19.22	\$58.12	\$29.70	\$19.42	\$59.62	\$33.95	\$16.67	3, 13
Might	\$55.67	\$36.45	\$19.02	\$95.12	\$27.70	\$19.22	\$58.37	\$29.95	\$19.42	\$59.87	\$34.20	\$16.67	3, 13
Power Saw Operator (2 h.p. & above)	\$55.37	\$35.35	\$19.02	\$92.82	\$27.50	\$19.22	\$56.27	\$28.85	\$19.42	\$57.77	\$30.10	\$16.67	3, 13
ELECTRICIAN: (Note: 2 increases in 2009)													
Cable Splicer (inside/outside)	613100			613100			610610			612011			
Ground Worker (outside)	\$55.86	\$41.91	\$23.97	\$97.30	\$42.69	\$24.71	\$70.23	\$44.17	\$26.03	-	-	-	5
Heavy Equipment Operator (outside)	\$48.48	\$28.89	\$19.50	\$49.05	\$29.10	\$20.95	\$51.89	\$30.11	\$21.76	-	-	-	5
Line Installer (outside), Wire Installer (outside)	\$54.93	\$24.29	\$21.64	\$57.26	\$24.92	\$22.34	\$59.74	\$23.14	\$23.60	-	-	-	5
Technician (inside/outside)	\$50.91	\$26.10	\$22.81	\$62.32	\$28.00	\$23.32	\$64.85	\$40.15	\$24.03	-	-	-	5
Technician (inside/outside)	\$52.40	\$29.24	\$23.16	\$65.64	\$39.55	\$23.69	\$68.14	\$41.35	\$25.19	-	-	-	5
Cable Splicer (inside/outside)	-	-	-	\$85.63	\$43.40	\$25.43	-	-	-	-	-	-	5
Ground Worker (outside)	-	-	-	\$59.79	\$29.50	\$21.20	-	-	-	-	-	-	5
Heavy Equipment Operator (outside)	-	-	-	\$68.93	\$35.91	\$23.00	-	-	-	-	-	-	5
Line Installer (outside), Wire Installer (outside)	-	-	-	\$63.67	\$39.45	\$24.22	-	-	-	-	-	-	5
Technician (inside/outside)	-	-	-	\$18.21	\$49.53	\$24.96	-	-	-	-	-	-	5
PLUMBER: (Note: 2 increases per year)													
Plumber, Pipefitter, Refrigeration Fitter, Heating & Air Conditioning Fitter, Sprinkler Fitter, Steamfitter	114100			116100			112110			112111			
Plumber, Pipefitter, Refrigeration Fitter, Heating & Air Conditioning Fitter, Sprinkler Fitter, Steamfitter	\$55.53	\$34.60	\$29.73	\$59.26	\$25.10	\$21.16	\$57.18	\$35.03	\$21.59	\$59.01	\$36.60	\$22.41	8
Plumber, Pipefitter, Refrigeration Fitter, Heating & Air Conditioning Fitter, Sprinkler Fitter, Steamfitter	-	-	-	-	-	-	\$58.11	\$35.10	\$22.04	\$59.65	\$37.10	\$22.65	8

Comments: Overtime must be paid at one and one-half times the basic hourly rate plus the hourly cost of required fringe benefits.
* Indicates a wage, fringe benefit, remark, or title change from the previous bulletin.

23. Does a contractor have to provide a wage rate schedule to each laborer and mechanic?

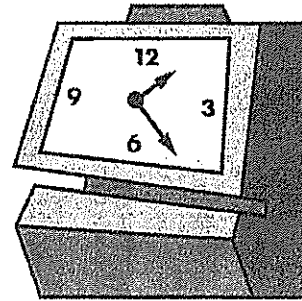
The contractor is required to give a complete copy to each laborer and mechanic employed on the project, except for employees covered by a collective bargaining agreement. Applicable wage rate schedules must also be posted by the contractor at the job site.

OVERTIME

24. *When must overtime be paid under Chapter 104?*

Overtime must be paid for all hours worked on:

- *Saturday*
- *Sunday*
- *a legal State holiday; or*
- *more than 8 hours on any other day whether worked on one or more projects*



25. *How is overtime computed?*

Overtime must be paid at 1½ times the basic hourly rate, plus fringe benefits.

EXAMPLE - OVERTIME	
Basic hourly rate:	\$28.30
	<u> x 1.5</u>
	\$42.45
Add fringe benefit:	<u> +12.05</u>
Overtime rate:	\$54.50

26. *On which holidays must overtime be paid?*

*Contractors must pay overtime for work done on these legal State holidays:**

<i>New Year's Day</i>	<i>January 1</i>
<i>Martin Luther King, Jr. Day</i>	<i>January – Third Monday</i>
<i>Presidents' Day</i>	<i>February – Third Monday</i>
<i>Prince Kuhio Day</i>	<i>March 26</i>
<i>Good Friday</i>	<i>Friday before Easter Sunday</i>
<i>Memorial Day</i>	<i>May – Last Monday</i>
<i>King Kamehameha Day</i>	<i>June 11</i>
<i>Independence Day</i>	<i>July 4</i>
<i>Statehood Day (Admission Day)</i>	<i>August – Third Friday</i>
<i>Labor Day</i>	<i>September – First Monday</i>
<i>Veterans' Day</i>	<i>November 11</i>
<i>Thanksgiving Day</i>	<i>November – Fourth Thursday</i>
<i>Christmas Day</i>	<i>December 25</i>

** Holidays that fall on Saturday are observed on the preceding Friday; holidays that fall on Sunday are observed on the following Monday.*

In addition, overtime must be paid for:

- *General election days, except primary and special election days, in the county where the election is held.*
- *Any day that the President or Governor proclaims as a holiday.*

CERTIFIED PAYROLLS AND RECORD KEEPING

27. What is a certified payroll?

A copy of the weekly payroll which the contractor has signed to affirm that:

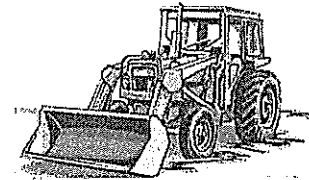
- *the payroll is correct and complete;*
- *the job classifications conform with the work performed by the laborer or mechanic; and*
- *wages paid are not less than the applicable rates contained in the wage rate schedule rate schedule.*

Certified payrolls must be submitted weekly to the governmental contracting agency. The general contractor is responsible for submitting the certified payrolls of all subcontractors.

28. What information should be on a certified payroll?

Certified payroll records for each laborer and mechanic working on the job site must contain the following:

- *name*
- *correct job classification as shown on the Wage Rate Schedule*
- *rate of pay and fringe benefits*
- *daily and weekly number of hours worked*
- *total straight-time, overtime, and gross earnings for each week*
- *amount and purpose of each deduction*
- *net wages paid, and*
- *date of payment*



There is no standard form required for certified payrolls. Any form, including the federal form WH-347, is acceptable as long as it includes all of the required information above, and is certified. You may obtain an internet copy of form WH-347 at: <http://www.dol.gov/whd/programs/dbra/wh347.htm>

29. How long should certified and original payroll records be kept?

All records must be maintained throughout the project, and for 3 years after completion of the project.

ENFORCEMENT

30. Who enforces Chapter 104?

The governmental contracting agency and the DLIR share joint enforcement responsibilities.

31. What can a governmental contracting agency do if a contractor violates Chapter 104?

The governmental contracting agency may:

- withhold payments to the contractor;
- terminate the contractor's right to continue work. If this action is required, the contractor and the contractor's bonding company are liable to the governmental contracting agency for any excess costs;
- refer the matter to the Wage Standards Division of the DLIR for investigation;
- within 60 days of a determination made by the Director of Labor either:



- (1) order any contractor to pay back wages found due directly to laborers and mechanics and pay the Director of Labor any penalty assessed;
- (2) pay directly to laborers and mechanics any wages found due and pay the Director of Labor any penalty assessed; or
- (3) pay the Director of Labor the total amount of back wages or penalties, or both.

32. What are the penalties if a contractor violates Chapter 104?

- **First Violation** Equal to 10% of back wages found due or \$25 per offense, whichever is greater.
- **Second Violation** Equal to amount of back wages found due or \$100 for each offense, whichever is greater.
- **Third Violation** Equal to two times the amount of back wages found due or \$200 for each offense, whichever is greater; and
Suspension from doing any new work on any public work of a governmental contracting agency for three years.

A violation would be deemed a second violation if it occurs within two years of the first Notification of Violation (NOV), and a third violation if it occurs within two years of the second NOV.

In addition, if a contractor interferes or delays an investigation, the department shall assess a penalty of \$1,000 per project. For each day thereafter that the contractor does not cooperate, the department shall assess a penalty of \$100 per project.

Suspension for nonpayment of wages or penalties. For a first or second violation, the department shall immediately suspend a contractor who fails to pay wages or penalties until all wages and penalties are paid in full. For a third violation, the department shall penalize and suspend the contractor as described above, except that if the contractor continues to violate the law, then the department shall immediately suspend the contractor for a mandatory three years. The contractor shall remain suspended until all wages and penalties are paid in full.

For falsification of records, or for delay or interference with an investigation, the contractor shall be suspended for 3 years.

WAGE RATE SCHEDULE

The wage rate schedule is available on the Internet – [click here](#).

- To request a copy of the wage rate schedule by mail call:

Oahu: (808) 586-9017

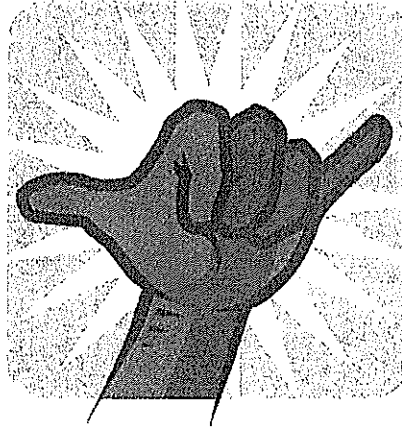
Dial toll free from the neighbor islands

Hawaii:	974-4000	⌋	
Kauai:	274-3141		Upon hearing the dial tone, key in 69017#
Maui:	984-2400	⌋	

Molokai/Lanai: 1-800-468-4644

Upon request for the last five digits of your party's number, key in 69017#





Thanks for Complying with the Law!

**Got a question?
Please contact these DLIR Offices:**

Wage Standards Division	Honolulu	Phone: (808) 586-8777 Fax: (808) 586-8766 Email: dlir.wages@hawaii.gov
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	Hilo	Phone: (808) 974-6464 Fax: (808) 974-6474
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	Kauai	Phone: (808) 274-3351 Fax: (808) 274-3355
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	Maui	Phone: (808) 243-5322 Fax: (808) 984-2071
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	West Hawaii (Kona)	Phone: (808) 322-4808 Fax: (808) 322-4813
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Apprenticeship Program of the Workforce Development Division		Phone: (808) 586-8877
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Research and Statistics		Phone: (808) 586-9017
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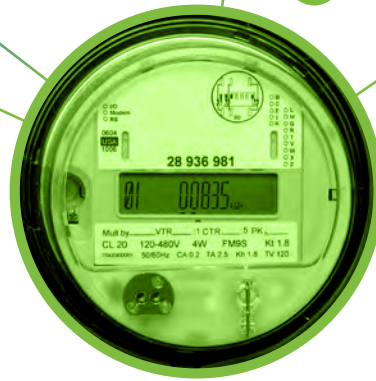
***Attachment C: SSN Product Data Sheet Communications Module for
Electricity Meters***



**Attachment C.-
SSN Product Dat...**

PRODUCT DATA SHEET

COMMUNICATIONS MODULE FOR ELECTRICITY METERS

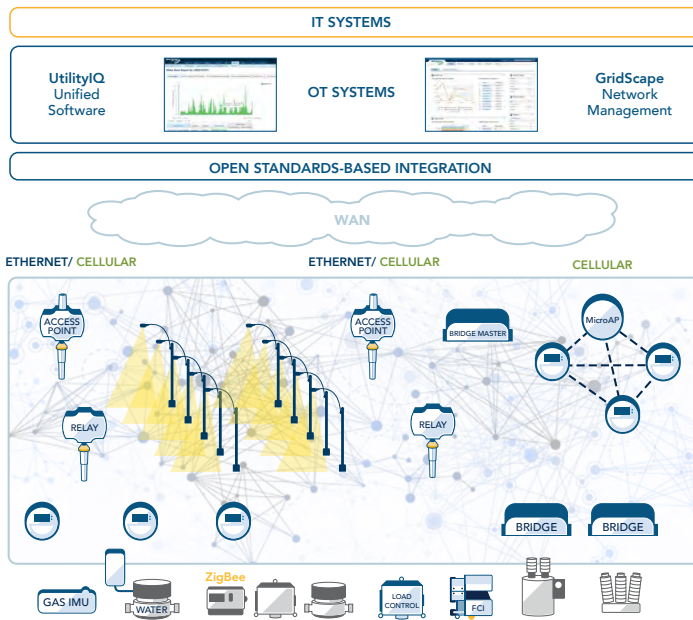


SMART METERING – THE FOUNDATION OF THE SMART GRID

The Silver Spring® Platform combines network infrastructure, software and services to enable a range of smart grid applications. Enabling two-way communications with modern electricity meters is fundamental to building the smart grid.

The Silver Spring Communications Module integrates under glass inside partners' electricity meters to provide wireless networking both back to utility OT/IT systems and into the customer's home. The module easily installs inside these meters and leverages Silver Spring network devices to form a highly resilient mesh network for the utility. The resulting two-way communications network gives utilities greater efficiency, more reliable service delivery, improved customer satisfaction, and a scalable platform for advanced smart grid applications.

The Communications Module accesses demand, consumption, time-of-use and interval data, alarms, and power-quality information from the meter. Its two-way wireless functionality supports remote data acquisition, meter program management, and real-time alerts for meter tampering and outages.



The Silver Spring Platform supports a range of smart grid applications on a single open standards-based network.

Two-Way Wireless Communications For Meters

- » Offers one-watt transmitter to provide full, two-way wireless NAN communications
- » Supports 2.4 GHz HAN communications
- » Integrates with Silver Spring UtilityIQ® application suite to support advanced metering and demand response
- » Enables over-the-air firmware upgrades to reduce operational cost
- » Provides multi-layer security and military-grade encryption to meet rigorous industry standards

LEADING RELIABILITY AND PERFORMANCE

With its full, one-watt transmitter, the Communications Module provides broad reach and robust connectivity in the Neighborhood or Field Area Network (NAN or FAN). In addition to supporting a 900 MHz radio for the NAN, the Communications Module also features an optional 2.4 GHz radio for the Home Area Network (HAN). This radio supports the ZigBee Smart Energy Profile specification to communicate with a wide range of smart devices within the home.

The Communications Module is available in a variety of models to support specific utility needs and geographic regions.

FEATURES

- » Full, two-way communications
- » One-watt transmitter
- » Frequency Hopping Spread Spectrum (FHSS)
- » Multi-layer security and encryption
- » Dynamic network discovery and self healing
- » Scheduled and on-demand meter reads
- » Alarm detection and clearing
- » Network time management
- » Continuous neighbor monitoring and route calculation
- » Over-the-air firmware upgrades and meter programming
- » Power outage and restoration notification
- » Support for a wide range of meters and form factors

COMMUNICATIONS MODULE SPECIFICATIONS

Gen 3 Product Family – General	
PLATFORM	Processor: SoC-based ARM 7 RAM: 4 MB Flash: 8 MB
NAN COMMUNICATIONS	Frequencies: 902 – 928 MHz, 865-880MHz Protocol: IEEE 802.15.4g, Wi-SUN compliant Data rates: 100 kbps Spread spectrum: Frequency hopping Transmitter output: up to 30 dBm (1 W) ¹ Receive sensitivity: -98 dBm for 10% PER
HAN COMMUNICATIONS	Frequency: 2400 – 2480 MHz Protocols: IEEE 802.15.4, ZigBee Smart Energy Profile 1.1 Date rate: 250 kbps Transmitter output: 20 to 23 dBm (100 to 200 mW) ¹ Receive sensitivity: -97 dBm for 1% PER
PROTOCOLS / SECURITY	Addressing: IPv6 Encryption: Advanced Encryption Standard (AES-128 or AES-256) Security: Secure Hash Algorithm 256-bit (SHA-256) and RSA1024 or ECC-256 Key storage: Secure NVRAM with tamper detection and key erasure
ENVIRONMENTAL	Operating temperature: -40°C to +85°C (-40°F to +185°F) Humidity: 0% to 95%, non-condensing
¹ Radio TX output power varies in accordance with local country regulations. Please contact Silver Spring Networks for more information.	

Gen 3 Product Family – North America	
RADIO	Frequency: 902 – 928 MHz Approvals: FCC 15.247, Industry Canada RSS-210
INTERFACES	Meter: ANSI C12.18/C12.19, serial
SUPPORTED METERS	GE I-210+ ² GE I-210+c GE kV2c GE KV2ce Elster A3 ALPHA L+G E330 FOCUS AX L+G E350 AX-SD Single Phase L+G E330 FOCUS AX Polyphase L+G E650 S4e
² indicates Measurement Canada approval.	

Gen 3 Product Family – Australia and New Zealand	
RADIO	Frequency: 915 – 928 MHz Approvals: ANZ/NZ 4268
INTERFACES	Meter: PACT, ANSI C12.18/C12.19, serial
SUPPORTED METERS	Secure i-Credit 500 Secure Sprint 200 Secure Premier L+G E350 – U1200 L+G E350 – U1300 L+G E350 – U3300 L+G E350 – U3350

Gen 3 Product Family – Brazil	
RADIO	Frequencies: 902 – 907 MHz, 915 – 928 MHz Approvals: ANATEL
INTERFACES	Meter: ANSI C12.18/C12.19, serial
SUPPORTED METERS	Nansen Spectrum K Elster A3

Gen 4 Product Family – General	
PLATFORM	Processor: SoC-based ARM 7 RAM: 4 MB Flash: 8 MB
NAN COMMUNICATIONS	Frequencies: 902 – 928 MHz, 865 – 880 MHz Protocol: IEEE 802.15.4g, Wi-SUN compliant Data rates: 50 – 300 kbps Spread spectrum: Frequency hopping Transmitter output: up to 30 dBm (1 W) ¹ Receive sensitivity: -101 dBm for 10% PER
HAN COMMUNICATIONS	Frequency: 2400 – 2480 MHz Protocols: IEEE 802.15.4, ZigBee Smart Energy Profile 1.1 Data rates: 250 kbps Transmitter output: 20 to 23 dBm (100 to 200 mW) Receive sensitivity: -97 dBm for 1% PER
PROTOCOLS / SECURITY	Addressing: IPv6 Encryption: Advanced Encryption Standard (AES-128 or AES-256) Security: Secure Hash Algorithm 256-bit (SHA-256) and RSA-1024 or ECC-256 Key storage: Secure NVRAM with tamper detection and key erasure
ENVIRONMENTAL	Operating temperature: -40°C to +85°C (-40°F to +185°F) Humidity: 0% to 95%, non-condensing

Gen 4 Product Family – North America	
RADIO	Frequency: 902 – 928 MHz Approvals: FCC 15.247, Industry Canada RSS-210
INTERFACES	Meter: ANSI C12.18/C12.19, serial
SUPPORTED METERS	Elster A3 ALPHA GE I-210+ ² GE I-210+c ² GE kV2c GE kV2ce Itron CENTRON II C12.19 L+G E330 FOCUS AX L+G E350 AX-SD Single Phase L+G E330 FOCUS AX Polyphase Tatung ETA Series (ETA-21S, ETA-31S, ETA-32S)
² indicates Measurement Canada approval.	

Gen 4 Product Family – Australia and New Zealand

RADIO	Frequency: 915 – 928 MHz, 921 – 928 MHz Approvals: ANZ/NZ 4268
INTERFACES	Meter: ANSI C12.18/C12.19, serial
SUPPORTED METERS	L+G E350 – U1200 L+G E350 – U1300 L+G E350 – U3300 L+G E350 – U3350

Gen 4 Product Family – Brazil

RADIO	Frequencies: 902 – 907 MHz, 915 – 928 MHz Approvals: ANATEL
INTERFACES	Meter: Serial, DLMS-COSEM
SUPPORTED METERS	Itron SL7000

Gen 4 Product Family – Asia Pacific

RADIO	Frequency: 915 – 918 MHz, 917 – 920.8 MHz, 919 – 923 MHz, 920 – 925 MHz, 922 – 924 MHz, 922 – 928 MHz Approvals: ETSI EN 302 208, ETSI EN300 328, ETSI EN301 489, IEC 60950-1, IDA
INTERFACES	Meter: ANSI C12.18/C12.19, serial, DLMS-COSEM
FREQUENCY RANGES	UMTS 800/850 Band VI/V, UMTS 900 Band VIII, UMTS 1800 Band III, UMTS 1900 Band II, UMTS 2100 Band I
SUPPORTED METERS	Secure i-Credit 510 Secure Sprint 210 EDMI 7B EDMI 10E WC EDMI 10E CT LT EDMI 10E CT HT Mirai 3PH CT-HT Mirai 3PH CT-LT Mirai 3PH WC

Accessories – Meter Patch Antenna Coupler

INTERFACES	Antenna connector: N type, Female Antenna types: various Cable length: 15.24 cm (6")
ENVIRONMENTAL	Operating temperature: -40°C to +85°C (-40°F to +185°F) Humidity: 0% to 95%, non-condensing
APPROVALS	FCC: 15.247

Attachment D: Technology and Cybersecurity Requirements



Attachment D --
Technology and...

Hawaiian Electric Technology Assessment Questionnaire				Vendor Response Options												
Project name				XYZ, Inc.												
Vendor Name: XYZ, Inc. Project: Project name Date Questionnaire Released: 02/01/09 Date Questionnaire Due: 03/15/09 Date of Last Assessment Ratings Added by HE:				Spreadsheet Template Version is:												
				1.0 as of 09/23/2014												
				Enter the numeric value "1" (not text) as the flag values in the yellow highlighted response options. Do not flag more than 1 (one) box per row. Use Grouping controls on far left side of this spreadsheet to fully open all text and response options. Use beige areas in expanded rows to enter any desired hyperlinks or additional explanation text.							System as Proposed Meets Standard	System will meet standard in scheduled upcoming release	System can meet standard using 3rd Party products	System can meet standard with customization	System as proposed does not meet standard	Other
											Hawaiian Electric Technology Standards					
Data and Database Architecture																
Data Architecture (or Data Object Architecture)				Meets	Will	3rd P	Cust	No	Other							
Information Only	Ideal	Core	Mandatory	1	Data Object Model											
				Standard: System shall access data through a data object rather than directly from the DB. Comment: Object models typically offer a higher level 'name based' form of access to data in a DB. When applications utilize a data object model, the data is normally better formulated and allows for easier name based data mapping (at the object model level vs. at the field level in the DB tables). Preference: No products specifically preferred. Desired Feedback: System providers should describe whether the application uses a data object model and whether the model provides an easy way to perform object model mapping.			Vendors may add any hyperlink to right: At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.									
Information Only	Ideal	Core	Mandatory	1	Logical Data Model											
				Standard: Logical data model(s) shall be available and aligned with project and enterprise requirements. Comment: HE desires that systems provide a logical data model AND that the attributes of the model be capable of integration into a Data Modeler. Preference: No products specifically preferred. Desired Feedback: System providers shall indicate whether they have a logical data model and whether it can be provided or made available for review.			Vendors may add any hyperlink to right: At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.									
Information Only	Ideal	Core	Mandatory	1	Physical Data Model											
				Standard: Physical data model(s) shall be available and aligned with project and enterprise requirements. Comment: HE desires that systems provide a physical data model and that attributes of the modeled data to be capable of integration into a Data Modeler. Preference: No products specifically preferred. Desired Feedback: System providers shall describe their physical data structure and whether it is represented in a model, whether the model is available for use or review and what tools can be used with the physical data model.			Vendors may add any hyperlink to right: At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.									
Data Management				Meets	Will	3rd P	Cust	No	Other							
Information Only	Ideal	Core	Mandatory	1	Data Access Utility											
				Standard: System shall include a data access utility that can be used to directly manage the data (business) object. Comment: The ability to perform basic data access/edits (e.g. data viewing, simple table editing) shall be provided through a data access utility included as part of the system/application. The utility shall access the data through the data object and shall also incorporate the business rules for data edits. (Note: This is not the same as use of a general third party SQL access tool. In general, data shall not be edited directly through use of such general DB tools. However a system provider provided utility which adheres to the system provider's data edit rules is helpful for data repair such switching a flag in the DB directly.)			Vendors may add any hyperlink to right: At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.									

				<p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System providers shall provide description of capabilities.</p>						
		1		<p>Data Import/Export Support</p>						
Information Only	Ideal	Core	Mandatory	<p>Standard: System shall include built-in data import/export utilities.</p> <p>Comment: Package applications shall provide out-of-the box data import/export capabilities. Such input might be accomplished via CSV, spreadsheet or other common formats. Import/export features shall use the data object (see above) to assist with proper data edits. This type of utility enables more flexible automated processes for performing data entry.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall describe the input/export support and indicate if its application uses a data object model. As a plus, the system provider shall provide a way to use object model mapping.</p>	Vendors may add any hyperlink to right:	At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.				
		1		<p>Extract/Transfer/Load (ETL) Capability</p>						
Information Only	Ideal	Core	Mandatory	<p>Standard: System shall support ETL capabilities directly or via close integration with other common ETL tools.</p> <p>Comment: Extract/Transfer/Load (ETL) is a potentially important capability for enabling HE to share data across platforms and across different DBs for Data Warehouse (Business Intelligence (BI)) reporting and for the potential use of one application's data by a different application.</p> <p>Preference: MS SQL Server SSIS or SAP Data Services.</p> <p>Desired Feedback: If system has incorporated ETL capabilities into its package, such capabilities shall be described by the system provider and shall be counted as a plus.</p>	Vendors may add any hyperlink to right:	At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.				
		1		<p>Adherence to Data Labeling and Handling Requirements</p>						
Information Only	Ideal	Core	Mandatory	<p>Standard: System shall allow for designating levels of confidentiality to be associated with data fields such that data users can readily comply with the Data Labeling and Handling Requirements.</p> <p>Comment: HE has specific data handling and labeling requirements associated with particular forms of confidential information. It is important that new systems or applications introduced into the HE environment allow for such confidential data to be identified and that printed reports be flagged and labeled when confidential information appears in the reports.</p> <p>Preference: Support the following data classifications: Public – information made readily available to the public; Internal Use – information for internal use within the Company by all employees and authorized Third Parties; Confidential – sensitive information for authorized employees and Third Parties who have a need-to-know; Confidential – Restricted Distribution – highly sensitive information whose distribution must be carefully controlled.</p> <p>Desired Feedback: System provider shall review the Data Labeling and Handling Requirements and assess whether data in system can be properly identified to meet the requirements.</p>	Vendors may add any hyperlink to right:	At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.				
Web Content Management Architecture										
		1		<p>Web Data Management Utility</p>						
Information Only	Ideal	Core	Mandatory	<p>Standard: System dealing with web data shall either have or integrate with a utility to easily add, edit or remove data that are presented or collected on-line.</p> <p>Comment: Well designed on-line web applications shall be data driven (rather than manually managing static pages). A built-in data management utility shall provide HE an interface to add, edit and remove data that will be presented online. Automation of that interface is important.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall describe out of box capabilities regarding data management services.</p>	Vendors may add any hyperlink to right:	At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.				
		1		<p>Web Content Management Utility</p>						
					Vendors may add any hyperlink to right:					

				Meets	Will	3rd P	Cust	No	Other	
Information Only	Ideal	Core	Mandatory	<p>Standard: System dealing with web content shall either have or integrate with a utility to easily manage or update the web content.</p> <p>Comment: Web content includes images, style sheets, multimedia files, etc. that typically do not come from the DB but rather from other file systems. Applications involved in presenting such content on the web should have powerful utilities for organizing, versioning, changing and updating content.</p> <p>Preference: Integration with Ingeniux externally, SharePoint 2013 internally.</p> <p>Desired Feedback: System provider shall provide capabilities regarding out of box web content management tools or integration with other standard tools.</p>	At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.					
				Database Architecture						
Information Only	Ideal	Core	Mandatory	<p>1</p> <p>ODBC Compliance</p> <p>Standard: System Database shall be ODBC compliant.</p> <p>Comment: The database shall be able to be registered as an ODBC data source, allowing custom applications to access the data through the ODBC layer.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall certify ODBC compliance.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
				JDBC Compliance						
Information Only	Ideal	Core	Mandatory	<p>1</p> <p>JDBC Compliance</p> <p>Standard: System Database shall be JDBC compliant.</p> <p>Comment: JDBC compliance is somewhat less important in many situations, but may be required in certain situations and shall always be noted if it exists.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall indicate whether data base is JDBC compliant.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
				OLEDB Compliance						
Information Only	Ideal	Core	Mandatory	<p>1</p> <p>OLEDB Compliance</p> <p>Standard: System Database should be OLEDB compliant.</p> <p>Comment: The database should provide an application programming interface employing the Common Object Model, according to OLEDB standards.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should indicate whether data base is OLEDB compliant.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
				SQL Data Access Compliance						
Information Only	Ideal	Core	Mandatory	<p>1</p> <p>SQL Data Access Compliance</p> <p>Standard: System database shall be able to accommodate and respond properly to standard SQL queries run against the database.</p> <p>Comment: The database shall be accessible not only from the package application interface, but shall also allow data extraction via standard SQL. This would mean that data can be extracted via a standard SQL based tool directly from the database.</p> <p>Preference: Oracle / MS SQL language compliance preferred.</p> <p>Desired Feedback: System provider shall verify that the database is SQL compliant.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
				Use of HE Standard Database						
Information Only	Ideal	Core	Mandatory	<p>1</p> <p>Use of HE Standard Database</p> <p>Standard: System operates using MS SQL Server 2012 for non-enterprise scale systems or Oracle XI (or newer) for Enterprise-scale applications.</p> <p>Comment: HE prefers to standardize its database technology around MS SQL or Oracle 64 bit versions.</p> <p>Preference: MS SQL Server 2012 or Oracle XI (or newer).</p> <p>Desired Feedback: System provider should certify that system operates on specified databases.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
				Use of Alternate Databases						

Information Only	Ideal	Core	Mandatory	<p>Standard: Systems may support other types of non-SQL databases (Hana, Hadoop, other No SQL databases).</p> <p>Comment: HE acknowledges that large-scale data may require alternate database types to address performance and volume.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should provide information about the other types of supported databases.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>	

Application Architecture				Meets	Will	3rd P	Cust	No	Other
Development Environment									
Information Only	Ideal	Core	Mandatory	1	Mainstream Integrated Development Environment				
					Vendors may add any hyperlink to right:				
					<p>Standard: Systems developed or maintained within HE shall allow development or maintenance work to be performed using a mainstream Integrated Development Environment (IDE).</p> <p>Comment: Many software packages can be customized using an industry mainstream IDE such as MS Visual Studio, Eclipse, WebSphere Visual Studio, etc. HE prefers applications that can be maintained using a mainstream, industry standard IDE with MS Visual Studio or Eclipse.</p> <p>Preference: MS Visual Studio - .Net, Eclipse for Java, SAP Workbench for SAP ABAP Development. For Source repository, we prefer MS Team Foundation Server for .Net, and CA Harvest for non-.Net.</p> <p>Desired Feedback: System provider shall indicate whether the system can be maintained using one of the industry standard development environments.</p>				
					<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				
Information Only	Ideal	Core	Mandatory	1	Programmatic Interface for Accessing/Modifying System Information.				
					Vendors may add any hyperlink to right:				
					<p>Standard: System shall provide an organized, programmatic interface or system development kit (SDK) to perform any system configuration or to access/modify system information or accounts.</p> <p>Comment: HE seeks to avoid systems that do not organize their configuration interfaces and make access to system information obtuse. Interfaces shall be documented and consolidated to logical screen groupings in order to make adjustments easy.</p> <p>Preference: Product shall provide a native SDK.</p> <p>Desired Feedback: System provider shall indicate whether system can be configured and maintained using pre-packaged screens with modern interfaces.</p>				
					<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				
Information Only	Ideal	Core	Mandatory	1	Mainstream Development Language				
					Vendors may add any hyperlink to right:				
					<p>Standard: Any user configurable or exposed development language used for product customization and maintenance shall be based on one of the following: .Net, Java, or ABAP.</p> <p>Comment: HE seeks to avoid use of highly proprietary languages for which programming resources are rare and difficult to acquire. System shall use mainstream languages and technologies.</p> <p>Preference: Preference is .Net, Java, ABAP.</p> <p>Desired Feedback: System provider shall indicate whether system can be programmed and maintained in one of the above designated mainstream languages.</p>				
					<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				
Information Only	Ideal	Core	Mandatory	1	Programming Model				
					Vendors may add any hyperlink to right:				
					<p>Standard: System/application shall be based on a modern development technology framework such as .Net, ASP.Net, Java EE, or Java Server pages (JSP).</p> <p>Comment: HE seeks to work within modern, web oriented frameworks that employ well established interoperability standards, are industry standard and support a Services Oriented Architecture approach.</p> <p>Preference: Preference is .Net, Java, ABAP.</p> <p>Desired Feedback: System provider shall indicate what, if any, programming model the system is based upon.</p>				
					<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				
Information Only	Ideal	Core	Mandatory	1	Use of Plain Text Configuration or GUI Configuration				
					Vendors may add any hyperlink to right:				
					<p>Standard: System customization and other configuration files available to HE developers should make source content available as plain text or through a GUI interface.</p> <p>Comment: Manipulation of configurable system data by HE programmers should not require that the HE programmers have to interpret the formatting of configuration files.</p>				
					<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				

Information Only	Ideal	Core	Mandatory	<p>Standard: System shall support the segregation of reporting functionality so as to allow use of mainstream external tools for generating reports from the data.</p> <p>Comment: Consistent with the n-tier architecture approach, HE prefers systems or applications architected to allow third party reporting tools such as SAP Business Objects to be used in developing reports from the data.</p> <p>Preference: Preference for SAP Business Objects.</p> <p>Desired Feedback: If system does not meet this standard, what type of data reporting approach is used? If compliant version is planned, provide any information on release date and form of compliance.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Substantial to Full Separation of the Presentation Layer	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: System shall employ substantial to full separation of the presentation layer from the application layer.</p> <p>Comment: Consistent with the n-tier architecture approach, HE prefers systems or applications architected to allow alternative presentation options such as fat vs. thin client options without affecting fundamental system functionality.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall indicate whether the system has multiple presentation modes or whether it allows the presentation mode to be upgraded separately from the application logic. If system does not meet this standard, what options for altering the presentation mode/layer exist? Is the system tied to a particular presentation mode?</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Application Function Componentization	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: Individual system functions should be modular, thereby providing individual business functions in a componentized fashion.</p> <p>Comment: Separated program modules should allow the individual modules to be 'called' from one another or from a main program in order to 're-use' functionality across the system.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should describe degree of componentization and whether the system is more fully based on principles of SOA.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	WSDL or WADL Enabled	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: System should allow business functions/processes to be defined in WSDL or WADL.</p> <p>Comment: Web Services Description Language (WSDL) is used to define a service within an SOA environment. Applications which are truly Web Services enabled will use this utility. Similarly, Web Application Description Language (WADL) is used to fine services usually within a REST web service.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should indicate if and where WSDL/WADL is used to define common services.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	WSFL Enabled	Vendors may add any hyperlink to right:					
Information Only	Ideal	Core	Mandatory	<p>Standard: When applicable, system should allow workflow attributes to be described in WSFL.</p> <p>Comment: Web Services Flow Language (WSFL) may be used to describe workflow activities within an SOA environment. Applications with workflow attributes may use this utility.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should indicate if and where WSFL is used to define common services.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	SOAP or REST Enabled	Vendors may add any hyperlink to right:					
y	Ideal	Core	Mandatory	<p>Standard: Important system functions shall be callable via SOAP or REST protocol.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but</p>						
						Vendors may add any hyperlink to right:					

Integration Architecture				Meets	Will	3rd P	Cust	No	Other
Integration Capabilities									
Information Only	Ideal	Core	Mandatory	1	API Extensiveness/Flexibility				
					<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				
<p>Standard: All user accessible data in the system shall be capable of being accessed via documented APIs (with the preferred method of access being a data access model).</p> <p>Comment: Data transfer in and out of applications is a critical component for evaluation. At a minimum, HE expects applications to have a robust level of Application Program Interfaces (API) or more preferably a data object model that provides flexibility to access the full range of functional data. Testing Excel insertion with paste link to word.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall describe API extensiveness including whether edit controls are applied to APIs and whether a data model is used for outside access to system data. More extensive feedback would include lists of documented APIs or documentation for the data access model.</p>									
Information Only	Ideal	Core	Mandatory	1	Integration with Websphere MQ and Message Broker				
					<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				
<p>Standard: System should support integration with IBM's Websphere MQ and Message Broker.</p> <p>Comment: For applications that communicate with other applications via a messaging process, HE seeks to accommodate such communication within its selected enterprise messaging system which is Websphere MQ. For application to application communication, especially if communication is in real time HE seeks to perform Enterprise Architecture Integration (EAI) functions using IBM Message Broker.</p> <p>Preference: Websphere MQ and Message Broker</p> <p>Desired Feedback: System provider should indicate if the system support integration with WebSphere MQ and Message Broker.</p>									
Information Only	Ideal	Core	Mandatory	1	Native XML Support				
					<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				
<p>Standard: System should support use of XML natively to present data or to transfer information in and out of the system.</p> <p>Comment: XML is widely accepted by today's IT industry, and it is the fundamental standard for SOA. Both WSDL/WADL and SOAP/REST are all defined in XML format. Native application support for XML is considered ideal with XML compatibility via additional utilities established as a next best alternative.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should describe native provisions for presenting data and whether that includes converting data to an XML format for inter system communication.</p>									
Information Only	Ideal	Core	Mandatory	1	XML Compatibility				
					<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				
<p>Standard: Even if the system does not natively support XML, the system shall be architected to extensively support XML processing through 3rd party XML utilities.</p> <p>Comment: Irrespective of whether the system natively supports XML interchange, does the system interface tightly with third party XML utilities that can be used to either convert system data to XML or take system provided XML data and process it further?</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall explain systems compatibility with 3rd party XML utilities and name its preferred utility if one exists.</p>									
Information Only	Ideal	Core	Mandatory	1	Integration at the Web Services Layer				
					<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired.</p>				
<p>Standard: System should support integration flexibility at the web services layer such as allowing XML/WSDL/WADL calls or the interactive use of portlets.</p>									

Information Only	Ideal	Core	Mandatory	<p>Comment: HE seeks functional flexibility among its applications that allow applications to make calls for web services and to receive calls for web services.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should explain the degree to which the system utilizes web services for calling services and for defining services that can be called.</p>	<p>Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Integration with OData	<p>Standard: System should support integration with Microsoft's Open Data Protocol (OData).</p> <p>Comment: OData allows for integration of the application data with other applications.</p> <p>Preference: No products specifically preferred</p> <p>Desired Feedback: System provider should explain whether system can be configured to support OData.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				
Information Only	Ideal	Core	Mandatory	<p>Standard: For direct DB to DB data consolidation, integration or Extract/Transfer/Load (ETL) functions, the system shall support integration with MS SQL Server Integration Services (SSIS) or SAP Data Services.</p> <p>Comment: When the direct integration of data environments is performed between two MS SQL compliant data bases, HE supports the use of SSIS for performing and monitoring the full Extract/Transfer/Load (ETL) of data from one database to the other. For other system-to-system transfers, SAP Data Services is the desired tool.</p> <p>Preference: Integration with MS SSIS and SAP Data Services.</p> <p>Desired Feedback: For relevant functions, system provider shall describe data integration capabilities and the ability of the system to leverage SSIS or SAP Data Services.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Integration ETL Tools	<p>Standard: For direct DB to DB data consolidation, integration or Extract/Transfer/Load (ETL) functions, the system shall support integration with MS SQL Server Integration Services (SSIS) or SAP Data Services.</p> <p>Comment: When the direct integration of data environments is performed between two MS SQL compliant data bases, HE supports the use of SSIS for performing and monitoring the full Extract/Transfer/Load (ETL) of data from one database to the other. For other system-to-system transfers, SAP Data Services is the desired tool.</p> <p>Preference: Integration with MS SSIS and SAP Data Services.</p> <p>Desired Feedback: For relevant functions, system provider shall describe data integration capabilities and the ability of the system to leverage SSIS or SAP Data Services.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				
Interoperability with Key Services Important to HE						Meets	Will	3rd P	Cust	No	Other
Information Only	Ideal	Core	Mandatory	<p>Standard: For e-mail related functions, system interfaces with or interoperates with MS Exchange 2010 or higher.</p> <p>Comment: For systems or applications that shall interoperate with e-mail to facilitate workflow notifications or other human messaging services, HE expects that such systems will interface with its current implementation of MS Exchange.</p> <p>Preference: Integrate with MS Exchange 2010 & 2012.</p> <p>Desired Feedback: System provider shall indicate the functions and the degree of integration, if any, with MS Exchange.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Interoperability with MS Exchange	<p>Standard: For e-mail related functions, system interfaces with or interoperates with MS Exchange 2010 or higher.</p> <p>Comment: For systems or applications that shall interoperate with e-mail to facilitate workflow notifications or other human messaging services, HE expects that such systems will interface with its current implementation of MS Exchange.</p> <p>Preference: Integrate with MS Exchange 2010 & 2012.</p> <p>Desired Feedback: System provider shall indicate the functions and the degree of integration, if any, with MS Exchange.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				
Information Only	Ideal	Core	Mandatory	<p>Standard: For relevant services, system shall interface with MS Office SharePoint.</p> <p>Comment: For systems or applications that shall integrate with group collaboration or group office productivity software, HE expects that such systems will interface with its current implementation of SharePoint.</p> <p>Preference: Integrate with SharePoint 2013.</p> <p>Desired Feedback: System provider shall outline functions and levels of interoperation with HE currently supported version of SharePoint.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Interoperability with MS Office SharePoint	<p>Standard: For relevant services, system shall interface with MS Office SharePoint.</p> <p>Comment: For systems or applications that shall integrate with group collaboration or group office productivity software, HE expects that such systems will interface with its current implementation of SharePoint.</p> <p>Preference: Integrate with SharePoint 2013.</p> <p>Desired Feedback: System provider shall outline functions and levels of interoperation with HE currently supported version of SharePoint.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				
Information Only	Ideal	Core	Mandatory	<p>Standard: For relevant office productivity integrations at the desktop, system shall interface with MS Office 2010 or higher.</p> <p>Comment: For systems or applications that should interoperate with desktop productivity tools, HE expects that such systems will interface with its current implementation of MS Office 2010 and will migrate with HE to a newer MS Office at an appropriate later date.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Interoperability with MS Office desktop productivity suite	<p>Standard: For relevant office productivity integrations at the desktop, system shall interface with MS Office 2010 or higher.</p> <p>Comment: For systems or applications that should interoperate with desktop productivity tools, HE expects that such systems will interface with its current implementation of MS Office 2010 and will migrate with HE to a newer MS Office at an appropriate later date.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				

				Desired Feedback: System provider shall state clearly what their browser compatibilities include and/or what their requirements are.	may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.						
		1		General Web Browser Compatibility – External Use							
Information Only	Ideal	Core	Mandatory	<p>Standard: Browser based portions of system exposed to public facing internet shall work with MS Explorer 10.0 & higher, Firefox 32.0 & higher and Safari 7.0 and higher to be inclusive of all external users.</p> <p>Comment: Applications that deliver UI over browser technology shall be compatible with the currently stated HE standard for external browser (public facing) technology and the separate standard for external browser technology.</p> <p>Preference: Certify Explorer, Firefox & Safari, Chrome.</p> <p>Desired Feedback: System provider shall state clearly what their browser compatibilities include and/or what their requirements are.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
		1		Full Enablement of UI via Browser (without Terminal Services)							
Information Only	Ideal	Core	Mandatory	<p>Standard: When required, web browser can be used as the sole client side access for the application. Native browser support is generally preferred while self-updating plug-ins may be accepted.</p> <p>Comment: The software should have web browser enabled UI (HTML over HTTP) that conducts the user interaction from either an unaided browser, or at minimum, a browser with plug-ins that update automatically. The objective of this standard is to support the application via "thin client" technologies which should not require HE to install any interface application on the user's desktop PC or require use of Terminal Services.</p> <p>Preference: Compatibility on all HE Browsers.</p> <p>Desired Feedback: System provider should indicate level of compliance with all browsers listed in current HE General Web Browser Compatibility standard.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
		1		Web Portal Enablement for External Use							
Information Only	Ideal	Core	Mandatory	<p>Standard: Information and functionality in the system UI can be segmented and presented as components within a web portal.</p> <p>Comment: The ability to have meaningful chunks of software application functionality and information displayed within a Web Portal is consistent with HE direction and is desired in any application in as much as it is reasonable and meaningful. Allowing flexible data exchange among portal segments is also desired.</p> <p>Preference: Integration with Ingeniux.</p> <p>Desired Feedback: System provider should outline the system capabilities for expressing its parts as portal components.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
User Interface (UI) Standards - Windows						Meets	Will	3rd P	Cust	No	Other
		1		Use of Windows 7 Browsers for Presentation							
Information Only	Ideal	Core	Mandatory	<p>Standard: For internally-accessed components, if system will not install as a native client on Windows 7 devices, system can use MS Explorer browser for full presentation and interaction.</p> <p>Comment: At a minimum, systems that must be accessed via Windows PCs must be able to present information and appropriate functionality via the native browser (MS Explorer) features of Windows 7.</p> <p>Preference: MS Explorer 10.</p> <p>Desired Feedback: System provider should indicate how system can be assessed and utilized via Windows 7 workstations.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						

Technology Architecture				Meets	Will	3rd P	Cust	No	Other
Server Platforms									
Information Only	Ideal	Core	Mandatory	1	Application Server Platform				
					Vendors may add any hyperlink to right:				
					<p>Standard: System should operate on current HE Application Server Platform Standard which is defined as Windows Server or AIX.</p> <p>Comment: HE mandates that any new software packages run on the current HE standard.</p> <p>Preference: Preference for Windows Server 2012 and AIX. Lesser preference for Redhat.</p> <p>Desired Feedback: System provider should specify supported application server platforms.</p>				
					<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				
Information Only	Ideal	Core	Mandatory	1	Use of MS IIS as Web Server Platform				
					Vendors may add any hyperlink to right:				
					<p>Standard: Web related system services should operate using a currently supported version of Microsoft Internet Information Server (IIS).</p> <p>Comment: Software requiring a web server platform should operate from the most recent version of MS IIS. Limited use of Unix Webservers may be allowed on a case-by-case basis.</p> <p>Preference: Preference for most recent version of MS IIS.</p> <p>Desired Feedback: System provider should specify supported web server platforms.</p>				
					<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				
Scalability and Performance									
Information Only	Ideal	Core	Mandatory	1	Vertical Scalability				
					Vendors may add any hyperlink to right:				
					<p>Standard: System can be scaled vertically by adding CPU power and/or memory.</p> <p>Comment: This is both application architecture standard and hardware standard. A system shall be able to scale by adding memory and/or CPU power. Horizontal scalability is addressed by a separate standard.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall describe ability to scale by adding resources to a single server and shall further describe any impact on licensing and fees.</p>				
					<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				
Information Only	Ideal	Core	Mandatory	1	Horizontal Scalability				
					Vendors may add any hyperlink to right:				
					<p>Standard: System can be scaled horizontally by adding servers.</p> <p>Comment: Horizontal Scaling means applications can be run on a cluster of servers (with balancing), thus enabling HE to add more servers when the work load expands. Not all software allows horizontal scaling.</p> <p>Preference: F5 load balancing preferred.</p> <p>Desired Feedback: System provider should describe ability to scale by adding additional servers.</p>				
					<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				
Information Only	Ideal	Core	Mandatory	1	Cluster Awareness				
					Vendors may add any hyperlink to right:				
					<p>Standard: System is 'cluster aware' at the application layer and can fully leverage server based clustering techniques.</p> <p>Comment: To fully leverage clustering features, the application layer must be designed to work with server functionality to engage clustering options. System provides such integration.</p> <p>Preference: Preference is Power HA for AIX, MS clustering for Windows, and Service Guard for Linux.</p> <p>Desired Feedback: System provider should provide information and architectural specifications dealing with how the system leverages clustering capabilities.</p>				
					<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				
Information Only	Ideal	Core	Mandatory	1	Manual Failover Procedures				
					Vendors may add any hyperlink to right:				
					<p>Standard: System should have manual failover procedures.</p> <p>Comment: Manual failover procedures should be documented and tested.</p> <p>Preference: Preference for manual failover procedures.</p> <p>Desired Feedback: System provider should provide information and architectural specifications dealing with how the system leverages failover capabilities.</p>				
					<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				

Information Only	Ideal	Core	Mandatory	<p>Standard: System can be recreated and brought back to prior state through manual restoration processes while also using system logs or other outside messaging / broker services to understand which transactions may have failed.</p> <p>Comment: This standard for failover protection is not intended to cover instant or semi-automatic failover services but instead represents a base line standard to validate that the system can at least be restored to a specific 'before failure' state using manual system restore techniques.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: If system is not being protected via other semi automated or fully automated fail over techniques, system provider should describe the steps necessary to restore the system and potentially recover transactions in progress at the point of failure.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				<p>1</p> <p>Semi Automated Failover Protection</p>	Vendors may add any hyperlink to right:						
Information Only	Ideal	Core	Mandatory	<p>Standard: System supports semi automated failover protection that allows a replacement platform to be brought up within 15 minutes of failure complete with an audit log of failed transactions.</p> <p>Comment: This standard for failover protection is not intended to cover instant failover involving full transaction recovery and seamless, automated re-processing of transactions. This standard assumes some operator intervention to bring up replacement system and to find, account for and re-process failed transactions.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall verify the steps necessary to provide for system restoration (even if manual) including the steps necessary to identify (and restore) transactions in progress at the time of failure.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				<p>1</p> <p>Unattended High Availability Failover Protection</p>	Vendors may add any hyperlink to right:						
Information Only	Ideal	Core	Mandatory	<p>Standard: System supports High Availability failover protection that provides for unattended within 1 second with complete transaction recovery and seamless re-processing of failed transactions in progress.</p> <p>Comment: This standard for failover protection assumes near instant failover involving full transaction recovery and seamless, automated re-processing of transactions. This standard assumes no significant operator intervention to bring up replacement system and to find, account for and re-process failed transactions.</p> <p>Preference: Preference is Power HA for AIX, MS clustering for Windows, and Service Guard for Linux.</p> <p>Desired Feedback: System provider shall detail high availability failover protection options.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				<p>1</p> <p>Response Time Performance – Internal Network</p>	Vendors may add any hyperlink to right:						
Information Only	Ideal	Core	Mandatory	<p>Standard: Overall Response time for a simple transaction should be consistent with the needs of the application. Internal Client based systems should generally return a query within 1.0 seconds on networks if one assumes a baseline of 50 mbps effective throughput.</p> <p>Comment: Response is difficult to estimate, but in general, response time performance for internally deployed systems operating at an average of 50 mbps should generally fall within 1.0 seconds for simple transactions. HE understands that ultimate responsiveness is heavily influenced by our underlying network and data stores, and HE expects that its systems can support such responsiveness if the application is well constructed.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should estimate system architecture requirements to achieve HE response standards. Provider should also indicate estimated response time.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				<p>1</p> <p>Response Time Performance – External Facing</p>	Vendors may add any hyperlink to right:						

Information Only	Ideal	Core	Mandatory	<p>Standard: Overall Response time for a simple query should be consistent with the needs of the application. Response to a well powered web client assuming a base overall throughput speed of 8 mbps on the network should be within 1.5 seconds. HE understands that ultimate responsiveness is also heavily influenced by our underlying network and data stores, and HE expects that its systems can support such responsiveness if the application is well constructed.</p> <p>Comment: Response is difficult to estimate, but in general, response time performance for web systems that provide external interactions to HE constituents and community members should provide return pages within 1.5 seconds assuming a typical workstation and an 8 mbps download speed to a major ISP.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should estimate system architecture requirements to achieve HE response as stated.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				<p>Network/Communication Architecture</p>							
		1		<p>TCP/IP Network Transport Protocol</p>							
Information Only	Ideal	Core	Mandatory	<p>Standard: TCP/IP is the standard HE business network transport protocol.</p> <p>Comment: HE does not support Novell NCP, IPX or other proprietary protocols other than VPN encryptions that continue to use TCP/IP. NetBIOS is not supported as a transport protocol even if it is recognized.</p> <p>Preference: IPv4 required.</p> <p>Desired Feedback: System provider shall describe its network transport protocols.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				<p>HTTP and HTTPS Data Transport Protocols</p>							
Information Only	Ideal	Core	Mandatory	<p>Standard: HTTP and HTTPS are the standard HE web data transport protocols.</p> <p>Comment: HTTP is the dominant data transport protocol today and it is a HE mandate for on-line applications. HTTPS is, at a minimum, required for secure data transport but can be replaced by more secure forms of connectivity as needed. See the "Cryptographic System" requirement for additional information.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall describe its data transport protocols.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						

System Operation, Management and Support Architecture							Meets	Will	3rd P	Cust	No	Other	
System Operation and Management													
Information Only	Ideal	Core	Mandatory	1	Capability to Run in Virtual Environment	Vendors may add any hyperlink to right:							
				<p>Standard: System is capable of effective operation in a virtual server environment.</p> <p>Comment: System will operate in a virtual server environment such as VMware or IBM LPARS. System functionality in the virtual server environment shall be equal to functionality on a dedicated server.</p> <p>Preference: VMware or AIX LPAR preferred.</p> <p>Desired Feedback: System provider shall indicate in what virtual environments, if any, the system will operate.</p>	At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.								
Information Only	Ideal	Core	Mandatory	1	Compatibility with Storage Area Network (SAN)	Vendors may add any hyperlink to right:							
				<p>Standard: System implementer shall deploy storage services within HE Storage Area Network (SAN) based on 3PAR.</p> <p>Comment: System shall be deployed to operate using a SAN for all system data storage needs other than server based logs or configuration files.</p> <p>Preference: 3PAR preferred.</p> <p>Desired Feedback: System implementer shall be familiar with SAN technologies in order to ensure that the product being implemented is configured correctly to function in a SAN environment.</p>	At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.								
Information Only	Ideal	Core	Mandatory	1	Compatibility with Native Fiber Channel for SAN Management	Vendors may add any hyperlink to right:							
				<p>Standard: System is compatible with the native fiber channel used with Storage Area Network (SAN) management.</p> <p>Comment: System will operate using native fiber channel standards for transmitting hardware commands used to manage remote services on SAN servers and devices.</p> <p>Preference: EMC SAN services using native fiber channel</p> <p>Desired Feedback: System provider shall indicate compatibility with native fiber channel.</p>	At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.								
Information Only	Ideal	Core	Mandatory	1	Compatibility with On-Line Back-up and Restore Functions	Vendors may add any hyperlink to right:							
				<p>Standard: System is capable of effective operation in concert with On-Line data back up procedures including awareness of open transactions and files.</p> <p>Comment: System shall allow data and applications to be backed up using on-line back up and restore services. Back-ups shall work from a schedule and the restore functions shall not first require conventional loading of the OS and relevant applications. HE currently uses CommVault software systems to manage its storage management and back-up services.</p> <p>Preference: Preference is eVault i365.</p> <p>Desired Feedback: System provider shall indicate compatibility with eVault i365 and related procedures.</p>	At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.								
Information Only	Ideal	Core	Mandatory	1	Compatibility with System Configuration Management software	Vendors may add any hyperlink to right:							
				<p>Standard: System is capable of effective operation in conjunction with system configuration software.</p> <p>Comment: System software change and configuration management services can be managed using SCCM (for windows) and Uptime (for AIX and Linux).</p> <p>Preference: SCCM management services for Windows, Uptime for AIX & Redhat.</p> <p>Desired Feedback: System provider shall indicate compatibility configuration software.</p>	At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.								
Information Only	Ideal	Core	Mandatory	1	Patch Level Compatibility	Vendors may add any hyperlink to right:							
				<p>Standard: Applications must be consistent with current HE upgrade and fixpack levels for the HE Operating Environment.</p>	At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but								

Information Only	Ideal	Core	Mandatory	<p>Comment: In many cases, direct system provider management and/or support the system via remote access (VPN) can greatly improve the service availability and cut down the cost of IT operation. Allowance of direct access to the application layer or beyond is not to be granted lightly.</p> <p>Preference: TLS (formerly known as SSL) and IPsec VPN.</p> <p>Desired Feedback: System provider should indicate whether system provides a remote administration console or a console application. If so, what is the preferred manner of access by the system provider and does that conform to the HE Standard? What controls are in place on the system provider side to prevent unauthorized access from their location.</p>	<p>vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	<p>Service Level Agreements</p>						
Information Only	Ideal	Core	Mandatory	<p>Standard: In order to support the Performance and Availability standards and requirements, external system providers will need to comply with HE developed Service Level Agreements (SLAs).</p> <p>Comment: Basic expectations include: (1) Back-end system should be available 24x7 (e.g., 8x5, 10x6, 24x7) with allowable downtime via a reserved maintenance window scheduled for Wednesday nights between 7:30pm – 12:00am. (In some e-business application outages, service may be maintained via appropriate caching techniques). (2) Back-end systems should provide appropriate transaction logging and tracking mechanisms to perform audits and establish controls.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should indicate its ability to comply with HE SLAs.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						

Security and Privacy Architecture				Meets	Will	3rd P	Cust	No	Other
User Access Management									
Information Only	Ideal	Core	Mandatory	1	Authentication and Identification				
				<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
<p>Standard: System shall provide or allow for user authentication and identification.</p> <p>Comment: System integrated into the HE environment must provide user ID management and logon functions as well as provide or interface with measures designed to guard against fraudulent transmission and imitative communication deception by establishing the validity of the transmission, message, station or individual. System shall provide authentication and identification for employees and customers.</p> <p>Preference: MS Active Directory preferred.</p> <p>Desired Feedback: System provider shall describe authentication and ID capabilities.</p>									
Information Only	Ideal	Core	Mandatory	1	Use of Integrated Windows Authentication for Web Services				
				<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
<p>Standard: If system uses web based components, system shall interface with Integrated Windows Authentication (IWA) to provide for user authentication and identification.</p> <p>Comment: Any new software package must provide user ID management and logon functions and HE desires that its systems use in as much as appropriate, the features of MS Integrated Windows Authentication.</p> <p>Preference: MS Active Directory preferred.</p> <p>Desired Feedback: System provider shall describe the extent of IWA capabilities.</p>									
Information Only	Ideal	Core	Mandatory	1	LDAP Integration				
				<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
<p>Standard: The system operates in conjunction with standard LDAP services.</p> <p>Comment: LDAP is the most widely accepted protocol for maintaining a directory of authenticated users and while a software package may provide its own authentication service, the capability of using 3rd party authentication using LDAP information is critical for raising security services to an enterprise level and using services such as single sign-on (SSO).</p> <p>Preference: MS Active Directory preferred. LDAP where Active Directory not supported.</p> <p>Desired Feedback: System provider shall describe the extent of LDAP integration.</p>									
Information Only	Ideal	Core	Mandatory	1	Internal and External Password Management				
				<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
<p>Standard: System must be capable of enforcing strong password handling for all external customer users and for HE users (employees or contractors), and the ability to enforce different rules based on account type (e.g. internal, customer, supervisor, administrator).</p> <p>Comment: Vendor system must support the following:</p> <ul style="list-style-type: none"> - Must have capability to have passwords expire on a configurable timeline based on account/user role, with 90-days being the default for internal system users and no expiration date for customers. - Must have configurable complexity requirements based on account/user role, including the ability to require: <ul style="list-style-type: none"> - passwords for internal system accounts must contain three or more of the following groups: <ul style="list-style-type: none"> --- Upper case letters; --- Lower case letters; --- Numbers; --- Special characters (ex: \$, @, #, %, etc.); - At least eight (8) characters long; - Must not be common words or combinations of common words; - Must not be the same as the user ID, nor an anagram or variation of the user ID. - Cannot reuse the last (configurable number) passwords by user type, with 10 being the default for internal system users and no re-use restriction for customers. <p>Preference: No products specifically preferred.</p>									

					Desired Feedback: System provider must verify that password strength and reset requirements can be configured and enforced.						
				1	Customer Privacy Settings- Web						
						Vendors may add any hyperlink to right:					
	Information Only	Ideal	Core	Mandatory	<p>Standard: System must not store cookies containing personally identifiable information and use the standard privacy settings of the browser.</p> <p>Comment: The system must also not employ SuperCookies, EverCookies, PermaCookies or any other mechanism that circumvents a user's browser privacy settings.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider must verify that cookies containing customer privacy information are not stored. System provider must verify that browser privacy settings are not overridden.</p>	At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.					
				1	Customer Privacy Settings-Mobile						
						Vendors may add any hyperlink to right:					
	Information Only	Ideal	Core	Mandatory	<p>Standard: System must not override a customer's mobile privacy settings.</p> <p>Comment: If the solution contains a mobile application (smart phone, tablet, etc.) The mobile application must obey the customer's mobile privacy settings for sharing or collection of customer data, such as contacts, geo-location data, or any other information not explicitly entered by the customer into the application.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider must verify that mobile application privacy settings are not overridden.</p>	At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.					
				1	Confirmation of Customer Privacy Settings-Mobile						
						Vendors may add any hyperlink to right:					
	Information Only	Ideal	Core	Mandatory	<p>Standard: System shall prompt for permission to access customer data.</p> <p>Comment: If the solution contains a mobile application (smart phone, tablet, etc.) The mobile application must prompt before accessing customer data, such as contacts, geo location data, or any other information not explicitly entered by the customer into the application.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider must verify that mobile application requires customer action to approve.</p>	At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.					
				1	Single Sign-On (SSO) Enabled						
						Vendors may add any hyperlink to right:					
	Information Only	Ideal	Core	Mandatory	<p>Standard: Product supports Single Sign-On (SSO).</p> <p>Comment: SSO can make security management easier, and provides an improved user experience. In the real world, when users have too many IDs and passwords to remember, the system may be less secure.</p> <p>Preference: MS Active Directory preferred for internal and SAML for external.</p> <p>Desired Feedback: System provider shall verify that system is compatible with SSO.</p>	At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.					
				1	Removal of Generic Accounts						
						Vendors may add any hyperlink to right:					
	Information Only	Ideal	Core	Mandatory	<p>Standard: At the time of install all generic accounts and default logins shall be removed.</p> <p>Comment: Default accounts and passwords may make the system vulnerable to unauthorized access. Unnecessary accounts shall be removed. For accounts that are required for proper system operation, the system provider shall document all accounts that are required and enable HE to modify them from the default setting.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall confirm that generic accounts and default logins will be removed/modified during installation.</p>	At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.					
				1	Multi-level Access Control						
						Vendors may add any hyperlink to right:					

Information Only	Ideal	Core	Mandatory	<p>Comment: Application utility needs to aggregate and report on existing versions/patches by module or executable file.</p> <p>The Supplier shall provide documentation of software/firmware that supports the procured product, including scripts and/or macros, run time configuration files and interpreters, databases and tables, and all other included software (identifying versions, revisions, and/or patch levels, as delivered). The listing shall include all ports and authorized services required for normal operation, emergency operation, or troubleshooting. This documentation must include user guide(s); system installation and maintenance documentation; application flow diagrams and descriptions; data file schema; back-up procedures; and recommended security and user test procedures.</p> <p>Preference: Native to the product (no third party).</p> <p>Desired Feedback: System provider shall confirm that it can provide a full inventory of software, firmware, scripts, ports, etc. supporting procured product and that unnecessary items will be removed or disabled during implementation.</p>	<p>Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				<p>Connection and Data Transport Security</p>							
Information Only	Ideal	Core	Mandatory	<p>1 Web browser session protection</p> <p>Standard: For web based components, the system supports the Transport Layer Security (TLS) protocol for internet session security.</p> <p>Comment:</p> <p>1) For web browser based components, the system must support the Transport Layer Security (TLS) protocol for internet browser session security, but the vendor is free to recommend alternative encryption methods as well.</p> <p>2) Unless otherwise agreed to during system implementation, set a default of using TLS for all web browser pages handling non-public data.</p> <p>3) Use HTTP Strict Transport Security (HSTS) and the Secure Cookie flag for all browser sessions handling non-public data.</p> <p>4) Do not include Hawaiian Electric Company non-public data as part of any URL.</p> <p>Preference: TLS v1.2.</p> <p>Desired Feedback: System provider shall verify that system uses TLS where appropriate.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				<p>SSH File Transfer Protocol</p> <p>Standard: System shall support large file transfer utilizing a SSH (Secure Shell) File Transfer Protocol (SFTP) Server.</p> <p>Comment: SFTP is the current industry standard for secure file transfer and is a HE mandate for open transfer of HE information.</p> <p>Preference: See "Cryptographic System" requirement for algorithm.</p> <p>Desired Feedback: System provider shall verify system uses SFTP where appropriate.</p>				<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>			
Information Only	Ideal	Core	Mandatory	<p>1 Inter-process Communication</p> <p>Standard: The system shall enforce security policies from the critical side when interprocess communication is initiated from a less privileged application.</p> <p>Comment: Separation of privileges between different applications is critical for minimizing the extent of system vulnerability if a particular application is compromised.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall verify its ability to configure interprocess communication and privilege separation.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				<p>Secure Transport of Company non-Public Data</p> <p>Standard: System shall support secure transmission of all non-public data.</p> <p>Comment: All non-public data must be encrypted in accordance with the standard depicted in the "Cryptographic System" requirement .</p> <p>Preference: See "Cryptographic System" requirement for algorithm.</p>				<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it</p>			

Information Only	Ideal	Core	Mandatory	1	<p>Desired Feedback: System provider shall specify the algorithms used for secure transports.</p>	<p>may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
					<p>Network Security Zones</p> <p>Standard: Vendor must document all data flows required to traverse any electronic security perimeter (ESP), whether between multiple internal ESPs or between internal and external ESPs. Requirements for Medium Impact BES Cyber Systems found in NERC CIP-005-5 Electronic Security Perimeters shall be followed.</p> <p>Comment: The network shall be segmented into multiple network security zones, and methods shall be in place to restrict communication between zones. Also see the "System Interfaces" requirement.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall describe its proposed network architecture and methods for controlling communication between network security zones. Vendor must provide this information regardless of whether the security zone interface devices are provided or maintained by the vendor.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
Information Only	Ideal	Core	Mandatory	1	<p>Wireless Technology</p> <p>Standard: Where wireless links are used in the implemented system, the system shall support wireless technologies while remaining compliant with security standards. System shall support link or end-to-end encryption independent of data transmission carrier.</p> <p>Comment: The system shall be compatible with other wireless equipment and shall minimize the potential for signal interception. The system shall be resilient to high-level threats including denial of service, eavesdropping, man-in-the-middle, masquerading, message modification, message replay, and traffic analysis. The system provider shall provide documentation regarding capabilities, requirements, limitations, and security of the system's wireless communication devices.</p> <p>Preference: See "Cryptographic System" requirement for algorithm. WPA-2 Enterprise for 802.11 for authentication.</p> <p>Desired Feedback: System provider shall describe the wireless protocols that are compatible with the provider's devices and demonstrate that known attacks do not compromise receiving devices. Describe their link or end-to-end encryption method and how it is independent of a data provider encryption (e.g. cellular data or microwave).</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
					<p>Network Intrusion Detection</p> <p>Standard: The system shall allow for means to document that network traffic is monitored, filtered, and alarmed (e.g., alarms for unexpected traffic through network security zones) and provide filtering and monitoring rules on a 24x7x365 basis.</p> <p>Comment: The system shall be configured with an intrusion detection system (IDS), which may be either host-based or network-based. The system provider shall provide recommendations for optimal IDS configuration which will enable HE to monitor traffic.</p> <p>Preference: Supports integration with HE network IDS.</p> <p>Desired Feedback: System provider shall describe its proposed network intrusion detection system architecture and monitoring conditions.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
Data Storage Security							Meets	Will	3rd P	Cust	No	Other
Information Only	Ideal	Core	Mandatory	1	<p>Elimination of 'Cached' Data</p> <p>Standard: If caching is used with non-public HE data, the cached data shall be encrypted and eliminated when no longer needed.</p> <p>Comment: If confidential data is processed on the system, the system shall provide for the encryption of the cached data and elimination the cached data to assure that residual data is not left in caches or on local hard drives.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall fully explain to what extent confidential information can be targeted and encrypted.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
					<p>Secure Storage of Company "Confidential-Restricted" Data At Rest.</p>	<p>Vendors may add any hyperlink to right:</p>						

Information Only	Ideal	Core	Mandatory	<p>Standard: Regulated data, such as SSNs, financial account numbers, driver's license, and PHI shall be encrypted at rest. PINS and passwords shall be stored hashed and never in clear text.</p> <p>Comment: If confidential restricted data is stored via the system, the data shall be protected against unauthorized access or other exposure via encryption. The encryption (cipher) can be provided via a 3rd Party tool, but shall seamlessly integrate with the system.</p> <p>Preference: See "Cryptographic System" requirement for specifics on algorithms. HE currently uses Vormetric software to encrypt data at rest.</p> <p>Desired Feedback: System provider shall confirm compliance.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>							
				Behavior Based Security Controls							Meets	Will
			1	Session Termination for Inactivity		Vendors may add any hyperlink to right:						
Information Only	Ideal	Core	Mandatory	<p>Standard: The system shall provide for automated session terminations after configurable periods of inactivity.</p> <p>Comment: System shall monitor the activity level of a session and after a designated number of minutes of inactivity, system shall automatically close out the session and require re-logging of at least the password to continue.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall describe how this functionality is implemented and what level of granularity exists for HE to configure settings.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>							
				Limit Concurrent Sessions for Same User								
			1	Limit Concurrent Sessions for Same User		Vendors may add any hyperlink to right:						
Information Only	Ideal	Core	Mandatory	<p>Standard: The system shall be able to set configurable limits on the number of concurrent sessions allowed for any user.</p> <p>Comment: System shall provide a configurable parameter to set the number of concurrent sessions allowed for any user. If the number is '1', then system would prevent a second log-on by the same user at the same time.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall describe how this functionality is implemented and what level of granularity exists for HE to configure settings.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>							
				Lock Out after Unsuccessful Log-On Attempts								
			1	Lock Out after Unsuccessful Log-On Attempts		Vendors may add any hyperlink to right:						
Information Only	Ideal	Core	Mandatory	<p>Standard: The system shall be able to lock out users after a configurable number of unsuccessful log-on attempts.</p> <p>Comment: System shall provide a configurable parameter to set the number of unsuccessful log-in attempts before user is locked out and requires a reset to log-in again.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall confirm its ability to provide and customize a lock-out system for failed log-in attempts.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>							
				Audit, Alert and Reporting Safeguards							Meets	Will
			1	Real-Time Inventory of Users		Vendors may add any hyperlink to right:						
Information Only	Ideal	Core	Mandatory	<p>Standard: The system shall be able to report real time on all active users outlining all of their permissions and roles.</p> <p>Comment: The system shall understand who is accessing the system at all times and be able to provide an immediate and on-going report of those users complete with all permissions granted, permissions being used, task roles granted and task roles being used.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall verify and explain provisions for tracking and understanding the actions of active users.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>							
				Audit History of Access and Changes								
			1	Audit History of Access and Changes		Vendors may add any hyperlink to right:						
Information Only	Ideal	Core	Mandatory	<p>Standard: The system shall support tracking of new access, modification of access and security permissions for a configurable period.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but</p>							

Information Only	Ideal	Core	Mandatory	<p>Comment: For systems hosted/maintained by Hawaiian Electric, integrating with Hawaiian Electric Anti-Virus tools is important for a system maintenance staff and cost/licensing perspective.</p> <p>For systems hosted/maintained by third parties, clarify requirements regarding keeping AV/malware signatures updated and notifying Hawaiian Electric whenever malware is detected on systems containing Hawaiian Electric data.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall describe its capabilities for preventing system infection by malware. Provider shall verify that cybersecurity services are compatible malware detection services. If malware detection is not included, service provider shall indicate compatible products.</p>	<p>Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	System Heartbeat Monitoring	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
Information Only	Ideal	Core	Mandatory	<p>Standard: Signals from system hardware, software, and firmware shall be monitored to detect abnormalities.</p> <p>Comment: The system shall preferably include regular heartbeat signals, but a last gasp from a failing component may also be used.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall identify viable heartbeat signals for network monitoring and examples of their application.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
Privacy Compliance						Meets	Will	3rd P	Cust	No	Other
Information Only	Ideal	Core	Mandatory	1	Customer Data Purging	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
				<p>Standard: The system must allow for the purging or archiving of individual customers' data after a period of time as defined by HE.</p> <p>Comment: In particular, the system shall allow for configuration and rule definition of either the period of time after which purging or archiving is desired or the definition of individual customers or groups of customers for purging or archiving.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall verify that the system has the capabilities to allow for this flexibility.</p>							
Information Only	Ideal	Core	Mandatory	1	Customer Communications Preference	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
				<p>Standard: System shall allow customers to define their preferred means of communications with HE.</p> <p>Comment: Customers shall be able to configure methods of communication including telephone, email, or text.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall verify that multiple communications channels are enabled throughout the system and that customers can be afforded the option as to which communication channel is preferred.</p>							
Information Only	Ideal	Core	Mandatory	1	Customer Opt-out	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
				<p>Standard: The system shall manage and track customer Opt-outs. (Applies only to systems with which customers directly interact.)</p> <p>Comment: In particular, customer Opt-Out shall store an effective date to provide an audit trail and clarity of the customer's choice at any given period of time.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: The system provider shall verify that customer opt-out, at a minimum, stores an effective date of opt-out. The system provider shall describe how the opt-out works.</p>							
Information Only	Ideal	Core	Mandatory	1	Customer Data Control	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired.</p>					
				<p>Standard: The system shall allow for customers to exercise meaningful control over their data. (Applies only to systems with which customers directly interact.)</p>							

Information Only	Ideal	Core	Mandatory	<p>Comment: Specifically, customers shall be permitted to opt-out of providing secondary data use; and, customers shall be permitted to retrieve and update their data as desired.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall describe how the system provides for ad hoc data retrieval and updating as well as use of secondary data opt-out.</p>	<p>Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				1	Customer Authentication	<p>Standard: The system should allow flexibility and choice with respect to customer authentication.</p> <p>Comment: Customers should be able to use 2 factor authentication for their accounts if they desire.</p> <p>Preference: SAML support.</p> <p>Desired Feedback: System provider should describe how the system affords multiple authentication optionality for customers.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				
Security Compliance						Meets	Will	3rd P	Cust	No	Other
Information Only	Ideal	Core	Mandatory	1	System Backup	<p>Standard: The system shall implement a rigorous data backup practice.</p> <p>Comment: For systems to be hosted at or managed by Hawaiian Electric, vendor system must be compliant with and integrated into the existing Hawaiian Electronic data backup systems and procedures. For systems hosted at external sites managed by the vendor or vendor's agent, vendor must ensure proper ongoing backup and storage of electronic data records.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System providers shall Describe how they have a defined a standard and enforced practice for system backup.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				
				1	Encryption Key Exchange	<p>Standard: The system should employ Ephemeral Key Exchange.</p> <p>Comment: Describe how your system can be used with ephemeral key exchanges for all key exchanges protecting transmission of highly sensitive data (Hawaiian Electric Confidential, Confidential-Restricted data, and control data) which traverses both an electronic and a physical security perimeter. Describe any performance or support implications of the use of Ephemeral Key Exchanges for your implementation.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should describe its cryptographic methods, how these support ephemeral key exchange.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				
Information Only	Ideal	Core	Mandatory	1	Cryptographic System	<p>Standard: The system shall employ cryptographic system with Validated and Acceptable encryption and key management features.</p> <p>Comment:</p> <ol style="list-style-type: none"> 1. Encryption must be "Validated" per FIPS 140-2 and currently "Acceptable" per NIST SP800-131(series). 2. Product must provide a method to remotely update encryption certificates on an acquirer-defined and configurable frequency without disrupting normal system operation. 3. Product must provide a method of updating the encryption method (algorithm/primitive) to maintain a NIST SP800-131(series) "Acceptable" encryption method throughout the service life of the device, without replacing the entire device. Vendor support must include provision for delivering these updates when needed. <p>Preference: No products specifically preferred.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>				

Information Only	Ideal	Core	Mandatory	1	<p>Comment: Vendor lifecycle management must ensure products and services are managed in an environment which provides appropriate assurance of product integrity. This is shown by doing vulnerability assessments consistent with NERC CIP-010-1 R3 requirements of Medium-Impact BES Cyber Assets. While NERC CIP compliance is not a regulatory requirement, its provisions are good practice and are used as guidance at HE.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: Describe how vendor conducts vulnerability assessments within its own environment, and mitigates identified risks, in a manner consistent with NERC CIP-010-1 R3.</p>	<p>Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>							
Information Only	Ideal	Core	Mandatory	1	<p>Systems Security Management</p> <p>Standard: Vendor shall ensure their systems and system implementation provide for compliance with all requirements of NERC CIP-007-5.</p> <p>Comment: While NERC CIP compliance is not a regulatory requirement, its provisions are good practice and are used as guidance at HE. CIP-007-5 provides guidelines for vendor products and their implementations.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: Vendor shall describe how their system and its implementation provides sufficient security controls to ensure NERC CIP-007-5 compliance at the level required for Medium-Impact BES Cyber Systems.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>							
Information Only	Ideal	Core	Mandatory	1	<p>Employee Mobile Device Applications</p> <p>Standard: Any applications intended for use by employees on mobile devices must be compatible with Hawaiian Electric's mobile device management suite.</p> <p>Comment: Testing must be done by selected vendor to confirm compatibility.</p> <p>Preference: Afaia for applications used by HE employees.</p> <p>Desired Feedback: System provider must describe how the mobile applications are compatible with HE security suite.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>							
Information Only	Ideal	Core	Mandatory	1	<p>Masking of Sensitive Data</p> <p>Standard: Regulated data, such as SSNs, financial account numbers, driver's license, and PHI shall be masked when presented on user screens and reports. Masking rules shall be configurable by user type. PINS and passwords should be stored hashed and never in clear text.</p> <p>Comment: Sensitive data such as, but not limited to, Social Security Numbers, Financial Account Numbers, drivers license numbers, Protected Health Information, etc.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider must describe how sensitive data will be masked, and how that masking varies by user type.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>							
Process Requirements													
Information Only	Ideal	Core	Mandatory	1	<p>Vendor Support Access</p> <p>Standard: The vendor shall ensure support personnel working on HE systems or handling HE information have had background checks and been trained in cyber security guidelines & policies.</p> <p>Comment: Proper cybersecurity training, background checks, and staffing updates are necessary to avoid compromising any sensitive information. The background checks and cyber security training shall be consistent with High & Medium BES Cyber System requirements in NERC CIP-004-5.1. While NERC CIP compliance is not a regulatory requirement, its provisions are good practice and are used as guidance at HE.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: The system provider shall describe its cybersecurity training and awareness procedures and frequency, and the provider shall agree to perform appropriate background checks on employees involved in the development, deployment and support of the proposed product.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>							
Information Only	Ideal	Core	Mandatory	1	<p>Patches and Updates</p>	<p>Vendors may add any hyperlink to right:</p>							

Remote Host and Application Service Provider (ASP) Architecture (IF APPLICABLE)							Meets	Will	3rd P	Cust	No	Other	
Remote Security													
Information Only	Ideal	Core	Mandatory	1	Determination of Security Trust Level		Vendors may add any hyperlink to right:						
					<p>Standard: The remote host or ASP system shall be covered by a Type II SAS70 SysTrust/WebTrust or else the host/ASP can provide an independent security assessment (attestation) report by a reputable reporting agency (e.g., PCI) that covers the ASP's application and infrastructure.</p> <p>Comment: Some independent evidence or report shall be provided to HE showing that the provider's security meets professional standards or has otherwise been evaluated. Attestation reports by a qualified professional assessment firm are preferred.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall provide copies or links to attestation reports if available.</p>		<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
Information Only	Ideal	Core	Mandatory	1	Data Preservation Provisions		Vendors may add any hyperlink to right:						
					<p>Standard: The remote host or ASP shall provide Service Level Agreements (SLAs) regarding the frequency and assuredness of data back-ups along with the provisions and timeliness of restoration/recovery procedures.</p> <p>Comment: Documentation of service levels pertaining to data preservation shall be built into the contract or other agreement documents such as SLAs.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall provide detailed descriptions of data protection and preservation procedures.</p>		<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
Information Only	Ideal	Core	Mandatory	1	System Access & Performance Requirements		Vendors may add any hyperlink to right:						
					<p>Standard: The remote host or ASP shall provide Service Level Agreements (SLAs) regarding the availability of the system and the required performance of the system when it is available.</p> <p>Comment: Documentation of service levels pertaining to up-time and performance requirements shall be built into the contract or other agreement documents such as SLAs.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall provide detailed commitments to mutually agreeable up-time and performance standards.</p>		<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						

Attachment E: Installation Requirements



Attachment E -
Installation Re...

	A	B	C	D	F	G					J	K	L	M	N	O	P	Q	R	S	T	U
1	Hawaiian Electric Functional Requirements Questionnaire																Vendor Response Options					
2	Smart Grid Meter Installation																XYZ, Inc.					
3	Vendor Name: XYZ, Inc.																Spreadsheet Template Version is: 1.0 as of 09/23/2014					
4	Project: Smart Grid Meter Installation																					
5	Date Questionnaire Released:																					
6	Date Questionnaire Due:																					
7	Date of Last Assessment Ratings Added by HE:																					
8	Information Only	Ideal	Core	Mandatory	Hawaiian Electric Smart Grid Meter Installation Requirements												Enter the numeric value "1" (not text) as the flag values in the yellow highlighted response options. Do not flag more than 1 (one) box per row. Use Grouping controls on far left side of this spreadsheet to fully open all text and response options. Use beige areas in expanded rows to enter any desired hyperlinks or additional explanation text.					
9																						
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18	General Installation Requirements																					
19	The requirements below describe the installer's general responsibilities for managing and performing meter installations, as well as managing meter inventory.																					
20																	Meets	Will	3rd P	Cust	No	Other
21				1	1.01.01	Scheduling customer visits: Bidder must manage scheduling/rescheduling customer visits and will ensure avoidance of conflicts with scheduled meter readings, outages, maintenance, etc.																
22		1			1.01.02	Deployment schedule: Bidder must meet The Companies' meter installation schedule: 24 mo for Maui (72,000 meters; 3,000/mo) and Hawaii (86,000 meters; 3,600/mo); 36 mo for Oahu (307,000 meters; 8,600/mo).																
23		1			1.01.03	Meter testing: Bidder must be able to perform post-installation testing and provide recommendations for The Companies meter testing procedures. Residential meters may be sampled. Testing data should be provided to HE.																
24				1	1.01.04	Background checks: Bidder must consent to background checks for each installer and provide a resume of each installer's training and experience. Installers must, at a minimum, be a journeyman electrician working under the supervision of a licensed electrical contractor. Installer licensed in Hawaii are preferred.																
25			1		1.01.05	Supervision: Bidder must provide sufficient supervision of its installer to ensure quality installation processes.																
26				1	1.01.06	Inventory management: Bidder must securely host and manage the meter inventory in their own warehouse in a manner compliant with SOX requirements. Meters shall be stored in a locked facility with a security guard and cameras. Meters shall not stored in vehicles. Installer is responsible for meter seal integrity and the return of unused meters.																
27			1		1.01.07	Meter assignment: Bidder must assign meters and seals to individuals and require that installers sign out the meters to keep track of inventory.																
28		1			1.01.08	Used meters: Bidder must track old meters, which must be signed in by installers. Sign-in information must be sent to HE. Meters must be sorted by type, then number, and match to the appropriate work order number.																
29			1		1.01.09	Installation tracking: Bidder must track installation progress and maintain this information in a database; reports are to be shared with The Companies as requested.																
30				1	1.01.10	Outage prevention: Bidder must be able to perform a bypass during installation of commercial meters to ensure that outages are avoided.																
31		1			1.01.11	Meter programming: Bidder must be able program meters, as necessary, according to the meter specification.																
32		1			1.01.12	Post-installation meter testing: Bidder must perform post-installation testing on all slow meters.																
33			1		1.01.13	Clock setting: Bidder must set meter clock after installation to ensure accuracy.																

	A	B	C	D	F	G	J	K	L	M	N	O	P	Q	R	S	T	U	
79			1		2.01.11	Outreach material approval: All customer outreach materials developed by installer must be approved by The Companies prior to distribution.													
84																			
85	IT Systems & Reporting																		
86	The requirements below describe the installer's responsibilities for managing customer, meter, and installation data, including the ability to report progress to The Companies' through integration with The Companies' systems.																		
87														Meets	Will	3rd P	Cust	No	Other
88				1	3.01.01	Customer information and work force management: Bidder must operate its own customer information system (CIS) and work management software.													
89			1		3.01.02	Meter installation reporting: Bidder must provide information on meter installations on a daily basis, which shall - at a minimum - include the following: - Installation date - Old meter number - Old meter read - New meter number - New meter read - Flags/errors - Latitude (WGS84) - Longitude (WGS84)													
90			1		3.01.03	Meter Integration Status & Reporting: Bidder shall provide meter integration status with location information on a daily basis.													
91			1		3.01.04	CIS data import: Bidder's CIS must have the ability to import batch The Companies' customer data on a weekly basis.													
92			1		3.01.05	HE computers: Computers provided by HE, if any, must be properly locked, secured, and controlled.													
93			1		3.01.06	Data transfer/integration with existing The Companies enterprise information systems: Bidder must be able to provide at the appropriate frequency high-level data objects for data transfer/integration into Hawaiian Electric's existing allocation systems, including but not limited to: 1 – Customer Object (from The Companies to installer) 2 – Location Object (from The Companies to installer) 3 – Meter Object (from installer to The Companies) 4 – Work Order Object (from installer to The Companies)													
94			1		3.01.07	Test results file format: Bidder must supply meter test results in SAP-compatible format.													
95				1	3.01.08	Installer work flow supporting data: Bidder must agree to provide each installer with only the customer data associated with a single day's work for that installer, and to ensure that customer data is not retained by the installer after the end of that work day.													
96				1	3.01.09	Data fields provided to installer: Bidder must agree to receive approval for all customer data fields from The Companies' customers from the Director of Privacy Programs prior to receiving The Companies data.													
97				1	3.01.10	Cyber security & privacy architecture: Bidder agree to ensure its data protection systems and procedures comply with The Companies' Security & Privacy Architecture requirements.													
98			1		3.01.11	Physical security of meters in transit and storage: Bidder must agree to and its methods for ensuring compliance with NERC CIP-006-5 (physical security controls) of facilities storing meters as if the meters were part of a "Medium Impact BES Cyber Systems with External Routable Connectivity."													
99			1		3.01.12	Work order management system (WOMS) SAP-CIS Integration: Bidder should management inventory with a work order management system that must integrate with The Companies' 's SAP-CIS to facilitate The Companies' monitoring of inventory tracking, installations, meter exchanges, route updates, meter information updates, etc. Also, integration will facilitate import of required customer data from The Companies for installer's inventory management.													
104																			
105																			
106																			
107																			

Attachment F: Detailed Pricing Sheet



Attachment F -
Detailed Pricing...

Description	Price		
	Per Unit	Quantity	Extended Price
Mobilization Fee <i>(includes management labor and limited IT modification costs for start-up period)</i>			\$ -
Residential Meters			\$ -
C&I Self-Contained Meters			\$ -
Pickup, Preparation, Testing, and Storage			\$ -
Tracking and Inventory Management			
Meter Disposal			\$ -
Management of Work Order Management Data			\$ -
Customer Support			\$ -
Start-up Travel and Lodging (estimated)	Rate	Quantity	Extended
Airfare Roundtrip			\$ -
Car Rental and Fuel per Day			\$ -
Lodging per Day			\$ -
Total Startup Travel	\$ -		\$ -
Ongoing Travel and Lodging (estimated)	Rate	Quantity	Extended
Airfare Roundtrip			\$ -
Car Rental and Fuel per Day			\$ -
Lodging per Day			\$ -
Total Ongoing Travel	\$ -		\$ -
Labor (estimated)	Rate	Quantity	Extended
Union Labor Pricing, Hawaii-Based			\$ -
Union Labor Pricing, Non-Hawaii-Based			\$ -
Non-Union Labor Pricing, Hawaii-Based			\$ -
Non-Union Labor Pricing, Non-Hawaii-Based			\$ -
Union Labor pricing, Hawaii Licensed Electrician			
Non- Union Labor pricing, Hawaii Licensed Electrician			
Total Labor	\$ -		\$ -
Installer Training Rate (one week)			\$ -
Subtotal before Hawaii General Excise Tax (if applicable)			\$ -
Hawaii General Excise Tax (if applicable)			
TOTAL			\$ -

Notes to Pricing

- 1 This pricing is offered contingent upon the mutual agreement and execution of a Master Service Agreement by the parties.
- 2 Estimated costs should be itemized and include all labor and non-labor costs deemed necessary to successfully complete the project and its deliverables as stated in Section 2.5 of the request for proposal.
- 3 Include costs for all meter receipt, preparation, tracking, inventory management, and the safe disposal of all replaced meters.
- 4 These costs should include all management and delivery of work order management data as well as customer support and the mailing of installation informational materials.
- 5 Bidder shall perform repairs and install new meter when meter pull causes an outage. The Companies will assume the T&M burden.
- 6 Labor pricing should be provided for union and non-union labor, with designation as to Hawaii-based resources and non-Hawaii-based resources.
- 7 The cost proposal shall also include a fee associated with mandatory training, provided by The Companies.
- 8 All labor hourly rates for each job classification will remain valid for one year after the execution of the Contract.
- 9 The estimated labor and non-labor costs can be summarized in tables similar to the template provided in Attachment G
- 10 Estimated costs should include travel expenses.
- 11 Travel expenses for this project should be based upon the most economical, direct, coach air travel from the point of origin to Honolulu and utilize moderate-level hotel accommodations whenever possible.
- 12 The estimated travel expenses shall not exceed 15 percent of the total project cost.
- 13 The Companies' Standard Business Travel and Expense Terms are included in Attachment K.
- 14 Hawaii General Excise Tax, if applicable, shall be listed as a separate line item.

Attachment G: Monthly Invoice Template



Attachment G -
Monthly Invoice Temp

Appendix G: Monthly Invoice Template

Date
 Invoice No: xxxxxxxxxxxx
 Project Manager: xxxxxxxxxxxx
 Attn: Hawaiian Electric Representative: xxxxxxxxxxxx

Hawaiian Electric Company
 Attn: Accounts Payable (CP11-AD)
 P.O. Box 2750
 Honolulu, HI 96840-0001

Project xxxxxxxxxxxx
 Purchase Order No.: xxxxxxxxxxxx
 Smart Meter Installation Project
 General Services Master Contract No.: xxxxxxxxxxxx
 Services for the period: xx/xx/xxxx – xx/xx/xxxx

Total	G.E.T. Tax (4.712% of Total)	Gross Amount	Retention (10% of hourly work)	Invoice Amount
4,000.00	188.48	4,188.48	(200.00)	3,988.48

Retainage Tracking:

Retention this Invoice	Prior Retention	Retention-To-Date
0.00	0.00	0.00

Appendix G: Monthly Invoice Template

Breakdown by Task

Task 1: xxxxxxxxxxxxxxxxxxxx (description of Task 1)

Personnel	Hours	Rate	Amount	
Project Manager (name)		40.00	\$25/hr	\$1,000.00
Senior Engineer (name)				
Engineer (name)				
Administrative Assistant (name)				
Etc.				
	Totals	40.00		\$1,000.00
	Total Labor			\$1,000.00
 Reimbursable Expenses				
Airfare				\$1,000.00
Lodging				\$ 600.00
Auto Rental				
Etc.				
	Total Reimbursables			\$1,600.00
			Total this Task	<u>\$2,600.00</u>

Appendix G: Monthly Invoice Template

Task 2: xxxxxxxxxxxxxxxxxxxx (description of Task 2)

Personnel	Hours	Rate	Amount	
Project Manager (name)		40.00	\$25/hr	\$1,000.00
Senior Engineer (name)				
Engineer (name)				
Administrative Assistant (name)				
Etc.				
	Totals	40.00		\$1,000.00
	Total Labor			\$1,000.00

Reimbursable Expenses

Airfare				
Lodging				\$ 400.00
Auto Rental				
Etc.				
	Total Reimbursables			\$ 400.00
			Total this Task	\$1,400.00

Total All Tasks		\$4,000.00
Hawaii G.E.T. Tax (4.712% of total)		<u>\$ 188.48</u>
Gross Amount		<u>\$4,188.48</u>
Retention (10% of hourly work)		<u>(200.00)</u>
Invoice Amount		\$3,988.48

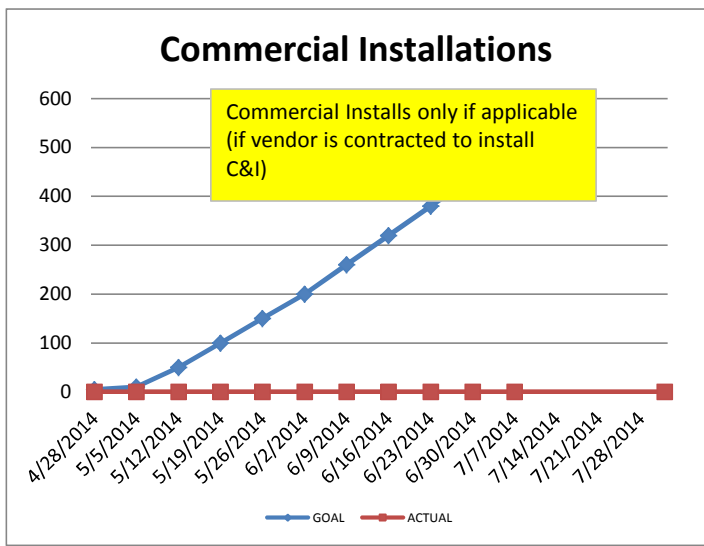
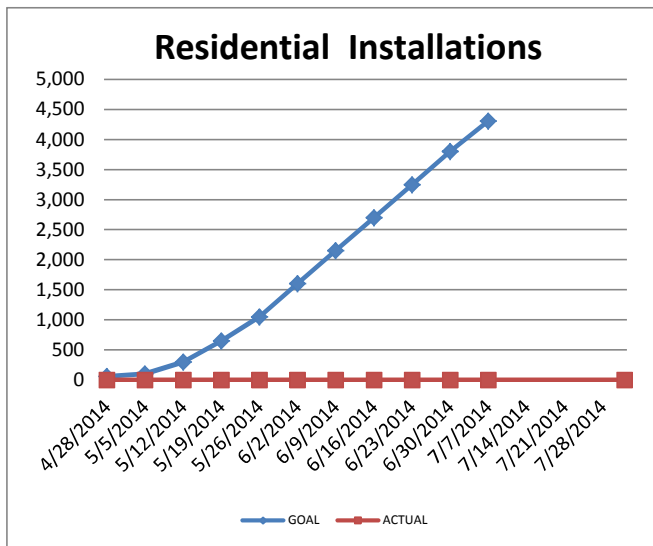
Attachment H: Monthly Progress Report Template



Attachment H -
Monthly Progress...

To: HECO From: Contractor Program: HECO AMI Phase 0
 Date: 3-Oct-14 Week Ending: 5-Oct-14

Production Type	PTD		
	Installs	Plan	Variance
Residential	#REF!	4,308	#REF!
Commercial	#REF!	504	#REF!



Quality Checks Audit Type	Weekly				PTD			
	Actual	Plan	Variance	Pass Rate	Actual	Plan	Variance	Pass Rate
Field QCs	30	#REF!	#REF!	100%	377	215	162	100%
PWC	Tested		ANSI					
Tested Meter	4,460	34						

Significant Events & Priority Issues:

Attachment I: Standard Business Travel and Expense Terms



Attachment I -
Standard Business Tr:

Hawaiian Electric Company
Hawaii Electric Light Company
Maui Electric Company

Standard Business Travel and Expense Terms

1. Approved Class of Travel

- a. Air Travel – Coach
- b. Lodging – Budget (e.g. Best Western) or Moderate (e.g. Embassy Suites)
- c. Transportation – Shuttle service, taxi or rental car. For rental cars, use compact size cars (full-size acceptable for 3 or more occupants)

2. Eligible Charges For Reimbursement

- a. Company will not reimburse or compensate the consultant for using personal mileage for airfare for Company-related business.¹
- b. Company will only pay for the consultant's round trip airfare to the designated Company location, and will not pay for consultant's personal travel.
- c. Company will not be responsible for consultant's airfare ticket change fees or penalties unless the changes were made at the request of the Company.
- d. Company will not reimburse consultant for alcoholic beverages.
- e. All consultant meals should be in connection with Company-related work and Company will reimburse for food and non-alcoholic beverages only.
- f. Allowable Company-related work incidentals (e.g. parking, internet connection, etc.) are reimbursable to the consultant at cost.
- g. Reasonable gratuities incurred in connection with Company-related work will be reimbursed to the consultant. Tips for restaurant services should be reported as part of the cost of the meal.
- h. All charges submitted for reimbursement by the consultant must be supported by the actual invoice or original itemized receipt.
- i. Company will reimburse the consultant for only those expenses that are reasonable, required, and approved.
- j. Expenses that are optional (e.g. magazines, movies, etc.) or of a personal nature (e.g. over-the-counter drugs and toiletries) are not reimbursable to the consultant.

3. Non-Business Day Costs

Company will not reimburse the consultant for costs incurred on non-business days. Non-business days are days without a business purpose. However, days used in traveling or layovers because of no available flights and weekends or legal holidays between business days are generally considered business days for purposes of these terms, if Company-related work was conducted on the day before the weekend or holiday and additional Company-related work will be conducted on the day following the weekend or holiday.

¹ "Company" means Hawaiian Electric Company, Hawaii Electric Light Company or Maui Electric Company, as the case may be. "Consultant" means any consultant, contractor, vendor or other person or entity hired by a Company.

Attachment J: Safety and Health Manual



Attachment J -
Safety and Heal...


Management and Union Statement

The goal of Hawaiian Electric Company, Hawaii Electric Light Company, and Maui Electric Company is to provide a safe and healthy workplace for all employees.

This Safety & Health Manual is a compilation of safety & health requirements which are mandatory practices at all company facilities, offices, and work sites. These requirements are based upon current Occupational Safety and Health Administration laws and regulations, Environmental Protection Agency regulations, consensus standards and HECO, HELCO, and MECO's safety and health policies & procedures. All employees share the responsibility for maintaining a safe and healthy workplace, and the requirements and guidance within this manual are specific means to achieve that result.

Our companies have strived to obtain an excellent safety record over the years and we need to continue to improve that record. Safety is an integral part of everything we do.

We ask each employee to accept the responsibility to work safely not only for yourselves, but also for your coworkers and for the public. A zero accident record is achievable. Together, we can make it happen.



Dick Rosenblum

President & Chief Executive Officer
Hawaiian Electric Company, Inc.



Hawaiian Electric Company
Maui Electric Company
Hawaii Electric Light Company



Brian Ahakuelo

Business Manager/Financial Secretary
IBEW, Local 1260



Hawaii • Guam
IBEW LOCAL 1260
Bridging the Pacific

Approved by: RCR	 Hawaiian Electric Company Maui Electric Company Hawaii Electric Light Company Program Administration	Safety & Health Manual
Date Revised: 12/3/12		Chapter: 1

Chapter Summary

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1.2 Safety Organization	1
1.3 Adherence to Safety and Health Rules and Regulations	2
1.4 Recognition Program	3
1.5 Safety Guiding Principles	4

1.0 Objective

Hawaiian Electric Company, Hawaii Electric Light Company, and Maui Electric Company, will develop, maintain, and administer, a comprehensive safety and health program. This manual will serve as the guidelines to establish a zero incident culture.

1.1 Purpose

This manual describes the HECO/HELCO/MECO safety and health program and the responsibilities of all employees and contractors in order to provide a safe and healthy workplace for everyone. This program addresses all applicable Federal, State, and local safety and health rules and regulations.

1.2 Safety Organization

1.2.1 The Safety Divisions of Hawaiian Electric Company, Hawaii Electric Light Company, and Maui Electric Company, are responsible for establishing and auditing all safety policies and procedures to ensure compliance with all applicable rules and regulations.

1.2.2 The Executive Safety Steering Committee (ESSC) is composed of HECO Vice Presidents of Energy Delivery, Power Supply, Corporate Services, Customer Service, Legal, System Operations and Planning, and the Presidents of MECO and HELCO. The Manager of Health, Safety, and Security, acts as the Chairman. The ESSC provides the overall direction of the safety culture throughout the Companies. It advises the Joint Safety Advisory Committees, as well as other committees, on issues, contract agreements, and areas of focus, which affect the health and safety of the employees. The ESSC meets as needed.

1.2.3 HECO, HELCO, and MECO, will each have a Joint Safety Advisory Committee (JSAC). The JSAC will be made up of an equal mix of management representatives and union representatives from various areas of the company. The Director of Safety for each Company will act as the Chairman. The JSAC will rule on changes to this Safety and Health Manual, review incidents and corrective actions, address relevant health and

safety issues, and provide guidance on health and safety issues that affect the Company. The JSAC will meet on a regular basis, at least quarterly.

- 1.2.4 Safety Steering Committees are formed to aid, direct, and strengthen the Company's safety culture. Safety Steering Committees are made up of members from an area of the company which the Safety Steering Committee focuses on (for example: a Process Area or various departments). The Safety Steering Committee identifies specific health and safety related issues which need attention, forms a Safety Continuous Improvement team to focus on and improve each of the identified issues, supports and provides direction and focus to the Safety Continuous Improvement team, and aids in the implementation of the recommended corrective actions made by the Safety Continuous Improvement Team. Safety Steering Committees will meet as needed.
- 1.2.5 Safety Continuous Improvement Teams are formed by a Safety Steering Committee to focus on and improve an identified safety issue. Teams are typically made up of employees who are most affected by the identified issue. The team will develop their objective, analyze related data, solicit assistance where needed, and make recommendations to the Safety Steering Committee. Safety Continuous Improvement teams meet on a regular basis until the issue is fully addressed.
- 1.2.6 Employee Safety Teams within Process Areas are generally cross functional and will review safety incidents, suggestions, and concerns in order to improve upon the overall safety of our employees.

1.3 Adherence to Safety and Health Rules and Regulations

- 1.3.1 All employees (including full-time, part-time, temporary workers, and interns) are expected to comply with this Safety and Health Manual. Non-compliance with these rules may result in disciplinary action according to the HECO/HELCO/MECO Code of Conduct.
- 1.3.2 All contract workers, consultants, and vendors working for the Companies shall also follow the rules within this manual. Non-compliance of these rules may result in termination of the contract and future contractual agreements. Those contract workers, consultants, and vendors that have their own safety manuals shall follow the more stringent of conflicting Health and Safety requirements. Discrepancies of Health and Safety rules shall be communicated to a HECO, HELCO, or MECO representative.
- 1.3.3 These rules shall be interpreted to ensure compliance and shall take precedence over any conflicting less stringent regulations.
- 1.3.4 Governmental regulations that are more stringent than the rules found in this manual will be applicable and changes will be made to this manual to reflect the most current regulations.

- 1.3.5 If a difference arises in the application or interpretation of the rules within this manual, then the decision of the supervisor in charge shall be followed.
- 1.3.6 All employees have the right to appeal and stop any job for unsafe reasons.
- 1.3.7 Safety Division will work with the appropriate Department to resolve any conflicts.
- 1.3.8 In a life threatening situation, the employee in charge may choose to modify or suspend the rules within this manual in order to permit prompt handling of the situation to avoid serious injury or death. In any such case, a person shall consider the reasonableness of their action and ensure that the safety and health for themselves and others is not compromised during the response.

1.4 Recognition Program

- 1.4.1 The Safety Recognition Program is structured to recognize all levels of employees who contribute to a safe and healthy work environment and exhibit a desired safety behavior. The Program focuses on providing recognition in a timely manner, for behaviors which promote a safe work environment and for significant accomplishments.
- 1.4.2 The expectations are that leaders recognize and reward employees in a timely manner; and that employees exhibit good (safe) behaviors. Well-delivered recognition is a top motivator for employee performance. The reward can be in the form of money, gifts, or meals, but thoughtful, personal recognition defines true appreciation.
- 1.4.3 The Safety Recognition Program describes three forms of recognition:
- Timely recognition by leaders to employees for their work and accomplishments,
 - Safety meals for individuals who successfully illustrate positive (safe) work behaviors, and
 - Team awards for milestone accomplishments.
- 1.4.4 For more information refer to the Company's [Safety Recognition Program](#), available on the Intranet.

1.5 **Safety Guiding Principles**

Wear the appropriate PPE for every job.

Only qualified workers can be around or work on electrical equipment.

Report all unsafe conditions, accidents, and near misses immediately.

Know the safety rules, or check with your Supervisor if you have questions.

Stop any unsafe act that presents a danger to you, your co-workers, or the general public.

Always check equipment and tools before use; remove from service if damaged.

Fall protection or guardrails are required above 4 feet.

Electrical equipment must be treated as "LIVE" until de-energized, grounded, and verified.

Lock out and tag out any equipment before you begin your work.

Your safety and the safety of your coworkers is our "Core Value".

Approved by: RCR	 Hawaiian Electric Company Maui Electric Company Hawaii Electric Light Company Roles & Responsibilities	Safety & Health Manual
Date Revised: 12/3/12		Chapter: 2

Chapter Summary

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2.4 Employee's Responsibility	2
2.5 Conduct At Work	3
2.6 Smoking on Company Property	4
2.7 OSHA Inspection Protocol	4

2.0 Objective

To ensure that the employees, contractors, and vendors of Hawaiian Electric Company, Hawaii Electric Light Company, and Maui Electric Company, understand and are accountable for their role to achieve and maintain a zero incident safety culture.

2.1 Purpose

This chapter describes the roles and responsibilities of all employees in order to ensure adherence to and enforcement of all the policies and procedures.

2.2 Safety First

The safety of all shall be on the minds of each employee and needs to be an integral part of every job and task to prevent accidents and injuries from occurring. The safety of our employees, our contractors, and the general public, is more than a priority it is a value.

2.3 Management Responsibility

2.3.1 The Senior Management Team is committed to maintaining a strong safety culture by being responsible for providing:

- Safe work conditions
- Proper safety training
- Safety equipment and tools
- Personal protective equipment
- Proper work procedures
- Recognition for good safety behavior

2.3.2 The Safety Division (HECO, HELCO, and MECO) has the responsibility to review current rules and regulations, to update this Safety and Health Manual to reflect any necessary changes, and to communicate all changes to all employees.

- 2.3.3 The supervisor, foreman, crew leader, or other person directly in charge of any field operation, shall be thoroughly familiar with all safety rules, work practices, and standards, applying to the work under their supervision. They are responsible for being a safety champion by:
- Monitoring and ensuring safe work practices.
 - Identifying and mitigating risks associated with all work.
 - Coaching their employees to be safety stewards.
 - Recognizing employees for good safety behaviors.
- 2.3.4 The supervisor must ensure the safety of all employees under their supervision and conduct documented inspections to evaluate job knowledge.
- 2.3.5 Conduct job briefings before every job. These job briefings shall include but are not limited to the following:
- Each employee will understand the purpose and scope of the job.
 - Each employee will understand what tasks they are to do.
 - Each employee will understand what tasks the other members of the crew are to do.
 - Each employee will understand the supervisor's (crew leader's) manner of carrying out the job.
 - Each employee will understand the hazards or trouble spots involved in a job and will know how to mitigate those hazards or trouble spots.
 - Each employee shall be notified by the supervisor (crew leader) of the conditions or clearance of lines or equipment before work is started. The supervisor (crew leader) shall notify each employee of any change of conditions or status of lines or equipment.
- 2.3.6 The supervisor shall not permit any employee to work when he/she is concerned about the ability of that employee because of illness, injury, substance abuse, extreme emotional stress, or similar conditions that would possibly compromise their own safety and/or the safety of the crew.

2.4 Employee's Responsibility

- 2.4.1 Each employee must follow all rules and work practices, and take responsibility and ownership of their personal safety and the safety of others.
- 2.4.2 All employees shall notify their supervisor when they are doubtful of their ability to perform work because of illness, injury, substance abuse, extreme emotional stress, or similar conditions that would possibly compromise their own safety and/or the safety of the crew.
- 2.4.3 Each employee has the authority, without fear of reprimand or retaliation, to immediately stop any work activity that presents a danger to themselves, their coworkers, or the general public.

2.4.4 All employees shall cooperate and assist, when necessary, in any investigation of accidents to determine the root causes and measures to prevent similar accidents from occurring in the future.

2.5 Conduct At Work

2.5.1 Horseplay, scuffling, or practical joking, is dangerous and is prohibited.

2.5.2 Employees are expected to be courteous to customers, the general public, and fellow employees.

2.5.3 Employees are not allowed to possess or use unauthorized weapons on Company property or at company worksites.

2.5.4 Safety shall not be compromised for speed in getting the job done.

2.5.5 Employees shall always place themselves in a safe and secure working position.

2.5.6 Running should be avoided on company property and shall be limited when necessary.

2.5.7 Care shall be used whenever opening and closing doors.

2.5.8 Handrails shall be used when ascending or descending stairs.

2.5.9 Office Safety

2.5.9.a Items such as chairs, wastebaskets, cords, boxes, papers, and other articles, shall not be left in the aisles, if they create a tripping hazard.

2.5.9.b All filing cabinets shall be left closed while unattended.

2.5.9.c Caution shall be exercised when opening and closing cabinet drawers.

2.5.9.d Where several tiers of cabinets are used, all cabinets shall be secured to each other and to the wall to avoid tipping over.

2.5.9.e Pointed objects such as uncapped pens, pencils, letter openers, or scissors, shall not be carried with exposed points in pockets.

2.5.9.f Used pressure containers, broken glass, or other sharp objects, shall never be placed in waste baskets unless they are safely wrapped for disposal.

2.5.9.g Chairs and boxes shall never be used as a ladder or stepstool.

- 2.5.9.h Round objects shall never be stored on a shelf without proper bracing or packaging, to ensure the object won't roll off the shelf and cause damage or injury.

2.6 Smoking on Company Property

- 2.6.1 Smoking areas within the properties of HECO, HELCO, and MECO, will be designated where possible, and employees, visitors, contractors, and vendors, shall smoke only within those designated areas.
- 2.6.2 Smoking is prohibited in all enclosed or partially enclosed areas of HECO, HELCO, and MECO, as well as customer and vendor facilities per State of Hawaii HRS 328J.
- 2.6.3 Smoking in Company vehicles is prohibited.
- 2.6.4 Matches, cigars, cigarettes, tobacco, or other substances, must not be discarded while still burning, except when placed in a proper receptacle or otherwise disposed of safely.

2.7 OSHA Inspection Protocol

These procedures shall be followed when an OSHA Compliance Officer(s) arrive at any facility/site for the purpose of conducting a general inspection or responding to a specific complaint.

2.7.1 OSHA Inspector Arrives on Site

- 2.7.1.a In most cases, when a regulatory inspector arrives at a company facility their first point of contact will be a Security Station, i.e. the front gate security office at the generation stations and/or the security desk at the office buildings. Upon arrival of anyone who claims to be an OSHA Inspector, the Security Officer on duty, or receptionist, shall verify that he/she/they are valid regulatory representative(s). Valid regulatory representatives have picture identification that must be presented before entrance is gained any facility.
- 2.7.1.b In cases where a regulatory inspector arrives at a field location such as construction job site, substation, or other site where Security is not present, the company employee making first contact should follow the same procedures outlined within this section.
- 2.7.1.c After proper identification has been presented, security shall immediately contact the Facility or Department Manager and the Director of the Safety Division to inform them that the regulatory inspectors are on site. After the OSHA inspector is approved for admittance to the facility, then a management representative should meet them at the Security Station and escort them to a break room or designated area for an opening conference. For field situation, the person having first contact shall inform the inspector that the appropriate management personnel are in route and to stand by pending their arrival.

2.7.1.d The opening conference will be attended by at least the Facility or Department Manager or his representative and a Safety Representative. A determination will be made as to the nature of the inspection, i.e. general inspection or specific (complaint related) inspection.

2.7.2 General Inspections

2.7.2.a A Management Representative should remain with the inspector until a walk around team is assembled and introduced to the regulatory representative(s). From that point on, at least one member of the walk around team will be with the inspectors at all times while they are on company property.

2.7.3 Walk Around Team

2.7.3.a The walk around team may consist of the following persons or their representative:

- Plant Maintenance Superintendent or Representative
- Plant Operations Superintendent or Representative
- Shop Steward or other employee Representative
- Safety Representative

2.7.3.b Other Facilities

- Facilities Superintendent or Department Representative
- Shop Steward or other employee Representative
- Safety Representative

2.7.3.c Walk Around Team will be equipped with:

- Camera - 35mm or digital
- Notebooks
- Video camera, if available

2.7.3.d Team Duties

2.7.3.d.1 Maintenance Superintendent: Maintain contact with "planner" to have maintenance personnel to respond and make immediate repairs where possible. Provide technical information to the inspector in regards to equipment name and function. Do not volunteer any information that the inspector does not ask for.

2.7.3.d.2 Operations Superintendent: Maintain contact with operations to have operations personnel respond to any area that may require their expertise to render a possible violation abated. Provide technical information to the inspector where requested, limiting that information to what is asked for only.

- 2.7.3.d.3 Shop Steward: Serve as an employee representative accompanying team. Additionally, if possible, the employee representative can assist with recording the inspector's comments and observations.
- 2.7.3.d.4 Safety Representative: Take pictures of everything that the inspector does and from the same angle at the location. Check and inspect every item that the inspector does. If, after pointing out your opinion of a difference and the inspector do not concede, make a note, take a picture, have note keeper circle that item, and at a later time look up the proper regulatory standard. The inspector must tell you which standard they are citing you for. If it appears that the inspector is taking a picture of company employee(s) exposed to a hazard, be sure to get a picture of the same incident or situation for future reference.
- 2.7.3.d.5 All Management Persons: Limit all conversations with OSHA inspectors to facts only. All questions should be answered with a minimum of conversation. Do not volunteer information not requested, and limit the scope of the inspection to locations requested by the inspector. Ensure that the inspector is treated with appropriate respect and courtesy.
- 2.7.3.d.6 Resource Planners (plant only): One planner should be alerted to the fact that OSHA is on site and prepare for possible immediate action, minor repairs. The need to make immediate minor repairs demonstrates good faith and in some cases can change an apparent violation to a suggested repair violation that does not carry a monetary penalty. Communications with planning shall be through any method necessary to call in needed repairs.
- 2.7.3.d.7 Resource Planning should alert all team leaders to have a crafts-person available to immediately start abatement on call in work orders at this time. All completed work orders shall be signed off immediately upon completion.
- 2.7.3.d.8 Resource Planning should maintain a log of all call-in repairs requested during the time the inspector is on site. The log shall contain, at a minimum, the following information:
- Repair needed
 - Locations of needed repair (Unit number, area, and absolute location), shop performing the work, person conducting the work, man-hours expended for repair(s)
 - Parts, if necessary
 - All OSHA work orders should be input into the computer system with the capability of retrieval.

2.7.4 Specific (OSHA Complaint Related) Inspection

- 2.7.4.a The walk around team procedures can be modified from those stated under GENERAL INSPECTIONS depending on the discretion of the affected Department Manager. The walk around team must have at least the Safety Representative and Representative of the affected Department.
- 2.7.4.b An OSHA Compliance Officer responding due to an employee complaint is allowed access to the complaint area only.
 - Other citation violations observed en route to the complaint area may be issued.

2.7.5 Closing Conference

- 2.7.5.a This conference should be attended by the Plant Manager, Maintenance Superintendent, Operations Superintendent, and a Safety Representative. This is the time to discuss and/or debate any violation that has been written. We can also ask for recommendations for abatement of any violation. The inspector will be instructed to contact the Corporate Safety Director before the formal closing conference at the OSHA or Facility Office.
- 2.7.5.b The Safety Division is to coordinate the company response to citations, etc. in collaboration with the respective area or department.

2.7.6 General

- 2.7.6.a Citations posting will be coordinated by the Safety Division.
- 2.7.6.b Informal Conference, if deemed necessary by Safety, Legal, and the respective area, will be coordinated by the Safety Division and attended by appropriate parties.
- 2.7.6.c Appeal process, (if necessary), will be coordinated by Safety Division in collaboration with Legal and the respective area.
- 2.7.6.d Fines: if any, shall be paid by the Respective Department.
- 2.7.6.e HECO/HELCO/MECO Safety Division should update each other on the progress of the OSHA inspection.
- 2.7.6.f At the conclusion of an OSHA inspection and/or investigation, the Safety Representatives of HECO/HELCO/MECO are to meet and review the findings and recommendations.

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3.0 Objective

Hawaiian Electric Company, Hawaii Electric Light Company, and Maui Electric Company will develop, maintain, and administer, a comprehensive safety and health program. In the event of an accident, discovery of a hazardous condition, or a near miss incident, the Company will perform a thorough investigation to determine and correct or eliminate the root causes, to prevent an accident from occurring in the future.

3.1 Purpose

The purpose of this chapter is to provide a mechanism for prompt reporting, investigation, documentation, root cause analysis and identification to prevent future reoccurrence.

3.2 Reporting Incidents

3.2.1 All employees shall promptly report all incidents resulting in injury or property damage to their supervisor and the Safety Division within two hours of occurrence.

3.2.2 Accidents shall be reported by phone or radio through Trouble/Load Dispatch.

3.3 Injury to Employee

3.3.1 Employees must immediately report all injuries to the supervisor in charge within two hours of occurrence.

3.3.2 After receiving treatment for their injuries, the employee shall fill out an Industrial Incident Report Form HE 384 as soon as possible and submit it to their supervisor.

3.3.3 The HE 384 must be completed by management and copies sent to Safety Division and Workers Compensation within 3 working days of the injury.

3.3.4 Following medical attention by a doctor, the injured must present to their supervisor a written release from the treating physician before they are permitted to return to work.

3.3.5 A light duty release must be followed up by a full release when returning to work for full duty.

3.3.6 Serious (Electrical) Emergency Procedures

3.3.6.a When a serious electrical accident occurs, prompt and effective response is needed. The following shall serve as a guide to providing this care:

- Promptly perform rescue
- Radio Trouble/Load Dispatch
 - “May day, May day, I’m declaring a radio emergency!”
 - Request Fire Department and Ambulance assistance.
- Administer emergency treatment at scene
 - CPR/AED
 - First Aid
 - Water-Jel blanket for electrical burns
 - Treat for traumatic shock
- Ambulance at scene:
 - Direct to Straub Clinic, Burn Center of the Pacific
 - Co-worker accompanies injured in ambulance
- Trouble/Load Dispatch notifies:
 - Safety Division
 - Corporate Health & Wellness Director, if applicable
 - Superintendent (to advise Manager and Vice President)
 - Corporate Communications
 - Security Command Center
- Safety Representative and Corporate Health & Wellness Director, if applicable, arrives at hospital:
 - Ensure proper care
 - Aid media, HPD
 - Assist employee and family with process
 - Notifies Worker’s Compensation Division
- Safety Representative and Supervisor arrive at scene of the accident:
 - Aid with media, HPD, HiOSH
 - Assist crew as necessary
 - Ensure evidence at scene is collected and photographed
 - Determine immediate corrective action is required
 - Determine if crew requires counseling or other assistance
- Notification of injured family
 - The injured
 - Appropriate designate

3.4 Injury to Non-employee

- 3.4.1 Company employees witnessing or receiving information of an accident resulting in the death or injury of a non-employee, shall immediately report the incident to their supervisor, superintendent, department head and Safety Division.
- 3.4.2 Notification shall be made by the fastest available means of communication.
- 3.4.3 Basic information shall be obtained as follows:
- Location, date, time, persons involved, extent of injury(ies), contact number(s), and possible cause.
 - Immediate notification shall be given to the Safety Division.
 - For all after hour notifications - Call Trouble Dispatch for a Safety Representative.
- 3.4.4 A written report of the incident using form HE 68, Report of Miscellaneous Accident, shall be filled out and a copy sent to Safety Division.

3.5 Vehicle Accidents and Damage

- 3.5.1 In the event of an accident while operating a Company vehicle. The driver shall:
- Stop at the scene or as close as possible.
 - Don't obstruct traffic unless necessary.
 - Render aid and call 911 for an ambulance if needed.
 - Call police to obtain a police report.
 - Exchange driver information as needed.
 - Do not discuss or argue the accident with the other driver. Treat them with respect.
 - Answer all questions asked by the proper authority (HPD).
 - If demands are made by the other driver, the employee shall notify their supervisor or the on-scene Safety Representative immediately, to ensure all demands are properly handled.
- 3.5.2 Complete and submit an incident report using form HE 197, "Vehicle Incident Report", by the next business day.
- 3.5.3 All employees using or assigned to use Company vehicles and equipment shall verbally report all accidents or damage found as soon as possible to their supervisor.
- 3.5.4 Employees operating non-company owned vehicles and/or equipment shall follow the same reporting requirement.
- 3.5.5 Immediate notification shall be given to the Safety Division.
- 3.5.5.a For all after hour notifications: Call Trouble Dispatch for a Safety Representative.

3.5.6 If an unattended vehicle or fixed object is involved, all reasonable steps to locate and notify the owner shall be taken.

3.5.6.a If the owner cannot be located, a note shall be left at the scene indicating what happened and how contact can be made with the Company.

3.5.7 Drivers shall report all citations received while operating any Company owned, leased and/or rented motor vehicle or personally owned vehicle operated on Company business, as soon as possible to their Supervisor, Superintendent, or Department Manager.

3.5.8 Drivers who discover damage to their vehicle while operating the vehicle shall park the vehicle when it is safe to do so to assess the damage.

3.5.8.a Notification shall be made to the Automotive Division for proper handling.

3.6 Property Damage, Fire and Theft (Vandalism)

3.6.1 The Company employee witnessing or receiving information of a miscellaneous accident or incident involving Company or general public property, in which the Company may become involved, shall verbally report this information as soon as possible to their Supervisor, Superintendent, or Department Manager.

3.6.2 A Qualified Company representative shall be sent to investigate and shall ensure that the equipment in question is safe for everyone.

3.6.3 Immediate notification shall be given to the Safety Division if the conditions warrant investigation.

3.6.4 File a written report of incident using form HE 68, Report of Miscellaneous Accident or Incident, to their supervisor.

3.6.5 Thefts and similar criminal activities shall be reported to the Security.

3.7 Near Miss Reporting

3.7.1 Employees shall report all near miss incidents where an employee could have been injured, to the supervisor in charge of the work.

3.7.2 Employees involved in the "Near Miss" shall cooperate in the investigation.

3.7.2.a Employees who report near misses shall not be reprimanded for their involvement.

- 3.7.3 “Supervisor in charge of the work” shall submit a written report to their department, with a copy of the report to the Safety Division, describing the incident and suggested preventive measures.
- 3.7.4 Division Superintendent and Safety Division are to review all “Near Misses”, evaluate potential seriousness, impact to the Company, identify trends, and ensure other similar work groups are aware of the incident.
- 3.7.5 If appropriate, a Job Hazard Analysis shall be used to develop a safe work practice to be shared with similar work groups throughout the Company.
- 3.7.6 For more detail, refer to the Near Miss Program located on the Intranet.

3.8 Reporting Hazardous Conditions

- 3.8.1 All employees have the responsibility to report hazardous conditions that could cause an accident resulting in injury or property damage to their supervisors immediately.
- 3.8.2 Employees who report hazardous conditions shall not be reprimanded for the reporting of the condition.
- 3.8.3 Employees who discover a hazardous condition shall ensure that the condition does not cause an accident for themselves or other employees in the area. Use cones, portable warning signage, caution tape, or other suitable material to warn employees of the hazard.
- 3.8.4 All Supervisors shall take steps to identify the hazardous condition and shall implement corrective action as needed, to prevent an accident from occurring.

3.9 Reporting Vehicle Damages Found During Pre/ Post-Trip Inspections

- 3.9.1 Vehicle damages found during pre and post trip inspections shall be reported to the employee’s supervisor as soon as possible.
- 3.9.2 The employee shall also complete form HE197, “Vehicle Incident Report”.

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Training

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4.0 Objective

Hawaiian Electric Company, Hawaii Electric Light Company, and Maui Electric Company employees will be trained to recognize and protect themselves from hazardous substances, tasks, and environmental conditions to which they are exposed. If employees lack the required training, then the Company will provide the necessary training.

4.1 Purpose

The purpose of this chapter is to address all safety training requirements for all Company employees. It addresses the training requirements detailed in OSHA 29 CFR 1910.269, "Electric Power Generation, Transmission, and Distribution", and all applicable United States Occupational Safety & Health Administration (OSHA) laws and regulations set forth in 29 CFR 1910 and 29 CFR 1926 as well as all applicable rules and regulations.

4.2 Responsibility for Training

- 4.2.1 The supervisor is responsible to determine the training requirements of a task and ensure that all employees have the necessary training needed to complete the task safely. Safety Division will assist with this determination.
- 4.2.2 Supervisors shall ensure that all new employees are enrolled in a New Employee Safety Orientation within 90 days of their hire date.

4.3 Employee Training

- 4.3.1 Employees shall be trained in and familiar with all safety-related work practices and procedures that pertain to their respective job assignments.

4.3.2 All new employees shall attend a New Employee Safety Training within the first 90 days of their employment.

4.3.3 Employees shall also be trained in and familiar with all other safety procedures, including applicable emergency procedures that are not specifically mentioned in this section but are related to their work and necessary for their safety.

4.4 Electrically Qualified Employee Training

4.4.1 Electrically qualified employees shall be trained, such as an apprenticeship program, competent in the skills, and techniques necessary to:

- Distinguish exposed energized parts from other parts of electrical equipment.
- Determine the nominal voltage of exposed energized parts.
- Determine minimum approach distances related to the voltages they are exposed to
- Properly use PPE, insulating and shielding materials and insulated tools, and special precautionary techniques for working on or near exposed energized parts of electrical equipment.

4.4.2 Training shall be a combination of classroom and on-the-job and the employee shall show proficiency in all the work practices required to complete the job safely.

4.5 Additional Training and Retraining

4.5.1 All employees shall receive additional training or retraining under the following conditions:

- 4.5.1.a The supervisor and/or annual inspection indicate the need for additional training or retraining.
- 4.5.1.b New technology, new procedures, or changes in safety related work practices, require more training.
- 4.5.1.c The employee must use a work practice that they have not utilized within a year and they are unsure of their ability to safely perform the work practice in order to complete the job task. The employee has the responsibility/right to inform their supervisor if they feel they need more training for a particular job task.

4.6 Emergency Training, First Aid, CPR/AED/Rescue

4.6.1 All employees engaged in electrical work shall receive training in Cardiopulmonary Resuscitation (CPR), Automated External Defibrillator (AED), First Aid, and in rescue techniques associated with working on poles and structures, in manholes, boilers, aerial buckets, enclosed spaces, etc.

- 4.6.1.a CPR/AED and all rescue training shall be completed annually, and include proficiency testing for each.

- 4.6.1.b First Aid training shall be provided at least every three years or as specified by each Company's training program.
- 4.6.2 Response to an emergency shall include but is not limited to the following:
- 4.6.2.a When the scene becomes safe, administer CPR/AED and first aid, call 911 as needed.
- 4.6.2.b Water-Jel or Burn Jel shall be used for the immediate care of all thermal burns including electrical contact burns.
- 4.6.2.c The injured shall be taken to the hospital emergency room for all injuries requiring emergency medical care.
- 4.6.3 Transportation by ambulance is required for the following injuries:
- Electric shock and/or burn (high or low voltage)
 - Chemical and/or thermal burns to the face
 - Severe bleeding
 - Major limb fractured
 - Fall from elevation
 - Unconsciousness
 - Severe nausea, chest pain, severe headache, disorientation
- 4.6.4 For personal illness where employee refuses to be transported by ambulance, immediately notify:
- Corporate Health & Wellness Director, if applicable
 - Safety Representative
 - Supervisor
- 4.6.5 Use of Personal Protective Equipment (PPE) is highly recommended when administering first aid and/or CPR/AED care to a victim. Recommended PPE shall include gloves, one way breather valves, and safety glasses or goggles.
- 4.6.5.a Employees shall wash hands and other potentially contaminated body parts after aid is provided.
- 4.6.5.b Employees shall report all exposures to blood and body fluids to their Supervisor and Corporate Health & Wellness Director, if applicable, for post exposure care as needed.
- 4.6.6 Preplanning for potential emergencies is highly recommended.
- 4.6.7 Properly equipped first aid kits shall be provided and maintained at various locations throughout the Company to allow for prompt response to emergency situations.

- 4.6.7.a All first aid kits shall be replenished frequently to ensure emergency supplies are provided when an emergency occurs.
- 4.6.7.b All employees shall learn how to use the supplies provided in the first aid kits.
- 4.6.7.c All first aid kits located in Company vehicles shall be at least a sixteen (16) unit kit and shall be maintained by the driver of the vehicle.
- 4.6.7.d Emergency containers for remote worksites shall be provided for all mountain and ridge work where access by vehicle is not possible.
Each container shall include but is not limited to the following items:
- (2) 10' x 12' vinyl tarps
 - (36) traffic road flares
 - (6) hard hat lights
 - (4) 1-gallon water cooler
 - (10) disposable blankets
 - (1) propane stove w/ 2 burners and hose assemblies
 - (1) 3 gallon propane tank
 - (2) carpenter lights
 - (1) 16 unit first aid kit
 - (1) AED

4.6.8 Emergency Rescue Guidelines

- 4.6.8.a Aerial Bucket Rescue
- In the event an employee, working from an aerial device is injured or becomes incapacitated, the ground crew shall take prompt response.
 - Be familiar with the vehicle controls.
 - Ensure the truck body is not energized.
 - If the vehicle is energized, protect yourself from electric shock, prior to operating any controls or getting onto the truck.
 - Plan the path of descent.
 - Know where you are going to place the bucket and the obstructions that you will encounter during lowering.
 - This should be an area free of danger and with enough room to work on the injured.
 - When the bucket is in position to work on the injured, disconnect or cut away their lanyard at the boom end.
 - Remove injured from bucket
 - Pull the injured up and place their arms forward on the lip of the bucket.
 - Climb onto bucket lip, behind the injured and lift the injured out by pulling in their lanyard.
 - Rest the injured over the lip of the bucket.
 - From the ground, elevate the feet of the injured to the back lip of bucket.
 - Remove lanyard from D-ring.

- Remove injured from bucket by placing one arm in the crotch of the injured and the other arm over their farthest shoulder.
- Lift up and lower injured to the ground.
- Administer CPR/AED or other first aid as needed
- Optional method 1:
 - Remove lanyard from the injured.
 - Move boom strap as far up as possible.
 - Connect service block to boom strap.
 - Connect end of the service block to the back D-ring on full body harness of the injured.
 - Raise injured until their seat (buttocks), is above the lip of the bucket.
 - Bring the legs of the injured out of the bucket and lower to the ground or onto the tool cabinet of the bucket.
 - Administer CPR/AED or other first aid as needed.
- Optional method 2:
 - Use a boom rescue unit
 - Boom rescue device should already be installed onto the boom.
 - Position the bucket then pull downward on the steel ring to open the bag.
 - Fall line, block/tackle and snap-hook should release from the bag.
 - Connect snap hook to the back D-ring on full body harness of the injured.
 - Hoist the injured to the ground, maintaining control of descent.
 - Administer CPR/AED or other first aid as needed.

4.6.8.b Communications Tower or Structure Rescue

- 100% fall protection shall be used while executing any tower rescue.
- Climb ladder and ensure correct positioning when belting in above the injured.
- Using ½" hand line, wrap around nearest beam or other object.
- Wrap line around injured, high above chest and secured with three half hitches.
- Pick up slack on the hand line.
- Twist load and fall lines, holding in one hand along with the injured persons positioning belt.
- Cut positioning belt and lower to the ground, maintaining control of descent.
- Administer CPR/AED or other first aid as needed.
- Optional method: Descent Device
 - Attach descent device
 - Ensure control of descent device, using the following as a guideline:
 - Slow descent - (3) turns of hand line: 150 – 200 lbs. person
 - Add ½ turn for each additional 75 lbs.
 - Medium descent – (2-½) turns of hand line: 150 – 200 lbs. person
 - Add ½ turn for each additional 75 lbs.
 - Run a hand line from the descent device to the injured and connect using a carabineer to the back D-ring of the full body harness.
 - Slowly lower the injured to the ground, maintaining control of descent.
 - Administer CPR/AED or other first aid as needed.

4.6.8.c Pole Top Rescue

- 100% fall protection shall be used while executing any pole top rescue.
- Climb pole with ½" hand line and wrap around nearest cross arm or other object.
- Wrap line around injured, high above chest and secured with three half hitches.
- Pick up slack on the hand line.
- Twist load and fall lines, holding in one hand along with the injured persons positioning belt.
- Cut positioning belt and lower to the ground, maintaining control of descent.
- Administer CPR/AED or other first aid as needed.

4.6.8.d Manhole Rescue

- Assess hole for hazards, air monitor.
- Descend ladder with ½" hand line.
- Wrap line around injured, high above chest and secured with three half hitches.
- Attach locking hook from retrieval system to hand line.
- Raise injured until their seat, buttocks clears the manhole.
- Administer CPR/AED or other first aid as needed.

4.6.9 Work shall be discontinued when adverse weather conditions make the work hazardous, in spite of the work practices required.

4.6.9.a Thunderstorms in the immediate vicinity, high winds, snow storms, and ice storms, are examples of adverse weather conditions that are presumed too hazardous to perform work safely.

4.6.9.b When emergency situations require immediate action to be taken in order to ensure the safety of the public, utmost care shall be exercised by the responding crew(s) to remedy the emergency condition. Once the emergency condition has been addressed, crews shall stand down until weather permits work to continue.

4.6.9.c Specific Company and Departmental Work Practices, where adopted, are also applicable.

4.7 Assistance to Public/Good Samaritan

4.7.1 As Company representatives and active members of our communities, it is highly recommended that each employee render aid to our fellow employees and to the public whenever aid is necessary in an emergency situation.

4.8 Non-Field Employee Training for Encroachment of the 10 Foot Rule

- 4.8.1 There may be occasions where non-qualified employees or contractors need to come into close proximity of exposed energized electrical equipment or lines for inspection or examination of the exposed energized parts. These non-qualified workers may receive temporary qualification as a worker in training, in accordance with OSHA 29 CFR 1910.269 "Access by unqualified persons to areas containing unguarded energized parts."
- 4.8.2 In order to obtain this limited qualification one must:
- Know what is safe to touch and what is not safe to touch in the area they will be entering;
 - Know what the maximum voltage of the area is;
 - Know the minimum approach distances for the maximum voltage within the area; (see table R6 in chapter 12);
 - Be trained in the recognition and proper use of protective equipment that will be used; and
 - Until proficiency is demonstrated, they will be considered to be employees undergoing on-the-job training and must be under the direct supervision of a qualified employee at all times.
- 4.8.3 If entry into substation facilities is necessary, the employee or contractor shall attend a Substation Safety Orientation prior to entering a substation.

4.9 Contract Employees/Contract Workers

- 4.9.1 All contract employees/contract workers shall attend a Contractor Safety Orientation.
- 4.9.2 All work performed for the Company by outside contractors shall have a Company contact person coordinating and over-seeing the work or project.
- 4.9.2.a The Company contact person is responsible for the contractors and shall monitor the progress of the work daily.
- 4.9.2.b The contact person shall ensure that all contract employees are qualified / certified if specific training requirements are necessary for the particular project.
- 4.9.2.c The contact person shall ensure that all contract employees comply with the Company safety policies and procedures as outlined in this manual. Failure to comply with Company policies and procedures could result in immediate termination of the work or project.
- 4.9.2.d In high risk areas such as substations, switchyards, microwave stations, etc., the Company contact person shall ensure a qualified employee accompanies the contractor for the duration of the work or project.

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5.0 Objective

Hawaiian Electric Company, Hawaii Electric Light Company, and Maui Electric Company employees working on electrical systems and equipment will control electrical hazards by following all electrical standards set forth by the Occupational Safety & Health Administration (OSHA), the National Electrical Code (NEC), or the National Electrical Safety Code (NESC).

5.1 Purpose

This chapter describes the practices and methods for working with or on all electrical equipment used by Company employees as required by OSHA 29 CFR 1910, Subpart S-Electrical.

5.2 General Electrical Safety

5.2.1 Only qualified electricians shall be allowed to work on electrical equipment or permanent electrical circuits.

5.2.2 All electrical work, installations, and wiring shall be in accordance with the National Electrical Code (NEC) and the National Electrical Safety Code (NESC) unless otherwise provided for by Departmental Work Standards, Company Engineering Standards, or other regulatory entities that have jurisdiction in determining electrical safe practices.

5.2.3 All repair work on electrical equipment shall be performed in a de-energized state. Testing for proper voltage and/or current is not considered repair work.

5.2.4 Before starting work on any electrical circuit or equipment, an inspection shall be performed to determine existing conditions.

5.2.4.a If visible or test inspection indicates any unusual conditions that could cause the circuit or equipment to fail while the employee is performing de-energizing operations, then a Job-Hazard-Analysis shall be conducted before standard operating procedures to de-energize the circuit or equipment is performed.

- 5.2.4.b All equipment or circuits that do not have visible openings to signify absolute disconnection from all energy sources shall be treated as energized (HOT) unless:
- Proper testing is conducted to verify de-energizing was completed and
 - Proper grounds are applied to ensure de-energizing has occurred. All grounds shall remain attached for the protection of the employees until all work is completed.
- 5.2.5 Tags or Locks shall be used to ensure that the circuit or equipment being worked on is not re-energized while employees are working on the circuit or equipment.
- Only Company authorized employees are allowed to install and remove tags or locks in accordance with the safe tagging procedures of the respective department.
 - Energizing of any tagged or locked circuit or equipment without proper authority is strictly prohibited.
- 5.2.6 When Holdoffs or Limited Holdoffs are needed to safely proceed with work on the system, refer to Chapter 12 for details.
- 5.2.7 No employee shall touch any exposed energized equipment or conductors of any voltage, unless they are insulated or isolated from all ground sources.
- 5.2.8 Before each use, all electrical appliances shall be inspected for obvious deficiencies in the appliance, cord, and plug. If any defects are found, the appliance shall not be used until properly repaired.
- 5.2.9 Electrical appliances shall be plugged directly into a wall outlet. Extension cords shall not be used as permanent wiring for these appliances.
- 5.2.10 The use of office space heaters is prohibited.
- 5.3 Extension Cords**
- 5.3.1 Extension cords are to be kept clean, dry, and free from kinks and protected from oil, hot or sharp surfaces, and from chemical exposure.
- 5.3.2 All cords shall be inspected before each use and found to be free from damage.
- 5.3.3 Cords found to be damaged shall be taken out of service immediately and;
- Tagged not to be used until repaired
 - Replaced with a new cord
 - Repaired by a qualified electrician
 - Disposed of properly by cutting the cord at both ends and placing it into a recycle bin.
- 5.3.4 Protection of cords while they are in use is highly recommended.

- 5.3.5 Avoid placing cords across aisles, through doors, and through holes in the wall.
- 5.3.6 Cords must not be hung on sharp edges, which may damage the insulation.
- 5.3.7 Avoid placing cords across walkways or on steps or stairs, which may pose a tripping hazard to employees.

Note: All extension cords being used in any of the above situations shall be protected while in use and shall be immediately removed once the task is completed.

- 5.3.8 Extension cords are designed for temporary use.
- 5.3.9 Cords used in wet locations shall utilize weatherproof or watertight wiring devices and/or connectors.
- 5.3.10 Ground Fault Circuit Interrupters shall be used in wet locations.

5.4 Electrical Protection and Guarding

- 5.4.1 Protection and guarding is essential for maintaining electrical systems and equipment.
- 5.4.2 Suitable access and working space shall be provided and maintained around all electrical equipment to permit safe operation and maintenance of that equipment.
- 5.4.3 The dimensions for the working space in the direction of access to energized parts in switchboards, control panels, fuses, circuit breakers, panel boards, motor controllers, and similar types of equipment which require operation or maintenance while energized, shall not be less than 36" in depth (30" for installations built before 1981) and the side at least 30" or the width of the equipment, whichever is greater.
 - 5.4.3.a The working space shall not be used for storage purposes.
- 5.4.4 Energized parts of electrical equipment operating at 50 volts or more shall be guarded against incidental contact by use of approved cabinets or enclosures.
- 5.4.5 Entrance to rooms and other guarded locations containing exposed energized parts shall be marked with the appropriate warning signs and kept locked at all times. Only Company authorized employees are allowed to enter these locations.
- 5.4.6 Temporary covers, warning signs, and/or barricades, shall be used when it is necessary to remove permanent covers for maintenance.
- 5.4.7 All openings in boxes, enclosures, or fittings, shall be effectively guarded or closed at all times.

5.5 Fuses

- 5.5.1 Fuses shall be replaced with a similar type and size amperage/voltage rating.
- 5.5.2 Replacing of a fuse with a higher amperage or voltage rating can only be done if authorization is issued and the circuit or equipment is designed to accommodate the increase.
- 5.5.3 When fuses must be installed or removed with one or both terminals energized, tools or gloves rated for the voltage shall be used.
- 5.5.4 When installing expulsion-type fuses, employees shall wear safety glasses or safety goggles and shall stand clear of the exhaust path of the fuse barrel.

5.6 Microwave RF Facilities

- 5.6.1 Employees shall be trained on safe working procedures prior to working near microwave facilities.
- 5.6.2 All warning labels on a microwave system shall be read and complied with.
- 5.6.3 No employee shall look into an open waveguide or antenna that is connected to an energized microwave source.
- 5.6.4 For further information, refer to the Company [Radio Frequency Radiation Exposure Health & Safety Program](#) on the Intranet.

5.7 Electrical Testing and Test Facilities

Electrical Testing and Test Facilities - this section applies to testing involving interim measurements utilizing high voltage (1,000 volts or more), high power, or a combination of both. This section does not apply to continuous measurements done in metering, relaying, or normal line work testing.

- 5.7.1 All employees shall be properly trained in safe work practices prior to their initial assignment to a testing facility.
- 5.7.2 The test operator in charge shall ensure that the following safety checks are completed before testing is conducted:
 - Barriers and guards are in workable condition and are properly placed to isolate hazards.
 - System test status signals, if used, are operable.
 - Test power disconnects are clearly marked and readily available in an emergency.
 - Ground connections are clearly identifiable.
 - Personal protective equipment is provided and used as required.
 - Signal, ground, and power cables are properly separated.

- 5.7.3 Permanent test area(s) shall be guarded by walls, fences, or barriers designed to keep employees out of the test areas.
- 5.7.4 Guarding shall be provided within the test areas to control access to test equipment or to apparatus under test that may become energized as part of the testing.
- 5.7.5 All conductive parts accessible to the test operator during the time the equipment is operating at high voltage shall be maintained at ground potential, except for portions of the equipment that are isolated from the test operator by guarding.
- 5.7.6 When ungrounded terminals of test equipment or apparatus under test may be present, they shall be treated as energized until determined by tests to be de-energized.
- 5.7.7 Visible grounds shall be applied, either automatically or manually, with proper insulating tools, to the high-voltage circuits after they are de-energized and before work is performed on the circuit or item or apparatus under test.
- 5.7.8 Common ground connections shall be solidly connected to the test equipment and the apparatus under test.
- 5.7.9 In high-power testing, an isolating ground-return conductor system shall be provided so that no intentional passage of current, with its attendant voltage rise, can occur in the ground grid or in the earth.
- 5.7.10 An isolated ground-return conductor need not be provided if the following conditions are met:
- An isolated ground-return conductor cannot be provided due to the distance of the test site from the electric energy source.
 - Employees are protected from any hazardous step and touch potentials that may develop during the test.
- 5.7.11 In tests in which grounding of test equipment by means of the equipment grounding conductor, located in the equipment power cord, cannot be used due to increased hazards to test personnel or the prevention of satisfactory measurements, a ground that affords equivalent safety shall be provided and the safety ground shall be clearly indicated in the test set-up.
- 5.7.12 When the test area is entered after equipment is de-energized, a ground shall be placed on the high-voltage terminal and any other exposed terminals.
- 5.7.13 High capacitance equipment or apparatus shall be discharged through a resistor that is rated for the available energy.
- 5.7.14 A direct ground shall be applied to the exposed terminals when the stored energy drops to a level at which it is safe to do so.

- 5.7.15 Control wiring, meter connections, test leads, and cables, may not be run from a test area, unless they are contained in a grounded metallic sheath and terminated in a grounded metallic enclosure, or unless other precautions are taken that demonstrate equivalent safety.
- 5.7.16 Meters and other instruments with accessible terminals or parts shall be isolated from test personnel.
- 5.6.16.a If this isolation is provided by locating test equipment in metal compartments with viewing windows, interlocks shall be provided to interrupt the power supply if the compartment cover is opened.
- 5.7.17 In field-testing or at a temporary site where permanent fences and gates are not provided, one of the following means shall be used to prevent an unauthorized employee from entering:
- The test area shall be guarded by the use of distinctively colored safety tape that is supported waist high and to which safety signs are attached.
 - The test area shall be guarded by a barrier or barricade that limits access to the area or the test area shall be guarded by one or more test observers stationed so that the entire area can be monitored.
 - Barriers shall be removed when the protection they provide is no longer needed.
 - If a test trailer or test vehicle is used in field-testing, its chassis shall be grounded. Protection against hazardous touch potentials with respect to the vehicle, instrument panels, and other conductive parts accessible to employees, shall be provided by bonding, insulation, or isolation.
 - Safety practices governing employee work at temporary or field test areas shall be provided at the beginning of each series of tests.

5.8 Battery Maintenance

- 5.8.1 Face shields, aprons, and rubber gloves, shall be used when handling acids or batteries.
- 5.8.2 An approved emergency eye wash and drench hose unit shall be readily available accessible, and reachable within 10-seconds.
- 5.8.3 Emergency showers and eye wash stations shall be properly maintained, operational, and accessible.
- 5.8.4 When making electrolyte for storage batteries, always pour concentrated/pure acid into the water.
- 5.8.5 Use distilled water when refilling lead acid batteries, to the electrolyte fill line. Pouring water into a weak acid is an acceptable practice.
- 5.8.6 When charging batteries, the vent caps shall be kept in place to avoid electrolyte spray.
- 5.8.7 Care shall be taken to assure that vent caps are functioning properly.

- 5.8.8 Smoking and use of matches or other open flames are not permitted in battery rooms, battery-charging areas, or while inspecting, filling, testing, or handling batteries.
- 5.8.9 'No Smoking' signs shall be posted.
- 5.8.10 Where fans or other mechanical ventilation equipment are provided, such equipment shall be maintained and operational.
- 5.8.11 Battery wrenches shall be insulated.
- 5.8.12 When the potential for contact exists, batteries shall be covered before work is performed or if equipment is stored in the vicinity.

Approved by: RCR	 Hawaiian Electric Company Maui Electric Company Hawaii Electric Light Company Vehicles	Safety & Health Manual
Date Revised: 12/3/12		Chapter: 6

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6.0 Objective

Hawaiian Electric Company, Hawaii Electric Light Company, and Maui Electric Company, are concerned about the safe operation of all powered-vehicles, industrial trucks, and all other motorized equipment.

6.1 Purpose

This chapter establishes the requirements for the safe operation of powered-vehicles, industrial trucks and all other motorized equipment to prevent accidents and injuries from their use.

6.2 Vehicles General

6.2.1 Only specifically authorized employees who possess a valid State of Hawaii driver's license, a Company Driver's Permit (when available from the respective Company), a Commercial Driver's License (CDL), or an operator training or permit for the vehicle being used, shall operate Company owned, leased, and/or rented motor vehicles or personally owned vehicles on Company business.

6.2.2 When employee owned vehicles are used for Company business:

- The vehicle shall meet the minimum requirements for safe operation
- The vehicle shall have the minimum liability insurance required by law.

6.2.2 All employees driving vehicles requiring a Board of Motor Carriers (BMC) Medical Examiners Certificate shall have a copy of their current certificate with them whenever they are operating the vehicle.

6.2.3 Use and possession of alcohol within a company vehicle is prohibited.

- 6.2.4 All employees using Company vehicles shall notify their Supervisor and the Safety Division of any traffic citation issued, while driving the Company vehicle, as soon as practical, but no later than 24-hours after the citation is issued.
- The driver is responsible for the payment of any citations received while they are using a Company vehicle.
 - Citations received in response to a company emergency will be handled by the Department on a case-by-case basis.
- 6.2.5 Employees shall also notify their Supervisor and the Safety Division if their driver's license is revoked or suspended as soon as practical, but no later than 24 hours after the revocation or suspension occurs.
- 6.2.5.a Employees must not drive a Company vehicle at any time if their driver's license has been revoked or suspended.
- 6.2.6 Pre-Trip and Post-Trip Inspections
- 6.2.6.a All drivers shall complete a visual walk around inspection prior to use. This visual inspection shall also be completed once the driver parks the vehicle and before the keys are returned to the carpool attendant or drop box.
- Damage shall be reported as noted in Chapter 3, Section 3.5
- 6.2.6.b Employees operating a CDL vehicle shall complete all pre-trip and post-trip report forms required by the Department of Transportation (DOT).
- 6.2.7 All drivers shall know and obey all state and local motor vehicle laws applicable to the safe operation of their vehicle.
- 6.2.8 All drivers shall drive at safe speeds no greater than that permitted by law. Traffic, road, and weather conditions, shall be given consideration by the driver in determining what speed is safe.
- 6.2.9 Speed limit on all Company facilities is 5 MPH. Caution shall be exercised while operating vehicle and equipment on Company property.
- 6.2.10 All employees are responsible for their own safety and the safety of the passengers who ride with them.
- 6.2.11 Seat belts are to be used as required by law.
- 6.2.12 No one shall be allowed to ride on running boards, fenders, or any part of a vehicle, unless the vehicle part is designed for that purpose.
- 6.2.13 No one shall be allowed to stand in a moving vehicle unless the vehicle is designed to permit safe standing while vehicle is moving.

- 6.2.14 No one shall be allowed to jump on or off a moving vehicle. Jumping off a parked vehicle shall be avoided.
- 6.2.15 All vehicle doors shall be closed whenever the vehicle is in motion.
- 6.2.16 Drivers shall be prepared to stop and yield the right-of-way in all instances to avoid an accident.
- 6.2.17 Defensive driving techniques shall be utilized at all times.
- 6.2.18 Drivers shall clearly signal intention to turn and change lanes.
- 6.2.19 Drivers shall be courteous to other drivers and pedestrians.
- 6.2.20 Use of cell phones or other electronic devices is prohibited while driving a vehicle.
- 6.2.20.a If communication is absolutely necessary while driving, hands free devices may be used in a very limited capacity.
- 6.2.20.b Drivers shall wait until they can safely park their vehicle before using a cell phone or electronic device.
- 6.2.20.c Two way radios in Company vehicles are exempt from these requirements.
- 6.2.21 Drivers shall maintain sufficient distance (at least the 4 second rule) between other vehicles, fixed objects, and pedestrians to ensure that their vehicle can be safely maneuvered or stopped to prevent an accident or injury from occurring.
- 6.2.22 Added caution is necessary when driving in or near the following areas or zones:
- Residential
 - Schools
 - Construction sites
 - Areas with obstructed views
 - Private property: driver shall pay added attention to areas that could get damaged by the weight of the vehicle they are driving.
- 6.2.23 Reversing
- 6.2.23.a Drivers shall ensure that their vehicle is clear of obstructions before reversing their vehicle. Reversing of any vehicle shall be slow while utilizing added caution.
- 6.2.23.b When a driver is faced with a difficult backing situation, they shall use another employee as a guide.

- 6.2.23.c It is the driver's responsibility to ensure that the guide knows the proper hand signals.
- 6.2.23.d When another employee is unavailable, the driver shall exit the vehicle and visually check the area that he/she will be moving into before reversing his/her vehicle.
- 6.2.23.e The use of rear view video devices, proximity alerts, and other electronic devices that assist with reversing, is highly recommended.
 - The driver needs to keep in mind that these devices are not 100% reliable and caution needs to be exercised whenever you reverse a vehicle.
 - It is the driver's responsibility if an accident occurs while reversing, even when the vehicle is equipped with these devices.

6.2.24 Parking

- 6.2.24.a When a vehicle needs to be parked on the side of the roadway the driver shall ensure:
 - The vehicle is parked in the same direction of travel with the flow of traffic.
 - The vehicle is parked off the traveled roadway.
 - Appropriate warning devices are used when the vehicle must be parked closer than 10-feet from the roadway, or as required by state and or local laws and regulations. Warning devices to give adequate advanced warning include:
 - Rotating beacon and/or strobe lights
 - Tail lights/emergency flashers
 - Flares or reflectors
- 6.2.24.b If work is in progress, traffic control devices (together with flaggers, where necessary) shall be used in accordance with the manual on Uniform Traffic Code. State of Hawaii and/or City and County parking permits shall be obtained and posted per the State/County regulations.
- 6.2.24.c Vehicles shall not be parked on bridges or over culverts, except when necessary to safely complete a job.
- 6.2.24.d When it is necessary to park on an incline, the driver shall:
 - Ensure that the vehicle is left in a safe position.
 - Turn the engine off unless needed for boom operation.
 - Place the vehicle in the neutral or parked position and set the parking brake.
 - Turn the front wheels into the curb and ensure that the wheels are chocked.
 - Ensure that rollaway is prevented.
- 6.2.24.e Parking in areas that have long grass or vegetation, where fixed objects may not be visible due to the overgrowth, shall be avoided.

- 6.2.24.f All parked and unattended vehicles shall be left in a safe condition with the parking brake engaged and the engine turned off.

6.2.25 Refueling of Vehicles

- 6.2.25.a Refueling of vehicles while the engine is running is strictly prohibited.
- 6.2.25.b All possible ignition sources are strictly prohibited while fueling of vehicles or storage containers (gas cans) is being performed.
- Gas cans shall be removed from the vehicle and placed on the ground before filling begins.

6.3 Trucks

- 6.3.1 All trucks shall be operated in a safe manner according to the manufacturers safe operating procedures and the training provided to employees, prior to operating a truck.

- 6.3.2 All operators shall conduct pre-trip and post-trip inspections as required by law.

- 6.3.2.a See [Walk Around Inspection Procedures for Single Trailers & Straight Trucks](#) for more Information.

- 6.3.3 Before moving derrick or boom trucks the operator shall ensure:

- Outriggers are fully retracted.
- Derrick or boom is properly stowed.
- Power take-off is disengaged.
- Loads are secure.

- 6.3.3.a Trucks with derricks or booms in the air above traveling height, shall not be moved unless:

- The truck is designed to be moved with the boom or derrick in the elevated position.
- The boom is being repaired due to boom malfunction.
- Movement of the truck is limited to the shortest distance possible to ensure contact, with exposed energized conductors or objects, is prevented.

- 6.3.3.b When traveling down grade with a truck, the following precautions need to be adhered to:

- The clutch shall not be disengaged.
- Heavily loaded trucks shall be in a lower gear prior to encountering a steep grade.
- Gear choice is usually one lower than the operator used while ascending the steep grade.
- Down shifting must not be done while descending.

6.4 Aerial Lift Vehicles

The term Aerial Lift Vehicles refers to electric line trucks with booms, or derrick trucks that are not approved as Insulated Aerial Devices.

6.4.1 When working near energized lines or equipment, the truck shall be preferably barricaded and considered energized or effectively grounded.

6.4.1.a Outriggers are not acceptable as grounds.

6.4.1.b See Chapter 12, Section 12 Temporary Protective Grounding.

6.4.2 The vehicle or its related equipment shall not be operated closer to any energized line or equipment, than in the clearances and conditions set forth in Chapter 12, Section 4, Working Distance - Energized Primary Voltage.

6.4.3 Ground personnel shall not contact vehicle chassis or grounds from vehicle to earth, when vehicle is close to energized lines or equipment.

6.4.4 Annual inspection of the equipment is required.

6.4.4.a A posted placard indicating inspection dates shall be posted on the equipment in a location easily visible by the operator.

6.5 Insulated Aerial Lift Vehicles

The term Insulated Aerial Devices refers to equipment commonly known as a bucket truck or basket truck which includes all line trucks equipped with an approved insulated fiberglass boom, portable basket, or insulated ladder platform. The complete vehicle, auxiliary power supply, upper and lower booms, baskets, controls, etc., shall be considered as an Insulated Aerial Device.

6.5.1 Unless the vehicle is equipped with lower boom and pedestal insulation rated for the voltage being worked, aerial basket vehicles working adjacent to energized primary shall be properly grounded or barricaded and treated as energized.

6.5.2 Electrical, mechanical, and structural tests and inspections shall be conducted semi-annually.

6.5.3 Only authorized persons who are properly trained and qualified shall use or operate aerial devices.

6.5.3.a Operating crew shall:

- Clean boom using [daily check off list](#).
- Ward up the equipment before use.
- Test hydraulic system and lift controls prior to use.
- Report any malfunctions or unsafe operational conditions immediately.
 - Unsafe equipment shall not be used.

- Check grease fittings on boom and oil lines weekly.
- Inspect and check the Rescue Dump System and its safety pins, weekly.
- Secure bucket cover while driving.

- 6.5.4 The operating and maintenance instruction manuals, issued by the manufacturer, shall be followed.
- 6.5.5 The positioning of the basket shall be performed or directed by the worker(s) in the basket, except in case of emergency. When a boom must be maneuvered over a street or highway, necessary precautions shall be taken to avoid accidents with traffic and pedestrians.
- 6.5.6 The operator shall always face in the direction in which the basket is moving and shall see that the path of the boom or basket is clear when it is being moved.
- 6.5.7 When two employees are in the basket or baskets, one of them shall be designated to operate the controls. One employee shall give all signals, which shall be thoroughly understood by all persons concerned.
- 6.5.8 When two employees are working from the basket, extreme care shall be taken to avoid one employee from contacting poles, cross arms, or other grounded or live equipment, while the second employee is working on equipment at a different potential.
- 6.5.9 No component of the aerial device will be operated from the ground without permission from the worker or workers in the basket, except in case of emergency.
- 6.5.10 The worker will have both feet firmly placed on the floor of the basket at all times while aloft. Employees shall not stand or sit on top or edge of the basket nor shall ladders be placed in the basket.
- 6.5.11 Employees shall not belt to an adjacent pole or structure.
- 6.5.12 The workers shall be strapped to the upper insulated portion of the derrick (boom), using approved equipment (full body harness with safety lanyard), while the basket is aloft.
- 6.5.13 No tools or equipment will be rigged to the basket in a manner that could cause basket to become unstable.
- 6.5.14 Climbing irons are prohibited in the basket.
- 6.5.15 Basket operating levers shall be guarded and kept clear of all obstructions.
- 6.5.16 Neither the basket nor the insulated portion of the derrick shall be allowed to contact energized or grounded conductors or equipment.
- 6.5.17 Load limits of the boom and basket shall not be exceeded.

- 6.5.18 Shock loading (sudden stops or starts) of the equipment shall be avoided.
- 6.5.19 Aerial devices shall not be “field modified” unless such modification is certified by the manufacturer.
- 6.5.20 The insulated portion shall not be altered in any manner that might reduce its’ insulating value.
- 6.5.21 Clearance:
- 6.5.21.a The aerial lift, together with the employee in the basket and all tools and equipment, shall maintain proper clearances from unprotected energized conductors.
 - 6.5.21.b If it is difficult for the operator to determine the distance between the equipment and the energized parts accurately, another person shall observe the clearance and give timely warnings when minimum clearance distance is approached.
- 6.5.22. The worker(s) shall not contact more than one conductor or piece of equipment at a time.
- 6.5.22.a They may come closer than permitted by Chapter 12, Section 4, but if they are within reach of conductors or any object at a different potential, the conductor or object shall be covered with protective equipment.
- 6.5.23 Equipment or material shall not be passed between a pole or structure and worker(s) in a basket, when within reaching distance of exposed energized conductors or equipment.
- 6.5.24 Riding in the basket shall not be permitted, except in certain designated operations when truck stability is not a factor. All exceptions are the full responsibility of the Supervisor/Crew Leader.
- 6.5.25 When the basket is in operation, a qualified employee shall be present to operate the ground controls if the need arises.
- 6.5.26 Troubleman trucks equipped with an insulated aerial bucket can be operated without the presence of the second qualified employee, for secondary work only.
- 6.5.27 Safety rules governing the use of hot-line tools, rubber goods, personal protective equipment, and general safe practices, shall also apply to work done from aerial baskets.
- 6.5.28 When using pneumatic or hydraulic tools in a bucket, the operator shall be sure that hoses or lines do not become entangled in the operational controls.

- 6.5.29 When employees are in the bucket of an aerial lift:
- The emergency parking brake of the vehicle shall be set.
 - Wheel chocks or outriggers shall be used to provide added stability.
- 6.5.30 When the vehicle is on an incline, wheel chocks shall be used regardless of whether outriggers are used.
- 6.5.31 When outriggers are used, they shall be set on pads or a solid surface. Outriggers shall not be extended or retracted outside of clear view of the operator, unless all employees are outside the range of possible equipment motion.
- 6.5.31.a The truck should sit approximately level when viewed from the rear or, if equipped with level indicators, the truck shall be no more than five degrees from level, left to right.
- 6.5.32 For additional information concerning aerial lifts, refer to:
- OSHA 1910.67
 - OSHA 1910.269
- 6.5.32 The following data pages are available for more information:
- [Driver's License Information \(CDL\)](#)
 - [Daily Aerial Checklist](#)
 - [Daily Derrick Checklist](#)

6.6 Forklifts-Industrial Trucks

- 6.6.1 Only company authorized employees shall operate a forklift.
- 6.6.2 Company employees shall not operate customer owned forklift or equipment.
- 6.6.3 All rental forklifts and equipment shall meet or exceed Company forklift/equipment standards.
- 6.6.4 Training
- 6.6.4.a All employees shall receive forklift operation training before operating a forklift.
- 6.6.4.b Training shall include a combination of classroom and hands-on evaluation of each forklift the operator is expected to operate.
- 6.6.4.c All forklift operators shall be re-evaluated for safe operation of each forklift they operate every three (3) year.
- 6.6.4.d Evaluation sheets shall be completed for each operator and filed in the employee's safety file. Corporate Safety will maintain this file.

6.6.5 Pre-shift Inspections

- 6.6.5.a All forklifts shall be inspected prior to each shift's use of the forklift.
- 6.6.5.b All [forklift inspection checklists](#) shall be completed and stored with the forklift at all times.
- 6.6.5.c Deficient items found during the pre-shift inspection shall be reported and repaired as soon as possible.
- 6.6.5.d Forklift deficiencies found that compromise the safe operation of the lift shall be repaired before the lift can be operated. Forklifts in this condition shall be tagged out and shall not be used until the repairs are completed.

6.6.6 Safe Operation

- 6.6.6.a All forklift operators shall ensure that the proper Personal Protective Equipment (PPE) is used while they are operating the forklift.
 - Safety glasses shall be worn, unless the lift is equipped with a shield to protect the eyes and face.
 - Hard hats shall be worn when required by the jobsite.
 - Seat belts shall be worn at all times.
- 6.6.6.b Operators should check brakes and controls prior to each use of a forklift.
- 6.6.6.c Before moving the forklift, the operator shall ensure that no object or person is in the path of the lift.
- 6.6.6.d All forklifts shall be operated at safe speeds at all times.
- 6.6.6.e Operators shall adhere to the following when loading and unloading:
 - Forks of the lift shall be set as far apart as possible to ensure stability under each load.
 - The operator shall ensure that the forks are firmly in place and properly secured.
 - Forks of a lift shall be kept as low as possible to the ground, while the forklift is moving forward or backward, at all times.
 - Loads shall not be suspended or swung over anyone.
 - Operators shall not allow anyone to stand, walk, or work under their load at any time.
- 6.6.6.f The Operator shall always face the direction the forklift is traveling.
- 6.6.6.g Sudden stops shall be avoided.
- 6.6.6.h Operators shall not refuel a forklift when the engine is running.

- 6.6.6.i The operator shall not allow anyone to ride on any part of the forklift, unless a seat is provided for that purpose.
- 6.6.6.j Operators shall ensure that dock boards are properly secure before loading and unloading vehicles. The wheels of parked vehicles shall also be chocked or blocked.
- 6.6.6.k When traveling downhill with a load, the operator shall always reverse downhill.
- 6.6.6.l Internal combustion engine lifts shall not be operated in confined spaces for extended periods of time.

6.6.7 Forklift Attachments

- 6.6.7.a Only attachments provided by or approved by the manufacturer can be used.
- 6.6.7.b All attachments need to be properly secured to the mast.
- 6.6.7.c Use of properly designed and constructed work platforms can be used, as long as guardrails and toe boards are provided, and the platform is properly secured to the mast.
- 6.6.7.d Jury rigging or improvising methods of loading and unloading is prohibited.

6.6.8 Parking Forklifts

- 6.6.8.a Parking a forklift on an incline shall be avoided if possible.
- 6.6.8.b When a forklift is left unattended (25-feet away or not in view) or is to be parked, the operator shall ensure that:
 - The forks are fully lowered to the ground.
 - The controls are left in neutral.
 - The ignition is shut off.
 - The brake is set.
 - The wheels are chocked if on an incline.

6.7 Load Safety

- 6.7.1 The driver shall make certain that all loads are within the rated load limits for the vehicle or equipment used in the transportation of that load.
 - 6.7.1.a All loads shall be properly secured, tied, and covered, to ensure that the load will not leave the vehicle when the vehicle is in motion.

- 6.7.1.b Cargo must be secured with a downward force of at least 20% of the cargo weight if it is not fully contained by the vehicle.
 - 6.7.1.c All tie downs shall not have knots.
 - 6.7.1.d If a tie down device is to be repaired, it must be made per manufacturer's standards.
 - 6.7.1.e Edge protection must be used if the tie down is subject to sharp edges.
 - 6.7.1.f A minimum of one tie down is required for articles 5 feet or less and less than 1,100 pounds.
 - 6.7.1.g A minimum of two (2) tie downs is required for articles between 5 and 10 feet in length with a weight greater than 1,100 pounds.
 - 6.7.1.h An additional tie down is required for each additional 10 foot length.
- 6.7.2 All trailers shall be coupled with safety chains.
- 6.7.3 When loading and unloading, employees shall ensure that all loads are positioned such that the load will not cause injury to anyone or damage to anything during any part of the loading and unloading process.
- 6.7.4 Whenever possible, loads shall not be handled from the street side of a vehicle.
- 6.7.5 Cargo securement devices must be able to withstand the following three (3) forces:
- Forward direction
 - Rearward direction
 - Lateral direction
- 6.7.5.a Minimum working load limit for cargo securement systems shall be at least one-half (1/2) the weight of the cargo.
- 6.7.5.b Specialty securement devices shall have markings indicating working load limit.
- 6.7.5.c Work load limits for ropes, steel straps, synthetic straps, and chains that are unmarked, can be found in the DOT table of working load limits 393.108. All limits shall be adhered to according to the table, with no exceptions.
- 6.7.6 Securing heavy vehicles for transport (low boys)
- 6.7.6.a Accessory equipment such as hydraulic shovels must be completely lowered and secured.
 - 6.7.6.b Articulating vehicles must be secured to prevent articulation from occurring.

- 6.7.6.c A minimum of 4 tie downs shall be used.
- 6.7.6.d Each tie down must be secured as close as possible to the mounting points.
- 6.7.6.e Mounting points must be specifically designed for the equipment being transported.

6.7.7 Hauling Poles, Ladders, Miscellaneous Heavy Equipment

- 6.7.7.a Items with length shall be loaded parallel with the vehicle and shall not extend beyond the sides of the vehicle.
- 6.7.7.b Materials that extend more than 3-feet beyond the front or back of the hauling vehicle or trailer shall have proper warning devices.
 - Red flags attached to the end of the load shall be used.
 - Red lights shall be used at night.
 - Escort vehicles shall be used when required.
 - An employee shall be used for flagging when necessary.
- 6.7.7.c Prior to releasing tie downs of any heavy load, the load shall be thoroughly checked to ensure that it has not shifted into a hazardous position on the vehicle.
- 6.7.7.d When employees are required to ride on top of a load during hauling operations to clear lines, they shall:
 - Ride the load with at least one other employee (buddy system).
 - Be in constant contact with each rider and the driver.
 - All riders shall be secured using some type of fall restraint system.
- 6.7.7.e Transporting of leaking or sweating transformers or other oil filled containers, requires the driver to place the leaking equipment into a spill pan and ensure that it is properly secured to prevent movement of the load while the vehicle is in motion and should be properly contained to prevent a release/spill.

6.8 Rigging

- 6.8.1 Rigging equipment shall be inspected prior to use to ensure that it is in good operating condition.
- 6.8.2 Equipment found to be defective shall be removed from service immediately and repaired before it can be used.
- 6.8.3 Recommended safe working load limits shall be adhered to by employees and shall not be exceeded for any reason.
- 6.8.4 Custom designed equipment shall be clearly marked with the safe working load limit.

6.8.5 Only specifically designed rigging equipment shall be used. Equipment shall not be modified unless the design allows for modifications.

6.8.5.a Use of makeshift or non-rigging devices is strictly prohibited.

6.8.6 Wire Ropes

6.8.6.a All wire ropes used for rigging purposes shall be inspected to ensure:

- Protruding wire strands are covered.
- An eye with a tuck splice has not less than three (3) full tucks.
- There are no knots in the wire.
- Load is not applied to a kinked wire rope.
- There is no excessive kinking or untwisting of the wires.
- All wire ropes for hoisting consist of one (1) continuous piece of wire without a splice.
- Eyes in bridles, slings, or bull wires, are not formed by clips or knots.

6.8.6.b When U-bolt clips are used to form splices, the closed or curved end of the U shall always be placed in contact with the short or dead end of the cable, and thimbles shall be used whenever possible in all cable eyes.

6.8.6.c All nuts and U clamps shall be inspected and tightened frequently.

6.8.6.d Wire rope drums shall have at least two (2) full turns of rope on the winding drum at all times.

6.8.6.e All rope shall be wound evenly on the drum and not allowed to overlap in an irregular fashion.

6.8.6.f Where feasible, a guide pulley shall be used to guide the rope properly on the drum.

6.8.7 Natural and Synthetic Ropes

6.8.7.a Natural and synthetic ropes shall be inspected before use.

6.8.7.b Hand lines and taglines shall not be less than ½-inch in diameter, when used for rescue work, and shall be maintained in good condition at all times.

6.8.7.c All rope splices shall be made in accordance with the manufacturer's recommendations.

6.8.7.d Manila rope eye splices shall contain at least three (3) full tucks and short splices shall contain at least six (6) full tucks.

- 6.8.7.e Synthetic rope eye splices shall contain at least four (4) full tucks and short splices shall contain at least eight (8) full tucks.
- 6.8.7.f Knots shall not be used in lieu of splices.
- 6.8.7.g All blocks shall be in good condition.
- 6.8.7.h Blocks built for wire rope shall not be used with natural or synthetic rope.

6.9 Cranes and Hoists

- 6.9.1 Only Company authorized employees shall operate a crane or similar types of lifting equipment.
- 6.9.2 Customer owned equipment shall not be operated by employees unless authorized by the Company.
- 6.9.3 Training
 - 6.9.3.a All employees shall receive crane training prior to operating a crane or lifting equipment.
 - 6.9.3.b Training shall include a combination of classroom and/or hands-on evaluation of each crane or piece of lifting equipment the employee is expected to safely operate.
- 6.9.4 The manufacturer's safe operating procedures shall be followed and shall not be modified unless approval by the manufacturer is received.
- 6.9.5 Cranes or lifting equipment that can lift loads greater than 5 tons requires the operator to be certified and physically fit in order to be allowed to operate the equipment. The operator shall obtain a valid State Crane Certification Card as well as a current Crane Operator Fitness Card before operating these cranes or equipment.
- 6.9.6 Inspection of lifting equipment before use is essential to all lifting operations.
 - 6.9.6.a The operator shall make a functional operating check and visually inspect load hook, ropes, and slings, daily before use.
 - 6.9.6.b All applicable inspection forms shall be completed by the operator daily or prior to each shift.
 - 6.9.6.c Lubrication points shall be accessible without the necessity of removing guards.
 - 6.9.6.d Annual inspection of the equipment is required.

- 6.9.6.e A posted placard indicating inspection dates shall be posted on the equipment in a location easily visible by the operator.
- 6.9.6.f Lifting equipment found to be unsafe for lifting operations, during an inspection or during use, shall not be used until necessary repairs are made.
- 6.9.6.g Warning or out of order signs shall be conspicuously posted on cranes, hoists, and derricks.

6.9.7 Safe Operations

- 6.9.7.a Hoist rated load capacity shall be marked on the equipment or load block and shall be clearly legible from the ground or floor.
- 6.9.7.b The operator shall not exceed the designed capacity of any piece of hoisting equipment under any circumstances.
- 6.9.7.c An accurate estimation shall be made and manufacturer's table of lifting capacity shall be consulted if needed.
- 6.9.7.d Operators shall not move loads over heads of workers or others, unless authorized by the person in charge.
- 6.9.7.e Employees shall never stand in the path or close to the path of cranes, hoists, or derricks, or enter the working area of such equipment in any location where they cannot be clearly seen by the operator.
- 6.9.7.f Operators shall not leave cranes, hoists, or derricks unattended while load is suspended, unless suspended over a barricaded area, blocked, or otherwise supported from below during repair or emergency.
- 6.9.7.g Employees shall not stand or pass under a suspended load.
- 6.9.7.h Side pulls on hoisting apparatus are dangerous and shall be avoided. If it is impossible to position the hoist to take a vertical "pick", the load or equipment shall be moved to allow a vertical lift.
- 6.9.7.i This rule does permit drag line operations, or operations with equipment designed specifically for side pulls.
- 6.9.7.j All loads shall be handled carefully under the direction of one person.
- 6.9.7.k Crane and derrick equipment shall have an angle indicator and a load-indicating device in good working order.

- 6.9.7.l An approved load moment device will be accepted in lieu of a boom angle indicator and load-indicating device.
- 6.9.7.m Except for floor-operated cranes, a gong or other effective audible warning shall be provided for each crane equipped with a power traveling mechanism.
- 6.9.7.n All hooks will have a latch, or other means, to prevent slings or load from accidentally slipping off the hook.
- 6.9.7.o Safety color code marking cranes shall follow ANSI Z-53.1-1971.
- Red for stop buttons or electrical switches for emergency stopping.
 - Orange for dangerous parts of machine or energized equipment.
 - Yellow for marking physical hazards.
- 6.9.7.p Standard Hand Signals shall be posted in a conspicuous location unless voice communication equipment is utilized.
- 6.9.7.q Signals must be discernible (audible) at all times.
- 6.9.7.r Signals shall be given by one designated person.
- 6.9.7.s On heavy lifts, two (2) test lifts, taking the load a few feet in the air, shall be made before attempting the working lift.
- 6.9.7.t Test lifts are required every time a crane is relocated and/or used for a "lift".
- 6.9.7.u Riding on loads, hooks, hammers, hoists, buckets, or baskets, is prohibited except with approval by the Safety Division.
- 6.9.7.v When mobile crane, hoists, or similar lifting devices, are used by Authorized and Qualified electric utility employees near energized high voltage lines, the mechanical equipment shall not be operated closer to any exposed energized line or equipment than the clearances set forth in Chapter 12, Table R-6, Minimum Approach Distances from Energized Lines.
- 6.9.7.v.1 In all cases of mechanical equipment used near energized lines, the equipment shall be preferably barricaded and considered energized or effectively grounded.
- 6.9.7.v.2 No one shall step on or off the equipment or touch any part of the equipment from the ground, unless permitted to do so by the person in charge of the job.
- 6.9.7.v.3 When equipment clearance is less than ten (10) feet or when it is difficult for the operator to maintain the desired clearance by visual means, a person

shall be designated to observe clearance of the equipment and give timely warning for all operations.

- 6.9.7.v.4 When the above mechanical equipment is used by NON-QUALIFIED electric utility employees near energized high voltage lines, the minimum clearance from energized lines or equipment shall be ten (10) feet for 50-KV plus 0.4-inch for each 1-KV over 50-KV.
- 6.9.7.v.5 A durable warning sign legible at 12-feet shall also be posted in plain view of the operator, reading, "UNLAWFUL TO OPERATE THIS EQUIPMENT WITHIN TEN (10) FEET OF ENERGIZED HIGH VOLTAGE LINES. THIS EQUIPMENT SHALL BE POSITIONED, EQUIPPED, OR PROTECTED, SO THAT NO PART SHALL BE CAPABLE OF COMING WITHIN TEN (10) FEET OF HIGH VOLTAGE LINES."
- 6.9.7.v.6 While in transit with no load and boom lowered, the equipment clearance shall be a minimum of four (4) feet for voltages less than 50-KV and ten (10) feet for voltages over 50-KV.

6.9.7.w For more information refer to the [Gantry & Overhead Crane Program](#)

6.10 Helicopter Operations

- 6.10.1 Before engaging in extensive helicopter-assisted construction activities, employees shall receive training in helicopter operations.
- 6.10.2 Only authorized personnel shall approach within 50-feet of the aircraft while rotor blades are turning.
- 6.10.3 Boarding and exiting the aircraft shall be in accordance with instructions from the pilot.
- 6.10.4 For other than routine operations, where takeoffs and landings are from designated helipads, the pilot will specifically brief passengers on boarding and exiting procedures.
- 6.10.5 Boarding and exiting the aircraft while it is hovering may be authorized where the pilot deems it safe.
- 6.10.6 All occupants will wear lap belts from the time they enter until preparing to exit the aircraft.
- 6.10.7 The helicopter operator shall insure that all operations are conducted in compliance with applicable Federal Aviation Regulations.
- 6.10.8 Operations involving externally carried loads will be covered by the Construction & Maintenance Department's Work Standard D-800.

6.10.9 All helicopter operators doing work under contract to the Company shall be bound by this chapter and by Construction & Maintenance Department Work Standard D-800. Copies of these documents shall be attached to and made a part of contracts with such operators.

6.10.9.a The National Safety Council's Data Sheet #649 entitled, "Externally Loaded Helicopters in Construction Work", will be used to fulfill this requirement and is available through the Corporate Safety Division.

6.10.10 Helicopters may be flown with doors removed as permitted by FAA Regulations.

6.10.11 The primary method of communicating with a helicopter shall be by radio.

6.10.11.a When radio communication is not possible, a single individual shall be designated to communicate using hand signals depicted in the [Hand Signals for Helicopters](#) data page. This individual shall wear an orange or other bright-colored vest to identify themselves.

6.11 Portable and Vehicle Mounted Generators

6.11.1 The generator may only supply equipment located on the generator or the vehicle and cord-connected and plug-connected equipment through receptacles mounted on the generator or the vehicle.

6.11.2 The non-current carrying metal parts of equipment and the equipment grounding conductor terminals of the receptacles shall be bonded to the generator.

6.11.3 In the case of vehicle-mounted generators, the frame of the generator shall be bonded to the vehicle frame.

6.11.4 Any neutral conductor shall be bonded to the generator frame.

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Chapter Summary

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7.0 Objective

Hawaiian Electric Company, Hawaii Electric Light Company, and Maui Electric Company, will protect employees, contractors, and property, from injury or damage caused by fire related emergencies.

7.1 Purpose

This chapter describes the Hawaiian Electric Company's Fire Safety policies and procedures and the responsibilities of all employees, as well as all contractors, when addressing a fire related emergency at any of our facilities.

7.2 Fire Protection and Prevention

Fire is a reaction that requires four components: heat, fuel, oxygen, and chemical chain reaction. You must have all four components in sufficient quantities to maintain a fire. Likewise, you must remove one or more of these components to extinguish a fire.

- 7.2.1 Careful thought shall be given, before work is started, to all possible fire hazards.
- 7.2.2 Adequate precautions shall be taken to prevent the occurrence of fires which may directly or indirectly be caused by the nature of the work or actions of others in the area.
- 7.2.3 Employees shall report all fire hazards in places where they work to the person in charge of the job.
- 7.2.4 Fire alarm signals within our facilities are primarily for the protection of life by indicating the necessity to evacuate.
 - 7.2.4.a The fire alarm signal is a continuous ringing of the fire alarm bell. Upon hearing this alarm for one (1) minute or longer and in the absence of different instructions, all employees are to evacuate the premises and go to the designated evacuation

areas as specified in section 8 of this chapter, unless otherwise instructed by Security, Safety, or other first responders (HPD, HFD, etc.).

7.2.5 The elevator alarm signal (red button usually located next to the floor buttons) will activate an alarm bell signifying aid is needed within an elevator.

7.2.5.a An emergency phone is available for assistance.

7.3 Materials

7.3.1 Materials in a building or area present hazards of varying potential. These hazards are classified as follows:

- Light or low hazard - a location where small amounts of combustible material or flammable liquids are present and only small size fires are anticipated.
- Ordinary or moderate hazard - A location where moderate amounts of combustibles or flammable liquids are present and moderate size fires are anticipated.
- Extra or high hazard - A location where large amounts of combustibles or flammable liquids are present and large size fires are anticipated.

7.3.2 Materials stored inside sprinklered facilities shall not be stored closer than 18-inches from a sprinkler head deflector.

7.4 Fire Classification

7.4.1 Fires are classified as Class A, B, C, D, or K depending on the types of materials involved in the fire. These classifications are defined as follows:

- Class A - Fires involving ordinary combustible materials such as wood, cloth, paper, trash, rubber, and plastic.
- Class B - Fires involving flammable liquids, oil, grease, tar, oil base paint, lacquer, and flammable gas.
- Class C - Fires involving energized electrical equipment or systems. Only when electrical equipment or systems can be de-energized can extinguishers for Class A and B fires be used safely.
- Class D – Fires involving combustible metals such as magnesium, titanium, and sodium.
- Class K – Fires involving vegetable oils or fats in cooking appliances that are found in commercial kitchens.

7.5 Extinguisher Classification

7.5.1 All types of extinguishers are not equally effective against all classifications of fires. Therefore, extinguishers are labeled with a letter and corresponding pictorial that indicates the class of fire on which the extinguisher is effective. An extinguisher that is effective on more than one class of fire will have multiple letters/pictorials on the label.

FIRE EXTINGUISHER IDENTIFICATION



“Class A” fires involve ordinary combustible materials such as cloth wood, paper, rubber and many plastics.



“Class B” fires involve flammable and combustible liquids such as gasoline, alcohol, diesel, etc., and flammable gases.



“Class C” fires involve energized electrical equipment.



“Class D” fires involve combustible metals such as magnesium, titanium, and sodium.



“Class K” fires involve vegetable oils or fats in cooking appliances. These are found in commercial kitchens.

Extinguishers suitable for more than one class of fire may be identified by multiple symbols.



7.5.2 Extinguishers are provided for employees to use when a small fire is present in the workplace.

- A small fire is a fire the size of office rubbish can.
- Attempts to control and extinguish fires larger than office rubbish can is not recommended.
- Employees shall activate the fire alarm.
- Immediately activate emergency fire notifications for the facility involved.
- Promptly evacuate the facility per evacuation procedure for that location.

7.5.3 If a fire extinguisher is used to extinguish a fire, it is the users responsibility to report its' use to Safety Division so that the extinguisher can be serviced and available for the next emergency.

7.5.4 All fire extinguishing equipment shall be maintained in good working condition and shall be accessible at all times.

7.5.5 Fire extinguishers and equipment shall be placed in designated areas.

7.5.5.a These designated areas shall be maintained free of obstructions in order to promote prompt response to a fire related emergency.

7.5.5.b Fire equipment removed from designated areas shall be replaced immediately.

7.6 Fire Suppression Systems

7.6.1 All fire suppression systems shall be maintained in a state of readiness at all times.

7.6.2 Prior/prompt notification to Safety Division shall be given for the following situations:

- Whenever a fire suppression system is taken off line.
- Whenever a smoke/fire detector is to be covered for any reason.
- Whenever there is a trouble alarm on any facility fire suppression system.
- Whenever water is leaking from a system.
- Notification to Safety Division can be delayed if an emergency warrants quick action to be taken to avoid injury to anyone or severe damage to equipment.

7.7 Training

7.7.1 All employees shall receive instructions relating to fire prevention and protection and be familiar with the fire-fighting equipment in the location where they report regularly for work.

7.7.1.a It is the employee's responsibility to know the location of the nearest fire extinguisher and what class of fire it can be used to extinguish.

7.7.1.b All employees shall be familiar with their facilities emergency evacuation plan.

7.7.2 Fire evacuations drills will be conducted on all Company facilities to ensure familiarity of the plan with all employees.

7.7.3 Employees who report to work at leased office spaces shall follow the building owner's emergency evacuation plan and participate in evacuation drills for that particular facility.

7.7.4 All employees shall know the nearest emergency exit available to them in case of a fire or an emergency that prompts evacuation from the facility.

7.7.5 Employees are to evacuate down stairways only.

7.7.6 All employees shall report to the designated evacuation areas for their facility.

7.7.7 Employees can return to their respective facilities once the emergency is over and the "All Clear" is given by Security or Safety Division.

7.8 Generation/Plant

7.8.1 All station operating personnel shall be part of the "Plant Incipient Stage Fire Brigade" and all other plant personnel shall be used to assist the brigade as needed.

7.8.2 Refer to each Company's Incipient Stage Fire Brigade Training Manual for more details.

7.8.3 Fire protection equipment shall be kept clear of obstructions and ready for use at all times.

7.8.4 Fire hoses that are pre-connected to a water source shall not be removed, unless it is necessary to connect a replacement section or for testing purposes.

7.8.5 Carbon Dioxide (CO₂) protection systems, shall be locked out and tagged and disconnected before starting maintenance work and before workers enter the enclosure.

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Chapter Summary

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8.0 Objective

Hawaiian Electric Company, Hawaii Electric Light Company, and Maui Electric Company, will ensure that the tools used for the maintenance of the electric power generation, transmission & distribution systems, and facilities of our Company, are kept in proper working condition and properly used in order to provide a safe and reliable product to all our customers

8.1 Purpose

This section describes the Company's requirements for the safe use and maintaining of the tools used by Company employees.

8.2 Tools (Hand-Fixed-Power)

- 8.2.1 Employees working with tools shall be familiar with the safe handling of the tools they are going to be working with.
- 8.2.2 Employees shall only use tools for the purpose they were intended for.
- 8.2.3 When using hand tools, the employee shall ensure that they are in full control of the tool and shall maintain their balance at all times.
- 8.2.4 Personal Protective Equipment (PPE) shall be used whenever working with tools, unless the PPE makes working with the tool more hazardous to the employee than the protection provided by the PPE.
- 8.2.5 Supervisors shall provide every employee the training needed to ensure that the employee knows how to use a tool safely.
- 8.2.6 Supervisors should always consider purchasing ergonomically designed tools to help protect their employees from ergonomic injuries resulting from tool use.
- 8.2.7 All tools shall be inspected before each use.
- 8.2.8 Tools found to be defective shall not be used or issued.

8.2.9 Use of a defective tool is prohibited.

8.2.10 Defective tools shall be properly repaired before it can be put back into service.

8.2.11 All tool safety guards and shields shall be properly installed.

8.2.12 Tools found without proper safety guards and shields shall not be used.

8.2.12.a Safety guards and shields that need to be removed from a tool for any reason while the tool is being used, needs to be approved by the employee in charge of the job. The employee in charge shall be fully responsible for the approval to remove guards and shields.

8.2.13 Tools temporarily stored or laid aside on the job shall be placed so as not to create a tripping, falling, or similar hazard.

8.2.14 Tools with sharp edges shall be covered or stored to protect against a cutting hazard.

8.2.15 Sharp edged/pointed tools and materials must not be carried in pockets or clothing unless the point or cutting edge is guarded.

8.2.16 Tools must be handed, not thrown to another worker.

8.2.17 When working in an elevated position:

8.2.17.a Tools must be in a stowed position or secured to prevent them from falling. Tools shall be sent up and down by hand-lines, canvas buckets, or other safe containers.

8.2.18 Tools must not be left on ladders or stairways.

8.2.19 Handles of tools such as pliers, screwdrivers, and similar tools, may be covered with insulation for improvement of grip or to avoid accidental short circuits; however, this covering shall not be depended upon as insulation or protection against personal injury on voltages above 250-volts. Duct tape shall not be used on handles.

8.2.20 Hammers

8.2.20.a Employees shall wear safety glasses while using a hammer.

8.2.20.b Additional eye and face protection shall be utilized if needed.

8.2.20.c Employees shall check behind them before swinging a hammering device.

8.2.20.d Employees shall always keep an eye on the target.

8.2.20.e Caution shall be used while a nail is being set by a hammer.

8.2.20.f Employees shall never place their hand(s) in close proximity to the landing area of the device head after nail is set and nail is being driven into the pole or wooden surface.

8.2.21 Chisels and Punches

8.2.21.a Employees shall wear safety glasses while using a chisel or punch.

8.2.21.b Additional eye and face protection shall be utilized if needed.

8.2.21.c Chisels shall be kept sharp and in good condition.

8.2.21.d Employees shall ensure that they strike the chisel squarely and that the working end of the chisel is pointed away from all body parts.

8.2.21.e Mushroom heads of chisels shall be grounded down periodically to prevent flying metal fragments while the hammer is hitting the chisel head.

8.2.22 Wrenches

8.2.22.a Whenever possible wrenches shall be pulled and not pushed.

8.2.22.b The moving jaw of a wrench should be placed in the direction the handle will be moving.

8.2.22.c Hammers shall never be used to strike a wrench unless the wrench is designed with a striking face.

8.2.22.d Cheater bars shall never be used to increase leverage.

8.2.23 Screwdrivers

8.2.23.a Screwdrivers shall be properly dressed to fit screw slots.

8.2.23.b They shall never be sharpened or used as a cutting tool.

8.2.24 Metallic Tapes and Rules

8.2.24.a Care shall be observed when retracting tape rules to avoid cutting hands or fingers.

8.2.24.b Metal tapes and rules shall never be used near exposed energized equipment or conductors.

8.2.25 Jacks

- 8.2.25.a Jacks shall never be overloaded or extended beyond their designed limit.
- 8.2.25.b Elevated loads which must be maintained for extended periods of time shall be additionally supported by blocks or other support devices.
- 8.2.25.c Employees shall never go under a load that is supported by a jack only.

8.2.26 Fixed Machine/Woodworking Tools

- 8.2.26.a Due to the complexity and the potential of serious injury while working with these tools, extreme caution shall be taken when operating these larger tools.
 - Only properly trained employees will be allowed to work with these tools.
 - All guards need to be in place and in good working condition before the operator can work with these machines. Machines without proper guarding shall not be used.
 - Talking or eating while machine is in operation is prohibited.
 - All machines shall be turned off when operator is not present.
- 8.2.26.b Whenever repairs are being made, proper lockout/tagout procedures shall be followed to de-energize and control all sources of energy that has the potential to cause injury or damage.

8.2.27 Portable Electric Power Tools

- 8.2.27.a Power tools shall be double insulated or have three-prong plugs with grounded extension cords and receptacles.
- 8.2.27.b All tools shall have a constant pressure switch that will shut off power when the pressure is released.
- 8.2.27.c Employees shall disconnect the power tools from the power source by pulling the plug. Pulling on the cord is prohibited.

8.2.28 Pneumatic Power Tools

- 8.2.28.a Pneumatic power tools shall be secured to the hose by some positive means to prevent the tool from becoming accidentally disconnected.
- 8.2.28.b The operating trigger shall be arranged to close the air inlet valve when the pressure of the operator's hand is removed.
- 8.2.28.c A tool retainer shall be installed on impact tools to prevent attachments from being accidentally expelled.

8.2.28.d They shall be equipped with a constant pressure switch that will shut off the power when pressure is released.

8.2.29 Hydraulic Tools and Hoses

8.2.29.a Manufacturers' safe operating pressures for hydraulic tools, hoses, valves, pipes, filters, and fittings, shall not be exceeded.

8.2.29.b Pressure shall be released before connections are broken unless quick-acting, self-closing connectors are used.

8.2.29.c Employees shall not use any part of their bodies to locate or attempt to stop a hydraulic leak. Hydraulic hoses and connections must not be dropped or rested on an employee's body part during operation.

8.2.29.d The fluid used in hydraulic-powered tools shall have dielectric properties and shall retain its operating characteristics at the most extreme temperatures to which it will be exposed.

- Due to its combustibility, employees shall use caution when handling leaks, especially those leaks that cause the liquid to atomize.
- All hydraulic lines longer than 35 feet shall have check valves or provide for loss of insulating value due to partial vacuum, when used where they may come into contact with exposed live parts.

8.2.29.e Immediately prior to activating the crimp (compression) or cutting function of the unit, the operator shall ensure the point of operation is clear of co-workers and the operator.

8.2.30 Power Lawn Mowers, Edgers, Etc.

8.2.30.a All power lawn mowers shall be equipped with adequate guards, which shall remain in place while mower is in use.

8.2.30.b Prior to making adjustments, inspections, or repairs, the employee shall turn off the mower and permit it to come to a complete stop.

8.2.30.c When operating a power mower, the employee shall perform the following:

- Remove any rocks, pieces of wire, or other foreign objects from the area to be mowed.
- Avoid placing the body in front of the discharge opening.
- Mow across the face of a slope or incline.
- Wear proper personal protective equipment to include, as a minimum, safety glasses or safety goggles, appropriate hearing protection, and safety footwear.

8.2.31 Powder-Actuated Tools

- 8.2.31.a Only those employees who are trained and qualified in their operation shall use powder-actuated tools.
- 8.2.31.b Tools shall be maintained in good condition and serviced regularly by qualified persons.
- 8.2.31.c Prior to use, the operator shall inspect the tool to determine if it is clean, if moving parts operate freely, and if the barrel is free from obstructions.
- 8.2.31.d The operator shall also ensure that the protective shield is properly attached to the tool.
- 8.2.31.e Operators and assistants using these tools shall be safe-guarded by means of eye protection (safety eye goggles or face shields), a safety hard hat, and appropriate hearing protection.
- 8.2.31.f Tools shall not be loaded until just prior to the intended firing.
- 8.2.31.g Tools and cartridges shall never be left unattended.
- 8.2.31.h Tools shall never be pointed at any person.
- 8.2.31.i A defective tool shall be tagged and immediately removed from service.
- 8.2.31.j Powder-actuated tools shall not be used in an explosive or flammable atmosphere.
- 8.2.31.k Only cartridges with an explosive charge adequate for the job and with proper penetration shall be used. Explosive charges shall be carried and transported in approved containers.
- 8.2.31.l Only powder charges, studs, or fasteners, specified by the manufacturer for the specific tool shall be used.
- 8.2.31.m In case of a misfire, the operator shall hold the tool in place for 30-seconds. Operator shall then try to operate the tool a second time and then wait another 30-seconds. Misfired cartridges shall be placed in a metal container and returned to the appropriate supervisor.
- 8.2.31.n For additional information concerning powder-actuated tools refer to
 - OSHA 29CFR Part 1910.243, Guarding of Portable Power Tools.
 - OSHA 29CFR Part 1926.302, Power Operated Hand Tools.
 - ANSI A10.3-1970, Safety Requirements for Explosive-Actuated Fastening Tools.

8.2.32 Use of Safety Devices and Supports

- 8.2.32.a All safety devices furnished by the Company shall be properly used by all employees as required. Employees are responsible for using only those devices in good condition.
- 8.2.32.b No employee, material, or equipment, shall be supported on any portion of a tree, pole structure, scaffold, ladder walkway, or other elevated structure, crane, or derrick, without it first being determined that such support is adequately strong and properly secured.

8.2.33 Hand Trucks

- 8.2.33.a Two-wheel trucks shall be loaded with most of the weight over the wheels, heaviest items on the bottom, lightest on the handles.
- 8.2.33.b Hand trucks shall be pushed not pulled, especially down grade, in order to see where you are going.

8.3 Ladders

- 8.3.1 All portable ladders such as straight ladders, stepladders, and extension ladders, etc., shall be maintained in good usable condition and shall be inspected before use.
- 8.3.2 Before climbing any ladder, the employee shall first assure that the ladder is safe. Employees shall use only approved Company ladders.
- 8.3.3 All portable ladders shall be equipped with safety feet to provide a non-slip base.
- 8.3.4 Wooden ladders shall be finished with clear shellac, varnish, or other clear finish only.
- 8.3.5 Paint shall not be used which might obscure a defect in the wood.
- 8.3.6 Portable metal ladders shall not be used in the vicinity of electric circuits.
 - 8.3.6.a Any metal ladder used for authorized purposes shall be legibly marked, "Caution-Do Not Use Around Electrical Equipment".
 - 8.3.6.b Portable metal ladders are not permitted for use in any generation (Production O&M) facility.
- 8.3.7 Ladders with weakened, broken, or missing steps, broken side rails, or otherwise defective, shall not be used.
- 8.3.8 Benches, boxes, tables, or other makeshift substitutes, shall not be used as ladders.

- 8.3.9 Ladders shall not be placed on barrels, boxes, or other unstable bases, to obtain additional height.
- 8.3.10 No ladder shall be used to gain access to a roof or ground level from a shaft, unless the top of the ladder extends at least 3-feet above the point of support, at eaves, gutter, roofline, top of transformer, breaker, or ground level.
- 8.3.11 All stepladders shall be provided with an automatic locking device or spreader to hold the front and back sections in an open position and not allow a spread of more than 40 degrees.
- 8.3.12 Stepladders shall not be used as a straight ladder unless designed by the manufacturer for combination use.
- 8.3.13 Ladders placed near doors, or in passageways, streets, alleys, or sidewalks, shall be protected against being struck by use of barriers and warning signs or by another employee holding the ladder.
- 8.3.14 While working from ladders:
- 8.3.14.a Employees shall not stand on the top rung of a ladder or on the top two steps of a stepladder.
 - 8.3.14.b Employees shall not lean over or reach out farther than normal arm's length unless they are using a safety belt and the ladder is adequately secured.
 - 8.3.14.c Employees shall face the ladder and use both hands when ascending and descending.
 - 8.3.14.d Keep base of ladder clear of debris, tools, etc. (items that may be a slip, trip, or fall hazard).
- 8.3.15 Ladders shall not be used in a horizontal position as platforms, runways, or scaffolds.
- 8.3.16 Straight or extension ladders shall be placed with the base one-fourth the distance to the top support.
- 8.3.16.a Ladders shall be secured, when possible, to prevent falling.
 - 8.3.16.b A second person, if available, must hold the ladder while it is being tied or untied.
- 8.3.17 Extension ladders shall not exceed forty-six (46) feet when extended.
- 8.3.18 Extension ladders shall not be fully extended, but shall have the following minimum overlap, controlled by a fixed stop:

- Three (3) feet for ladders up to and including 36-feet
- Four (4) feet for ladders over 36-feet and up to and including 46-feet.

8.3.19 Extension ladders shall always be erected so that the upper section is resting on the bottom section.

8.3.20 Adjustments of extension ladders shall only be made by the user when standing at the base of the ladder so that he can observe when the locks are properly engaged.

8.3.21 Ladders stored in a horizontal position shall be supported sufficiently to avoid sagging.

8.3.22 Ladders or climbing devices made by nailing cleats across a single rail are prohibited.

8.3.23 Fixed ladders shall meet all Federal and State safety requirements.

8.3.24 For additional information concerning ladders, refer to:

- OSHA 29CFR 1910.25, Portable Wood Ladders.
- OSHA 29CFR 1910.26, Portable Metal Ladders.
- OSHA 29CFR 1910.269.

8.4 Scaffolding

8.4.1 Training shall be conducted for all employees involved with erection and dismantling of scaffolds. This training shall comply with the most current version of OSHA's Scaffolding Regulation.

8.4.2 All scaffolding shall be erected and dismantled under the direct supervision of a competent person.

8.4.3 All users of scaffolds shall receive training in the safe use of scaffolds in accordance with the most current version of OSHA's Scaffolding Regulations.

8.4.4 All scaffolding must be inspected and any necessary corrections or repairs made before starting each day's work.

8.4.5 Danger signs must be displayed and/or barricades used where overhead work is being carried on and where persons or traffic may be endangered.

8.4.6 Any scaffold, including accessories such as braces, brackets, trusses, screw legs, or ladders, damaged or weakened from any cause, shall be immediately repaired or replaced.

8.4.7 All scaffolds and their components shall be capable of supporting without failure at least four (4) times the maximum intended load.

- 8.4.8 All scaffold platforms more than 2-feet above or below a point of access, shall use portable ladders, hook-on ladders, attachable ladders, stair towers, stairway-type ladders, ramps, walkways, prefabricated scaffold access, direct access from another scaffold, structure personnel hoist, or similar surfaces, as a means of access.
- 8.4.9 Cross braces shall not be used as a means of access.
- 8.4.10 Metal tubular scaffolding shall be erected and maintained in accordance with the manufacturer's instructions.
- 8.4.11 All load-carrying timber members of wooden scaffolds shall be a minimum of 1,500 pounds per square inch fiber construction grade lumber.
- 8.4.12 All planking or platforms shall be two (2) inches thick, or the equivalent in strength, and overlap one (1) foot or secured from movement.
- 8.4.12.a Planks shall extend over their end supports at least six (6) inches but not more than one (1) foot and shall be secured.
- 8.4.13 Scaffolds shall be secured to a permanent structure or use outriggers when the height exceeds four (4) times the base dimension.
- 8.4.14 No welding, burning, riveting, or open flame work, shall be performed on any staging suspended by fiber or synthetic rope.
- 8.4.15 Employees shall not work on scaffolds during storms or high winds.
- 8.4.16 Employees shall not ride on manually propelled scaffolds.
- 8.4.17 Scaffolds erected on public or private property shall be dismantled at the conclusion of each day's work, or suitable barricades or a watchman shall be provided.
- 8.4.18 When metal scaffolds are used near energized conductors or equipment, the scaffold shall be grounded as an added safety measure.
- 8.4.18.a Metal scaffolds are not permitted within 10-feet of energized conductors or equipment.
- 8.4.19 Suspension scaffold platforms shall not be less than 20-inches nor more than 36-inches wide overall.
- 8.4.19.a Not more than two workers shall be permitted to work from suspension scaffolds with a rated working load of 500-pounds and no more than three workers shall be permitted when the rated working load is 750-pounds.

- 8.4.19.b Each worker on the suspension scaffold shall be protected by the use of a safety harness attached to a lifeline.
- 8.4.19.c The lifeline shall be securely attached to a substantial structure or line, not a part of the scaffolding, which will safely suspend the worker in case of a fall.
- 8.4.20 Any wire, synthetic, or fiber rope, used for scaffold suspension, shall be capable of supporting at least six (6) times the rated load.
- 8.4.21 Boatswain's chair seats shall not be less than 12-inches by 24-inches and 1-inch thick and shall be reinforced on the underside by cleats to prevent the seat board from splitting.
- 8.4.21.a The employee shall be protected by a safety harness and lifeline.
- 8.4.21.b Chair tackle shall consist of the correct size ball bearings or bushed blocks containing safety hooks and properly "eyed spliced" a minimum five-eighth (5/8) inch diameter first grade manila rope or other rope which will satisfy the criteria (e.g., strength and durability) of manila rope.
- 8.4.21.c Chair seat slings shall:
- Be woven through four corner holes in the seat.
 - Cross each other on the underside of the seat.
 - Be rigged so as to prevent slippage, which could cause an out-of-level condition.
- 8.4.21.d When a heat producing process such as gas or electric arc welding is being performed, the chair seat slings shall be a minimum of three eighths (3/8) inch wire rope.
- 8.4.22 Mobile scaffold wheels and/or casters shall have a positive lock or equivalent mean to prevent movement while the scaffold is used in a stationary manner.
- 8.4.23 Employees shall not ride on scaffolds unless the surface being moved upon is no more than 3-degrees of level and free of holes, pits, and obstructions.
- 8.4.24 No employee shall stand, sit, or ride, on any part of the scaffold, except during proper/intended operation.
- 8.4.24.a Employees shall have feet firmly planted on the floor of the basket platform.
- 8.4.24.b No sitting or climbing is allowed.
- 8.4.24.c The use of ladders, planks, or other device, to achieve additional reach from the platform is prohibited.


8.4.25 If outriggers are provided, the outriggers shall be set and positioned on pads or a solid surface.

8.4.25.a Platform shall be leveled and posts plumb.

8.4.25.b If provided, wheel chocks shall be used unless unit is equipped with locking mechanisms for the wheels

8.4.26 For more information refer to:

- OSHA 29 CFR Part 1910.28 - Safety Requirements for Scaffolding
- OSHA 29 CFR Part 1926.450 - Scope, Application and Definitions Applicable to Subpart L.
- OSHA 29 CFR Part 1926.451 - General Requirements
- OSHA 29 CFR Part 1926.452 - Additional Requirements Applicable to Specific Types of Scaffolding.

Approved by: RCR	 Hawaiian Electric Company Maui Electric Company Hawaii Electric Light Company Other Work Processes & Permits	Safety & Health Manual
Date Revised: 12/3/12		Chapter: 9

Chapter Summary

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9.0 Objective

Hawaiian Electric Company, Hawaii Electric Light Company, and Maui Electric Company, will provide Safe Operating Procedures (SOP) for all other work processes encountered by our employees and contractors.

9.1 Purpose

This Chapter describes the Safe Operating Procedures SOP's that all employees and contractors must follow, in order to provide a safe working environment for every employee or contractor who is engaged in the work processes or permit procedures outlined in this Chapter.

9.2 Work Area Protection

9.2.1. Work area protection is the adequate safeguarding or protecting of pedestrians, motorists, Company workers, and equipment, by the use of adequate barriers, warning sign, lights, flags, traffic cones, high-level standards, barricade rope, flaggers, etc., on approaches to work areas, excavations, open manholes, parked equipment, etc.

9.2.2. Work area protection is accomplished by the use of good informative and protective devices, keeping in mind that a safe installation requires the use of these devices in relation to the location of the workers and the equipment involved.

9.2.3.a The use of these devices must be coupled with proper planning, design, installation, inspection, and maintenance.

9.2.3.b It is of the utmost importance that the work area be properly identified and that the warning devices used clearly conveys the message well in advance of the work area.

- 9.2.4 In plants, buildings, substations, and other structures, temporary opening(s) in floors, platforms, or maintenance areas must be guarded with rails or other substantial barricades and toe boards when needed.
- 9.2.4.a Barriers with appropriate signs shall be used to separate work areas from nearby hazards.
- 9.2.5 When possible, the truck or equipment shall be used as a part of the barricade especially in heavy or fast moving traffic situations.
- 9.2.6 The public must be warned in advance, then monitored and guided safely through or around the work area.
- 9.2.7 State of Hawaii and/or City and County work area permits shall be obtained and posted per the state/county regulations.
- 9.2.8 Equipment
- 9.2.8.a Only those signs, standards, barricades, flags, and cones that conform to state or local codes shall be used.
- 9.2.8.b During night operations or in periods of reduced visibility, special precautions shall be taken. Adequate warning equipment, which may include flashing light, flares, or area illumination, shall be used.
- 9.2.8.c Warning devices and equipment shall be removed as soon as the hazard is eliminated.
- 9.2.8.d Warning devices and equipment not in use shall be stored in a proper manner.
- 9.2.8.e Whenever possible, the services of an outside barricade contractor should be utilized.
- 9.2.9 Flaggers
- 9.2.9.a Flaggers or other appropriate traffic controls shall be used to supplement protection provided by signs, signals, and barricades whenever necessary.
- 9.2.9.b Flaggers shall wear high-visibility clothing which meets ANSI/ISEA 107 Class 2, unless a higher classification is required by the facility or project.
- 9.2.9.c Flaggers shall be trained to understand their responsibilities and the hazards associated with the task.
- 9.2.9.d Flaggers using hand-signaling equipment shall ensure signals provide sufficient warning to protect all personnel at the worksite.

- 9.2.9.e Flaggers shall place themselves in a protected position to reduce possibility of injury from traffic.
- 9.2.9.f Flaggers shall face oncoming traffic at all times.
- 9.2.9.g Flaggers shall ensure they can fully observe the operation and shall guide and warn vehicular traffic in such a manner as to minimize the possibility of accidents or injury.
- 9.2.9.h Flaggers shall give clear signals to effectively direct traffic.
- 9.2.9.i When flaggers are used at both ends of a jobsite, reliable communications or prearranged signals shall be used to ensure proper traffic flow.
- 9.2.9.j Whenever possible, a uniformed Police Officer or a uniformed private guard should be utilized for “Flagger” activities.
- 9.2.9.k For additional information refer to Manual on Uniform Traffic Control Devices for Streets and Highways.

9.3 Welding/Torch Cutting/Brazing

9.3.1 Qualifications and Training

- 9.3.1.a All arc welding (SMAW, GMAW, FCAW, GTAW, GTPAW) shall be performed by welders qualified under AWS or ASME welding codes.
- 9.3.1.b Non-critical welds may be performed by employees under the direction of a qualified welder (AWS or ASME).

9.3.2 Whenever welding is being conducted, all employees directly involved with the welding operation shall wear the proper PPE to avoid injury. Proper PPE for welding shall include, and is not limited to, the following:

- Cutting goggles/welding hood/glasses/ face shields
- Coveralls with long sleeves
- Protective sleeves
- Leather or equivalent gloves, aprons, capes, or jackets
- Hard Hats
- Respirators
- Leather steel-toe shoes
- Hearing Protection when required

9.3.3 Whenever practicable, the welder shall place screens and cover open gratings to prevent eye injuries and fires.

9.3.4 Helpers and other employees exposed to welding shall wear suitable eye protection.

9.3.5 Hot materials shall not be left unguarded.

9.3.5.a They shall be covered, marked "hot", or protected by barriers to prevent contact.

9.3.5.b A fire extinguisher shall be kept near welding operations.

9.3.5.c Where there is danger of causing a fire in the area, an employee shall stand a fire watch.

9.3.6 Inspections

9.3.6.a All welding equipment shall be inspected by the user before use. Worn or defective parts shall be replaced promptly.

9.3.6.b Particular attention shall be given to cables, hose, controls, regulators, and valves. Inspection shall include but is not limited to:

- All leads for broken or cut insulation.
- Electrode holders for broken insulators or worn holders.
- Oil and fuels on gas or diesel-powered units.
- Covers are in place where leads attach to welding machines.
- All connections have no exposed current-carrying parts.

9.3.7 Cutting or welding shall not be done in the presence of explosive atmospheres.

9.3.7.a The general atmosphere, lower explosive limit (LEL), shall be below 10%. Before welding is performed on containers (i.e. transformer tanks, tanks, or pipes), the internal atmosphere shall be purged with inert gas (nitrogen) until the oxygen level (O₂) is below 8% AND LEL is below 10%.

9.3.7.a. Maintain a positive pressure of inert gas, by continuously purging, until the welding is completed.

9.3.7.b If cables, points of electrical contact, etc., are deemed to be hazardous during welding operations, they shall be covered with appropriate arc safe blankets and "refrasil" cloths by the electrical qualified Company employee.

9.3.7.c When welding on transformer tanks below the oil level, it should be determined if the transformer wall is thick enough for the type of welding to be performed.

9.3.7.c.1 Purging with inert gas above the oil level shall be done to avoid a build up of gasses within the transformer.

9.3.7.c.2 If a possibility of melting through exists, the oil shall be brought below the area that is to be welded.

- 9.3.8 Torches shall be lighted by a friction lighter and not by matches or from hot work.
- 9.3.9 Check valves shall be installed at torches and regulators, acetylene and oxygen, for flash back protection to prevent flame from passing into the fuel-gas system.
- 9.3.10 Gauges on oxygen regulators shall be marked: "USE NO OIL".
- 9.3.11 Cylinders containing oxygen or acetylene or other fuel gas shall not be taken into confined and enclosed spaces.
- 9.3.12 Arc Welding
- 9.3.12.a Before using electric arc welding equipment, the welding outfit shall be properly grounded. The ground return cable shall have a safe current carrying capacity equal to or greater than the maximum output capacity of the arc welding unit.
- 9.3.12.b All arc welding cables shall be the completely insulated, flexible type.
- 9.3.12.c There shall not be any splices, for a minimum distance of ten (10) feet, from the cable end to which the electrode holder is connected.
- 9.3.12.d Electrode holders shall be insulated to protect the welder against shock or to prevent short circuits when laid aside.
- 9.3.12.e When electrode holders are to be left unattended, the electrodes shall be removed and the holders shall be so placed or protected that they cannot make electrical contact with employees or conducting objects.
- 9.3.12.f Hot electrode holders shall not be dipped in water.
- 9.3.12.g The arc welding machine shall have the power supply switch opened before the machine is moved or before the welder (employee) leaves the machine unattended.
- 9.3.12.h When cutting pole conduit risers, the cable shall be removed from such conduit before cutting operations can proceed.
- 9.3.12.i When cutting pole conduit risers when the cable is not able to be removed before cutting operations, the cable shall be grounded or visibly disconnected from the system.
- 9.3.12.j Welding and cutting checklists must be completed for operations that are 35 feet from combustibles, 50-feet from flammables, or performed by contractors, and is not within a designated or temporary designated welding area.

9.3.12.k For additional information, refer to respective Company's Hot Work Permit Program.

9.4 **Ergonomics**

Ergonomics is the study of designing equipment and devices that fit the human body, its movements, and its cognitive abilities. Work-related musculoskeletal disorders (MSD's) can result when there is a mismatch between the physical capacity of workers and their equipment and the physical demands of their job. Proper application of ergonomic principles can help to reduce the risk of injuries or illnesses for employees working with computers, or in jobs involving repetitive motions and handling of heavy materials.

9.4.1 Training

9.4.1.a All employees shall receive ergonomics awareness training during the New Employee Safety Training.

9.4.1.b Employees shall be trained in safe lifting and carrying methods, either as individuals or as members of a lifting team and shall follow these methods in all cases.

9.4.2 Work Stations

9.4.3.a A properly adjusted work station is important to the health and well-being of all employees. Employees shall ensure that they adjust all adjustable features of their work station once a work area is assigned to them. For additional information, refer to the pictorial of Ergoman, on page 7 of this section.

9.4.3.b Chair adjustment

- Chairs should be adjustable to adapt to everyone's particular size.
- Sit in chair with hips as far back on the chair as possible and bent at a 90 degree angle.
- Adjust the height of the chair, so your thighs are parallel to the floor and your feet are flat on the floor. If your chair cannot be adjusted to meet this requirement, a foot rest shall be provided or the chair will be replaced. This will relieve pressure on the thighs.
- Adjust backrest for lumbar support. This should support the natural curve in the back. The backrest should be able to adjust up, down, backward, and forward.

9.4.3.c Video Display Terminal (Monitor) adjustment

- Position video display terminal, so the operator's eyes are level with the top of the screen or just slightly below.
- Operator should use eyes to scan the video display instead of moving operator's head up and down. Video display should be 18 to 30-inches from the operator's eyes.

- Position the video display terminal directly in front of the user and adjusted to avoid glare.

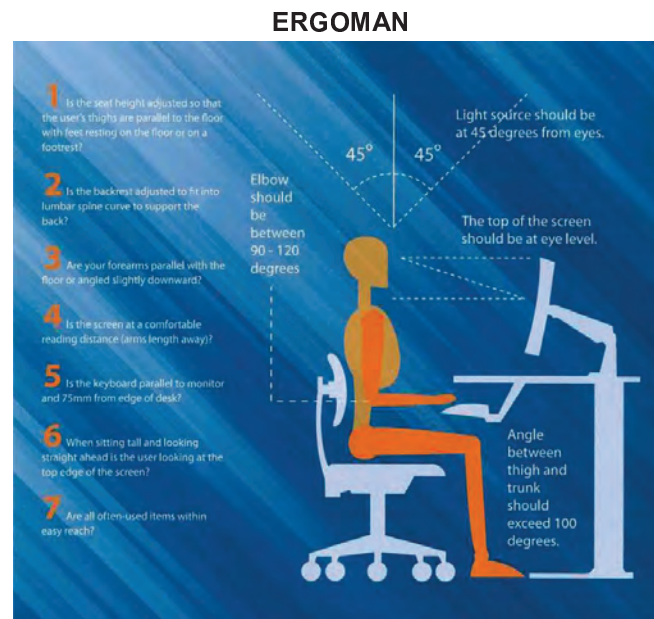
9.4.3.d Keyboard adjustment

- Adjust the height of the keyboard, so that shoulder-elbow-arm angle is at 90 degrees and wrists are straight.
- If a “mouse” is used, place it directly to the left or right of the keyboard to avoid extended reaching.
- Use a cushioned wrist rest to keep user’s hands and fingers in the same plane as the forearm.

9.4.3.e Other Workstation Adjustments and Considerations

- Use a copyholder on the side of the video display terminal, positioning the documents at a proper viewing distance and height.
- Adjust height of desk or terminal base to adapt to the size of the workers.
- Use a telephone shoulder rest or headset to maintain the neck in a neutral position.
- Video display terminal users shall take “micro breaks” periodically to allow the body to rest itself, especially the eyes, backs, shoulders, neck, arm, and hands, and if possible alternate work tasks.
- Arrange the most often used materials within easy reach and arrange the desktop so everything is accessible without twisting the torso or overreaching.
- Blink eyes every few seconds to keep them moist and lessen strain and fatigue.

9.4.3.f Employees may request an in-person ergonomic workstation evaluation, by contacting the Facilities Operations & Planning Division or Safety Division.



9.4.3 Other Ergonomic Work Activities

- 9.4.4.a Stretch muscles prior to actual lifting, climbing, other physical work, and after meal breaks. See [HECO Stretching Program](#).
- 9.4.4.b Alternate repetitive motions with other tasks and rest between repetitions.
- 9.4.4.c Avoid long periods in one position.
- 9.4.4.d Work with your body in a neutral position.
- 9.4.4.e Use two hands for a task rather than one.
- 9.4.4.f Keep wrists straight (neutral) rather than bent or flexed while performing a task.
- 9.4.4.g Grasp objects with your full hand and not just with your finger(s).

9.4.5 Lifting

- 9.4.5.a Manual lifting shall be limited to the 1991 NIOSH Lifting Standard Recommended Weight Limit (RWL), which serves as a recognized guideline for manual lifting activities. For information relating to the 1991 NIOSH Lifting Standard Recommended Weight Limit (RWL), confer with the respective Safety Representative.
- 9.4.5.b Engineering controls or lifting teams shall be considered when lifting exceeds the RWL.
- 9.4.5.c Employees shall use the following lifting techniques whenever lifting:
 - Set feet securely, shoulder width apart.
 - Squat over the object being lifted, bending the knees and keeping the back as nearly upright as possible.
 - Lift with the leg and arm muscles, keeping the load close to the body. Face the load while carrying and when it is necessary to turn, do so by shifting the feet.
 - Do not twist when lifting or carrying.
 - Lower the object using the same principles.
 - Lifting team members should be of approximately the same height and lift in unison, with one person giving all the orders.
- 9.4.5.d When carrying or handling materials, watch out for pinch points, uneven surfaces, and material defects.
- 9.4.5.e Never carry a load so large that it obstructs the vision.

9.4.6 Back Supports

- 9.4.6.a Back supports do not replace education and proper lifting, bending, and carrying techniques.
- 9.4.6.b Back supports should not be used if the goal is to lift greater weights do more repetitions, or otherwise overdue normal activities.
- 9.4.6.c For more information, refer to the Company's [Guide for Back Supports and Anti-vibration Protection](#), available on the Intranet.

9.5 Confined / Enclosed Spaces

9.5.1 Before entering any Confined/Enclosed space, all policies and procedures outlined in this section and in the Company's Enclosed Space Program shall be followed, to ensure the safety of all employees working within these spaces.

9.5.2 Training

- 9.5.2.a Only employees who have been properly trained on the hazards associated with confined or enclosed space work shall be allowed to enter a confined or enclosed space.
- 9.5.2.b Training shall be a combination of classroom and on-the-job and shall include, but is not limited to, the following:
 - What is a confined space.
 - Difference between enclosed and confined.
 - Testing of a space and what the results mean.
 - Other hazards of confined/enclosed space entry.
 - Confined/enclosed space entry and rescue procedures.
 - CPR/AED and Basic First Aid.

9.5.3 Removal of Manhole/Handhole Covers

- 9.5.3.a Before any entrance cover to a confined or enclosed space is removed, it shall be determined that there are no temperature or pressure differences, or other hazardous conditions, that may injure the employees removing the cover.
- 9.5.3.b When covers are removed from confined or enclosed spaces, the opening shall be guarded by a railing, temporary cover, or other temporary barrier.

9.5.4 Atmospheric Testing

- 9.5.4.a Before entering a confined or enclosed space, all levels of the space shall be tested for lack of oxygen, and then for the presence of flammable or toxic gases and vapors. Monitoring instrumentation must be calibrated.

- 9.5.4.b If a hazard-increasing work activity is to take place in a confined or enclosed space (i.e., welding, painting, working with solvents, and coating), the air in the space shall be continuously tested and forced ventilation shall be used, to maintain oxygen at a safe level and to prevent a hazardous concentration of flammable or toxic gases and vapors.
- 9.5.4.c Electric welding, gas welding, cutting, or any other hot work, shall not be performed on the interior, exterior, or near the openings, of any confined or enclosed space that may contain flammable or explosive gases or vapors, until the space has been properly cleared.
- 9.5.4.d Compressed-gas bottles shall not be taken into a confined space.
- 9.5.4.e If flammable or toxic gases or vapors are detected or if an oxygen deficiency is found, the space shall be continuously tested and forced ventilation shall be used to maintain oxygen at a safe level and to prevent a hazardous concentration of flammable or toxic gases and vapors.
- 9.5.4.f Entry into a confined or enclosed space, with an unsafe atmosphere shall be avoided if at all possible.
- 9.5.4.g If a space needs to be entered with an unsafe atmosphere present, then permit requirements outlined in Section 9.5.6 must be followed.

9.5.5 Non Permitted Confined/Enclosed Space

- 9.5.5.a Before employees are allowed to enter a confined space, all electrical and mechanical energy sources that could affect the employees working in the space shall be physically rendered inoperative, locked out, and tagged.
- 9.5.5.b Safe access/egress to/from the confined space shall be maintained at all times.
- 9.5.5.c If required, the space shall be drained, vented, and cleaned.
- 9.5.5.d If possible, all cords, hoses, leads, etc., shall be routed through an entrance other than the employee access into the confined space.
- 9.5.5.e While work is being performed in an enclosed space, a person with CPR and basic first aid training shall be immediately available to render emergency assistance.
- 9.5.5.f Necessary trained rescue personnel and equipment shall be available in the event of an emergency.

9.5.6 Permit Required Confined/Enclosed Space

- 9.5.6.a If work is to be performed in a confined space, the Company's written permit system shall be followed.
- 9.5.6.b A properly trained attendant shall be stationed outside the confined space.
- 9.5.6.c The attendant shall maintain continuous communication with the employees authorized to be in the confined space.
- 9.5.6.d The attendant shall be able to recognize confined space hazards and changing conditions in the confined space that could affect employees in the space.
- 9.5.6.e In the event of an emergency, the attendant shall not enter the confined space and shall be able to summon emergency and rescue services.
- 9.5.6.f For additional information concerning confined-space requirements, refer to;
 - HiOSH and OSHA standards 29 CFR 1910.269, 29 CFR 1910.146,
 - Company's [Confined and Enclosed Space Program](#), available on the Intranet.

9.6 Excavations, Trenching, Shoring

- 9.6.1 Each employee who works in or around an excavation shall be trained to recognize potential hazards associated with excavations: Cave-in potential, fall hazards, safe entry and exit, proximity to excavating equipment, air quality, back-filling and compacting activities, protective systems, etc.
- 9.6.2 Prior to excavation all information and required approvals on underground structures such as water lines, gas lines, telephone cables, power cables, sewers, etc., shall be obtained and care shall be used to avoid damage to or hazard from such structures.
- 9.6.3 Before opening an excavation, all interferences such as trees, sidewalks, and foundations, shall be removed or supported as necessary to protect all employees and the public.
- 9.6.4 The estimated location of utility and other underground installations that may be encountered during excavation work shall be determined before opening the excavation.
- 9.6.5 The Hawaii One-Call Center, phone 1-866-423-7287, which operates 24/7, shall be called when HECO, HELCO, or MECO, as well as their contractors and vendors, are serving as commercial excavators for planned/non-emergency jobs.
 - Use to request information on the location of underground utility lines in the area.
 - Each utility with underground lines in the planned excavation area must accurately describe or mark their lines within five (5) working days of the request.
 - Commercial excavators still need to obtain proper excavation permits, if applicable, prior to calling "One Call".

- Commercial excavators who fail to call the Hawaii One-Call Center are subject to penalties/fines.
- 9.6.6 When excavation operations approach the estimated location of underground installations, the exact location of the installations shall be determined by safe and acceptable means, usually by hand digging with an insulated shovel and the use of suitable gloves.
- 9.6.7 If electric cables are damaged, the following steps shall be taken:
- If the damaged cable belongs to a utility other than the one performing the work, this utility shall be notified at once.
 - The area shall be barricaded and the public kept out until hazardous conditions can be eliminated.
- 9.6.8 If gas lines are damaged, the following steps shall be taken:
- The hole shall be left open to allow the gas to dissipate into the atmosphere.
 - All possible sources of igniting the gas shall be prevented, removed, or eliminated.
 - Residents of the area shall be warned when necessary and the public kept out of the area.
 - The fire department shall be notified immediately.
 - The gas company shall be notified immediately.
 - The local police department shall be notified.
- 9.6.9 If communication cables are damaged, the communication company shall be notified at once.
- 9.6.10 While the excavation is open, underground installations shall be protected, supported, or removed, to safeguard employees.
- 9.6.11 Sides of trenches in unstable or soft material four (4) feet or more in depth shall be shored with approved shoring and braced or sloped to prevent collapse.
- 9.6.12 If sloped, it shall not be steeper than one (1) foot vertical rise to each 1/2 foot horizontal.
- 9.6.13 Sides of trenches in hard or compact soil, including embankments, shall be shored when the trench is more than four (4) feet in depth and eight (8) feet or more in length or sloped to prevent collapse.
- 9.6.14 Excavation for pad or pile-type footings in excess of five (5) feet deep shall be sloped or shored if entry is required.
- 9.6.15 When shoring and bracing, the upper trench jack or cross brace shall be installed first and removed last.

- 9.6.16 Where employees are required to be in trenches four (4) feet deep or more, ladders, extending from the floor of the trench to at least three (3) feet above the top of the excavation, shall be provided and so located as to provide means of exit without more than twenty-five (25) feet of lateral travel.
- 9.6.17 Excavated materials and superimposed loads shall be kept a minimum of two (2) feet away from the edge of the trench. Soil banks more than four (4) feet high shall be shored or sloped.
- 9.6.18 Walkways, runways, and sidewalks shall be kept clear of excavated material or other obstructions and if undermined, they shall be shored to carry a minimum live load of 125 pounds per square foot and shall be provided with standard guardrails.
- 9.6.19 Where bridging is necessary to permit the safe flow of traffic for equipment or vehicles, it shall overlap the opening by a minimum of two (2) feet on each side.
- 9.6.19.a A steel plate ½-inch thick minimum, properly shored, is preferred over wood planking.
- 9.6.20 Unobstructed passageways shall be maintained at all fire hydrants and fire alarms.
- 9.6.21 Employees exposed to vehicular traffic shall wear warning vests made of high visibility material.
- 9.6.22 Daily inspections of excavations shall be made for evidence of possible cave-ins, slides, or defective shoring. Corrections shall be made before continuing the excavation.
- 9.6.23 Backfilling shall progress with the work whenever possible.
- 9.6.24 For additional information on excavation requirements, refer to HiOSH 12-132.

Approved by: RCR	 Hawaiian Electric Company Maui Electric Company Hawaii Electric Light Company Hazard Communication	Safety & Health Manual
Date Revised: 12/3/12		Chapter: 10

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10.0 Objective

Hawaiian Electric Company, Hawaii Electric Light Company, and Maui Electric Company, will develop, maintain, and administer, a comprehensive Hazard Communication (Employee Right-to-know) Program.

10.1 Purpose

The purpose of a Hazard Communication Program is to ensure that all employees, contractors, and the public, know the hazards associated with the chemicals used at our jobsites, and that our employees are knowledgeable in the proper handling and care while using these chemicals to perform their daily tasks safely.

10.2 Hazard Communication (HAZCOM)

10.2.1 Training through either classroom or on-the-job, shall be provided to all employees to inform them of their right-to-know about the hazards associated with the chemicals being used in the workplace.

10.2.2 All chemically based products must be accompanied by a Material Safety Data Sheet (MSDS) and approved for use by Safety Division, before it can be used by any employee for any process or operation.

- 10.2.2.a The Safety Division shall review all MSDS's before a product may be used in any operation.
- 10.2.2.b Safety Division will review all new products for unwanted health effects to employees, such as carcinogenic properties, and toxicity.
- 10.2.2.c Upon review, Safety Division will notify the submitting user whether or not the product can be used and what precautions, if any, need to be adhered to while using the product.
- 10.2.2.d A Material Safety Data Sheet on-line database, located on the Intranet, is available to all employees.
- 10.2.2.e The central library for all MSDS's is in the Safety Division.
- 10.2.2.f All MSDS's received shall be forwarded to Safety Division for inclusion into the database and library.
- 10.2.3 Employees shall familiarize themselves with the hazards involved before using such substances and shall take all necessary precautions to protect themselves, their fellow workers, and the general public.
- 10.2.3.a All employees shall read the label before handling any chemical product.
- 10.2.4 All chemically based products that have been transferred from its' own container into another container, must be labeled to include the following:
- Name of the Product.
 - Type of Hazard (eg. Flammable, Corrosive, Explosive).
 - Manufacturer.
- Note: The only exception, is when all the contents in the container is for immediate use and the container is empty when not in use.
- 10.2.5 Employees shall consult the Material Safety Data Sheets on the chemically based products that are in use if more information, not found on the label, is needed by the employee for safe handling of the product.
- 10.2.6 Where it is impractical to control and/or eliminate harmful quantities of dusts, fumes, mists, or vapors, all employees working in the vicinity of the zone of contamination shall be protected through the use of proper personal protective equipment.
- 10.2.7 Because of the volatile nature of ammonia or chlorine solutions, containers of the concentrated liquid should be opened in a well-ventilated area. Pouring or pumping these solutions into open containers should be done with caution.

10.2.8 For more information, refer to the Company's [Hazard Communication Program](#), available on the Intranet.

10.3 Material Storage/Disposal

10.3.1 Load limits shall not be exceeded at any time.

10.3.2 Maximum safe load limits of floors within buildings and structures, in pounds per square foot, shall be conspicuously posted in all storage areas, except for floor or slab on grade.

10.3.3 Material shall be stacked so as to prevent toppling, sliding, or rolling. In general, heavy material shall be stacked at lower levels with light materials above.

10.3.3.a Bags of material shall be cross-tied with the openings on the inside of the pile and stepping back the layers every ten (10) bags high.

10.3.3.b Brick stacks shall be cross tied and not be more than seven (7) feet in height. Bricks shall be tapered back two (2) inches in every foot of height above the four (4) foot level.

10.3.3.c Barrel and keg stacks shall be piled on end where possible. If stored on their sides, racks must be provided for them and planks lay on top of a row before others are placed above.

10.3.4 Aisle and passageways shall be kept clear to provide for the free and safe movement of material handling equipment or employees.

10.3.4.a Such areas shall be kept in good repair.

10.3.5 Compressed gas cylinders must be handled with care to avoid being dropped or jarred.

10.3.5.a Cylinders shall be stored in the upright position and secured in racks, for this purpose, to prevent falling or being knocked over.

10.3.5.b Valve protection caps must always be kept on cylinders when they are being moved, stored, or until ready for use.

10.3.5.c Cylinders shall not be lifted by their valve protection caps and shall be protected from heat, sparks, or flames.

10.3.6 Nails must never be left projecting from boards, packing cases, concrete forms, etc.

10.3.6.a All projecting nails must be removed entirely, bent flat, or boards containing them be placed in a container immediately.

- 10.3.6.b All scrap lumber, waste material, and rubbish, shall be removed from the immediate work area as the work progresses.
- 10.3.7 All solvent waste, oily rags, and flammable liquids, shall be kept in fire-resistant covered containers until removed from the work site.
- 10.3.8 Whenever materials are to be dropped more than twenty (20) feet to any point lying outside the exterior walls of the building, an enclosed chute of wood or equivalent material shall be used.
 - 10.3.8.a When debris is dropped through holes in the floor without the use of chutes, the area onto which the material is dropped shall be completely enclosed with barricades not less than 42-inches high and not less than six (6) feet back from the projected edge of the opening above.
 - 10.3.8.b Signs warning of the hazard of falling materials shall be posted at each level.
 - 10.3.8.c Removal shall not be permitted in this lower area, until debris handling ceases above.

10.4 Flammable Liquids

- 10.4.1 Flammable liquids are liquids with flashpoints of less than 100° F.
 - 10.4.1.a Flammable liquids shall be handled in closed and approved marked safety containers (preferably metal), and such containers kept in approved locations.
 - 10.4.1.b Flammable liquids may be used only where there are no open flames or other sources of ignition within fifty (50) feet of the operation.
 - 10.4.1.c Transfer flammable liquids from one container to another only when containers are electrically interconnected (bonded), or in firm contact.
 - 10.4.1.d Leaky flammable liquid furnaces or torches shall not be used.
- 10.4.2 Combustible liquids have flashpoints at or above 100° F.
 - 10.4.2.a No more than 25-gallons of flammable or combustible liquids shall be stored in a room outside of an approved storage cabinet.
 - 10.4.2.b They shall not be stored in areas used for exits, stairways, or normally used for the safe passage of people.
- 10.4.3 Flammable and combustible liquids shall not be disposed of by pouring them into the sewer or other drains. Approved means of disposal must be used, such as waste oil or solvent tanks.

10.4.4 Spraying (atomizing) of flammable and combustible liquids in the proximity of open flames or hot surfaces must be avoided.

10.4.5 Consult the applicable MSDS for more information.

10.5 **Asbestos**

Asbestos is a fibrous mineral used primarily as an insulating material. It has been widely used at the power plants and within our facilities in various capacities. Asbestos is an inhalation hazard that adversely affects the lungs. If not handled properly, breathing in asbestos fibers can cause diseases such as asbestosis and lung cancer.

10.5.1 Only those employees who have been properly trained and equipped with the necessary personal protective equipment shall be allowed to perform asbestos abatement activities.

10.5.1.a Supervisors shall ensure that employees required to work with asbestos receive the training needed to perform the particular job task.

10.5.2 Negative-air enclosures or other engineering controls (e.g., glove bags) that reduce the concentration of airborne asbestos fibers shall be used when working with asbestos whenever possible.

10.5.2.a Asbestos shall be handled, removed, cut, scored, or otherwise worked, in a wet state. Other methods of controlling airborne levels of asbestos shall be used, when an electrical hazard exists and cannot be eliminated during abatement work.

10.5.3 Respirators:

10.5.3.a Approved respirators shall be worn when there is a possibility of airborne concentrations of asbestos fibers that exceed the action level.

10.5.3.b The type of respirator required shall be based on the airborne concentrations of asbestos fibers.

10.5.3.c At no time shall less than a half mask air-purifying respirator with a high efficiency filter be used.

10.5.3.d Refer to the Company's Respiratory Protection Program for additional information.

10.5.4 Special Clothing:

10.5.4.a Employees who are exposed to detectable airborne concentrations of asbestos fibers shall use special clothing such as coveralls, head coverings, gloves, and foot coverings.

10.5.4.b Clothing shall be changed only in the designated location and shall be kept separate from street clothes.

10.5.4.c Contaminated clothing shall be properly cared for or disposed of and kept separate from other laundry or disposed of material; it shall be transported in sealed, impermeable bags or similar containers, and properly labeled to identify the possible hazard.

10.5.5 Housekeeping

10.5.5.a All external surfaces shall be maintained free of accumulations of asbestos fibers.

10.5.5.b Asbestos waste and materials contaminated with asbestos, which may produce airborne concentrations, shall be collected and disposed of in sealed impermeable bags at least 6 mils thick or similar containers.

10.5.5.c Bags or containers shall be wetted thoroughly and evacuated of all air before sealing, and all bags shall be double bagged and properly labeled.

10.5.6 For additional information concerning asbestos requirements, refer to:

- OSHA 1910.1001, the Environmental Protection Agency's Worker Protection Rule 40 CFR 763,
- HiOSH standard, and the Company's [Asbestos Program](#) and [Guidelines for Transite Duct and Brake Work](#), available on the Intranet.

10.6 Lead (Paint Abatement)

10.6.1 Training

10.6.1.a All employees who are exposed to lead hazards shall receive lead awareness training.

10.6.1.b Only employees who have received additional training on the safe handling of lead materials shall be allowed to work with lead containing products.

10.6.2 For more information on lead exposure, refer to:

- HiOSH 12-202-33 for General Industry Standards
- HiOSH 12-148-2 for Construction Industry Standards, and
- Company's [Lead Program and Guidelines](#), available on the Intranet.

10.7 Compressed Gases/Poison Gas/Liquified Petroleum Gas (LPG)

10.7.1 Training

- 10.7.1.a All persons who use or handle compressed gas cylinders shall be qualified by experience or training. Cylinders shall be protected against tampering by unauthorized persons.
- 10.7.1.b All cylinders shall be inspected before being transported or used.
- 10.7.1.c No damaged or defective cylinder shall be used.
- 10.7.1.d Never hammer the valve wheel in attempting to open or close the valve.
- 10.7.1.e If a cylinder leaks and the leak cannot be stopped by simply tightening a valve gland or packing nut, close the valve and attach a tag stating that the cylinder is unserviceable.
- 10.7.1.f Relocate the cylinder out of doors to a ventilated location.
- 10.7.1.g If the gas is flammable, keep away from any source of ignition and slowly empty it.

10.7.2 All compressed gas cylinders shall be of the approved type, which meets Federal and State regulations for construction.

10.7.3 Compressed gas cylinders shall be legibly marked for the purpose of identifying the gas content. Whenever practical, the marking shall be located on the shoulder of the cylinder.

10.7.4 Empty cylinders shall be legibly marked "MT" and segregated from full cylinders. Empty cylinders shall be returned to a permanent storage facility as soon as possible.

10.7.5 Full or empty cylinders shall never be used as rollers or supports.

10.7.6 Oxygen cylinders shall not be stored near highly combustible material and shall be separated from fuel-gas cylinders a minimum distance of twenty (20) feet, or by a non-combustible barrier at least five (5) feet high having a fire resistance rating of at least one-half hour.

10.7.7 Avoid dragging, sliding, dropping, or permitting cylinders to strike violently against each other or against other surfaces.

10.7.8 The primary method of moving cylinders shall be by a mechanical device, such as a hand truck or forklift with cylinders properly secured to the device; however, when this is

not practical, tilting and rolling them on their bottom edges is preferable to team carrying by employees.

10.7.8.a Cylinders shall not be hoisted or transported by means of magnets or choker slings.

10.7.9 Do not place cylinders where they might become part of an electric circuit.

10.7.10 Never use compressed gases where the cylinder is apt to be contaminated by the feedback, unless protected by suitable traps or check valves.

10.7.11 Connections to piping, regulators, and other appliances, shall always be kept tight to prevent leakage.

10.8 Valves and Regulators

10.8.1 Where provision is provided for removable valve caps, they shall be kept hand tight on cylinders for valve protection, except when cylinders are in use or connected for use.

10.8.2 Remove regulators and reinstall valve caps, when transporting on public highways or roads.

10.8.3 Cylinder valves shall be kept closed, except when withdrawing gas.

10.8.4 Cylinders not having fixed hand wheels shall have keys, handles, or non-adjustable wrenches on valve stems, while they are in service.

10.8.5 Suitable pressure regulating devices shall be used in all cases where gas is admitted to a system having pressure-rating limitations lower than the cylinder pressure.

10.8.6 Before a regulator is removed from a cylinder, close the cylinder valve and release all pressure from the regulator.

10.8.7 Oil and grease shall not be used on cylinder or regulator connections.

10.8.8 Cylinder valves shall be opened very slowly while standing to one side of the outlet, never in front of it.

10.8.9 Oxygen cylinder valves shall be opened fully, against the back seat, to prevent leakage around the valve stem or seat.

10.8.10 Fuel cylinder valves shall be cracked and reclosed before attaching regulator, when there is no possible source of ignition.

10.8.10.a When placed in use, the valve shall not be opened more than 1-1/2 turns and preferably no more than 3/4 of a turn.

10.8.11 Poison Gas

- 10.8.11.a If the gas is toxic (Poison Gas), place a sign at the cylinder warning against the hazard; notify the gas supplier and follow his instructions. Before using poison gases, read all label information and data sheets associated with the use of the particular gas.
- 10.8.11.b All personnel handling or using poison gases shall have available for immediate use, a self-contained breathing apparatus (SCBA). SCBA equipment shall be located convenient to the place of work, and kept out of the area most likely to be contaminated.
- 10.8.11.c Poison gases shall be used in forced ventilation areas, or in hoods with forced ventilation or out of doors.
- 10.8.11.d Poison gases emitted from equipment in high concentration shall be discharged into appropriate scrubbing equipment, which will remove it from effluent streams.
- 10.8.11.e Use of poison gases shall be limited to small cylinder sizes, to ensure complete usage of the cylinder content within a reasonable amount of time.

10.8.12 Liquefied Petroleum Gas (LPG)

- 10.8.12.a All persons who handle or dispense LPG shall be qualified by experience or training.
- 10.8.12.b Persons exposed to freezing vapors shall wear rubber gloves.
- 10.8.12.c During loading and discharge of LPG, vehicles shall not be left unattended, brakes shall be set, and the engine shall be shut off. Wheels are to be blocked if needed.
- 10.8.12.d Tanks and fittings shall be protected against physical damage and No Smoking or Open Flame shall be permitted within 50-feet of the area.
- 10.8.12.e All propane gas cylinders shall be inspected and pass hydrostatic testing for service, according to DOT regulations, within 12-years of the manufacturer's date, or removed from service and replaced.

10.8.13 Compressed Air

- 10.8.13.a All compressed air equipment shall be inspected prior to use to ensure safe operation.
- 10.8.13.b Air hose, valves, and fittings, shall be of the proper pressure rating and all couplings shall be of a safety type to prevent accidental disconnection.

10.8.13.c All air hoses ½-inch inside diameter or greater, shall have an approved safety device at the source of supply or branch line, to reduce pressure in case of hose failure.

10.8.13.d Air hoses and lines shall be checked for soft spots and damage, before use by the employee in the field.

10.8.13.e The use of hoses for hoisting or lowering tools shall not be permitted.

10.8.13.f The pressure on air hoses or lines shall be released before uncoupling or disconnecting them.

10.8.13.g Air receivers shall:

- Meet the State of Hawaii requirements for construction and fittings.
- Be blown frequently enough to prevent the accumulation of water, oil, and rust.
- Have their pressure released completely when not in use.

10.3.13.h Use of quick release fittings is permitted.

10.3.13.i Safety valves shall be tested at least twice a year to determine that they are in good operating condition.

10.3.13.j Compressed air streams shall not be brought into close or direct contact with any portion of an employee's body or the clothing they are wearing, due to the danger of injection of air into the blood stream.

10.3.13.k Compressed air shall not be used for cleaning purposes, except where reduced to less than 30 PSI and then only with an effective chip guarding and personal protective equipment. The 30-PSI requirement does not apply for sand blasting operations, mill scale cleaning, and similar cleaning operations.

10.3.13.l Compressed air shall not be used to force the contents out of drums, except in special cases with pressure control equipment under the direction of a qualified employee.

10.9 Painting/Coating/Dipping/Degreasing

10.9.1 The person in charge of the job shall inform employees, before performing this type of work, when they are using volatile, toxic, strong acid or alkali paints, solvents, chemical preservatives, or removers.

10.9.1.a Employees shall obtain this information from the container label.

- 10.9.1.b Consult the MSDS if the label does not have the information needed for safe handling.
- 10.9.2 Employees shall be provided protection against skin contact during the handling and application of these products as well as approved respiratory and eye protection.
- 10.9.3 When the products are considered flammable or combustible, there shall be No Smoking or Open Flame within fifty (50) feet during the handling and application, nor until the area is well ventilated.
- 10.9.4 Whenever brush or spray painting operations are performed, all waste or rags shall be deposited in an approved metal waste can and removed daily.
- 10.9.5 Clothing used by employees for painting shall be stored in a metal locker or removed from the premises at the end of each shift.
- 10.9.6 Brushes, tools, and spray equipment, shall be cleaned daily and the cleaning solvent shall have a flash point not less than 105°F; however, a lower flash point may be used for special conditions, but the cleaning shall be done inside a spray booth and ventilating equipment shall be operating during the cleaning.
- 10.9.7 Spray painting shall not be conducted outside a predetermined spraying area.
- 10.9.7.a The area shall be guarded to assure that a safe isolation of the process is maintained from other employees or others in the area.
- 10.9.8 Pressure tanks used in spraying operations shall meet the requirements of the ASME Code and shall be so marked. Tanks of two-gallon capacity or over shall be so designed that the bottom will not be in contact with the floor or ground.

10.10 Explosives / Dynamite Blasting

- 10.10.1 Detonating explosives such as dynamite or other explosive compound and detonators, used by the Company or its' Contractors, shall be purchased, transported, and used, only by or under the direct supervision of a person trained in their use and designated as a "Powder Man" or "Blaster".
- 10.10.2 A blaster shall be qualified by training, knowledge, or experience, in the field of transporting, handling, and use of explosives, and have working knowledge of all State and local regulations with respect to explosives.
- 10.10.2.a Blasters shall be required to furnish satisfactory evidence of competency in the safe handling of the explosives being used.
- 10.10.2.b They shall be certified and licensed by the state they are working in. The handling and use of explosives shall be in strict accordance with Federal and

State Safety Laws and the instructions given in "Safe Handling and Use of Explosives", published by The Institute of Makers of Explosives.

10.10.3 The use of electric blasting caps or detonators, where sources of extraneous electricity make the use dangerous, is strictly prohibited. Only non-electric detonating devices shall be used in those situations.

10.10.4 The Blaster shall have complete authority over the blasting operation.

10.10.5 The Company employee in charge shall follow the direction of the Blaster and shall ensure that all employees, contractors, and the public, are clear before and during blasting operations.

10.10.6 The Blaster shall give three distinct warnings before blasting.

- Warning Signal - 1 minute series of long blasts 5-minutes prior to blast signal.
- A series of short blasts 1 minute prior to the shot.
- A prolonged blast following the inspection of the blast area.

10.10.7 In case of miss-fire or failure of the charge to explode, it must be left guarded for at least one (1) hour before any one is permitted to approach.

10.10.7.a Another charge may be planted at least two (2) feet away from the unexploded charge.

10.10.7.b No attempt shall be made to drill out or draw the unexploded charge.

10.11 Lasers

10.11.1 Only qualified and trained employees shall be assigned to install, adjust, and operate, laser equipment.

10.11.2 Areas in which lasers are used shall be posted with standard laser warning placards.

10.11.3 Beam shutters or caps shall be utilized, or the laser turned off, when the laser transmission is not actually required.

10.11.4 When the laser is left unattended for a substantial period of time, such as during lunch hour, overnight, or at change of shifts, the laser shall be turned off.

10.11.5 Only mechanical or electrical means shall be used, as a detector, for guiding the internal alignment of the laser.

10.11.6 Laser equipment shall bear a label to indicate maximum output.

10.11.7 Employees shall not be exposed to light intensities above:

- Direct staring: 1 microwatt per square centimeter;

- Incidental observing: 1 milliwatt per square centimeter; and
- Diffused reflected light: 2-1/2 watts per square centimeter.

10.11.8 Employees, when working in areas in which a potential exposure to direct or reflected laser light is greater than 0.005 watts (5 milliwatts), shall be provided with anti-laser eye protection devices.

10.11.9 The laser beam shall not be directed at anyone.

10.11.10 Laser unit in operation should be set up above the heads of the employees when possible.

10.11.11 When it is raining, or when there is dust or fog in the air, the operator of the laser systems shall ensure employees are kept clear of the source and target areas.

10.11.12 Employees shall not be exposed to microwave power densities in excess of ten (10) milliwatts per square centimeter.

10.12 Polychlorinated Byphenyls (PCB's)

10.12.1 Only properly trained employees shall handle material containing 50 ppm or greater PCB's.

10.12.2 Employees shall wear the appropriate Personal Protective Equipment (PPE) when cleaning up after a rupture of a capacitor or transformer containing 50 ppm or greater PCB's.

10.12.3 Before entering a confined space such as a transformer vault room or manhole, after the failure of equipment containing 50-ppm or greater PCB's, the space shall be purged by forced ventilation and employees entering the space shall wear proper auxiliary breathing equipment, until tests indicate it is free of fumes.

10.12.4 All materials such as rags, solvents, dirt, etc., contaminated by 50-ppm or greater PCB's, shall be disposed of according to the Company's PCB Procedures manual and the PCB's Marking and Disposal Rule.

10.13 X-Ray (Radiography)

10.13.1 X-ray (radiography) work shall be performed by qualified and licensed personnel only.

10.13.2 Whenever someone is using an X-ray instrument shall:

- Never put any part of your body in the expected path of the main beam.
- Avoid being around the X-ray tube housing and main beam path as much as possible.
- Keep the enclosure doors closed whenever possible.
- Not enter an X-ray facility unless the person in charge lets you in.

10.14 Illumination (Lighting)

10.14.1 Lighting at the following minimum intensity shall be provided by natural or artificial means during working hours:

Table 14a - Work Area-Light Requirements

Foot-candles	Work Area or Operation
5	General outdoor area such as yards and roadways.
30	Areas not requiring discrimination of detail at working levels.
50	Rough bench and machine work areas.
50	Regular office work including filing, reading, etc.
100	Detailed office work including bookkeeping, accounting, etc.

10.14.1.a These minimum intensities shall not apply where they may cause a strain on the vision or glare in the eyes of the worker.

10.14.1.b Employees can request a light intensity survey, if they feel the lighting in their area is adversely affecting their ability to work. Contact Safety Division for surveys.

10.14.2 Only an Underwriters' Laboratory (or equivalent) approved flashlight, extension cord, and lighting fixtures, shall be used in areas suspected of containing flammable vapors or gas.

10.15 Housekeeping

10.15.1 All Company buildings, yards, and enclosures shall be kept clean and orderly.

10.15.1.a All trucks and vehicles shall be kept in orderly condition with tools, parts, materials and equipment properly stored and secured when necessary. Junk, scrap, and refuse shall be disposed of promptly and not allowed to clutter the vehicle.

10.15.1.b Each job and work area, whether on Company premises, public roadways, or private premises shall be run in a neat and orderly manner, with tools, scraps, parts, equipment, and materials, neatly piled or stored out of the way of work or traffic.

10.15.2 Electrical extension cords and electrical wiring must be kept clear of walking and working areas and/or covered or otherwise secured.

10.15.3 Good housekeeping is the responsibility of each employee and is essential at all facilities and jobsites.

10.15.4 Floor surfaces shall be kept in good repair, free from holes, and all tripping hazards.

- 10.15.5 All oil, grease, water, or other slipping hazards, must be cleaned up immediately. Combustible waste such as oily rags, shall be disposed of in an appropriate covered metal container.
- 10.15.6 Small, loose items, and debris, shall not be left lying around in any place, particularly in areas where personnel walk.
- 10.15.7 The orderly storage of material on Company premises is essential, with proper passageways and access for everyone at all times.
- 10.15.8 Glass objects and sharp-edged materials shall be disposed of in a manner which will not result in a hazard to other persons.
- 10.15.9 Good housekeeping helps prevent slips, trips, and falls. Additional requirements to prevent slips, trips, and falls include:
- 10.15.10 Personnel shall take extra precautions when walking on steel decking, catwalks, sloped surfaces, and stairs, during wet weather, such as establishing firm hand holds, wearing suitable footwear, and walking slowly.
- 10.15.11 Personnel using hand and mechanical tools shall position themselves properly; consider leverage and events if a tool is suddenly removed.
- 10.15.12 Personnel shall not walk or climb on piping, valves, fittings, or any other equipment, not designed as walking surfaces.
- 10.15.13 Stairways, walkovers, and ramps shall be installed where personnel must walk or step over equipment in the course of their normal duties.
- 10.15.13.a Stairways shall have handrails and be well lighted. Nothing shall be left or stored on stairways at any time.
- 10.15.13.b Unsafe conditions of handrails, stairways, ramps, floors, yards, or any other location must be noted and reported promptly to the employee's supervisor for corrective action.
- 10.15.14 Walkways and grating shall be kept free of obstacles. Openings in walkways and grating shall be repaired immediately when possible.
- If not immediately repaired, the section must be roped off or closed until repairs can be made.

10.16 Sanitation

- 10.16.1 Lavatories, dressing rooms, and cafeterias shall be kept clean, orderly, and in a sanitary condition. As far as possible they shall be maintained in a dry condition.

10.16.2 Waste disposal containers shall be emptied daily and shall be maintained in a clean and sanitary manner.

10.16.3 Spitting upon the walls, floors, work places, or stairs of any establishment shall not be permitted.

10.16.4 Food and other consumables shall not be stored or eaten in any area containing toxic materials or substances.

10.16.4.a Food shall be stored and/or eaten only in approved areas.

10.16.4.b Food and canned items shall not be permitted within drinking water containers unless container is appropriately marked "non-potable water".

10.16.4.c Drinking fountains or containers shall be kept in a sanitary condition and common drinking cups are prohibited.

10.17 Use of Herbicides and Other Chemicals

10.17.1 Before using any herbicide or other chemical, employees shall read the label carefully and follow the directions and precautions listed. More information can be found in the MSDS for the specific chemical. Precautions listed below shall also be followed:

10.17.1.a Employees shall avoid skin contact with or breathing mist of spray material whenever possible.

10.17.1.b When working with toxic materials, proper respirator protection must be used.

10.17.1.c Spray equipment shall be cleaned daily when using oil solutions.

10.17.1.d Spraying shall not be done when wind exceeds 15-mph unless specifically authorized by supervisor.

10.17.1.e Brush shall not be sprayed at a distance greater than 15-feet from power spray nozzle.

10.17.1.f Foliage and basal sprays shall not be used on wild fruit trees, in areas where livestock may graze, because of the poisonous acid that is generated.

10.17.1.g Oil and other liquids, spilled on power spray equipment, shall be removed as soon as possible to prevent falls from slippery surfaces.

10.17.1.h Walking and working surfaces of sprayers shall be covered with slip resistant material.

- 10.17.2 Hose connections on hydraulic sprayers shall be checked before use to prevent blowing.
- 10.17.3 Where applicable, all employees who apply pesticides or herbicides shall be licensed or work under the direct supervision of a licensed operator.
- 10.17.4 Employees shall not smoke on or around mist-spray equipment when oil solutions are being mixed or used.
- 10.17.5 Herbicides and other chemicals shall never be left where they would create a menace to persons or property.
- 10.17.6 Empty containers shall be disposed of in a safe manner. They shall never be thrown into ponds, lakes, or streams.
- 10.17.7 Spray wastes shall be disposed of in a safe manner and in accordance with federal, state, and local regulations.
- 10.17.8 When spraying is required from a moving vehicle, guardrails are required.

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Date Revised: 12/3/12		Chapter: 11

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11.0 Objective

Hawaiian Electric Company, Hawaii Electric Light Company, and Maui Electric Company, are committed to the safe design, construction, and operation, of our facilities and electrical systems. When engineering controls, administrative controls, or work practice controls, are not feasible to protect employees from existing hazards, the Company will provide the Personal Protective Equipment (PPE) necessary to protect our employees from these hazards.

11.1 Purpose

This Chapter shall be used as a guide, to ensure that the PPE needed is provided and used by all employees. The guidelines within this chapter describe the proper use, inspection, and the maintenance, of the head-to-toe PPE that is provided for the protection of our employees.

11.2 Head Protection/Hard Hats

11.2.1 All employees shall wear a hard hat when subject to falling material or overhead hazards.

11.2.2 Hard hats shall also be worn in areas designated as "Hard Hat Areas". Signs shall be posted to indicate where hard hats are required, when these areas do not normally require the use of head protection.

11.2.3 Hard hats shall be inspected regularly and replaced when damaged. A hard hat should be removed from service if chemical corrosion, cracks, deformities, worn suspension, or severe discoloration, is found during an inspection of the hat.

11.2.4 Hard hats shall meet the requirements and specifications of ANSI Z89.1 for all non-electrical work and ANSI Z89.2 for all electrical work.

11.2.5 Hard hats shall not be altered in any way by drilling, cutting or other means, unless approved by the manufacturer.

11.2.6 "Bump Caps" are not approved as providing employees with proper head protection and therefore are prohibited from use.

11.3 Noise Exposure / Hearing Conservation

11.3.1 All employees who are exposed to noise levels of 85-decibels, A-scale, slow response or greater for an 8-hour time weighted average, shall be covered under the Company's Hearing Conservation Program.

11.3.2 Annual audiograms shall be provided to all employees whose noise exposure is equal to or exceeds an 8-hour time weighted average of 85-decibels.

11.3.3 For more information, refer to the Company's [Hearing Conservation Program](#), located on the Intranet.

11.4 Eye Protection / Safety Glasses

11.4.1 Appropriate and approved eye and face protection shall be worn when an employee is exposed to eye and face hazards at all jobsites and facilities.

11.4.2 Where the eye/face hazard to be protected against requires the use of face shields, helmets, or hoods for adequate protection, safety glasses shall not be used in place of the required equipment.

11.4.2.a Safety glasses can be used in addition to the face shield for added protection.

11.4.3 Eye and face protective devices shall comply with American National Standards Institute (ANSI) Z87.1.

11.4.4 Eye/face protection may not be altered or modified in any manner, such as removing side shields on safety glasses.

11.4.5 Face shields are required for electrical switching for live-front cabinets and walk-in vaults.

11.4.6 The supervisor will be responsible to identify the need for additional eye/face protection and specify the eye/face protection required for each task.

11.4.7 The task determines the level of eye/face protection required. A guideline identifying eye hazards and the appropriate eye protection required is presented in the Eye and Face Protection Selection Guide below.

Eye and Face Protection Selection Guide

Hazard	Protection
Flying fragments, objects, sand, large chips, particles, dirt from chipping, grinding, riveting, and sanding.	Safety glasses or goggles. Supplement with face shield for severe exposure.
Chemical splash from corrosive and chemical handling, pressure washing operations.	Chemical splash goggles (indirect ventilation) Supplement with face shield for severe exposure.
Chemical splash from noncorrosive material handling (includes working on those systems)	Safety glasses or goggles. Supplement with face shield for severe exposure.
Nuisance dust from woodworking, buffing, and general dusty conditions.	Safety glasses or goggles.
Hot Sparks from grinding operations.	Safety glasses or goggles. Supplement with face shield for severe exposure.
Molten metal from torch cutting operations.	Shaded cutting goggles and face shield. Welding operations Safety glasses and shaded welding hood.
Laser	Safety glasses or goggles with lenses selected to protect against the specific wavelength and density of the laser.

11.4.8 For additional information concerning eye and face protection requirements, refer to OSHA 1910.133.

11.5 Respiratory Protection

11.5.1 Respirators shall be worn when engineering controls are not feasible to eliminate or control the respiratory hazards in the work space.

11.5.2 Respiratory protection shall be selected on the basis of the hazards to which the employee is exposed.

11.5.3 Only employees who have been properly trained are allowed to wear a respirator.

11.5.4 All respirator users must first complete a physical examination to ensure that the employee is physically able to perform work while wearing a respirator.

11.5.5 After completing the physical, the employee must then be fitted for a properly sized respirator.

11.5.6 Fit-testing shall be conducted for users of tight-fitting, negative and positive pressure, air-purifying, and supplied air respirators, prior to initial use and annually thereafter

according to one of the four(4) categories of users, as defined in the Company's Respiratory Protection Program under fit-testing requirements.

- Contact Safety Division for the fit-testing of employees.

11.5.7 Respirators can be signed out from the employee's respective tool rooms. Specialty respirators need to be ordered.

11.5.8 All respirator users shall be clean-shaven with properly trimmed mustaches while using a respirator, to reduce conditions that prevent a good face-to-face piece seal and compromise the effectiveness of the respirator.

11.5.9 All employees designated to utilize SCBA's for emergency response activities shall be clean-shaven while they are on duty.

11.5.10 When respirators are provided for a particular work activity, they shall be used.

11.5.11 When employee exposure exceeds permissible limits, approved respirators shall be worn when:

- Applying paint or toxic liquids with pressure spray equipment inside buildings, including shops where special approved rooms or booths are provided for this purpose.
- Buffing creates an abnormal amount of dust.
- Welding or cutting involving hazardous materials without adequate ventilation.
- Handling lime or other toxic or caustic powdered chemicals.
- Sandblasting.
- Handling acids or caustics.
- Handling friable asbestos above the Permissible Exposure Level (PEL) 0.1 F/CC
- Handling lead containing material above Action Level (AL) 30 micrograms/m³
- Exposed to nuisance dusts.
- Handling fly or bottom ash.
- Chain saw cutting of poles.
- Entering or working in areas of unknown air quality (SCBA's shall be worn).
- Required by the Respiratory Protection Program or supervision.

11.5.12 Users of a respirator shall follow the manufacturer's instructions, the specific instructions of supervision, or the Company's Respiratory Protection Program.

11.5.13 Respirators shall be properly maintained and cleaned after use and stored in sanitary containers.

11.5.14 For further information, refer to the Company's [Respiratory Protection Program](#), available on the Intranet.

11.6 Clothing

11.6.1 Employees shall wear clothing suited for the safe performance of their job.

11.6.2 Special protective clothing and equipment is furnished and required for specific jobs.

11.6.2.a When designated, in this and other sections, the wearing of such clothing and equipment is mandatory and shall be worn.

11.6.3 Shirtless (bare back) work and work in sleeveless shirts and coveralls is prohibited.

11.6.4 Long pants are required at all times and must be in good repair.

11.6.5 Employees can obtain required clothing from their respective tool rooms or through their departments clothing allowance program.

11.6.6 In considering work clothing, employees should take into consideration:

11.6.6.a Should an accident occur, the use of reasonable clothing may minimize the injury.

11.6.6.b The combination of an accident and certain types of clothing may increase the same injury into an extremely serious and painful condition.

11.6.6.c Loose or ragged clothing, finger rings, wristwatches, or neckties, shall not be worn when working around rotating machinery.

11.6.7 Long hair shall be managed in such a way as to prevent contact with rotating machinery.

11.6.8 When working on or within five (5) feet of energized lines or equipment;

- Clothing shall be of FR (fire resistive/fire treated material), Nomex, Fire Wear, or the equivalent, and shall be worn when working on or near live parts where the possibility of an electric arc exists.
- Clothing made of acetate, polyester, nylon, cotton, or rayon (either alone or in blends), shall not be worn unless it has been adequately treated or worn in such a manner as to eliminate the hazard.
- Workers shall not wear loose, dangling watch chains, key chains, rings, wristwatches, or other exposed metallic articles.

11.6.9 When work is performed on any energized cable or apparatus, fire resistive clothing (Nomex or equivalent) shall be worn with sleeves rolled down, to fully cover the arms above the protective rubber gloves and protective rubber sleeves for high-voltage work.

11.6.10 Employees are to exercise proper care and laundering of the apparel.

11.6.11 Whenever abrasive grinding, arc or gas welding, including cutting or soldering is performed, appropriate protective clothing shall be worn.

11.6.12 Materials that are oil or paint soaked are highly combustible and shall not be worn during work, which may involve exposure to flames or electrical flash.

11.7 Gloves/Hand Protection

11.7.1 Employees shall wear hand protection suited for the safe performance of their job.

11.7.2 Work gloves shall not be worn when working around rotating machinery, where the gloves may present a hazard by being caught in the machinery.

11.7.3 Tools, work holders, and other such devices shall be used in lieu of gloves when working around rotating machinery.

11.7.4 Anti-vibration gloves shall be worn, as needed, where a danger of segmented vibration exists from the use of power hand tools and equipment.

11.7.5 Avoid placing hands and fingers in pinch point locations.

11.7.6 For further information, refer to the Company's [Guide for Back Supports and Anti-Vibration Protection](#) available on the Intranet.

11.8 Foot Protection/Steel Toed Shoes

11.8.1 Safety-toed shoes or boots shall meet the requirements and specifications of ASTM-F2413-05, formerly ANSI-Z41.1.

11.8.2 Only shoes or boots suited to the safe performance of the job, well fitted, and in good condition, shall be worn.

11.8.3 Damaged shoes or boots must be immediately replaced.

11.8.4 Foot guards can be provided and can be worn on jobs in lieu of safety shoes (boots), where movement of heavy materials or equipment presents foot hazards.

11.8.5 For additional information refer to [Safety Shoe Program](#).

11.9 Safety Belts, Life Lines, Fall Protection

11.9.1 When an employee is exposed to a fall in excess of 4-feet, fall-arrest equipment or positioning devices are required such as body belts, body harnesses, lanyards, lifelines, and rope grabs.

- 11.9.2 Employees shall not use fall-arrest equipment or positioning devices until they have been properly trained in their use.
- 11.9.3 Fall arrest equipment is available in tool rooms, or needs to be ordered.
- 11.9.4 Prior to each use, the employee shall visually inspect all fall-arrest equipment and positioning devices for cuts, cracks, tears or abrasions, undue stretching, overall deterioration, mildew, operational defects, heat damage, or acid or other corrosion.
- 11.9.5 Equipment showing any defect shall be removed from service.
- 11.9.6 Follow manufacturer's recommendations when using multiple brands of fall arrest equipment.
- 11.9.7 100% fall protection equipment shall be used on poles and all structures by qualified employees.
- 11.9.8 When choosing fall-arrest equipment or positioning devices, consideration should be given to the type of work to be performed, and limiting the shock load on the body of the wearer in the event of a free fall.
- Employees shall rig fall-arrest equipment so that they cannot free fall more than 6-feet or contact any lower object.
 - When positioning devices are used, they shall be rigged to limit free fall to 2 feet.
- 11.9.9 Anchorage points for fall-arrest equipment and positioning devices shall be capable of supporting a static load of 5000 lbs. or more per person and located above the employee's harness attachment point.
- 11.9.10 The lifeline shall be properly weighted at the bottom and terminated to preclude a device such as a rope grab, from falling off the line.
- 11.9.11 Horizontal lifelines should be used in accordance with manufacturer's requirements.
- 11.9.12 All fall-arrest equipment and positioning devices subjected to impacts caused by a free fall or by testing shall be removed from service and destroyed.
- 11.9.13 Fall-arrest equipment designed to accommodate multiple shock loading caused by free falls may be re-used, after inspection by a qualified person to determine it's safe to re-use.
- 11.9.14 Employees shall store all fall-arrest equipment and positioning devices in a dry place, which is not subjected to direct sunlight.
- 11.9.14.a Protective bags, when provided by the Company, shall be utilized in exercising proper care for the fall-arrest equipment.

11.9.15 A worker using a boatswain chair shall be secured by a safety harness and a safety line to a fixed part of the structure being worked upon.

11.9.15.a No welding, burning, or sandblasting, shall be done from a boatswain chair suspended by a fiber rope.

11.9.16 Safety belt shock absorbing lanyard shall be a minimum of ½-inch nylon or equivalent, with a maximum length to provide for a fall of no greater than six (6) feet.

11.9.17 100% fall protection shall be utilized on towers, fixed ladders, poles, and all structures.

11.9.18 In conjunction with new construction, replacement, and/or with major repairs / maintenance work, 100% fall protection shall be implemented.

11.9.19 For additional information on fall-arrest equipment and positioning device requirements, refer to:

- OSHA 1910.269
- HiOSH (12-121.2), construction standard 1926.500, and
- HECO's [Fall Protection Program](#), available on the Intranet.

11.9.20 Safety nets shall be used when work places are more than 25-feet above the ground, or water, or other surfaces, where the uses of ladders, scaffolds, catch platforms, temporary floors, safety lines, or safety harness assemblies are impractical.

11.9.20.a Nets shall extend eight (8) feet beyond the edge of the work surface and shall be installed as close under the work surface as practical.

11.9.20.b Net rigging and suspension systems shall be designed for 17,500-foot pounds impact resistance, and edge ropes shall have a breaking strength of 5,000 pounds. A label of proof shall be attached.

11.9.20.c The mesh size of nets shall not be greater than six (6) inches by six (6) inches.

11.10 Working Near/Over Water -- Diving Operations

11.10.1 Employees working over or near water shall be provided with, and be required to use, U.S. Coast Guard approved life jackets or buoyant work vests. A U.S. Coast Guard approved 30-inch life ring with not less than ninety (90) feet of line attached, shall be readily available within two hundred (200) feet.

11.10.2 Safe access to and from work floats shall be by a ramp or ladder.

11.10.3 Guardrails, mid rails, and toe boards, shall be installed on all open sides and ends of work float platforms.

- 11.10.4 At least one lifesaving boat/skiff shall be immediately available where employees are working over water.
- 11.10.5 All power boats over eight (8) feet in length shall be registered and numbered by the State Harbors Division and pass a yearly U.S. Coast Guard courtesy safety inspection.
- 11.10.6 In case the boat is capsized, stay with the boat unless to do so causes greater danger. The buoyancy of a capsized boat will provide you a means of keeping afloat and aid in your rescue.
- 11.10.7 Company and/or Clean Islands Council boat(s) shall be operated by qualified employees who can swim, perform CPR, water rescue, and know basic seamanship for small boats.
- 11.10.8 Diving operations shall be under the control of one (1) qualified diver.
- 11.10.9 All divers shall be qualified and capable of performing CPR and water rescue.
- 11.10.10 A diving flag shall be displayed during all ocean diving operations.
- 11.10.11 The "Buddy System" shall be used for all diving operations. This means not diving alone and when scuba diving both divers shall be in full scuba gear.

11.11 Care and Testing of Rubber/Insulated Protective Equipment

- 11.11.1 Employee using rubber/insulated protective equipment shall visually inspect for general condition, defects, and damage, wipe clean and dry each day before and after use, and at any other time when their condition is in doubt.
- 11.11.2 Protective equipment found in a doubtful condition shall be tagged or marked "defective" and turned in for replacement.
- 11.11.3 The person in charge at the job shall check to see that the personal protective equipment used is properly cared for, field inspected, and sent to the tool room for shop testing as needed.
- 11.11.4 All rubber/insulated protective equipment must be handled carefully and shall be stored in such a manner as to be protected from mechanical and chemical damage.
- 11.11.5 Rubber protective equipment shall be stored in containers provided and shall be stored in full-length position, never folded.
- 11.11.6 Line hose shall never be doubled back on itself.
- 11.11.7 In-Service Care and Testing of all rubber/Insulated protective equipment shall conform to ANSI-ASTM Standards and the following:

Rubber/ Insulated Equipment Test Intervals

Type of Equipment	When to Test
Rubber insulating line hose	Before first issue and every 12 months thereafter
Rubber insulating covers	Before first issue and every 12 months thereafter
Rubber insulating blankets	Before first issue and every 6 months thereafter*
Rubber insulating sleeves	Before first issue and every 6 months thereafter*
Rubber insulating gloves	Before first issue and every 3 months thereafter*
Insulated non-shielded jumper cable	Before first issue and every 12 months thereafter
Fiberglass, PVC, Synthetic hot line tools	Before first issue and every 12 months thereafter
Wooden hot line tools	Before first issue and every month thereafter
Hot line rope	Sample tested from each new coil of rope

* If the insulating equipment has been electrically tested but not issued for service, it may not be placed into service unless it has been electrically tested within the previous test period.

11.11.8 Test voltage will be 75kV per foot.

11.11.9 A detailed inspection of all rubber/insulated protective equipment in the field shall be made once every month, in addition to the before and after use inspections.

11.11.10 A Crew Monthly Safety Check Report shall be sent to the Corporate Safety Division covering this inspection.

11.11.11 For additional information concerning rubber protective goods, refer to HiOSH or OSHA 1910.269.

11.12 Use and Care of Rubber Gloves and Sleeves

11.12.1 The use of rubber gloves shall be in accordance with the following table:

Maximum Voltage - Use for Rubber Gloves

Class of Glove	Voltage
00	500
0	1,000
1	7,500
2	17,500
3	26,500
4	36,000

11.12.2 Voltage shall be considered to be phase-to-phase voltage unless all conductors, except the one being worked, are insulated (with protective devices) or isolated so that physical contact cannot be made with any energized part.

11.12.2.a In that case, phase-to-ground voltage will determine maximum use voltage.

11.12.2 In addition, rubber gloves and sleeves shall be worn during the following conditions:

- 11.12.2.a Working on or within falling or reaching distance of conductors, electrical equipment, or metal surface (crossarms, crossarm braces, or transformer cases), which are not effectively grounded and which may be or may become energized.
- 11.12.2.b During wet or stormy weather, working on or within falling or reaching distance of any conductor or equipment that may be or may become energized at any voltage.
- 11.12.2.c Required by supervision.
- 11.12.2.d Making statoscope tests on cables.
- 11.12.2.e Operating manually controlled air-break switches.
- 11.12.2.f Opening and closing manually operated oil circuit breakers.
- 11.12.2.g Using approved switch sticks or live-line tools for opening, closing, removing, or replacing hot clamps, fuses, or fuse doors, on cutouts or when making or breaking any circuit.
 - 11.12.2.g.1 When using fiberglass sticks that exceed ten feet in length, rubber gloves are not required.
- 11.12.3 Using approved switch sticks or live-line tools for making tests to determine if lines are de-energized and in applying and removing grounding devices.
- 11.12.4 Working on or near series street-lighting circuits, even though they are disconnected from the source of power.
- 11.12.5 Pulling in wires or handling other conducting unprotected materials near circuits, apparatus, or equipment that is or may become energized.
- 11.12.6 Working on or near telephone or other circuits that are subject to induced voltages from energized high voltage circuits, unless such circuits to be worked are adequately grounded.
 - 11.12.6.a Also see URD Section.
- 11.12.7 “Reaching distance” includes the employee’s reach as extended by handling conductive material and/or work equipment.
- 11.12.8 When working with rubber protective equipment on energized circuits or apparatus where the voltage between any two conductors is more than 600 volts, the following minimum conditions shall be met in addition to all other rules governing the use of protective equipment:

- 11.12.8.a Rubber gloves and rubber sleeves shall be used.
- 11.12.8.b Employee shall not make physical contact with protective devices installed on energized primary conductors with other than rubber gloves and rubber sleeves.
- 11.12.8.c When two or more employees are working on the same structure, they shall only work on or contact the same conductor at one time.
- 11.12.9 Rubber gloves shall never be worn inside out.
- 11.12.10 Rubber gloves shall be exchanged at any time they become damaged or the employee to whom they are assigned becomes suspicious of their condition.
- 11.12.11 Leather protection should be worn over insulating gloves except as follows:
 - 11.12.11.a Protector gloves need not be used with Class O gloves under limited use condition, where small equipment and part manipulation require unusually high finger dexterity.
 - 11.12.11.b Extra care shall be used in the visual examination of the glove and in the avoidance of handling sharp objects.
 - 11.12.11.c Any other class of glove may be used for similar work without protective gloves, if the possibility of physical damage is small and if the class of glove is one class higher than that required for the voltage involved.
 - 11.12.11.d Insulated gloves used without protector gloves may not be used at a higher voltage until tested.
- 11.12.12 Leather protectors or over gloves shall not be worn except over rubber gloves.
 - 11.12.12.a Their use shall conform to the following table:

Minimum Distance Between Protector Gauntlet and Cuff of Rubber Glove

Class of Rubber Glove	Minimum Distance (inches)
0	1
1	1
2	2
3	3
4	4

- 11.12.13 Rubber gloves shall be inspected before each use.
 - 11.12.13.a Check for corona cracks or other damage.

11.12.13.b Air test at least once each day while in use, preferably at the beginning of the work period, and at any other time when their condition is in doubt.

Visual and Air Test for Rubber Gloves

<p>Examine inside of cuff for tears, punctures, etc.</p>	
<p>By stretching cuff slightly, abrasions and weak spots will become more evident.</p>	
<p>Examine entire outer surface for burns, cuts, cracks, punctures, and weak spots.</p>	
<p>Roll cuff of glove to trap air. Device pictured is not necessary for procedure.</p>	
<p>Hold tightly to force air into the palm and fingers of glove. Air will be forced out through any holes or tears.</p>	
<p>Escaping air can be easily detected by holding the glove close to your cheek and ear to feel and/or hear any leaking air.</p>	

- 11.12.14 Gloves, when not in use, shall be kept in canvas bags or other approved containers, and stored where they will not become damaged from sharp objects or exposed to direct sunlight.
- 11.12.15 Gloves shall never be folded while stored nor shall other objects be placed upon them.
- 11.12.16 Rubber gloves shall be stored in the glove bag with the cuffs down to permit drainage and better ventilation, and to reduce the possibility of damage.
- 11.12.17 Refer to OSHA Standards for additional rubber glove requirements.

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12.0 Objective

Hawaiian Electric Company, Hawaii Electric Light Company, and Maui Electric Company, will develop, maintain, and administer, these Transmission and Distribution Policies and Procedures.

12.1 Purpose

This Chapter describes the transmission and distribution policies and procedures necessary and the responsibilities of all employees, as well as all contractors working in this area, in order to provide a safe work environment. This written program addresses all applicable United States Occupational Safety & Health Administration (OSHA) laws and regulations set forth in 29 CFR 1910 (1910.269) and 29 CFR 1926, as well as all applicable rules and regulations.

12.2 Qualified Employees

12.2.1 Only qualified workers or workers under continuous supervision or instruction of a qualified worker shall be assigned to work on conductors or equipment energized in excess of 50-volts.

- 12.2.1.a Except in cases of emergency, where danger to life or property would be aggravated by waiting for the arrival of other workers, one worker may clear the hazard by de-energizing the lines and/or equipment at the nearest structure, if it can be done without presenting unusual hazard to the worker.
- 12.2.2 It is intended that a worker shall be available in the immediate vicinity to render emergency assistance, but it is not intended to prevent this worker from providing assistance other than in an emergency.
- 12.2.3 Workers shall utilize the buddy system before one or both individuals enter an energized zone (within 5-feet of exposed energized conductors or 3-feet of insulated energized conductors). The buddy system requires the workers to review their scope of work, approach; any safe guards utilized, and ensure that the proper personal protective equipment is being worn.
- 12.2.4 This requirement does not prevent a qualified worker, working alone, from entering for brief periods of time, areas of energized conductors or equipment which are in service, for the purpose of switching, inspection, housekeeping, taking readings, or similar work, if such work can be performed safely.
- 12.2.5 If a worker finds a condition that is beyond their ability to handle safely, they shall call for assistance.

12.3 Energized Low Voltage Work

- 12.3.1 No worker shall touch any exposed conductor or equipment energized at 50-600 volts, unless worker is insulated from other conducting surfaces or uses adequate protective devices.
- 12.3.2 Low voltage rubber gloves (Class O) with leather protectors shall be worn.
- 12.3.3 Rubber gloves and protectors shall be worn within 5 feet of an energized conductor.
- 12.3.4 Use of leather gloves alone are not considered insulated protectors.
- 12.3.5 Protective covering equipment, suitable to insulate, shall be installed over energized and grounded unprotected conductors, surfaces, and equipment, whenever needed to reduce the workers' exposure to either possible contact or short circuit flash.

12.4 Working Distance -- Energized Primary Voltage

- 12.4.1 The following table R-6 constitutes the minimum working distance from unprotected energized conductors or equipment.

Table R-6 Minimum Working Distance

Nominal Voltage Phase-to-Phase	Phase-to-Ground Exposure	Phase-to-Phase Exposure
0.05 to 1.0 KV	Avoid Contact	Avoid Contact
1.1 to 15 KV	2-feet 1-inch	2-feet 2-inches
15.1 to 36 KV	2-feet 4-inches	2-feet 7-inches
36.1 to 46 KV	2-feet 7-inches	2-feet 10-inches
46.1 to 72.5 KV	3-feet 3-inches	3-feet 6-inches
72.6 to 121 KV	3-feet 7-inches	4-feet 3-inches
138 to 145KV	3-feet 7-inches	4-feet 11-inches

12.4.2 No worker shall be permitted to approach or take any conductive object, without an approved insulating handle, closer to exposed energized parts than that shown in table R-6 unless the worker is insulated or guarded from the energized part.

- 12.4.2.a Gloves and sleeves rated for the voltage involved shall be considered insulation of the worker from the energized part.
- 12.4.2.b Gloves and sleeves shall be worn within 5-feet of any energized primary conductor.
- 12.4.2.c Rubber hose, blankets, hose connectors, insulator hoods, insulated jumpers, epoxy glass covers, and similar guards rated for the voltage involved, shall be tested and approved insulation for "brush" contact from the energized part.
- 12.4.2.d Deliberate contact with this protective equipment while it is in contact with energized parts shall be avoided.
- 12.4.2.e The worker is isolated and insulated or guarded from any other conductive object at a different potential.
- 12.4.2.f Tested and approved insulated aerial devices, such as booms, basket liners, platforms, and lineman boards, rated for the voltage involved, shall be considered as isolation; however, the worker must also use gloves and sleeves or Hot Sticks to be considered insulated or guarded.
- 12.4.2.g Live-line, bare-handed work is not permitted.

12.5 Energized Primary Work General Information

12.5.1 Rubber gloves and rubber sleeves rated for the voltage involved shall be worn before entering any location where a worker is within reach, including slipping, falling, or reach extended by conducting material being carried, of any energized conductor or equipment having a potential above 600-volts.

- 12.5.2 When work is to be done on a pole, rubber gloves and rubber sleeves rated for the voltage involved shall be put on at least five (5) feet below the exposed high voltage circuits or apparatus.
- 12.5.3 When work is to be done from an insulated aerial unit, rubber gloves and rubber sleeves rated for the voltage involved shall be put on at least five (5) feet away from the exposed high voltage circuits or apparatus.
- 12.5.4 When work is to be done at a padmount or within a vault, rubber gloves and rubber sleeves rated for the voltage involved shall be put on at least five (5) feet away from exposed high voltage circuits or apparatus.
- 12.5.5 Before opening or inspecting any damaged underground compartment, enclosure, or vault (padmount), rubber gloves rated for the voltage potentially involved shall be worn.
- 12.5.6 Automatic reclosing features of the energized conductor or equipment to be worked on and those energized circuits that might be affected by the work, shall be made non-automatic to afford a greater degree of protection. This includes both glove and hot stick work, other than switching.
- 12.5.7 Workers doing live-line work shall devote their undivided attention to the work at hand. Unnecessary conversation shall be avoided.
- 12.5.8 When two or more workers are working within reach of each other, they shall never work simultaneously on different phases or on items at different potentials.
- 12.5.9 Personal rubber protective gloves and sleeves rated for the voltage involved need not be used when installing and removing protective equipment, guards, or barriers, if the work is done with hot sticks.
- 12.5.10 Temporary non-conductive guards or barriers that are not approved for direct contact on energized lines or equipment, when used for any method of working, shall provide at least the following minimum clearance from energized parts.

Nominal Voltage Between phases (volts)	Minimum Clearance From Parts
301 to 600	2-inches
2,400	3-inches
4,160	3-1/2 inches
11,000 to 11,500	5-1/2 inches
12,470 to 13,800	6-inches
23,000	9-inches
34,500	1-foot
46,000	1-foot 4-inches
69,000	1-foot 11-inches
138,000	3-feet 8-inches

12.5.11 Employees may not work on equipment or lines, in any position, from which a shock or slip will tend to bring the body toward exposed parts that are at a different potential from the employee's body.

12.5.12 When work is performed in the vicinity of exposed energized parts of equipment, employees shall remove or render non-conductive all exposed conductive articles, such as key or watch chains, rings, or wristwatches or bands.

12.5.13 In connecting de-energized equipment lines to an energized circuit by means of a conducting wire or device, employees shall first attach the wire or device to the de-energized part.

12.5.13.a When disconnecting, employees shall remove the source end first.

12.5.13.b Loose conductors shall be kept away from exposed energized parts.

12.5.13.c Load pick-up devices are to be utilized, whenever the conditions warrant, to avoid flashes and explosions as well as when there is the possibility of an in-series electrical contact exposure due to adverse storm/rain conditions.

12.5.14 Electrical equipment and lines shall always be considered "live" unless they are tested and grounded.

12.5.14.a Before starting to work, preliminary inspections or tests shall be made to determine what conditions exist.

12.5.14.b Care shall be exercised to handle neutral wires with the same caution that is used with energized wires.

12.5.15 Secondary windings of current or series transformers shall be short circuited before any instrument, or other device connected in the circuit, is removed or disconnected.

12.5.16 The use of non-conductive hoist (strap or come-a-long hand hoist), must always be used with insulating link sticks rated for voltage.

12.6 Working on Energized Lines with Live-Line Tools

12.6.1 Rubber gloves need not be worn when workers are using live-line tools, except when making or breaking a circuit such as switching and grounding procedures where there is a potential for electrical flash.

12.6.2 Lines of No. 6 copper, No. 6 ACSR, and No. 8A Copperweld or smaller, shall not be worked on with live-line tools, except in specific instances where continuity of service is vital and then only upon special authorization.

- 12.6.3 A careful check shall be made to see that the condition of the structure and lines at the point of the work is such that the job may be performed safely.
- 12.6.3.a The adjacent spans and structures shall be carefully checked for defects in conductors, tie wires, insulators, and other equipment.
- 12.6.4 Planned work with live-line tools shall not be started during unfavorable weather.
- 12.6.5 Before work with live-line maintenance tools is begun, the dispatcher or person having jurisdiction shall be notified and a limited holdoff shall be taken.
- 12.6.5.a If during live-line tool work, an interruption to service occurs, the dispatcher or other person having jurisdiction shall be notified immediately.
- 12.6.6 While live-line work is in progress, no other work of any nature shall be performed on the same pole or structure.
- 12.6.7 Only tools approved by the Company shall be used in live-line maintenance work.
- 12.6.8 Under no circumstances shall a lineman depend on another worker to hold a live conductor (e.g., jumper loop) clear of them.
- 12.6.9 When moving heavy conductors, blocks shall be used on the live-line tool so that they may be moved slowly and carefully.
- 12.6.10 All live-line tools, when not in use, shall be kept in canvas bags or waterproof boxes provided for that purpose and such containers shall be stored in a dry and, if possible, warm place.
- 12.6.11 Live-line tools shall never be laid directly on the ground or against sharp objects such as barbed wire fences. Special tool holders or tarpaulins shall be used for this purpose.
- 12.6.12 All live-line tools shall be visually inspected before use each day. Tools to be used shall be wiped clean (waxed) and if any hazardous defects are noted, such tools shall be removed from service.
- 12.6.13 Live-line tools used for primary employee protection shall be removed from service annually for examination, cleaning, repair, and service.
- 12.6.14 For additional information concerning Transmission & Distribution requirements, refer to OSHA 1910.269.

12.7 Energized Primary Voltage Flash / Short Circuit Avoidance

Protective covering equipment, suitable to insulate, shall be installed over energized and grounded unprotected conductors, surfaces, and equipment, whenever needed to reduce the workers' exposure to either possible contact or short circuit flash.

12.7.1 If a non-insulated tool being used on energized work can come into contact or within close proximity to an exposed grounded apparatus (e.g., pole, cross arm, brackets, braces, etc.), such apparatus shall be covered with suitable protective equipment.

12.8 De-Energized Work

12.8.1 When working on de-energized conductors and equipment, with an operating range in excess of 600 volts:

12.8.1.a The particular section of line or equipment to be de-energized shall be clearly identified, and it shall be isolated from all sources of voltage by obtaining a "holdoff".

12.8.1.b Both sides of any open switch shall be considered energized until grounded.

12.8.2 All switches and disconnectors shall be fully open and plainly tagged at the control mechanism of the switch or disconnector stating, "Men Working On This Line", and where design of such switches and disconnectors permits, they shall be rendered inoperable.

12.8.3 For special trayer type submersible vaults, tagging, lock-out, and holdoff clearance rules, will be issued in accordance with the following:

12.8.3.a C&M Field personnel (PTMs): Physically hang and attach their clearance tag on the switch handle of the device to be cleared, for the trayer type submersible vaults, and follow all practices written in their department work procedures.

12.8.3.b C&M Underground personnel:

12.8.3.b.1 Ensure the PTM tag is found on the switch handle of the circuit to be cleared, for trayer type submersible vaults.

12.8.3.b.2 Crew leaders will physically lock and tag the switch handle of the circuit to be cleared.

12.8.3.b.3 Once locked and tagged, the holdoff request can be taken.

12.8.3.b.4 Follow all practices written in their department work procedures.

12.8.3.b.5 Notify Dispatch if a PTM tag is not found on the device to be cleared. No work shall be performed until the discrepancy has been resolved.

- 12.8.3.c System Operations (Dispatch):
 - 12.8.3.c.1 Identify the switch handle which needs to be locked and tagged on the tray type submersible vaults.
 - 12.8.3.c.2 Relay this information to the crew requesting the holdoff.
 - 12.8.3.c.3 Issue the holdoff once the crew has completed their required locking and tagging.
 - 12.8.3.c.4 Follow all practices written in their department work procedures.
- 12.8.3.d Test all conductors and equipment of the de-energized circuit with approved testing equipment using rubber gloves and sleeves, if needed, unless done with "hot sticks."
- 12.8.3.e Apply temporary protective grounds at the work location immediately after testing and before any work is done on the conductor or equipment.
 - 12.8.3.e.1 Install guards and barriers as needed.
 - 12.8.3.e.2 When a condition exists in work involving UG risers and there is a "visible open" from the actual crew work site, grounds on riser blades are not required.
- 12.8.3.f Upon completion of work on de-energized conductors or equipment, the qualified worker in charge shall determine that all workers in their crew are clear, that temporary protective grounds installed by their crew have been removed, and he/she shall report to the designated authority that all tags protecting their crew may be removed.
- 12.8.4 When more than one group or department is working on the same major piece of equipment, circuit, or lines, each qualified worker in charge of a group shall follow the procedures outlined in Section 12.8.
- 12.8.5 Communication conductors/bare-wire communication conductors on power poles or structures shall be treated as energized lines unless protected by insulating materials.

12.9 Holdoff and Limited Holdoff Procedures

- 12.9.1 Holdoff and limited holdoff procedures shall be in writing, in accordance with the requirements of the Company (HECO, HELCO and MECO) and departments concerned.
- 12.9.2 The written procedures shall be a part of the department work standards and supervisors are responsible for training and enforcement of those procedures.

- 12.9.3 Supervisors are responsible for the authorization and the accuracy of holdoff requests for their work groups; individual crew leaders are responsible for the initiation and the accuracy of their own limited holdoff request.
- 12.9.4 A holdoff is the authorization officially issued to a specific person at their request, or their supervisor's, to work on specific equipment, circuit, or circuit segment, which is inherently too hazardous to work while in service.
- 12.9.4.a The equipment or circuit must be de-energized in a prescribed manner and placed in a safe condition to work until released by the work crew.
- 12.9.5 It is the responsibility of the person receiving the holdoff to:
- 12.9.5.a Verify, to the extent practical, that the job can be done safely as planned with the lines and equipment de-energized, as specified on the Holdoff Request.
- 12.9.5.b Familiarize themselves and those working under the holdoff with the equipment or lines to be worked on, their surroundings, and any potential hazards (such as energized circuits that may come in contact with the subject circuit, induction, backfeed, etc.).
- 12.9.5.c Test the equipment or circuit to verify that it is de-energized.
- 12.9.5.d Install safety devices, such as grounds/bonds, or other protective equipment, prior to beginning any work on the equipment or lines held out.
- 12.9.6 Upon the completion of work, the person holding the holdoff shall be responsible to ensure that all employees working under their holdoff are clear, and that all bonds and grounds have been removed before releasing their holdoff.
- 12.9.7 Tags may not be removed, unless the associated holdoff has been released as noted above.
- 12.9.8 Only after all protective grounds have been removed, all crews working on the lines or equipment have released their clearance, all employees are clear of the lines and equipment, and all protective tags have been removed from a given point of disconnection, may action be initiated to re-energize the lines or equipment at that point of disconnection.

12.10 Breaker Open Only - Limited Holdoff

A limited holdoff is authorization officially issued to a specific person for a specific apparatus. During this time, certain automatic features of this circuit or apparatus may be overridden in order to afford personnel working on or near the circuits or apparatus a greater degree of protection. Most common features overridden are the automatic reclosure of a circuit breaker and the automatic transfer of a normal power source to an alternate source.

- 12.10.1 Breaker open only - a limited holdoff is issued when a holdoff is not required, but additional protection is necessary on a critical circuit.
- 12.10.2 In situations where equipment may accidentally come into brush contact with the conductors, limited holdoffs will be issued with approval of the System Operations Department.
- 12.10.3 Breakers will be open to afford personnel working near the circuit protection against accidental contact only.
 - 12.10.3.a All other apparatus involving the operation of that breaker will not be overridden or disabled.
 - 12.10.3.b The circuit may be tested with an approved tester.
 - 12.10.3.c Grounds shall not be applied at any time.
 - 12.10.3.d Personnel and equipment should maintain a working distance, as indicated in Section 12.5.
 - 12.10.3.e The line must still be considered energized.
- 12.10.4 Upon completion of work, the person holding the limited holdoff shall be responsible to make sure that all workers are clear before releasing the limited holdoff.
- 12.10.5 Specific substation and circuit names and pertinent operating equipment are to be identified on both types of requests.
- 12.10.6 Persons to whom holdoffs and limited holdoffs are granted must keep their whereabouts known in order that lines, etc., can be returned in an emergency.
- 12.10.7 Only qualified employees shall be given a holdoff on any piece of equipment or circuit.
- 12.10.8 When persons other than Company employees are working on equipment that has been cleared for work, an authorized Company employee shall hold the holdoff.
- 12.10.9 During operations in emergency conditions (major storms and/or outages), holdoffs may be accepted verbally (by radio/telephone), without a copy of the Holdoff Request.

12.10.9.a Extremely close attention to clearance limits must be paid in these circumstances, and there must be no question, whatsoever, as to the particular line held out.

12.10.9.b Bonding and grounding is likewise an absolute requirement (where called for) in these situations due to the hazard of falling lines and other adverse potential conditions.

12.11 Release of New Construction

12.11.1 Whenever a new circuit or circuit segment is added to the system, the construction division responsible shall initiate notification to all construction and operating divisions involved, and make a formal release to the operating division's designated authority.

12.11.2 If new construction is not released to the operating division's designated authority, but is capable of being energized by being connected to a switching device, the construction division is responsible to formally notify the operating division's designated authority so that the switching device can be properly secured and tagged.

12.11.3 Departments involved in construction and operation of the system shall have work standards or procedures to cover details.

12.12 Switching -- Primary Voltage

12.12.1 Switching will only be performed by authorized and qualified employees.

12.12.2 Switches shall not be operated without first obtaining permission from the designated authority.

12.12.3 Whenever switching operations are to be performed and written orders are available covering such switching operations, they shall be used. Orders using general terms shall not be given.

12.12.4 When issuing instructions for switching, the switch numbers involved and specific instructions shall be given.

12.12.5 To avoid misunderstandings and to prevent accidents, each person receiving an unwritten message or order concerning switching, clearances, load change, or other matters affecting the handling and operation of lines or equipment, shall immediately write and repeat back the items as received and then repeat the complete message back to the sender and secure an acknowledgment. Such messages shall not be relayed if they can be sent direct.

12.12.6 Equipment or lines that have been cleared for work, inspection, safety, etc., must be tested immediately when ready for service, unless covered by instructions or established procedure to the contrary.

- 12.12.6.a In the event it is impossible or unsafe to test at the time work is completed, this must be done as soon thereafter as possible.
- 12.12.6.b If the work on a circuit involves any possibility of incorrect phasing or polarity, the circuit must be phased out or polarity checked before paralleling with other circuits.
- 12.12.6.c The rotation must be checked if the circuit does not parallel with another circuit.
- 12.12.6.d If work on relays is involved, the relays and associated equipment must be checked for correct operation before placing in service.
- 12.12.7 Flame-resistant coveralls or Company uniforms with Nomex jackets, safety hard hat, face shield (balaclava hood is acceptable), high voltage rubber gloves, and safety glasses, shall be used when performing primary voltage switching in front of "live and dead front" padmounts, pole mounted fuses and cutouts, solid blade disconnects within enclosed vaults, and other confined and/or enclosed spaces.
- 12.12.8 For all other primary switching, personal protective equipment - high voltage rubber gloves, safety hard hat, face shield (balaclava hood is acceptable), and safety glasses, shall be used, unless no condition exists which would make the work hazardous if personal protective equipment were not used.
- 12.12.9 If lines or apparatus referred to in switching orders or instructions are not available for service, or if switches are tagged for clearance or damages which were not covered in orders or instructions, the switchman (employee) shall immediately contact the designated authority.

12.13 Temporary Protective Grounding – General

- 12.13.1 All energized conductors shall be considered energized until tested and properly grounded.
- 12.13.2 New construction: New lines or equipment may be considered de-energized and worked as such where:
 - 12.13.2.a The lines or equipment are grounded.
 - 12.13.2.b The hazard of induced voltage is not present and adequate clearances or other means are implemented to prevent contact with energized lines or equipment and the new lines or equipment.

- 12.13.2.c To alleviate static voltages inducted on the lines from the wind, high voltage rubber gloves shall be used or a bonding jumper shall be placed in parallel or along-side the worker, before cutting a line or touching surfaces of different potentials (pole, another conductor, etc.).
- 12.13.3 Bare-wire communication conductors on power poles or structures shall be treated as energized lines, unless protected by insulating materials.
- 12.13.4 De-energized conductors and equipment, which are to be grounded, shall first be tested for the presence of nominal voltage.
- 12.13.5 Attaching and removing grounds;
 - 12.13.5.a When attaching grounds, the ground end shall be attached first, and the other end shall be attached and removed by means of insulated tools.
 - 12.13.5.b When removing grounds, the grounding device shall first be removed from the line or equipment using insulating tools.
- 12.13.6 Grounds shall be placed between the work location and all sources of energy and as close as practicable to the work location, or grounds shall be placed at the work location.
 - 12.13.6.a If work is to be performed at more than one location in a line section, the line section must be grounded and short-circuited at one location in the line section, and the conductor to be worked on shall be grounded at each work location.
 - 12.13.6.b The minimum distances shown in Section 12.4, Table R-6, shall be maintained from ungrounded conductors at the work location.
 - 12.12.6.c If making a ground is impracticable or the conditions resulting would be more hazardous than working on the lines or equipment without grounding, the grounds may be omitted and the line or equipment worked as energized, using approved live-line methods.
 - 12.12.6.d Temporary protective grounds shall be placed at equipotential zones and arranged in such a manner to prevent exposure to hazardous differences in electrical potential.
- 12.13.7 When grounds need to be removed for testing purposes, grounds may be temporarily removed. Extreme caution shall be exercised during the test procedures. Each employee within the test area shall use insulating equipment and shall be isolated from any potential ground sources before testing is conducted.

- 12.13.8 When grounding electrodes are used, such electrodes shall have a resistance to ground low enough to remove the danger of harm to personnel, or permit prompt operation of protective devices.
- 12.13.9 Grounding to a tower or structure shall be made with a properly designed clamp capable of conducting the anticipated fault current. A ground lead, to be attached to either a tower ground or driven ground, shall be capable of conducting the anticipated fault current and shall have a minimum conductance of No. 2 AWG copper.
- 12.13.10 Lifting equipment shall be bonded to an effective ground or considered energized and barricaded when used near energized equipment or lines.
- 12.13.11 Before any grounding is installed, lines and equipment shall be tested and found to be absent of nominal voltage, unless a previously installed ground is present.
- 12.13.12 When work is performed on cable at a location remote from the cable terminal, the cable may not be grounded at the cable terminal, if there is a possibility of hazardous transfer of potential should a fault occur.

12.14 Temporary Protective Grounding - Equal Potential Grounding

- 12.14.1 Installation of bonding chain:
- 12.14.1.a A bonding chain, for attaching personal protective grounds, shall be tightened around the pole (wood, steel, concrete, etc.), at a position below and as close as practical to the workers' work zone.
 - 12.14.1.b The pole's ground wire shall be connected to the bonding chain.
- 12.14.2 When working on a grounded steel pole or tower, the structure itself is the ground electrode and a jumper connection to earth is not necessary.
- 12.14.3 Should the circuit to be worked on have a neutral conductor, connect a jumper from the bonding chain to the system neutral.
- 12.14.3.a Connect a jumper, that is rated for the fault current of the system, from a ground electrode or ground rod to the bonding chain.
- 12.14.4 Attachment of personal protective grounds procedure:
- 12.14.4.a Test the circuit to make sure the line or equipment is de-energized.
 - 12.14.4.b Connect a jumper from the bonding chain to the nearest phase conductor.
 - 12.14.4.c Apply jumpers from the grounded conductor to the next closest ungrounded conductor, until the conductors are grounded.

12.14.4.d When work is completed, the personal protective grounds shall be removed in reverse order of installation.

12.14.5 When a circuit is to be opened (e.g., opening jumpers at a junction pole or cutting slack), a temporary personal protective ground shall be installed across the open point.

12.14.15.a When it is not practical to use single-point grounding at the pole where work is to be performed, such as when wires are down, grounds shall be installed on both sides of the work location but not further than adjacent structures.

12.15 Customer Generation Interconnected with Utility System

12.15.1 Before working on interconnected system equipment, the load dispatcher shall be contacted for clearance and identification.

12.15.2 Interconnected customer generation is capable of backfeed and high current load, even when the system is isolated from the utility's source of potential.

12.15.3 Interconnected lines or equipment to be de-energized must be positively identified and isolated from ALL possible sources of voltage. De-energized interconnected transformers shall be tested and grounded on the secondary side before starting work to prevent possible backfeed.

12.15.4 Interconnected non-load break devices shall be tested to determine the absence of current before they are operated.

12.16 Working on Pole Mounted Capacitors

12.16.1 Line capacitors shall be considered at full voltage, until they have been removed from the line and the terminals short-circuited and discharged to ground by an approved method.

12.15.1.a The terminals shall not be short-circuited until the capacitors have been de-energized for at least five minutes. The terminals of used capacitors in storage shall be shorted.

12.16.2 Employees shall wear rubber gloves and use an approved hot line tool while shorting and grounding terminals.

12.16.3 Employees shall not come in contact with an ungrounded capacitor case, until the capacitor has been disconnected from the circuit and the terminals shorted.

12.17 Series Street-Lighting Circuits (600V-7200V)

12.17.1 Before a series street-lighting circuit is opened and work is performed on or adjacent to, one of the following procedures shall be performed:

12.17.1.a Circuit shall be disconnected from the source by opening and physically rendering inoperative disconnecting switches or other cutouts to which danger tags shall be attached.

12.17.1.b Do not rely on timed switches or other automatic devices.

12.17.1.c Circuit shall be properly jumpered to avoid an open circuit condition.

12.17.1.d Protected with high voltage rubber goods.

12.17.2 All series street-lighting circuits shall be considered as energized and worked (handled) in accordance with Section 12.5.

12.18 Working on Transformers

12.18.1 The primary leads of a distribution transformer shall be considered energized at full voltage until both the primary and secondary leads have been disconnected, or it has been determined that the secondary circuit to which it is attached is grounded.

12.18.2 The case of a transformer connected to a source shall be considered as being energized at the full primary voltage, unless adequately grounded.

12.18.3 Employees shall not stand on, or otherwise contact, transformer cases while working on or near energized circuits.

12.18.4 Employees shall refer to Company/Departmental policy for procedure on grounding substation transformers.

12.19 Working with Flexible Protective Equipment (Rubber Synthetics, etc.)

12.19.1 Employees shall not touch or work on any exposed energized lines or apparatus, except when wearing protective equipment approved for the voltage to be contacted. Blankets, gloves, and sleeves, shall be produced by a seamless process and will be marked with the appropriate class and type. The markings shall be non-conductive.

12.19.2 Line hose, hoods, blankets, line guards, etc., shall be visually inspected before each day's use, and immediately following any incident that can reasonably be expected of having caused damage.

12.19.3 Insulating sleeves shall be worn with insulating gloves.

- 12.19.4 When work is to be done on or near energized lines, all energized and grounded conductors or guy wires within reach of any part of the body, shall be covered with rubber protective equipment, except that part of the conductor on which the employee is to work.
- 12.19.4.a Energized work should be done from a work location below the energized line or equipment.
- 12.19.4.b In applying flexible protective equipment, an employee shall always protect the nearest and lowest wires first, protecting themselves as they progress.
- 12.19.4.c The protective equipment shall extend beyond the reach of the employee's anticipated work position or extended reach distance.
- 12.19.4.d In removing rubber protective equipment, the reverse of 12.19.4.b shall apply.
- 12.19.5 Flexible blankets shall not be used on the ground without protecting them from physical damage and moisture by means of a tarpaulin, canvas, or a protective mat.
- 12.19.6 When not in use, rubber protective equipment shall be protected from mechanical and chemical damage and shall always be stored in the containers provided and nothing else placed therein.
- 12.19.7 To avoid corona and ozone damage, rubber protective equipment shall not be allowed to remain in place on energized lines or apparatus overnight or for more than one 8-hour period, unless approved by the supervisor in charge.
- 12.19.8 Flexible protective devices shall be stored in special compartments on trucks, and elsewhere, so that they will not be damaged by tools or other equipment.
- 12.19.9 Bare communications conductors shall be treated as energized lines and shall be protected accordingly.
- 12.19.10 Equipment shall be free from physical irregularities that can be detected by the tests or inspections required under this section.
- 12.19.11 For additional information concerning flexible protective equipment, refer to OSHA Standard and related ANSI standards.

13.2.7 Climbers shall be worn only when engaged in work requiring their use and shall never be worn when driving or riding in a vehicle, setting or handling poles, climbing ladders, working on the ground, in an aerial basket, or while on floors or roofs.

13.2.8 When climbers are stored in the truck or tool room, they shall be placed where the sharp points will not damage other equipment or cause personal injury.

13.2.9 Lineman's belts and safety straps shall be used when working in an elevated position.

13.2.10 Workers shall visually check and be sure that the double locking snap hooks are securely and properly engaged in the "D" rings, before trusting their weight on the safety strap.

13.2.10.a Never depend on the sound of the snap hook.

13.2.10.b When the safety strap is in use, both double locking snap hooks shall never be attached to the same "D" ring, unless the lineman's belt is approved for such use.

13.2.11 Only Company approved lineman's belts, body harnesses, and straps shall be used.

13.2.12 Metal hooks, chains, etc., for holding tools or tape shall not be attached to the lineman's belt or harness.

13.2.12.a Leather or other non-conducting material shall be used for this purpose.

13.3 Climbing and Working on Poles in Elevated Positions

13.3.1 Before climbing poles or structures, employees shall familiarize themselves with the circuits, voltage, apparatus thereon, and any unusual conditions, which might present a hazard.

13.3.2 Metal traffic signs that present hazards to the employee during climbing shall be removed during work on pole.

13.3.3 "Stop" signs shall be temporarily relocated but visible to motorists.

13.3.4 Before climbing through any circuit energized at 300-12,500 volts, phase-to-phase, all conductors and equipment, which the worker is liable to contact, shall be covered with suitable protective (insulated) equipment.

13.3.5 All poles and structures shall be carefully inspected before climbing to assure that they are in a safe condition for the work to be performed and that they are capable of sustaining the additional stresses to which they will be subjected.

13.3.5.a The types of abnormalities that should be checked are general condition, cracks, holes, shell rot and decay, knots, depth of setting, soil conditions, and burn marks.

- 13.3.5.b Acceptable tests for poles are hammer tests, a rocking test, and screwdriver (pole prod) probing below ground level.
- 13.3.5.c Refer to OSHA 1910.269, Appendix D, for specific methods of inspecting and testing wooden poles.
- 13.3.6 If poles or structures may be unsafe for climbing, they shall not be climbed until made safe by guying, bracing, or other adequate means.
 - 13.3.6.a If the pole to be climbed is being replaced and the new pole is set adjacent to it, the old pole may be lashed to the new one in lieu of guying.
 - 13.3.6.b Workers shall observe the height brand on pole to make certain that the pole is set to the proper depth.
 - 13.3.6.c Rule of thumb: the pole brand should be at eye level or below.

Pole Height	Location of Pole Brand Mark
25' to 40'	11' from butt
45' to 60'	12' from butt
65' to 90'	14" from butt

- 13.3.7 When climbing over spars, 100% fall protection must be maintained.
- 13.3.8 Training in the use of a wood pole fall restriction device or equivalent/fall arrest system is recommended as part of the pole climbing class or on the job training.
- 13.3.9 Special attention should be given when climbing double poles, due to the additional hazards to the climber.
- 13.3.10 Specific training for the hazard is covered in Company provided Pole Climbing Training.
- 13.3.11 Wires shall not be attached to or removed from a pole or structure, until it is certain the pole or structure will withstand the altered strain.
- 13.3.12 Employees shall not work on an elevated pole or structure, without 100% fall protection.
- 13.3.13 A wood pole fall restriction device or equivalent shall not be put around a pole above the uppermost pole attachment position, except where pole top or attachment is above eye level and cannot ride over the top of the pole.
 - 13.3.13.a Use of a fixed stop such as pole hardware or tool can be utilized.

13.3.14 Fall restraint/arrest devices shall not be used on pole steps, crossarm braces, insulators, insulator pins, conductors, rotten or otherwise weak crossarms, or on attachments that are being moved.

13.3.14.a When a fall restraint/arrest device must be attached to a crossarm, it shall never be placed beyond the outside crossarm attachment.

13.3.14.b It shall be so placed that it will not be cut by line equipment or twisted or fouled by material that may give way under strain.

13.3.15 Employees shall not trust their weight to guy wires, pins, braces, conductors, or other such equipment that might prove unstable.

13.3.16 When two or more employees are to work on the same pole at the same time, each shall reach the working position before the next leaves the ground.

13.3.16.a They shall descend the pole one at a time.

13.4 Special Ladders / Platforms / Lineman Boards

13.4.1 Ladders and platforms used in overhead line work may be used only in applications for which they were designed.

13.4.2 Ladders and platforms shall be inspected each day before use by employees.

13.4.3 Defective or damaged equipment shall be tagged out of service.

13.4.4 Safe working capacities shall be legibly marked on each ladder and platform.

13.4.5 Ladders and platforms shall be secured to prevent their becoming accidentally dislodged.

13.4.6 Ladders and platforms may not be loaded in excess of the working loads for which they are designed.

13.4.7 In the configuration in which they are used, ladders and platforms shall be capable of supporting, without failure, at least 2.5 times the maximum intended load.

13.4.8 Fall protection equipment shall be utilized as prescribed in Chapter 11, section 11.9.

13.5 Hand Lines / Running Block Line / Taglines

13.5.1 When raising or lowering tools or lightweight material, a hand line or hand line with material bag attached shall be used.

- 13.5.2 Hand lines shall be of approved material having not less than the equivalent size and strength of ½-inch rope.
- 13.5.3 A hand line shall be placed on every structure where overhead work is being performed from the structure on energized conductors or equipment, or where energized conductors or equipment are located below the work area.
- 13.5.3.a Such a line may be used when lowering an employee from a pole or elevated position, provided the rope is passed over a crossarm or fixed member of the structure and is not directly supported by the hand line sheave.
- 13.5.4 Taglines shall be used to control loads being hoisted, where it is necessary, to prevent hazards to workers or damage to equipment or material.
- 13.5.5 Hand lines and taglines used near energized lines and equipment shall be non-conductive.

13.6 Pole Handling and Temporary Storage

13.6.1 Setting and Removing Poles

- 13.6.1.a If any holes are left unfilled at the end of the work period, they shall be protected with substantial coverings.
- 13.6.1.b All persons not engaged in pole-setting operations shall keep out of the work area.
- 13.6.1.c No one shall be on a gin pole when it is being used to raise another pole.
- 13.6.1.d While setting or removing poles between or near conductors energized above 600-volts, observe the following:
- 13.6.1.d.1 A minimum distance of 3-feet shall be maintained between unprotected energized conductors and portions of the equipment.
- 13.6.1.d.2 If safe clearance cannot be maintained, the conductors shall be de-energized or covered with protective devices and spread, or pole guards shall be used to minimize accidental contact.
- 13.6.1.d.3 Workers handling the butt of the pole shall wear high voltage rubber gloves.

13.6.2 Employees engaged in handling or working on poles shall wear suitable gloves and shall wear a shirt or jacket with the sleeves rolled down.

13.6.3 The use of cant hooks, peaveys, hand lines, or slings, does not lessen the high voltage electrical exposure.

- 13.6.4 Until a pole is positively secured from moving against an energized conductor, employees shall not step on or off the truck, or touch any part of it without using rubber gloves if the employee is standing on the ground.
- 13.6.5 Ground wires shall not be attached on the pole higher than 10-feet from the ground.
- 13.6.6 When pikes are used to hold poles in place while holes are being backfilled, the pikes shall be firmly grounded in all directions and shall not be removed until the backfill is sufficient to hold the pole.
- 13.6.6.a When a pole is being “canted” or “hooked”, the pikes shall be held.
- 13.6.7 Employees shall not stand or pass under a suspended load or adjacent to or over or under a loaded winch line.
- 13.6.8 When removing set poles, extreme caution shall be exercised to assure the hoisting equipment is not overloaded due to the weight of the pole and its adhesion to the ground.
- 13.6.9 The use of pole jacks, tension load meters (dynamometer), or a hoisting device with sufficient lifting capacity, shall be used when loosing of the earth around the pole, along its' entire depth, is necessary.
- 13.6.10 Hoisting equipment operators shall accept signals only from the employee specifically designated.
- 13.6.11 The operator shall obey the stop signal given by anyone.
- 13.6.12 When poles are set, moved, or removed near exposed energized overhead conductors, the pole may not contact the conductors.
- 13.6.13 Temporary Storage of Poles
- 13.6.13.a If it becomes necessary to store poles at the location where they are to be set, they shall be so placed that they will not interfere with traffic.
- 13.6.13.b If poles left on or near streets, highways, or walkways overnight create a hazard, they shall be safeguarded by blinking light-barricade or well-lit warning signs.
- 13.6.13.c Poles shall be blocked to prevent rolling.
- 13.6.13.d Employees shall not remain on a pole pile while poles are being hoisted.
- 13.6.13.e When a load of poles is within working distance of the ground, load binders shall be installed so that they can and will be operated by employees while standing on the ground.

13.6.14 Employees shall not ride pole dollies or trailers.

13.6.15 The wheels of the transporting vehicle shall be blocked or securely braked prior to loading or unloading.

13.6.16 Poles Average Weights are furnished to A.S.A. specifications:

13.6.17 Poles, even with the same class, vary in diameter and, hence, weight.

13.6.18 Moisture content of a pole changes under various conditions

13.6.19 Weights given in the table should be taken as average values only, but are sufficiently reliable.

10 – Pole Weight Chart

Pole Length (feet)	Class 1-3 Creasote Treated (lbs)	Class 1-3 Penta Treated (lbs)	Class 1-3 CCA Treated (lbs)	Fiber Glass
30		1100	800	
35	2300	1200	1000	300
40	2600	2000	1800	465
45	3000	3000	2200	620
50	3500	3500	2500	827
55	4000	4000	3000	
60	4700	4600	3300	
65	5200	5200	3800	
70	5900	5800	4200	
75	6600	6300	4700	
80	7500	7000	5200	
85	8000	7600	5700	
90	8800	8500	6200	
95		9200	6700	
100		9800	7200	
105		11000	7800	
110		11700	8400	
120		13200	9300	

13.7 Wire Stringing

13.7.1 When stringing or removing de-energized conductors and there is a possibility of the conductor accidentally contacting an energized circuit or receiving inducted voltage buildup, grounding devices shall be used.

13.7.2 The manufacturer's load rating shall not be exceeded for stringing lines, pulling lines, connections, and all load bearing hardware and accessories.

13.7.3 Conductors being strung in or removed shall be kept under positive control by the use of adequate tension reels, guard structures, tie lines, or other means, to prevent accidental contact with energized circuits.

- 13.7.4 When stringing or removing wires on poles or towers and there is any hazard from energized lines or equipment, the wire being pulled in or out shall be pulled over a grounded roller at the second pole from the payout and take-up equipment, and through traveling grounds between the first pole and the payout and take-up equipment.
- 13.7.4.a The metal frame of the wire stringing equipment shall be bonded to the traveling ground.
- 13.7.5 While the conductor or pulling line is being pulled (in motion), workers shall not be permitted directly under overhead operations, nor shall they be permitted on the crossarm.
- 13.7.6 When stringing or removing wire along or over streets or highways, the payout and take-up equipment shall be provided with warning flags in addition to normal work area protection.
- 13.7.7 Workers shall not intentionally contact wire stringing equipment in a manner which would permit their bodies to become a parallel path to ground.
- 13.7.8 Precautions shall be taken to adequately insulate the workman from the wire or wire stringing equipment by the use of rubber protective equipment or other approved methods.
- 13.7.9 Reliable communications between the payout and take-up equipment operators shall be used.
- 13.7.10 Grounding and/or clearance need to be maintained and /or controlled for nylon pulling lines that become wet.
- 13.7.11 If two bare conductors are to be spliced, the conductors shall be bonded (jumped) and grounded before being spliced to alleviate employee's exposure to working in series.
- 13.7.12 When crossing over energized conductors in excess of 600-volts, rope nets, guard structures, aerial lift trucks, or derrick trucks, shall be installed or utilized and the line being strung shall be grounded on either side of the crossover, or considered and worked as energized.
- 13.7.12.a The automatic reclosing feature of the energized circuit shall be made inoperative by obtaining a limited holdoff.

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Chapter Summary

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14.0 Objective

Hawaiian Electric Company, Hawaii Electric Light Company, and Maui Electric Company, will develop, maintain, and administer, these Underground Policies and Procedures.

14.1 Purpose

This Chapter describes the underground safety policies and procedures necessary for employees, as well as contractors, who work in this challenging area, in order to provide a safe work environment. This written program addresses all applicable United States Occupational Safety & Health Administration (OSHA) laws and regulations set forth in 29 CFR 1910 (1910.269) and 29 CFR 1926, as well as all applicable rules and regulations.

14.2 Underground Work Area Protection and Precautions

14.2.1 Whenever a cover is to be removed from a manhole or a vault or any other obstruction to traffic exists, the work area shall be protected as outlined in Chapter 9, section 9.2.

14.2.2 Manhole, vault, and service-box covers, shall always be removed and replaced by means of approved hooks, hoists, or lifting devices.

14.2.3 When lifting the 138-KV manhole covers and the driveway/street concrete covers (260+ lbs), only approved mechanical lifting devices shall be used.

14.2.3.a The use of T-bar handle lifters is strictly prohibited.

- 14.2.4 When lifting the side walk concrete covers (165+ lbs), the use of a mechanical lifting device is recommended and appropriate.
- 14.2.4.a T-bar handle lifters may be used only under conditions where the “installation” does not allow nor permit the use of such mechanical devices due to location, configuration, etc.
- 14.2.5 Workers shall never leave an open padmounted vault, standard vault, or manhole unattended, unless it is properly protected from unauthorized entry.
- 14.2.6 When work is to be performed in a manhole or unvented vault, observe the following:
- 14.2.6.a No entry shall be permitted unless forced ventilation is used and the atmosphere is found to be safe by testing for oxygen deficiency and the presence of toxic, explosive, gases or fumes.
- 14.2.6.b Provisions shall be made for an adequate continuous supply of air.
- 14.2.6.c When unsafe conditions are detected by testing or other means, the work area shall be made safe before entry.
- 14.2.7 Where cables in manholes appear defective by the presence of abnormalities that could lead to or be an indication of any impending fault (such as oil or compound leaking from cable or joints, broken cable sheaths or joint sleeves, hot localized surface temperatures of cables or joints, or swollen joints whose circumference exceeds 3.5 times the standard sleeve size diameter), no employee may work in the manhole while the defective cable is energized.
- 14.2.7.a If the defective cable or splice cannot be de-energized because of service load conditions, employees may enter the manhole, provided they are protected from the possible effects of a failure by shields or other devices (arc safe blankets) that are capable of containing the adverse effects of a fault in the joint.
- 14.2.8 Employees shall be alert for asbestos exposure. Asbestos on cables (blue wrap or plaster) shall be properly removed or wrapped before work is to be performed inside the space.
- 14.2.8.a Refer to Chapter 10, section 10.5, for more information and procedures.
- 14.2.9 A ladder shall always be used when entering or leaving a manhole or vault. Climbing into or out of manholes or vaults by stepping on cables or hangers is forbidden.
- 14.2.10 While work is being performed in manholes (enclosed spaces), a qualified employee trained in first aid and CPR shall be available in the immediate vicinity to render emergency assistance if required.

14.2.11 If it becomes necessary for an employee to enter a manhole or vault with a hazardous atmosphere, the employee shall follow all procedures outlined in the Company's [Enclosed Space Program](#), under "Permit Required Space Entry".

14.3 Working on Cable or Equipment

14.3.1 Every possible precaution shall be exercised to make sure of the correct identity, by the approved method, of the cable or equipment to be worked upon.

14.3.2 The cable or equipment shall be considered energized and worked with protective devices until it has been tested, proven not to be energized, and grounded.

14.3.2.a Cables without a test point at the work site shall be "speared" with a grounded spiking or cutting tool (hot line).

14.3.3 Cables normally energized at more than 600-volts, shall be speared from outside the manhole or vault.

14.3.4 When possible, lower voltage cables should be speared from outside the manhole or vault.

14.3.5 Single conductor cable normally energized at not more than 600 volts may be cut or spliced if, in each instance, specific directions are given by the supervisor or person in charge.

14.3.6 When testing with a staiscope, rubber gloves shall be worn. The staiscope is not approved for use at 750-volts or less.

14.3.7 Sheath continuity

14.3.7.a When work is performed on buried cable or on cable in manholes, metallic sheath continuity shall be maintained, or the cable sheath shall be treated as energized.

14.4 Heating Materials

14.4.1 Metals and insulating compounds shall be heated in such a manner, as to prevent hazards to the workers in manholes or vaults and to vehicular or pedestrian traffic.

14.4.2 Gloves, sleeves, and safety glasses approved for this work, shall be worn while heating or handling hot metal or compound.

14.4.3 Furnaces and tanks containing liquefied petroleum gas (propane, butane, map gas), shall not be placed in a manhole or vault.

14.4.4 Torches or furnaces must be kept at a safe distance from flammable materials.

14.4.5 Heating pots for solder, oil, or compound, shall be safely positioned so that the contents cannot enter the vault or manhole in the event of spillage.

14.4.6 Before lowering hot metal or compound into a manhole or vault, those working in the hole shall be warned to stand clear.

14.4.6.a The person on the surface shall not lower material until he/she is so instructed from below.

14.5 Work on Energized Cables

14.5.1 All underground cables and apparatus carrying current at voltages greater than 600-volts, shall be de-energized before work is done on the conductor or before the cables are cut into or spliced.

14.5.2 Before any work is performed on an energized cable, other cables and all grounded equipment with which contact can be made while working on the energized cable, shall be covered with rubber blankets or approved insulating shields.

14.5.3 Cables with non-metallic sheaths and those with an insulating jacket over the metallic sheath need not be covered.

14.5.4 Because of the characteristics of a low-voltage network system, when work is performed on cables or apparatus carrying less than 600-volts, employees shall take extra precautions in the use of necessary rubber protective equipment, in observing adequate clearances, and in using proper tools, in order to prevent short circuits.

14.5.5 Employees shall wear high voltage rubber gloves with leather protectors and preferably stand on approved rubber mats, while cutting into and removing sheathing or sleeves and while testing an energized cable.

14.5.6 When cutting an energized multiple conductor cable, a piece of non-conductive material shall be placed between the conductor being cut and the other conductors, and the cut shall be made directly over the shield.

14.5.7 Immediately after each conductor of an energized multiple conductor cable is cut in two, the ends shall be insulated before another conductor is cut.

14.5.7.a During the course of the work, only one un-insulated conductor shall be exposed at any one time.

14.6 Moving Energized Cables

14.6.1 Underground cables rated in excess of 600-volts, shall not be bent or re-racked while energized, except that some movement may be made to separate and support cables in the work area, and cables terminated in separable connectors of the load break type may be moved as required with proper live line tools.

14.6.2 All cables operating at voltages less than 600-volts, may be moved at the discretion of the person in charge.

14.6.2.a They shall not be moved if such movement requires changing bends.

14.6.3 All energized cables shall be handled with appropriately rated rubber gloves (high voltage or low voltage), except when applying fireproofing materials.

14.6.4 Energized cables that are moved shall be inspected for defects.

14.6.5 Pulling Cables

14.6.5.a Employees shall not handle pull-wires or pulling-lines within reaching distance of blocks, sheaves, winch drums, and take-up reels.

14.6.5.b Pull-wires, steel pulling-lines, or metal rodding, shall not be pushed through ducts where energized equipment is present, unless another employee is stationed at the other end of the run.

14.6.5.c Employees shall not remain in a manhole or vault during pulling operations involving heavy pulling strains, unless they can take a position clear of the pulling-line.

14.7 Excavating Buried Energized Cables

14.7.1 All hydraulic or pneumatic tools used around energized cables or equipment, shall have non-conducting hoses and an accumulator to collect moisture as needed.

14.7.2 Hydraulic or pneumatic tools used around energized cable, shall be equipped with a grounding lug below handles.

14.7.2.a An appropriate grounding conduit, #2 AWG-copper welders grade, shall be provided.

14.7.3 Hand digging only, shall be done when in proximity to buried energized facilities.

14.7.3.a Mechanical digging may be used when there is no known danger of contacting energized facilities.

14.8 Underground Residential Distribution (URD)

14.8.1 Underground Residential Distribution systems have a number of apparent advantages over overhead systems; however, they also have some disadvantages, such as confined working spaces, closer clearances between energized parts, and greater exposure to all types of grounds.

14.8.1.a In most cases, if protective devices are not used, the employee will be in direct contact with the ground or grounded equipment.

14.8.1.b This contact completes half of an electrical circuit; therefore, if these contacts are not avoided or protection against contact is not used, serious injury could result.

14.8.1.c There is a safe way of doing every job; employees must know it before proceeding.

14.8.1.d Before a URD transformer enclosure is opened, all unauthorized persons, including private citizens, shall be required to leave the work area and remain clear of all hazards involved in the work.

14.8.1.e When underground equipment is being located, short sections of scrap cable could provide false indications of the actual position of permanent conductors; therefore, all scrap cable, regardless of length, is to be removed from the job site.

14.9 Opening and Closing Circuits (URD)

14.9.1 Company switching procedures, including danger tagging and tagging practices, shall be followed when sectionalizing URD systems.

14.9.2 When an URD circuit has been opened, the route of the circuit shall be patrolled for obvious hazards before the circuit is reclosed.

14.9.3 An approved switching tool and rubber gloves, shall both be used when switches in an energized circuit are opened or closed.

14.9.3.a This includes secondary breakers and primary load-break elbows.

14.9.4 Any URD primary circuit shall be de-energized by opening one or more load-break devices.

14.9.4.a De-energizing shall be done with a load-break elbow connector, load-break fuse cutout at the riser pole, load-break tool, or other approved load-break device.

14.9.5 Eye and face protection, high voltage rubber gloves, a safety hard hat, and approved flame resistant clothing, shall be worn whenever primary switching operations are performed.

14.10 Grounding (URD)

- 14.10.1 All URD cables and equipment, including services, that have been energized or could become energized from any source, shall be considered as energized until the equipment is positively proven to be de-energized and has been grounded.
- 14.10.2 All conductors of a circuit shall be de-energized when work is to be performed on any of them.
- 14.10.2.a A capacitance charge can remain in a URD cable after it has been disconnected from the circuit and a static-type arc can occur when grounds are applied to such cables.
- 14.10.3 Before working on de-energized primary circuits or equipment:
- 14.10.3.a A visible open break shall be provided.
- 14.10.3.b A voltage test shall be made.
- 14.10.3.c The equipment shall be grounded.
- 14.10.4 When work is to be done on equipment or cables of an underground system, precautions to prevent backfeed shall be taken, including grounding of secondary conductors.
- 14.10.5 De-energized cables to be worked on shall be grounded at a point as close to the work as possible.
- 14.10.6 All underground cables and apparatus carrying current at voltages greater than 600-volts, shall be de-energized, “speared” or verified as de-energized using a test point, and grounded.

14.11 Rubber Glove Use (URD)

- 14.11.1 High voltage rubber gloves shall be put on before any URD compartment or enclosure, including service pedestals, is opened and kept on, until the compartment or enclosure is closed and locked or until all equipment is properly grounded, barricaded, and shielded.
- 14.11.2 High voltage rubber gloves shall be worn when removing animals, vines, weeds, grass, or vegetation of any kind that has grown into an energized URD installation, whether the equipment is opened or closed.
- 14.11.3 High voltage rubber gloves shall be worn when energized primary cables are moved, handled, or protected.

14.11.4 High voltage rubber gloves shall be worn when working on or contacting a neutral.

14.11.5 Rubber sleeves shall be used with high voltage rubber gloves when working URD primary.

14.11.6 Low voltage rubber gloves shall be worn when work is performed on energized secondary cables and services.

14.12 Work on Energized Equipment (URD)

14.12.1 When work is performed on cables or apparatus energized at less than 600-volts, employees shall take extra precautions in the use of necessary rubber protective equipment, in observing adequate clearances, and in using proper tools, in order to prevent short circuits.

14.12.2 When energized pad-mounted transformers are unlocked and opened, they shall be directly attended by a worker.

14.12.2.a They shall be kept closed and locked at all other times.

14.12.3 A primary or secondary system neutral on any energized circuit shall not be opened under any circumstances.

14.12.4 Only those connectors designed and approved for load break use, shall be used to connect or disconnect an energized circuit.

14.12.5 Only tools with insulated handles shall be used for making energized secondary connections, or when work is performed within energized service pedestals, pad-mounted compartments, or submersible transformer enclosures.

14.12.6 Only one energized secondary or service conductor shall be worked on at any one time and protective devices shall be used to insulate or isolate it from all others.

14.12.7 Before any attempt is made to replace a damaged or blown cable limiter, the customer's service will be checked for faults by the use of either an ohmmeter or a voltmeter.

14.12.8 When work is performed on any energized URD cable or apparatus, approved flame resistant coveralls shall be worn with sleeves rolled down to fully cover the arms above the protective rubber gloves and protective rubber sleeves for voltages above 600v.

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15.0 Objective

Hawaiian Electric Company, Hawaii Electric Light Company, and Maui Electric Company, will develop, maintain, and administer, these Substation Policies and Procedures.

15.1 Purpose

This Chapter describes the substation safety policies and procedures necessary for employees, as well as contractors, who work in this challenging area, in order to provide a safe work environment. This written program addresses all applicable United States Occupational Safety & Health Administration (OSHA) laws and regulations set forth in 29 CFR 1910 (1910.269) and 29 CFR 1926, as well as all applicable rules and regulations.

15.2 Entering or Working in Substations

15.2.1 No person shall enter or work on any station apparatus without first obtaining proper authorization.

15.2.2 While working in a substation, to allow for evacuation and emergency response, remove lock from gate. Keep gate closed and designate a crew member to watch out for illegal entry. Workers shall ensure that the fence and gate, as well as the Company standard "Warning" signs, are in place and are not obscured. Lock gate at all times when substation is unattended. When working alone inside the substation, the employee may apply the gate lock to prevent unauthorized entry, but must communicate this to his Supervisor. When necessary, emergency personnel shall cut the lock to access an incapacitated employee.

15.2.3 Before driving a car or truck into a substation, the driver shall check the overhead clearance of the vehicle (radio antenna, boom, basket) to prevent contact with low lines or other structures.

15.3 Working Near Energized Equipment

15.3.1 Temporary barriers or barricade tape or netting, shall be placed between the space occupied by workers and the nearest energized equipment, as a protection and reminder as to the limits of safe working space.

15.3.2 When elevated platforms or aerial devices are utilized within substation facilities, caution shall be exercised.

15.3.2.a Insulated aerial devices, as described in Chapter 12.0, with associated requirements of using these devices are preferred.

15.3.2.b If un-insulated devices are utilized, the horizontal clearances to the energized electrical equipment shall comply with the minimum approach distances for a non-qualified electrical employee.

15.3.3 Signs reading, "Danger Do Not Pass This Barrier", shall be posted with barricade tape or with any type of barrier device when painting, or at any time if considered appropriate by the person in charge of the job.

15.3.4 Caution shall be used when handling bus bars, tower steel, or any conductive materials or equipment, in the vicinity of energized equipment or lines.

15.3.4.a Tag lines shall be used to control movement when hoisting or lowering.

15.3.4.b Materials or tools that are long shall be carried in a horizontal position.

15.3.5 Except for fuse replacement or other necessary access by qualified persons, the guarding of energized parts within a compartment shall be maintained during operations and maintenance functions to prevent accidental contact with energized parts and to prevent tools or other equipment from being dropped onto energized parts.

15.3.6 When draw-out type circuit breakers are removed or inserted, the breaker shall be in the open position and the control circuit shall also be rendered inoperative if the design of the equipment permits.

15.3.7 When guards are removed from energized equipment, barriers shall be installed around the work area to prevent other employees from contacting the exposed energized parts.

15.3.8 Sufficient access and working space shall be provided and maintained around electrical equipment to permit ready and safe operation and maintenance of the equipment

15.3.9 For additional information concerning substations, refer to OSHA 1910.269.

15.4 Storage

15.4.1 No materials or equipment shall be stored under energized buses, lines, or near energized equipment.

15.5 Substation Fences

15.5.1 When a substation fence must be expanded or removed for construction purposes, a temporary fence with comparable site protection shall be installed.

15.5.2 Company standard "Warning" signs shall be attached to temporary fences.

15.5.3 Install a minimum of two Company standard "Warning" signs per side at a maximum distance of 40-feet between signs, on security fences surrounding the substation, and not more than 20-feet from any outside corner.

15.5.4 Install signs at an approximate height of 4-feet.

15.5.5 Install Company standard "Warning" signs at all gates and entrances to the substation.

15.5.6 Refer to Company Substation Engineering Standard 54-005 Rev. 1

15.5.7 Adequate interconnection with ground shall be maintained between temporary fences and permanent fences.

15.6 Substation Transformers / Tanks

15.6.1 Before entry into a transformer tank, the following shall apply:

15.6.1.a Permit required [Enclosed Space Pre-entry Checklist](#) shall be completed.

15.6.1.b An [Enclosed Space Entry Permit](#) checklist shall be completed.

15.6.1.c If the transformer has an inert gas system, the nitrogen tank must be physically disconnected from the transformer.

15.6.1.d The tank shall be forced ventilated for five (5) minutes.

15.6.1.e Sufficient natural or forced ventilation shall be continued while anyone is in the transformer tank.

15.6.1.f Test for oxygen with a calibrated instrument.

15.6.1.g The atmosphere within the tank shall be periodically tested.

15.6.2 A second person, trained in first aid, shall be present in the immediate area on the top of the transformer tank and in voice communication with the person inside the tank at all times.

15.6.3 Rescue equipment shall be readily available.

15.6.4 When lighting is required inside the tank, a low voltage, 12-volts or less D.C. light, shall be used.

15.6.5 All bushing terminals, where possible, shall be bonded together prior to anyone entering the transformer tank.

15.7 Vaults

15.7.1 Only employees authorized and familiar with the installations or accompanied by an authorized employee familiar with the installation shall enter a vault.

15.7.2 Walk in Switching Vaults or Transformer Vaults

15.7.2.a Signs warning unqualified persons to keep out shall be displayed at entrances to the rooms and spaces.

15.7.2.b Entrances to rooms and spaces that are not under the observation of an attendant shall be kept locked.

15.7.2.c Attach a "WARNING-HIGH VOLTAGE" sign to the guardrail inside the vault.

15.7.2.d Refer to HECO Underground Engineering Standards 23-1030 rev 4.

15.7.3 Submersible or Subsurface Vaults

15.7.3.a Before entering unvented vaults, adequate continuous ventilation shall be provided, and the atmosphere shall be instrument tested for adequate oxygen content and the presence of explosive gases.

15.7.3.b Barricades are to be installed.

15.7.3.c No employee may climb into or out of a vault by stepping on cables or hangers.

15.7.3.d When lowering tools and materials into vaults, the person on the surface shall alert the person receiving the equipment.

15.7.3.e Tools and materials shall be lowered using a hand line and tool bag.

15.7.4 Non-Company Standard Vaults

- 15.7.4.a Before entering an abnormal or non-Company standard vault, open vault door for 5-minutes.
- 15.7.4.b If there is any indication of a hazardous atmosphere, an approved and properly calibrated instrument shall be used to test for the presence of explosive gases.

15.8 Oil Handling

- 15.8.1 Bushing terminals shall be grounded when pumping oil in or out of equipment.
- 15.8.2 When filtering or pumping oil, the filter or pump and containers shall be bonded and grounded.
- 15.8.3 Containers with a volume of 55-gallons or less are excluded from this rule.
- 15.8.4 Appropriate venting or purging procedures shall be followed, when adding or removing oil from equipment.

15.9 Circuit Breaker Maintenance

- 15.9.1 When working on an isolated de-energized circuit breaker, the breaker mechanism shall be made inoperative, and appropriate danger tags shall be placed where required.
- 15.9.2 When a breaker is to be operated, persons in the area of the breaker shall be warned and moved to a safe place if necessary.
- 15.9.3 When working on the mechanism of an energized breaker, employees shall stay clear of moving parts or parts that may move.
- 15.9.4 When a person is required to enter a circuit breaker tank, an "Equipment Pre-entry Checklist" shall be filled out.
- 15.9.5 A second person shall be present in the immediate work area outside the tank, where communications can be maintained with the person inside the tank.
- 15.9.6 When lighting is required while working inside a breaker tank, a low voltage, 12-volts or less D.C. light, shall be used.
 - 15.9.6.a A Supervisor can authorize the use of 110-volt lighting, if GFCI is provided and the bulb is protected.

15.10 Sulfure Hexaflouride (SF6) Gas Insulated Equipment

15.10.1 Refer to Substation Maintenance's Safe Work Practices for SF6 Gas.

15.10.2 Description of SF6 - Sulfur Hexaflouride Gas;

- SF6 is odorless, tasteless, colorless, and non-toxic in its' pure state.
- SF6 is heavier than air and collects in low places and can exclude oxygen.
- SF6 subjected to an electric arc, open flames, or glowing coils, produces toxic decomposition products in the form of white or tan powder.
- SF6 in the presence of moisture, may present a noxious gas that has an odor characteristic of rotten eggs.

15.10.3 Working with SF6 Gas

15.10.3.a Do not smell for leaks. A halogen gas detector shall be used to determine leaks.

15.10.3.b No smoking, open flames, or heaters, shall be allowed in the immediate area where a mixture of SF6 gas and air could be present.

15.10.3.c Employees shall not contact the decomposition products with exposed skin.

15.10.3.d The residue from decomposition products, if in large quantities, shall be removed with an approved vacuum cleaner.

15.10.3.e All internal parts shall be wiped clean with a rag and approved cleaner, to remove the residue from decomposition products not removed by the vacuum cleaner.

15.10.3.f All residue and materials contaminated with residue, shall be handled and disposed of as outlined in the Substation Maintenance's Safe Work Practices for SF6 Gas.

15.10.3.g If an interrupting mechanism is to be opened, all persons engaged shall wear neoprene gloves and any other appropriate protective equipment.

15.10.3.h When allowing SF6 gas to vent itself to the atmosphere, persons shall not breathe the escaping gas. A fan may be used to disperse the gas if there is insufficient air movement.

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16.0 Objective

Hawaiian Electric Company, Hawaii Electric Light Company, and Maui Electric Company, will develop, maintain, and administer, these Meter Service safety requirements.

16.1 Purpose

This Chapter describes the safety policies and procedures necessary for employees, as well as contractors, who work in this challenging area, in order to provide a safe work environment. This written program addresses all applicable United States Occupational Safety & Health Administration (OSHA) laws and regulations set forth in 29 CFR 1910 (1910.269) and 29 CFR 1926, as well as all applicable rules and regulations.

16.2 Entering Customer Property

16.2.1 Employees shall always remain aware of their surroundings and look out for hazards (tripping or overhead), dogs, cats, or other animals.

16.2.2 Employees shall announce their presence if practical, and state their business when entering customer's premises.

16.2.3 Notify the customer when you leave, if practical.

16.3 Test Equipment and Fuses

16.3.1 Only approved test lamps, voltmeters, or voltage testers, shall be used for determining whether a circuit is energized or if a fuse is blown.

16.3.2 Fuse pullers or rubber gloves, shall be used in replacing cartridge fuses in energized service installations.

16.3.3 Refer to Chapter 5, section 5.5, for additional information on fuses.

16.4 Primary Metering

- 16.4.1 Before starting work on any primary metering installation, make certain that transformer cases or metering cabinets are not energized as the result of instrument transformer failure.
- 16.4.2 In completing installations, always make a voltage check to eliminate the possibility of incorrect or dangerous voltage at the test block and meter.

16.5 Current Transformers

- 16.5.1 Before working on current transformers, the secondary leads shall be shunted/jumpered to prevent induced high voltage.
- 16.5.2 Under no circumstances should the secondary of a current transformer be opened while in service. In the event this condition is encountered, do not attempt to close the current transformer secondary without first de-energizing the circuit.
- 16.5.3 A check shall be made to ensure that all instrument transformers are properly grounded.
- 16.5.4 Follow the respective Department's Meter Tagging Procedures for New Transformer – Rated Meter.

16.6 Metering (Meter Sets and Changes)

Installation, removal, and maintenance of transformer-rated meters, shall only be performed by properly trained employees.

- 16.6.1 When installing or removing meters from energized meter sockets, the following PPE and equipment shall be utilized:
- Low voltage rubber gloves with leather protectors.
 - Hardhat.
 - Safety glasses.
 - Face shield or nomex hood (balaclava).
 - Flame resistive clothing.
- 16.6.2 For meter sockets equipped with bypass capabilities, leather gloves shall be worn if socket is de-energized.
- 16.6.3 Meter sockets shall be inspected before the meter is installed and/or the service is energized.
- 16.6.4 Checks shall be made to ensure there is no socket damage, loose connections, or foreign objects present, that could cause a short circuit or flashover.
- 16.6.5 Voltage readings between the source, load, and ground, shall be made to prevent cross phasing, feedback, or phase-to-ground fault, through the meter or meter socket.

- 16.6.6 During testing, the energized socket or test equipment shall not be left unguarded.
- 16.6.6.a If a socket is to be left energized, a meter or approved socket cover shall be in place before leaving the work area.
- 16.6.7 Single-phase and three-phase meters installed in meter bases with bypass capabilities shall be disconnected or connected using one of the following methods: by using the facility main switch or disconnect, by using the portable service disconnect device, or by disconnecting the service or de-energizing the transformed station.
- 16.6.8 If possible, employees shall turn off customer main switch prior to installing and removing socket-type meters.
- 16.6.9 When removing a meter, a visual inspection shall be made to determine if the meter or meter socket is damaged.
- 16.6.10 When it is possible, always use a meter puller to remove meters.
- 16.6.11 If damage is indicated, the meter shall be de-energized before removal.
- 16.6.12 Meters shall not be disconnected by rotating the meter in the meter socket.
- 16.6.12.a Unlock and remove the meter ring prior to the removal of the meter.
- 16.6.12.b Remove the meter by disengaging the source side terminals first, followed by the load side terminals.
- 16.6.13 When setting socket-type meters, the load side terminal shall be entered first, followed by the source side.
- 16.6.13.a Employees shall push socket-type meters into their socket.
- 16.6.13.b Great care must be taken when inserting a meter by hand.
- 16.6.13.c No device shall be used to hit the meter.

16.7 Unlocking Meters

- 16.7.1 Inspect meter disc rotation after every "unlock".
- 16.7.2 Never leave a location with the meter disc turning, unless employee sees and speaks with the customer and the employee is certain that no hazardous condition exists.

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17.0 Objective

Hawaiian Electric Company, Hawaii Electric Light Company, and Maui Electric Company, will develop, maintain, and administer, these Generation Policies and Procedures.

17.1 Purpose

This Chapter describes the generation safety policies and procedures necessary for employees, as well as contractors, who work in this challenging area, in order to provide a safe work environment. This written program addresses all applicable United States Occupational Safety and Health Administration (OSHA) laws and regulations set forth in 29 CFR 1910 (1910.269) and 29 CFR 1926, as well as all applicable rules and regulations.

17.2 Generation/Production

17.2.1 Visitors or non-qualified workers shall be accompanied by a qualified employee in stations and around utility properties when life, service, or property, might be endangered.

17.2.2 All employees entering an attended station, except employees regularly working at such station, shall immediately report their presence or purpose according to plant procedure.

17.2.3 Employees shall not work on gauge glasses until pressure has been relieved.

- 17.2.3.a Gauge glasses shall be pressurized carefully, with only authorized personnel present.
- 17.2.4 Steam lines shall not be worked on while under pressure, except for repacking valves or peening pinhole leaks.
- 17.2.5 All control, annunciator, and indicating-light circuits on the back of control gauge boards, shall be considered as energized.
 - 17.2.5.a Employees working in back of these boards shall use precaution to guard against contact with exposed energized parts.
 - 17.2.5.b Caution shall be exercised when disconnecting, blowing down, or draining gauge lines, to prevent contact with exposed electrical equipment.
- 17.2.6 Should the water in the boiler become so low that it is not visible in the water column, the furnace fire shall be extinguished and other procedures followed, as recommended by the manufacturer.
- 17.2.7 When prolonged welding or burning is to be done in the boiler drum, auxiliary ventilation shall be used.
- 17.2.8 On all water tube boilers where drums are equipped with manheads at each end, both manheads shall be removed from each drum before workers enter the boiler
 - 17.2.8.a For inspection purposes, only one manhead need be removed if a worker is stationed outside during period of inspection.
 - 17.2.8.b For drum entry, the requirements of Chapter 17, Section 15, shall be followed.
- 17.2.9 Before entering the furnace or gas passes of a boiler, the following precautions shall be taken;
 - 17.2.9.a All fuel shutoff valves shall be closed, physically rendered inoperative, and tagged with clearance tags.
 - 17.2.9.b Soot blower, steam, or air supply valves, shall be closed, physically rendered inoperative, and a clearance tag placed on each valve.
 - 17.2.9.c Clearance tags shall be placed on the controls, and the controls physically rendered inoperative on the mechanical firing equipment such as air supply fans, gas lines, pulverizers, and dampers.
 - 17.2.9.d Fuel oil pumps may remain operational provided the burner front valves are tagged shut and all burner guns removed, so any oil valve leak-by would go to the floor and not back into the boiler.

17.2.9.e Refer to Generation/Production Tagging Procedures for more detail.

17.2.9.f Clearance tags shall be placed and the controls physically rendered inoperative of all equipment that may cause motion within the furnace or gas passes, including rotating air heaters, retractable temperature probes, soot blowers, and bypass dampers.

17.2.9.g Thoroughly ventilate all areas in which work is to be performed.

17.2.9.g.1 It may be advisable to provide continuous forced ventilation during the progress of the work.

17.2.10 When working inside the furnace or ash hopper, protection shall be provided against falling slag.

17.2.11 Boilers should be satisfactorily cleaned when out of service for furnace work.

17.2.12 When working on or above gratings, a canvas or other suitable coverings shall be used to cover the grating in order to prevent tools, parts, or welding rod, from dropping to a lower level.

17.2.12.a Approved barricades or hole coverings shall be used when gratings are removed.

17.2.12.b Gratings shall be tied off before removing to prevent falling.

17.2.13 Before removing a valve bonnet, stuffing a box gland, or breaking a flanged joint or other pressure connection, the bolts, nuts, or other fasteners, shall first be loosened and special care exercised to make sure that pressure does not exist and that steam or hot water has been drained.

17.3 Generation Equipment Lockout/Tagout

17.3.1 All equipment shall be considered in service unless properly isolated and designated as out of service by the respective department's isolation procedures.

17.3 Boiler Start Up

17.4.1 A pre-firing check shall be made of all instrumentation, equipment, and controls, essential to the operation of the boiler.

17.4.1.a All such equipment shall be operable and in proper adjustment for safe operation.

17.4.1.b There shall be water showing in the boiler drum gauge glasses or remote drum water level indicator.

- 17.4.1.c The boiler shall be thoroughly purged of flammable mixtures before lighting fires.
- 17.4.2 An approved torch or igniter shall be used for lighting fires in a boiler.
 - 17.4.2.a Personnel handling the torch shall remain clear of the opening into which the lighted torch is placed.
 - 17.4.2.b Long sleeve insulating type arm protection and face shield shall be worn.
 - 17.4.2.c Igniters shall be checked and monitored to be burning before burners are placed in service.
- 17.4.3 Under no condition shall burners be lit from a hot boiler wall.
 - 17.4.3.a In case of unstable fires or loss of fires in a boiler, fuel valves shall be closed and the boiler thoroughly purged before lighting fires again.
 - 17.4.3.b Continued monitoring of fires shall be maintained until stable fires are assured.
- 17.4.4 Established procedures for starting up and shutting down shall be rigidly followed.
 - 17.4.4.a Necessary deviations shall be made, with special permission, and shall be recorded.
 - 17.4.4.b Follow boiler standards and B & W or C.E. start-up instructions such as K-15-1; K-3-10; K-3-17.

17.5 Boiler Operation

- 17.5.1 Loss of fires shall be considered an emergency.
- 17.5.2 The fuel supply to the affected boiler shall be isolated immediately.
- 17.5.3 Before relighting, it must be assured that all combustible gases are purged.
- 17.5.4 Before making observations of boiler firesides that involve opening doors or close approach to openings, precautions must be taken for blow back and suitable eye protection shall be used.
- 17.5.5 Return and supply valves shall be closed before removing a burner gun.
- 17.5.6 Inspections of fuel oil equipment and areas adjacent thereto, shall be made periodically to check for oil leaks and drips.
- 17.5.7 Fuel oil shall not be allowed to soak into pipe or equipment insulation and cause a fire hazard.

17.5.8 Oil spills shall be cleaned up without delay.

17.6 Out of Service Boilers

17.6.1 Workers shall not enter fires or water sides of a boiler until boiler clearance is obtained.

17.6.2 Entering the boiler for inspection will not be done until the person holding the clearance is notified.

17.6.3 Precautions shall be taken to prevent fuel oil from leaking into a furnace following shut down.

17.6.4 Remove all burners immediately after purging.

17.7 Boiler Plant

17.7.1 Water-wall ring header and economizer blowdown valves shall not be operated while boiler is under load or being fired with other than ignition or pilot torches.

17.7.2 Should a blowoff line break, a tube fail, or some similar serious leak develop, the fire shall be drawn or retarded immediately and other procedures followed as recommended by the manufacturer.

17.7.3 When the blowdown line of a boiler being worked on is connected to a common blowdown line with other boilers and it becomes necessary to open the blowdown valves of the boiler being worked on, clearance tags shall be attached to the blowdown valves and the valves physically rendered inoperative from all boilers.

17.7.3.a These clearance tags shall not be removed until the valves of the boiler being worked on have been reclosed.

17.7.3.b See Generation Tagging Procedures for more detail.

17.7.4 Employees shall not work on safety valves while boiler is under pressure, except to make necessary adjustments, nor shall they work near unvented safety valves while the boiler is under pressure.

17.7.5 Leaky manheads, handhole plates, and bolted flanges on steam lines, shall not be worked on under pressure without getting specific approval from the Superintendent or authorized representative.

17.7.6 Before a boiler water column is repaired or adjusted, the upper and lower shutoff valves shall be closed and the drain opened to release the pressure.

- 17.7.7 Before placing a boiler water column in service, all personnel shall place themselves so that if the gauge glass should rupture, no one would be in the direct line of steam discharge.
- 17.7.8 While applying a hydrostatic test to a boiler, only those inspecting for leaks shall be inside the boiler.
- 17.7.9 If safety valve gags are used, care shall be taken to see that they are removed before the boiler is fired.
- 17.7.10 All employees shall stay clear of leaking pressurized equipment.
- 17.7.10.a No attempt shall be made by an employee to stop or slow such a leak by using hands, feet, or other parts of the body.
- 17.7.10.b The pump, compressor, or engine, shall be stopped as soon as the leak is detected.
- 17.7.11 Inlet and outlet circulating water valves shall be locked out or tagged out and physically rendered inoperative before employees enter the water box of a condenser.
- 17.7.11.a If these valves are electrically operated, their main breakers shall be opened, physically rendered inoperative, and locked out or tagged out.
- 17.7.12 All boiler plant safety devices such as safety valves, relief valves, fuel tripping devices, auxiliary tripping relays, interlocks, and alarms, shall be tested periodically as specified by plant management.
- 17.7.13 When lancing boilers, employees shall wear a long-sleeved, non-synthetic material shirt, buttoned at the collar (or Nomex coveralls), gloves, a safety hard hat, a face shield, and safety glasses.
- 17.7.14 The boiler operator shall be notified before any door on a boiler is opened, because the fire might flash out due to a positive pressure within.
- 17.7.15 Only authorized personnel shall be permitted to open boiler doors. Employees shall stand to one side when opening a boiler door.
- 17.7.16 When required, boiler doors shall be closed before leaving the area.
- 17.7.17 In units that have both induced draft fans and forced draft fans, when practicable, the unit should be placed on a fixed load and the induced and forced draft fans on hand control to lessen the danger of a positive pressure.
- 17.7.18 Employees shall stand to one side when using plugs or brushes with an air gun to clean tubes.

- 17.7.19 Before removing a valve bonnet or stuffing box gland, or breaking a flanged joint or other pressure connections, the pressure shall be relieved and the system drained, physically rendered inoperative, and tagged.
- 17.7.20 Employees shall use only hoses that are approved for the intended use.
- 17.7.21 Air and water hoses shall not be used for steam.
- 17.7.22 Steam hoses shall be insulated sufficiently to avoid burns from accidental contact.
- 17.7.23 While working or pounding on hoppers to aid the removal of fly ash or siftings, employees shall wear dustproof goggles, dust respirator, gloves, and long-sleeved shirt buttoned at the collar (or Nomex coveralls).
- 17.7.24 Dustproof goggles shall be worn and care employed when removing inspection plugs from hoppers.
- 17.7.25 Ash pit doors and gates shall be opened and closed cautiously.
- 17.7.26 The following applies to water and steam spaces associated with boilers:
- 17.7.26.a A designated employee shall inspect conditions before work is permitted and after its' completion.
 - 17.7.26.b Eye protection and full-face protection, if necessary, shall be worn at all times when condenser, heater, or boiler tubes are being cleaned.
 - 17.7.26.c When it is necessary for employees to work near tube ends during cleaning, shielding shall be installed at tube ends.

17.8 Boiler and Pressure Vessel Chemical Cleaning

- 17.8.1 Areas where chemical cleaning is in progress shall be cordoned off to restrict access during cleaning.
- 17.8.2 The chemical cleaning area shall be posted with signs restricting entry and warning of the health hazards associated with the chemicals being used and the potential for fire and explosion.
- 17.8.3 Only properly trained employees shall be allowed in restricted areas and limited in number to those necessary to accomplish the task safely.
- 17.8.4 Employees in restricted areas shall wear protective equipment as required by Company policy and the Material Safety Data Sheet for the chemicals in use.

- 17.8.5 An emergency shower or water source shall be available for emergency use.
- 17.8.6 All chemical cleaning waste material shall be properly disposed of according to federal, state, and local regulations.

17.9 Hydrogen Cooling Systems

- 17.9.1 Open flames shall be kept away from all hydrogen cylinders and hydrogen equipment where there is a potential for hydrogen leaks to occur.
- 17.9.2 No smoking or open flames will be allowed in the immediate vicinity (within 25 feet) of these hydrogen areas.
- "No Smoking or Open Flame" signage shall be posted in these areas.
- 17.9.3 Only non-sparking tools shall be used in hydrogen areas.
- 17.9.4 A sufficient quantity of CO₂ shall be readily available, at all times, to purge the hydrogen from the generator.
- 17.9.5 Any generator or other vessel containing air shall first be purged with CO₂ before hydrogen gas is admitted.
- 17.9.6 Any generator or other vessel containing hydrogen shall be purged before entering, first with CO₂, then with air.
- 17.9.7 Tests for adequate oxygen shall be made with approved apparatus, and the removable link in the hydrogen supply line shall be removed before entering.
- 17.9.8 If hydrogen-seal oil pressure is lost and cannot be immediately restored, the generator will be unloaded and the hydrogen shall be purged from the generator.

17.10 Turbine Generators

- 17.10.1 Turbine generators shall be started and stopped in accordance with approved station operating instructions.
- 17.10.2 When working on or above open grating, a suitable covering shall be used to cover the grating in order to prevent tools or parts from dropping to a lower level.
- 17.10.3 Work area protection shall be provided, or the danger area shall be barricaded when gratings are removed.
- 17.10.4 When opening any part of the turbine casing or steam side of the condenser, all valves or piping that may allow steam, air, or other fluids to enter the turbine, shall be closed, physically rendered inoperative, and tagged with clearance tags.

- 17.10.5 All equipment that can cause motion to the turbine, such as turning gear, shall be physically rendered inoperative and tagged with clearance tags.
- 17.10.6 Before exciter or generator brushes are changed while the generator is in service, the exciter or generator field shall be checked to determine that a ground condition does not exist.
- 17.10.6.a If the equipment has ground-protecting devices, the protective devices shall be disconnected and tagged with clearance tags before the brushes are changed.

17.11 Uncontrolled Material Release

- 17.11.1 An uncontrolled release of hazardous material can present a physical and health hazard to those in the area.
- 17.11.1.a Examples of materials present in the Power Generating Units that may pose these hazards include, but are not limited to: asbestos, mercury, hydrazine, ammonia, morpholine, hydrochloric acid, sulfuric acid, sodium hydroxide, and sodium hypochlorite.
- 17.11.1.b Severity of an uncontrolled release of such materials will vary depending upon substance properties, quantity, and location of the release.
- 17.11.2 During an uncontrolled release of material, responders must place personal safety and the safety of others as the number one priority.
- 17.11.2.a Ensure that you are at a safe distance from the release or have appropriate PPE if any closer, and cordon off the area to prevent others from entering the compromised area.
- 17.11.2.b Determine the appropriate PPE for entry into the area, if necessary.
- 17.11.2.c Immediately notify your Supervisor and the Shift Supervisor of the incident.
- 17.11.2.d Supervisors must:
- Evaluate the incident and notify appropriate parties to respond.
 - Notify the Corporate Safety Division of all uncontrolled material releases.
 - Obtain an MSDS of the material released and review with those involved.
 - Establish a safe zone for responders.
 - Ensure that only properly trained personnel, wearing the correct PPE, enter the contaminated zone.
 - Control the source of release, if possible.
 - Effectively contain material to prevent further contamination.
 - Re-evaluate the initial established zone and modify as necessary.
 - Begin clean-up of the release.

17.11.3 The Corporate Safety Division will determine if monitoring is required based upon the severity of the release.

- Prior to releasing the area for general work/occupancy, the Corporate Safety Division will determine if the area is cleared through visual inspection and/or sampling.

17.12 Generation/Production/Plant Acids and Caustics

17.12.1 When mixing acid or caustic with water, the acid or caustic shall be poured slowly into the water and agitated through the mixing process. Never pour water into the concentrated acid or caustic.

17.12.2 If it is necessary to enter a tank or vat, all confined/enclosed space entry requirements shall be followed, per Chapter 9, section 9.5.

17.12.3 Hydrazine and morpholine are highly toxic and caustic and shall never be handled without adequate ventilation.

17.12.3.a Skin or clothing contact and the breathing of fumes shall be avoided.

17.12.3.b Proper PPE shall be worn when handling these chemicals.

17.12.3.c All small containers, such as bottles or jars, shall be rinsed thoroughly when emptied.

17.12.4 Carboys, steel drums, tank trucks, or tank cars, shall not be washed but shall be completely drained of all acid before returning to the acid supplier.

17.12.5 Open flames and smoking are prohibited when working with or near acid in metal containers, such as tanks, condensers, or boilers.

17.12.6 Certain acids (e.g. sulfuric acid) in contact with metal produce explosive hydrogen.

17.12.7 Suitable procedures shall be established to avoid explosions from released hydrogen or injuries from the chemicals.

17.12.8 Areas where acid cleaning is to be done shall be barricaded by suitable means, and no smoking or open flames shall be permitted within 25-feet.

17.12.9 Persons working in chemical laboratories or with chemicals shall take special precautions to protect themselves and others from spilled chemicals, broken glassware, or other injurious substances.

17.12.9.a All persons entering such areas shall exercise care to avoid injury from these substances.

17.12.9.b All persons using chemical feeders shall wear face shield protection or chemical goggles and shall be instructed in the operation of the equipment.

17.12.9.c Special precaution shall be taken to insure that the pressure tank is void of pressure, drained, and vented before opening.

17.12.10 Dangerous chemicals shall not be issued to unauthorized personnel.

17.13 Storage of Production Acids and Caustics

17.13.1 Acids, in any quantity, shall be kept in an approved carboy or other container, properly labeled.

17.13.1.a These containers shall not be used for any other purpose.

17.13.1.b Acids shall not be stored within 15-feet of heaters, steam pipes, or other sources of heat.

17.13.1.c Acid containers shall be securely stoppered or covered.

17.13.1.d Acids kept on shelves shall not be stored higher than waist level.

17.13.1.e Storage areas for acids and caustics shall be posted with appropriate warning signs.

17.14 Handling Acids and Caustics

17.14.1 Only properly trained employees or suppliers' personnel shall operate valves or other equipment that control the movement of chemicals.

17.14.2 Company approved protective equipment and clothing shall be worn whenever acids or caustics, in harmful quantities, may spill, splash, fly, or drip upon the person handling them.

17.14.3 The quantity of acid or caustic handled shall determine the kind and quantity of clothing and equipment. Minimum protection shall be chemical goggles, acid-proof gloves, and apron.

17.14.4 Should any acid, caustic, or other chemical come in contact with the eyes, they shall be thoroughly washed with large amounts of running water and a physician consulted as soon as possible.

- Do not rub the eyes.
- Employees shall not handle acids or caustics, unless there is access to an adequate supply of water for quick drenching and flushing of the eyes and body.

17.14.5 After handling large quantities of caustics and acids, employees shall take a shower to avoid skin irritation.

17.14.6 Before lifting or moving a carboy or other acid container, it shall be examined carefully to see that it is not in a leaky or defective condition.

17.14.6.a The wire holding the carboy stopper in place shall be checked to see that it has not corroded and that the stopper is secure.

17.14.6.b All movements shall be made slowly, to avoid excessive agitation of the acid.

17.14.7 Only approved methods, tools, and equipment, shall be used to extract acids and caustics from a container. Chemical pumps shall be washed externally before repacking or performing maintenance work.

17.14.8 See Supervisor or Department Work Practices for additional information and specific procedures.

17.14.9 Before starting to unload a tank truck of acid, the acid storage tank shall be gauged to see if there is adequate space inside the tank to contain the acid being added without over-flowing.

17.14.9.a Warning signs shall be prominently posted and barriers placed so as to warn all personnel of the impending danger.

17.14.9.b Acid in tank trucks shall be unloaded in accordance with the regulations of the Interstate Commerce Commission and the recommended practices of the Manufacturing Chemists Association.

17.14.10 If acids or caustics are spilled, they shall be flushed away with an ample supply of water and should never be wiped up. Use of proper neutralizing agents can be used before flushing with water.

17.15 Plant Confined Space Precautions

17.15.1 Before employees enter a confined or enclosed space, they shall notify their supervisor and shall see that all valves, switches, control devices, and other operating mechanisms have been so positioned, physically rendered inoperative, and tagged with clearance tags, as to prevent closing the exit opening, energizing electrically, evacuating the air, or flooding the space with steam, gas, water, or anything else that may endanger their lives.

17.15.1.a No employee shall undertake work inside a furnace, boiler drum, pressure vessel, or tank, except by direction from Supervisor.

- 17.15.2 Before anyone enters a boiler drum, all valves, including blowdown valves, feedwater valves, steam valves, and fuel valves, shall be closed tightly and approved clearance tags displayed.
- 17.15.2.a One on each of the blowdown valves and one at each of the water inlet valves.
- 17.15.2.b These tags shall not be removed until all work on the boiler has been completed, all workers are out of the boiler; and all handhole, manhole, and heater plates have been replaced.
- Refer to Generation/Production Tagging Procedures for more detail.
- 17.15.3 To prevent the latching of self-locking doors or hatches while employees are working inside confined spaces, the locking devices shall be made inoperative or the doors/hatches shall be secured in the open position.
- 17.15.4 Only circuits with approved low-voltage, (6-12 volts) or GFCI (ground fault circuit interrupter), power supplies for lighting, shall be used in boiler drums, boilers, pressure vessels, and tanks.
- 17.15.4.a These circuits shall have extension cords of sufficient length, so that the transformers and power supplies are located outside the wet areas at all times.
- 17.15.4.b Cords entering confined spaces shall be protected against damage from the edges of doorways and hatches.
- 17.15.4.c If there are multiple entry and exits into a confined space, consideration shall be made to dedicating an entrance/exit for electrical cords and pneumatic hoses.
- 17.15.4.d Only explosion-proof lamps shall be used.
- 17.15.5 Refer to Chapter 9, section 9.5, for additional confined/enclosed space requirements.

Approved by: RCR	 Hawaiian Electric Company Maui Electric Company Hawaii Electric Light Company Tree Trimming	Safety & Health Manual
Date Revised: 12/3/12		Chapter: 18

Chapter Summary

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18.0 Objective

Hawaiian Electric Company, Hawaii Electric Light Company, and Maui Electric Company, will develop, maintain, and administer, these Tree Trimming Policies and Procedures.

18.1 Purpose

This chapter describes tree trimming requirements to help prevent injury and illness associated with tree trimming activities. This written program addresses all applicable United States Occupational Safety & Health Administration (OSHA) laws and regulations set forth in 29 CFR 1910 (1910.269) and 29 CFR 1926, as well as all applicable rules and regulations.

18.2 General

- 18.2.1 When tree trimming, tree felling, brush loading, or brush disposal operations, are under way on street, highway, or any other area accessible to the public, "People working" signs, cones, red flags or flares, barricades, and other warning devices or combinations thereof, shall be used to protect vehicular and pedestrian traffic.
- 18.2.2 Climbers with pole gaffs shall not be used in trees.
- 18.2.3 Dead or rotted limbs, regardless of size, shall not be used by employees for support.
- 18.2.4 No work shall be done in a tree until the employee is securely tied in or belted to the tree.
- 18.2.5 The climbing rope shall be crotched in such a manner as to prevent its' "working out" on a lateral limb.
- 18.2.6 When working in a multiple trunk tree, the climbing rope shall preferably be crotched around a main trunk other than the one on which the employee is working.

- 18.2.7 Employee shall crotch their climbing rope in two places, if a single crotch does not adequately protect them from falling into energized lines or falling back into trunk of tree.
- 18.2.8 The climbing rope shall not be used as a pull rope or as a hand line to lower limbs or branches.
- 18.2.9 The ground end of a climbing rope shall not be allowed to dangle over roadways and shall be kept free from obstructions, passing vehicles, etc.
- 18.2.10 The taut-line hitch shall not be released until the climber is on the ground.
- 18.2.11 Branches or other material shall not be dropped, unless the immediate area has been cleared so that there is no possibility of injury to persons or damage to property.
- 18.2.12 If such a possibility exists, a rope shall be used to lower branches or other materials.
- 18.2.13 When lowering heavy tree members, employees shall not tie fall lines around hands or bodies.
- 18.2.14 Employees shall not attempt to clear limbs or brush from under the side of the tree where the climber is working.
- 18.2.15 Employees shall obtain assistance or use power equipment, if available, when lifting logs or other heavy loads.
- 18.2.16 When loading brush on a truck, employees shall not stand on or straddle the loaded brush.
- 18.2.17 Brush shall be hauled away promptly or otherwise disposed of, to avoid presenting “an attractive nuisance” to children and to prevent injury to persons or damage to passing vehicles.
- 18.2.18 When hauling brush, care shall be taken that it does not extend over the side of the truck.
- 18.3 Working Near Energized Conductors**
- 18.3.1 Before any employee climbs, enters, or works around any tree, a close inspection shall be made to determine whether an electric conductor passes within 10-feet of the tree.
- 18.3.2 Wires in proximity to tree trimming shall be considered as energized, unless tested to be dead and are grounded.

- 18.3.3 All employees involved with tree trimming, other than line-clearance tree trimmers or qualified electrical line workers, shall maintain the following minimum clearances from energized conductors and equipment:
- 18.3.3.a For lines and equipment energized at 50kv or less, the minimum clearance distance is 10-feet.
 - 18.3.3.b For lines and equipment energized at more than 50kv, the minimum clearance distance is 10-feet plus 4-inches for every 10kv over 50kv.
 - 18.3.3.c Numbers expressed are phase-to-ground.
- 18.3.4 Only line-clearance tree trimmers shall perform tree trimming if an electrical hazard exists or if parts of the trees are within 10-feet of exposed energized overhead conductors or equipment.
- 18.3.5 A second line-clearance tree trimmer shall be within normal voice communication and have climbing gear within 50-feet of the work area if any of the following conditions exist:
- 18.3.5.a If a line-clearance tree trimmer is to approach closer than 10-feet to any conductor or electrical apparatus energized at more than 750-volts.
 - 18.3.5.b If branches or limbs being removed are closer to lines energized at more than 750-volts or are within the distances listed in Table R6, Chapter 12, section 12.4.
 - 18.3.5.c If roping is necessary to remove branches or limbs from energized conductors or apparatus more than 750-volts.
- 18.3.6 Line-clearance tree trimmers shall maintain clearances from energized conductors as shown in Chapter 12, Section 12.4, Table R-6.
- 18.3.7 Line-clearance tree trimmers shall use insulating equipment and rubber gloves when removing branches that are contacting exposed energized conductors or equipment or that are within the distances, or have the potential to become within the distances, specified in Chapter 12, section 12.4.
- 18.3.7.a Limbs being removed from contact with wires are to be handled with the same precautions as the wires themselves.
 - 18.3.7.b Care shall be taken to prevent limbs being removed from coming in contact with the tree trimmer's body.
- 18.3.8 Ladders, platforms, aerial lifts, tools, and equipment shall not be brought closer to an energized conductor or apparatus than the Minimum Approach Distances listed in Chapter 12, Section 12.4.

- 18.3.9 Tree-trimming and tree-felling work should terminate and employees should be moved to a place of safety during electrical storms and periods of high winds or other unusual weather conditions that are dangerous to employees.
- 18.3.10 Employees shall not remove tree limbs or branches from above energized conductors while other employees are working in trees below the conductors in the same span.
- 18.3.11 Tree limbs shall not be dropped on conductors.
- 18.3.12 Ropes shall not be thrown over conductors or crossarms for the purpose of using the conductor or crossarm as a support or hitch.
- 18.3.13 Broken or fallen wires shall not be handled except by persons experienced in such work.
- 18.3.14 When working near wires, the employee shall have their climbing rope so secured that in the event they slip or a limb breaks, they will swing free and clear of the wires.
- 18.3.15 Dry ropes shall be used in trees through which energized conductors pass.
- 18.3.16 For additional information concerning working near energized conductors, refer to OSHA 1910.269(r).

18.4 Tree Felling

- 18.4.1 The employee felling the tree shall plan a clear retreat path before a cut is started.
- 18.4.2 The feller shall shut off his saw before he starts his retreat.
- 18.4.3 The feller shall appraise the situation for dead limbs, the lean of the tree to be cut, wind conditions, and other hazards, and exercise proper precautions before the cut is started.
- 18.4.4 When felling a tree, an undercut shall be made about 1/3 the diameter of the tree to guide the tree in the direction to fall and reduce the possibility of splitting.
 - 18.4.4.a A back or felling cut shall be made parallel to the inner edge of the undercut and approximately 2-inches higher than the undercut.
- 18.4.5 On terrain where trees are likely to slide or roll, fellers shall fell trees from the uphill side.
- 18.4.6 No one shall be allowed to work in a tree located near a tree that is being felled if there is any danger of its being struck by any part of the falling tree.

18.4.6.a The recommended distance between workers is twice the height of the trees being felled.

18.4.7 All persons not engaged in the felling operation shall be kept clear of guide ropes and other rigging.

18.4.8 Clear warning shall be given to all employees in the area when trees are to be felled or heavy tree members are to be dropped.

18.4.9 Once the felling of a tree has been started, it shall be completed before leaving the job.

18.5 Care and Use of Rope and Cutting Tools

18.5.1 Ropes shall be inspected at least daily and before each use.

18.5.1a Damaged sections shall be cut out and destroyed or the rope replaced.

18.5.2 Ropes shall be kept away from fire, acids, oil, chemicals, and all sources of excessive heat.

18.5.3 Dragging ropes over rough surfaces and sharp objects, such as rocks, shall be avoided.

18.5.4 Ropes shall be stored separately from sharp-edged cutting tools.

18.5.5 Climbing ropes shall have a minimum diameter of 0.5-inches (1.2 cm) with minimum breaking strength of 2,300-pounds (10.2 kN).

18.5.6 Climbing rope may not be spliced.

18.5.6.a Synthetic rope shall have an elasticity of not more than 7-percent.

18.5.7 Ropes shall be coiled and piled or suspended so that air can circulate through the coils.

18.5.8 Rope ends shall be secured to prevent unraveling.

18.5.9 A rope that has compromised insulation (e.g., wet or contaminated), may not be used near exposed energized lines.

18.5.10 The cutting edge of tools shall be suitably sheathed or guarded, except while in actual use.

18.5.11 Cutting tools shall be kept sharp and properly shaped.

18.5.12 When not in actual use, the trimmer's saw shall be returned to the scabbard.

18.5.13 Axes shall not be used in trees or carried on the shoulder.

18.5.14 Tools shall not be thrown into or dropped from a tree; they shall be raised or lowered by a suitable rope line.

18.5.15 A pruner shall not be laid on a limb, in a crotch, or hooked on a wire or rope. It shall be hooked over a limb strong enough to hold its' weight.

18.5.16 Ladders shall be removed from the base of the tree when not in use.

18.6 Power Trimming Equipment

18.6.1 Chain-saw operators shall inspect the saw before each use to assure that all handles and guards are in place and tight, that all controls function properly, and that the muffler is operational.

18.6.2 Chain-saw operators shall follow manufacturer's instructions on operation and maintenance.

18.6.3 All chain saws shall be equipped with "deadman" controls which prevent the device from being locked in the "on" position.

18.6.4 Employees operating powered trimming equipment shall wear suitable eye, ear, and face protection.

18.6.5 Power saws weighing more than 15-pounds, that are used in trees, shall be supported by a separate line, unless the work is performed from an aerial lift or no supporting limbs are available.

18.6.6 When starting a chain saw, it shall be placed on or against a solid support and the area cleared of all co-workers.

18.6.7 The operator shall grip the chain saw with both hands during the entire cutting operation.

18.6.8 Saw bumper shall be against the tree or limb before starting a cut.

18.6.9 Chain-saw operators shall, when necessary, clear the immediate area around their work to make certain that brush will not interfere with either the chain saw or operator.

18.6.10 The chain-saw engine or motor shall be stopped for the following:

18.6.10.a When working on any part of the chain or cutting bar.

18.6.10.b While the saw is being moved from one location to another, including being carried up into the tree.

- 18.6.10.c While unit is unattended.
- 18.6.11 Gasoline-driven chain-saw engine shall be stopped when being refueled.
 - 18.6.11.a If gas is spilled on the chain saw during refueling, it shall be wiped off before engine is started.
 - 18.6.11.b Chain saws shall not be started within 10-feet of fueling area.
- 18.6.11 A gasoline-driven chain saw shall not be used above shoulder level or at a distance that would require the operator to relinquish a safe grip on the saw.
- 18.6.12 Employees shall not approach the chain-saw operator or place themselves within the reach of the saw, while the saw is in operation.
- 18.6.13 Employee shall never hand a pneumatic or hydraulic pruner or saw to another employee unless it is disconnected.
- 18.6.14 Powered tools shall not be left unattended, if connected to a power source.
- 18.6.15 Powered tools shall not be adjusted or repaired while connected to a power source.
- 18.6.16 Stump cutters shall be equipped with enclosures or guards to protect employees.
 - 18.6.16.a Each employee in the immediate area of stump grinding operations shall wear personal protective equipment.
- 18.6.17 When backpack power units are used, the following precautions shall apply:
 - 18.6.17.a No one, except the operator, shall be within 10-feet of the cutting head of a brush saw.
 - 18.6.17.b The backpack power unit shall be equipped with a quick shut-off switch readily accessible to the operator.
 - 18.6.17.c Backpack power unit engines shall be stopped for all cleaning, refueling, adjustments, and repairs to the saw or motor, except when the manufacturer's service procedure requires otherwise.
- 18.6.18 For additional information concerning power trimming equipment, refer to OSHA.


18.7 Chippers

- 18.7.1 Brush chippers shall be equipped with a locking device in the ignition system.
- 18.7.2 The ignition key shall be removed when chipper is left unattended.

- 18.7.3 Trailer chippers detached from trucks shall have their wheels chocked.
- 18.7.4 Access panels for maintenance and adjustment of the chipper blades and associated drive train, shall be in place and secure during operation.
- 18.7.5 Chippers shall never be parked directly under the tree being trimmed.
- 18.7.6 Employees shall not permit spectators to stand near the machine while feeding brush into the chipper.
- 18.7.7 Proper PPE's shall be used whenever the chipper is on.
 - 18.7.7.a Full-cover goggles or face shield shall be worn by employee when feeding brush into the chipper.
 - 18.7.7.b Hearing protection shall be worn when noise levels exceed acceptable levels.
 - 18.7.7.c Only wrist-length, non-gauntlet gloves, shall be used by employees feeding a chipper.
- 18.7.8 Employee shall never place hands or body parts into the brush hopper while the chipper is in operation.
- 18.7.9 Tools or other metallic objects shall not be used to push brush into the chipper.
- 18.7.10 Sweepings, which may contain foreign objects such as stones and nails, shall be loaded onto a truck and not fed into the chipper.
- 18.7.11 For additional information on chippers, refer to OSHA 1910.269(r)(2).

18.8 Right-of-Way Clearing and Maintenance

- 18.8.1 When two or more employees are cutting brush, they shall be separated by at least 10-feet.
- 18.8.2 Under no circumstances shall anyone, except the operator, ride on a bulldozer, or any other heavy equipment used in land clearing.
- 18.8.3 Bulldozer operators shall wear seat belts.
- 18.8.4 Employees shall not anchor equipment to railroad tracks, fences, or structures belonging to others.
- 18.8.5 When emerging from a right-of-way prior to road travel, employees shall test brakes.

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Definitions

100% Fall Protection - any system/component designed to protect personnel from the risk of falls when working at heights by eliminating the fall hazard; restricting the free fall to no more than 2-feet or more than 6-feet with a deceleration device, and preventing contact with any other lower level.

Action Level (AL) – Level of exposure to a harmful substance or other hazard (present in a work environment or situation) at which an employer must take the required precautions to protect the workers. It is normally one-half of the permissible exposure limit.

Aerial Device – Any piece of equipment utilizing a bucket or platform to place the worker(s) at an elevated worksite.

Affected Employee – An employee whose job requires him or her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tag out, or whose job requires him or her to work in an area in which such servicing or maintenance is being performed.

Alive or Live – Electrically connected to a source of potential difference or electrically charged so as to have a potential significantly different from that of the earth in the vicinity. The term “live” is sometimes used in place of the term “current-carrying”, where the intent is clear, to avoid repetition of the longer term.

Anchorage – A secure means of attachment for lifelines, lanyards, and straps. Anchorage used with fall protection must have a weight capacity of 5000-pounds. Sometimes referred to as “Anchor Point”.

ANSI – American National Standards Institute.

Approved – The term “approved”, when used in connection with methods, tools, or equipment, refers to the methods, tools, or equipment approved by the company through committee, departmental action, or safety rule.

ASME – American Society of Mechanical Engineers.

ASTM – American Society of Testing Material.

Attendant – An employee assigned to remain immediately outside the entrance to an enclosed or other space to render assistance as needed to employees inside the space.

Authorized Person/Personnel – One who has the authority to perform specific duties under certain conditions or who is carrying out orders from responsible authority and who is knowledgeable in the construction and operation of the equipment and the hazards involved.

Automatic Circuit Recloser – A self-controlled device for interrupting and reclosing an alternating current circuit with a pre-determined sequence of opening and reclosing followed by resetting, hold-closed, or lockout operation.

AWS – American Welding Society.

BMC Card – Board of Motor Vehicle Carrier's medical fitness physical required by the Department of Transportation for drivers of vehicles over 10,000-lbs. GVW.

Barricade – A physical obstruction such as tapes, cones, or A-Frame type wood or metal structures intended to warn and limit access to a hazardous area.

Barrier – A physical obstruction that is intended to prevent contact with energized lines or equipment or to prevent unauthorized access to a work area.

Benching (Benching System) – A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

Body Belt (Safety Belt) – A strap that both secures around the waist and attaches to a lanyard, lifeline, or strap.

Body Harness – Straps that are secured about an employee in a manner that distributes the arresting forces over at least the thighs, shoulders, and pelvis with provisions for attaching a lanyard, lifeline, or deceleration device.

Bond – The electrical interconnection of conductive parts designed to maintain a common electrical potential.

Boom – A timber or metal section or strut, pivoted or hinged at the heel (lower end) at a location fixed in height on a frame or mast or vertical member, and with its point (upper end) supported by chains, ropes, or rods to the upper end of the frame, mast, or vertical member with a rope for raising and lowering the load reeved through sheaves or a block at the boom point.

Bump Cap – Designed with a lightweight shell and no suspension system. Bump caps are not regulated/required by ANSI or OSHA.

Bus – A conductor or a group of conductors that serve as a common connection for two or more circuits.

Bushing – An insulating structure, including a through conductor or providing a passageway for such a conductor, with provision for mounting on a barrier, conducting or otherwise, for the

purposes of insulating the conductor from the barrier and conducting current from one side of the barrier to the other.

CDL – Commercial Driver’s License required for all drivers of vehicles with a GVW of 26,000-lbs. and above.

Cable – A conductor with insulation, or a stranded conductor with or without insulation and other coverings (single-conductor cable), or a combination of conductors insulated from one another (multiple-conductor cable).

Cable Sheath – A conductive protective covering applied to cables (may consist of multiple layers, one or more of which is conductive).

Circuit – A conductor or system of conductors through which an electric current is intended to flow.

Clear Hot Stick Distance – The minimum distance for the use of live-line tools held by linemen when performing live-line work.

Clearance (between objects) - The clear distance between two objects measured surface to surface.

Clearance (for work) – Authorization to perform specified work or permission to enter a restricted area.

Clearance Tag – Tag hung to communicate equipment shall not be operated.

Combustible Liquids – Any liquid having a flash point at or above 100 degrees F. Does not include compressed gases or cryogenic fluids.

Competent Person – One who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Communication Lines – The conductors and their supporting or containing structures that are used for public or private signal or communication service. **NOTE:** Telephone, telegraph, railroad signal, data, clock, fire, police alarm, community television antenna, and other similar systems are included.

Conductor – A material, usually in the form of a wire, cable, or busbar, suitable for carrying an electric current.

Confined Space – An enclosed space that is large enough and so configured that an employee can bodily enter and perform assigned work; has limited or restricted means for entry or exit (some examples are tanks, vessels, silos, storage bins, hoppers, vaults, pits, and dike area); is not designed for continuous employee occupancy. A Permitted Confined Space has one or

more of the following characteristics: contains or has a known potential to contain a hazardous atmosphere, contains a material with the potential for engulfment of an entrant, has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section, or contains any other recognized serious safety or health hazard.

Contractor – Organization contracted by company to perform work on company property.

Covered Conductor – A conductor covered with a dielectric having no rated insulating strength or having a rated insulating strength less than the voltage of the circuit in which the conductor is used.

Crane – A machine for lifting and lowering a load and moving it horizontally, with the hoisting mechanism an integral part of the machine. Cranes, whether fixed or mobile, are driven manually or by power.

Current-Carrying Part - A conducting part intended to be connected in an electric circuit to a source of voltage. Non-current carrying parts are those not intended to be so connected.

DOT – Department of Transportation, Hawaii and Federal.

De-energized – Free from any electrical connection to a source of potential difference and from electric charge; not having a potential different from that of the earth.

Derrick – An apparatus consisting of a mast, or an equivalent member, held at the head by guys or braces, with or without a boom, for use with a hoisting mechanism and operating ropes.

Designated Person – See authorized person.

Disciplinary Action – Administrative action taken by the employer against the employee. May vary from verbal reprimand to dismissal.

Disconnected – Disconnected from any electrical source of supply.

Effectively Grounded – Intentionally connected to earth through a ground connection or connections of sufficiently low impedance and having sufficient current-carrying capacity to prevent the buildup of voltages that may result in undue hazard to connected equipment or to persons.

Electric Line Truck – A truck used to transport personnel, tools, and material for electric supply line work.

Electric Supply Equipment – Equipment that produces, modifies, regulates, controls, or safeguards a supply of electrical energy.

Electric Supply Lines – Conductors used to transmit electrical energy and their necessary supporting or containing structures. Signal lines of more than 400-volts are always supply lines within this section, and those with less than 400-volts are considered as supply lines if so run and operated throughout.

Emergency – An emergency occurs when an unusual condition exists that endangers life and/or property.

Employee – In the broad sense, any person employed by or representing the company. In general usage, a person employed by the company and below the level of supervisor or foreman.

Employer – Company (HECO, MECO, and HELCO).

Enclosed – Surrounded by a case, cage, or fence, which will protect the contained equipment and prevent accidental contact of a person with live parts.

Enclosed Space – A working space such as a manhole, vault, tunnel, or shaft that has a limited means of egress or entry, that is designed for periodic employee entry under normal operating conditions, and that under normal conditions does not contain a hazardous atmosphere but may contain a hazardous atmosphere under abnormal conditions.

Energized (also Alive or Live) – Electrically connected to a source of potential difference or electrically charged so as to have a potential different from that of the earth or different from that of adjacent conductors or equipment.

Energy Isolating Device – A physical device that prevents the transmission or release of energy, including, but not limited to, the following; a manually operated electric circuit breaker, a disconnect switch, a manually operated switch, a slide gate, a slip blind, a line valve, blocks and any other similar device with a visible indication of the position of the device (push buttons, selector switches, and other control circuit-type devices are not energy isolating devices).

Energy Source – Any electrical, mechanical, hydraulic, pneumatic, chemical, nuclear, thermal, or other energy source that could cause injury to personnel.

EPA – U.S. Environmental Protection Agency.

Equipment (electric) – A general term including material, fittings, devices, appliances, fixtures, apparatus, and the like used as part of or in connection with an electrical installation.

Excavations – Any man-made cut, cavity, trench, or depression in an earth surface formed by earth removal.

Expulsion-Type Fuse – An electrical fuse that is blown out of its cartridge by a short circuit.

Exposed – (a) In such a position that in case of failure of supports or insulation, contact with another circuit or line may result; (b) An object or device that can be inadvertently touched or approached nearer than a safe distance by a person. Applied to objects not suitably guarded or situated. Not isolated or guarded.

FAA – Federal Aviation Administration.

Fall Arrest System – The assemblage of equipment such as a positioning device or a full body harness in conjunction with a deceleration device and an anchorage to limit the forces a worker experiences during a fall from one elevation to another.

Fall Prevention System – A system intended to prevent a worker from falling from one elevation to another. Such systems include positioning devices, guardrail, barriers, and restraint systems.

Fall Protection Program – A program intended to protect workers from injury due to falls when working at elevations.

Fall Protection System (hardware) – Consists of either a fall prevention system or a fall arrest system.

FCAW – Flux Cored Arc Welding

FCC – Federal Communications Commission.

FDA – U.S. Food and Drug Administration.

Fell – The process of severing a tree from the stump so that it drops to the ground. “Feller” is the person who fells the tree.

Flammable Liquid – Any liquid having a closed cup flash point below 100-degrees F. Does not include compressed gases or cryogenic fluids.

Flares – The word “flares” shall be used to indicate flares, torches, fuses, red lanterns, reflectors, or any other equipment that is adaptable for the purpose intended.

Foreman, Crew Leader, or Supervisor – Any person, regardless of classification, who is directly in charge of a specific job or specific jobs. (Depending upon local classification, this person may be a “lead man”, working foreman, foreman, general foreman, supervisor, or superintendent).

Free Fall – The act of falling before the personal fall protection system begins to arrest the fall.

GMAW – Gas Metal Arc Welding.

Governmental – Any type of political agency having control over a certain activity. Included are federal, state, county, township, city, etc.

Ground (noun) – The connection, established either intentionally or accidentally, of an electric circuit or equipment with reference ground through a conductor, or other conducting object or substance.

Ground (reference) – That conductive body, usually earth, to which an electric potential is referenced.

Ground (verb) – Connecting or establishing a connection, either intentionally or accidentally, of an electric circuit or equipment to reference ground. Connect to earth or some conducting body that serves in place of earth.

Ground-Fault Circuit Interrupter (GFCI) - A device designed to prevent electrical shock by breaking the circuit when there is a difference in the currents in the hot and neutral wires.

Grounding Electrode (Ground Electrode) – A conductor embedded in the earth, used for maintaining ground potential on conductors connected to it and for dissipating into the earth current conducted to it.

GTAW – Gas Tungsten Arc Welding.

GTPAW – Gas Tungsten Plasma Arc Welding.

Guarded – Protected by personnel, or covered, fenced, or enclosed by means of suitable casings, barrier rails, screens, mats, platforms, or other suitable devices in accordance with standard barricading techniques designed to prevent dangerous approach or contact by persons or objects. (Wires that are insulated but not otherwise protected are not considered guarded).

Hazard Communication Program – Company developed program to ensure that information concerning hazardous chemicals (material) is transmitted to employees through the use of warnings, procedures, material safety data sheets, and employee training.

Hazardous Atmosphere – An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (escape unaided from an enclosed space), injury, or acute illness from one or more of the following causes: 1) Flammable gas, vapor, or mist in excess of 10 % of its lower explosive limit (LEL); 2) Airborne combustible dust at a concentration that meets or exceeds its LEL; 3) Atmospheric oxygen concentration below 19.5% or above 23.5%; 4) Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart G, Occupational Health and Environmental Control, or in Subpart Z, Toxic and Hazardous Substances, of this part and which could result in employee exposure in excess of its dose or PEL; 5) Any other atmospheric condition that is immediately dangerous to life or health.

Hazardous Material (Substances) – Any substance that is a physical hazard or a health hazard. A substance is a physical hazard when there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, organic peroxide, an oxidizer, pyrophoric, unstable (reactive), or water reactive. The substance is a health hazard when it is determined to be a carcinogen, a toxic or highly toxic agent, a reproductive toxin, irritant, corrosive, sensitizer, hepatotoxin, nephrotoxic, neurotoxin, an agent that acts on the hematopoietic system, or an agent that damages the lungs, skin, eyes, or mucous membranes.

Hazard Material (Transport) – State Department of Transportation requires all commercial vehicles to have proper shipping documents when transporting regulated quantities of hazardous materials, as identified in 49 CFR table 172.101, on local roadways. Generally, this quantity is 440-pounds of all hazardous materials on the vehicle. Examples of hazardous materials include: propane, acetylene, nitrogen, oxygen, gas in containers and others. [Any questions or concerns regarding transporting of hazardous materials should be directed to your Process Area's Environmental Compliance Representative].

High Wind – A wind of such velocity that an employee would be exposed to being blown from elevated locations, or, an employee or material handling equipment could lose control of material being handled, or, an employee could be exposed to other hazards not controlled by the standard involved. Winds exceeding 40-miles per hour or winds exceeding 30-miles per hour if material handling is involved are considered to be high winds unless precautions are taken to protect employees from the hazardous effects of the wind.

Highly Hazardous Chemical – A substance possessing toxic, reactive, flammable, or explosive properties that are listed in OSHA standard 29 CFR 1910.119.

High Power Test – Tests in which fault currents, load currents, and line-dropping currents are used to test equipment, either at the equipment's rated voltage or at lower voltages.

High-Voltage Test – Tests in which voltages of approximately 1000-volts are used as a practical minimum and in which the voltage source has sufficient energy to cause injury.

HiOSH – Hawaii Occupational Safety and Health.

Hot Work – Any work involving burning, welding, or similar operations that is capable of initiating fires or explosions. This may include, but is not limited to, welding, torch cutting, plasma cutting, brazing, soldering, grinding, and the use of flares or other incendiary devices.

Hot Work Checklist – A checklist required for welding, torch cutting, or plasma cutting activities, in areas not normally designated for such operations, and are performed within 35-feet of combustible material, within 50-feet of flammable material, or by a HECO Contractor.

Hot-Line Tools and Ropes – Those tools and ropes that are especially designed for work on energized high voltage lines and equipment. Insulated aerial equipment especially designed for work on energized high voltage lines and equipment shall be considered "hot-line".

Immediately Dangerous to Life or Health (IDLH) – Any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space.

Industrial Trucks (Powered) – Trucks used to carry, push, pull, lift, stack, or tier material. Powered industrial trucks may be classified by power source, operator position, and means of engaging the load.

Insulated – Separated from other conducting surfaces by a dielectric substance or air space, permanently offering a high resistance to the passage of current and to disruptive discharge through the substance or space.

Isolated – An object that is not readily accessible to person unless special means of access are used.

Job Hazard Analysis – A study of a job or activity to identify hazards or potential accidents associated with each step or task, and develop solutions that will eliminate or prevent the hazard or accident.

Jobsite – The assembly point at the structure or equipment where the workers, tools, and vehicles are assembled to perform the climbing to the worksite.

Lanyard (Strap) – A flexible line used to secure a body belt or body harness to a lifeline or directly to a point of anchorage.

Lifeline – A line provided for direct or indirect attachment to a worker's body belt, body harness, lanyard, or deceleration device. Such lifelines may be horizontal or vertical in application.

Line Clearance Tree Trimmer – An employee who, through related training or on-the-job experience or both, is familiar with the special techniques and hazards involved in line clearance.

Line Clearance Tree Trimming – The pruning, trimming, repairing, maintaining, removing, or clearing of trees or the cutting of brush that is within 10-feet (305-cm) of electric supply lines and equipment.

Load Dispatcher-Power Dispatcher-System Operator – Person designated by the employer as having authority over switching and clearances of high voltage lines and station equipment.

Low Voltage – Less than 600-volts.

Manhole – A subsurface enclosure, which personnel may enter, that is used for installing, operating, and maintaining equipment and/or cable.

Manhole Opening – An opening through which persons may enter into a confined or enclosed space.

Material Safety Data Sheet – A document provided by manufacturers and importers of chemicals to convey information to the users of their products. The information includes data on physical characteristics, fire and explosion hazards, reactivity, and health hazards; special precautions; and fire and spill procedures.

Minimum Approach Distance – The closest distance an employee is permitted to approach an energized or a grounded object.

Near Miss – An unintended, unplanned, and unexpected event that could have, but did not result in personnel injury or property damage.

NIOSH – National Institute for Occupational Safety and Health.

Occupational Safety and Health Act (OSHA) of 1970 – Requires employers to provide to employees a workplace free from recognized hazards and to comply with safety and health standards established by the act. The act also charges each employee with a legal duty to comply with the act's safety and health standards. The federal act pertains to most employers but specifically excludes federal, state, and local government employees. However, numerous states have developed safety and health standards that require compliance by all government entities.

Pad Mount – Transformer or equipment in a surface-mounted enclosure normally worked from ground level.

PCBs (Polychlorinated Biphenyls) – A hazardous non-conductive and non-combustible liquid used in some transformers and capacitors. It has several trade names – Pyranol, Askeral, Inerteen, etc.

Permissible Exposure Limit (PEL) – Standard set under the Occupational Safety and Health Act that sets allowable levels of worker exposure to such toxic substances as asbestos, certain chemicals, and radiation.

Physically Render Inoperative – The use of locks, blind flanges, or other similar devices or procedures to prevent the operation of switches, breakers, valves, and operating controls.

Positioning Device – A body belt or body harness system rigged to allow an employee to be supported on an elevated vertical surface such as a wall or pole and to work with both hands free.

Primary Compartment – A compartment containing voltages greater than 600-volts.

Primary Voltage – Any electrical circuit that normally operates at more than 600-volts.

Protective System – A method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent

structures. Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.

Public – Any individual not an employee or representative of the company.

Qualified Person (for electric power generation, transmission and distribution) – One knowledgeable in the construction and operation of the electric power generation, transmission, and distribution equipment involved, along with the associated hazards. Qualified employees shall be trained and competent in: 1) the skills and techniques necessary to distinguish exposed live parts from other parts of electrical equipment; 2) the skills and techniques necessary to determine the nominal voltage of exposed live parts; 3) the minimum approach distances corresponding to the voltages to which the qualified employee will be exposed, and; 4) the proper use of precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electric equipment. An employee who is undergoing on-the-job training and who, in the course of that training, has demonstrated an ability to perform duties safely at his or her level of training and who is under the direct supervision of a qualified employee is considered to be a qualified employee for the performance of those duties. An employee undergoing on-the-job training must meet the full requirements for fall protection.

Qualified Person (in general) – A qualified person is one who is specially qualified to do a particular job because of education, training, and/or experience. It is possible, even likely, that a qualified person in one context or situation would not be a qualified person in another situation.

Reduced Visibility – Times when normal visibility is reduced because of insufficient daylight (dawn or dusk) or adverse weather conditions such as fog, heavy rainfall, or snow.

Registered Professional Engineer – A person who is registered as a professional engineer in the state where the work is to be performed. However, a professional engineer registered in any state is deemed to be a “registered professional engineer” within the meaning of this standard when approving designs for “manufactured protective systems” or “tabulated data” to be used in interstate commerce.

Road – The paved and unpaved surface of a roadway upon which vehicles are intended to travel. When the road is paved, the entire surface is thus included.

Roadway – The road and the areas immediately adjacent thereto, such as the shoulder of the road, parking strip, etc. This area normally extends approximately 15-feet from the road.

Rope Grab – A device that attaches to a lifeline as an anchoring point to provide a means for arresting a fall.

Safety Can – An approved closed container of not more than 5-gallon capacity having a flash arresting screen, spring-closing lid, and spout cover and designed so that it will safely relieve internal pressure when subjected to a fire.

Safety Rule – A positive rule requiring compliance by all employees concerned. Deviation from safety rules is not permitted and is subject to disciplinary action.

S.C.B.A. – Self-Contained Breathing Apparatus.

Secondary Compartment – A compartment containing voltages less than 600-volts.

Secondary Voltage – Any electrical circuit that normally operates at less than 600-volts.

Shall – When the word “shall” appears in the wording of a rule, the rule is to be obeyed as written. (A mandatory requirement).

Shield (Shield System) – A structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within the structure. Shield structures can be permanent or portable and moved along as work progresses.

Shoring (Shoring System) – A structure such as a metal hydraulic, mechanical, or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.

Should – When the word “should” appears in the wording of a rule, the rule is to be obeyed as written when it is reasonable or practical to do so. (A strong advisory requirement).

Sloping (Sloping System) – A method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

SMAW – Shielded Metal Arc Welding.

Snap-Hook – A self-closing device with a keeper, latch, or other similar arrangement that will remain closed until manually opened. Such devices include self-closing, single-action, double-action, or double-locking snap-hooks.

Stable Rock – Natural solid mineral material that can be excavated with vertical sides and will remain intact while exposed. Unstable rock is considered to be stable when the rock material on the side or sides of the excavation is secured against caving in or movement by rock bolts or by another protective system that has been designed by a registered professional engineer.

Step Bolt – A bolt or rung attached at intervals along a structural member and used for foot placement during climbing or standing.

Switch – A device for opening and closing or changing the connection of a circuit. In these rules, a switch is understood to be manually operable, unless otherwise stated.

System Operator – A qualified person designated to operate the system or its parts.

Tailboard Safety Talk – A short informal discussion of the work to be accomplished and the safety measures to be incorporated. Normally conducted by the foreman, these discussions are sometimes referred to as “tailgate talks”, “tool box talks”, or “five-minute safety talks”.

Time-Weighted Average (TWA) – The average exposure to a contaminant or condition (noise) to which workers may be exposed without adverse effect over a period such as in an 8-hour work day or 40-hour work week.

Transferring – The act of moving from one distinct object to another.

Transitioning – The act of moving from one location to another on equipment or a structure while going around or over an object.

Underground Residential Distribution (URD) – A general term that covers the necessary facilities to furnish underground service, generally to residential and commercial customers and usually through directly buried cable.

Unsafe Conditions – Used to indicate dangerous conditions, hazardous conditions, defective conditions, or unusual conditions that could be conducive to accidents.

Utility – The employer. The entity having jurisdiction and control over the operation of the utility (including such entities as municipal utilities, electrical cooperatives, etc.).

Vault – An enclosure above or below ground, which personnel may enter, used for installing, operating, and/or maintaining equipment and/or cable.

Vented Vault – A vault that has provision for air changes using exhaust flue stacks and low level air intakes operating on differentials of pressure and temperature providing for airflow which precludes a hazardous atmosphere from developing.

Voltage – The effective (RMS) potential difference between any two conductors or between a conductor and ground. The voltage specified in this manual shall mean the maximum effective voltage to which the personnel or protective equipment may be subjected. Low voltage includes voltages up to 600-volts. High voltage shall mean voltages in excess of 600-volts.

Voltage of an Effectively Grounded Circuit – The voltage between any conductor and ground, unless otherwise indicated.

Warning Signs – For the purpose of these rules, any sign or similar means of employee or public notification alerting an employee to an actual or possible hazard. Included are “Danger” signs, “Caution” signs, traffic protection signs, instructional signs, and informational signs.

Waveguide – Is a hollow metal pipe used to carry radio waves. It is used as a transmission line mostly at microwave frequencies, for such purposes as connecting microwave transmitters and receivers to their antennas.

Worksite – The location on the structure or equipment where, after the worker has completed climbing (horizontally and vertically), the worker is in position to perform the assigned work or task.

Zone of Protection – The de-energized, isolated, and/or drained portion of the mechanical equipment or system or electrical equipment or circuit within the boundaries of the clearance tags and within which maintenance activities can safely be performed.

Attachment K: EPMO Standards and Sample Templates

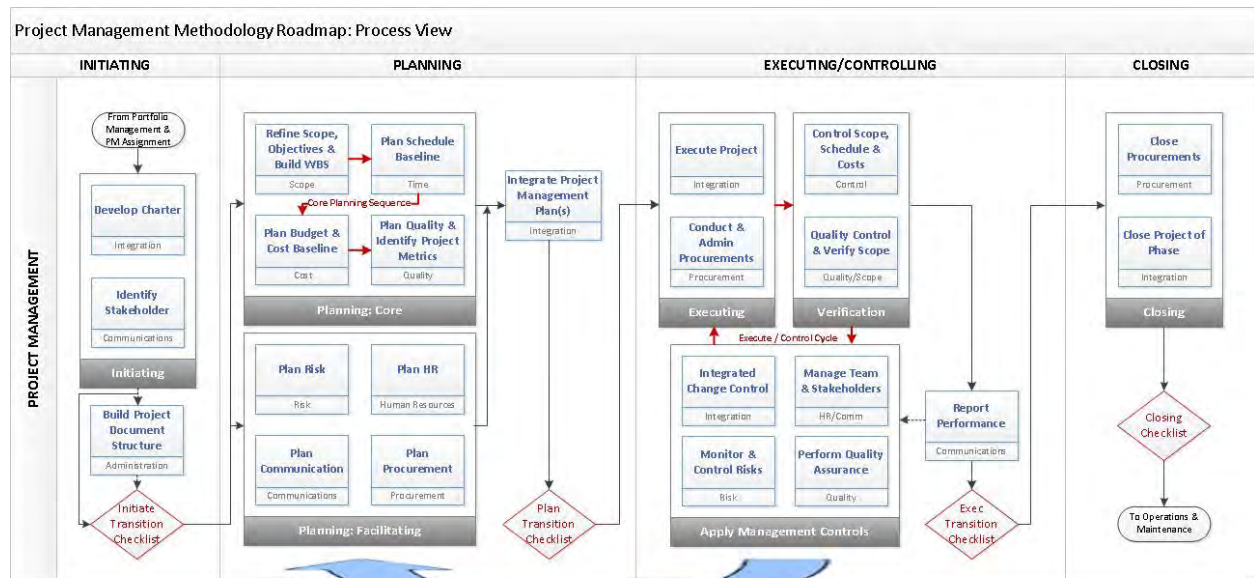


Attachment K -
EPMO Standards and

The following components from the HECO EPMO will be reviewed and adjusted as needed per collaborative agreements made between both parties in the project management phase. Note that for this Project many of the templates will be systematized in Solution Manager. This document is provided purely as a sampling of EPMO standards. The full EPMO standards are housed in HECO's online PM Resource Center.

High Level Project Management Methodology

The EPMO Project Methodology is based on the Project Management Institute (PMI) PM Book Of Knowledge (collectively referred to as the HECO PMBOK). This framework is specifically adjusted to fit the HECO business model and current organization capability maturity level. Below is the high level general process cycle for the applied project management methodology:



Project Charter

The following template is the current HECO Project Charter template version to be used for recording and obtaining overall project initiation approval.

Contents

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STRATEGIC GOALS / INITIATIVE 2
PROJECT GOVERNANCE 2
INITIAL RISK ASSESSMENT 3
PROJECT MAJOR MILESTONES & DELIVERABLES 3
PROJECT BUDGET..... 3
MAJOR STAKEHOLDERS 4
LABOR RESOURCE EXPECTATIONS 4
OTHER NOTES 4
APPROVALS 5

PROJECT IDENTIFICATION			
Project Name		Project Number	
Project Description <i>Describe the project in one paragraph with one to four sentences</i>			
Project Sponsor	Title	Project Sponsor Representative	Title
Project Manager		Target In Service Date	
Company (HECO, HELCO, MECO)		Responsible Process Area	

PROJECT OVERVIEW
Current Situation <i>Important Historical Background and "As-is" situation</i>
Proposed Solution <i>Describe the "To Be" situation – What the project will deliver; the solution to the functional/operating need.</i>
Project Assumptions
<ul style="list-style-type: none"> •

PROJECT OVERVIEW	
Project Constraints	
	•
Project Scope and Description <i>EXECUTIVE SUMMARY OF PURPOSE AND FUNCTION</i>	
Out of Scope	

STRATEGIC GOALS / INITIATIVE	
<i>Describe the specific Strategic goals that this project is aligned to.</i>	
Aligned with the following goals and objectives of Hawaiian Electric's "Embracing Change" strategy.	
	<ul style="list-style-type: none"> ▪ ▪ ▪

PROJECT GOVERNANCE	
<i>The Project shall be governed in compliance with existing policies, processes, and procedures. Outline the decision rights / authority of the Executive Steering Group (if any), the Sponsor, the Sponsor Rep (if any) and the Project Manager.</i>	
Executive Steering Group (if applicable to the project) Level	
	<ul style="list-style-type: none"> ▪ ▪
Sponsor Level	
	<ul style="list-style-type: none"> ▪ ▪
Sponsor Rep (if applicable to the project) Level	
	<ul style="list-style-type: none"> ▪ ▪
Project Manager Level	
	<ul style="list-style-type: none"> ▪ ▪

INITIAL RISK ASSESSMENT	
<i>Major Risks with High Impact and Medium/High Probability</i>	
Project Internal Risks (in Scope, Design, Labor Resources, Cost, Schedule)	
<ul style="list-style-type: none"> ▪ ▪ 	
External Risks (such as Regulatory, Permitting, Community Considerations and other Inter-dependencies)	
<ul style="list-style-type: none"> ▪ ▪ 	

PROJECT MAJOR MILESTONES & DELIVERABLES	
<i>Indicate the major deliverables</i>	
Project Definition and Description	Deliverables
▪	▪
▪	▪
▪	▪
▪	▪
▪	▪
▪	▪

PROJECT BUDGET	
<i>Overview of estimated costs by project.. Projects are not empowered to spend funds until appropriate policies and procedures have been followed and the funds are authorized. The authorized amounts may vary significantly from the estimates below.</i>	
PUC Expectations and Recovery of Costs	
Project / Category	Estimated Costs
Total	

MAJOR STAKEHOLDERS

Major groups which may be involved in, affected by, or show an interest in the project.

-

LABOR RESOURCE EXPECTATIONS

Labor resource plan (i.e. internal, external, billable) as well as anticipated issues/conflicts

-

OTHER NOTES

Other References or Pertinent Information not included above

-

APPROVALS			
Name	Project Title	Date	Signature
	Project Sponsor		
	Project Sponsor Rep.		
	Project Manager		

Integrated Project Plan

The following template is the current HECO Integrated Project Plan template version to be used for the execution of the overall project management plan.

INTEGRATED PROJECT MANAGEMENT PLAN

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1. PROJECT IDENTIFICATION			
Project Name		Project Number	
Project Description <i>Describe the project in one paragraph with one to four sentences</i>			
32T			
Project Manager		Target In-Service Date	
Project Sponsor	Title	Project Sponsor Representative (if any)	Title
Company (HECO, HELCO, MECO)		Responsible Process Area / Department / Division	

2. PROJECT OVERVIEW	
Background & Current Situation <i>Summarize the historical background and "as-is" situation in one paragraph.</i>	
Project Objectives <i>Describe the project's objectives.</i>	
<ul style="list-style-type: none"> • • 	
Strategic Alignment <i>Describe what strategic goals will be supported by these project objectives.</i>	
<ul style="list-style-type: none"> • • 	
Project Approach & Proposed Solutions <i>Summarize the proposed project approach and solutions in one paragraph.</i>	

--

3. SCOPE MANAGEMENT

3.1 Project Scope Statement

Describe the scope of the project

- The Project Scope Statement is a standalone document. The location address is:
- The Project Scope Statement is described below.

Scope Description

Describe the major characteristics of the product or services the project will deliver in one paragraph.

--

Out of Scope

Call out what will not be included in the scope of the current project or phase to help clarify the boundary of the project scope.

<ul style="list-style-type: none">••

Project Assumptions

Describe assumptions of the project if any. All assumptions should be verified during the planning process, and reviewed during risk identification.

<ul style="list-style-type: none">••

Project Constraints

Describe known constraints (e.g. time, budget, regulations, or safety) of the project if any. Known constraints become part of the boundary of the project scope.

<ul style="list-style-type: none">••

Major Deliverables

Describe the major deliverables or categories of deliverables of the project.

<ul style="list-style-type: none">••

3.2 SCOPE Management Plan

Describe how the scope of the project will be planned, managed and controlled.

- The Scope Management Plan is a standalone document. The location address is:
 The Scope Management Plan is described below.

4. TIME MANAGEMENT

4.1 Work Breakdown Structure (WBS)

All the work required to complete the project, including the deliverables and all activities required to produce each deliverable. The approved WBS will become the Scope Baseline of the project.

- The WBS is a standalone document. The location address is:
 The WBS is described below.

WBS No.	Description
1	
1.1	
1.2	
1.3	
1.4	
2	
2.1	
2.2	
2.3	
2.4	
3	
3.1	
3.2	
3.3	

3.4	
4	
4.1	
4.2	
4.3	

4.2 Schedule

The schedule for all activities and milestones of the project, including the sequence, duration and resources of the activities, in order to produce the project deliverables. The approved Schedule will become the Schedule Baseline of the project.

The Schedule is a standalone document. The location address is:

The Schedule is described below.

WBS No.	WBS Description	Resource Name	Target Start Date	Target End Date	Predecessor WBS No. (if any)	Status	% Complete
1							
1.1							
1.2							
1.3							
1.4							
2							
2.1							
2.2							
2.3							
2.3							
3							
3.1							
3.2							
3.3							
3.4							
4							

4.1							
4.2							
4.3							

4.3 SCHEDULE Management Plan

Describe how the schedule of the project will be developed, managed and controlled.

The Schedule Management Plan is a standalone document. The location address is:

The Schedule Management Plan is described below.

5. COST MANAGEMENT

5.1 COST Management Plan

Describe how the costs and budget of the project are estimated, managed and controlled.

The Cost Management Plan is a standalone document. The location address is:

The Cost Management Plan is described below.

5.2 Cost Estimates and Proposed Budget

Summarize the project cost and budget. The approved Budget will become the Cost Baseline of the project.

The Cost Estimates and Proposed Budget are a standalone document. The location address is:

The Cost Estimates and Proposed Budget are described below.

WBS Category	Estimated Cost (\$)	Risk Assessed?	Adjustment for Risk Included?
1 WBS Category Description		<input type="checkbox"/>	<input type="checkbox"/>
2 WBS Category Description		<input type="checkbox"/>	<input type="checkbox"/>
3 WBS Category Description		<input type="checkbox"/>	<input type="checkbox"/>
4 WBS Category Description		<input type="checkbox"/>	<input type="checkbox"/>

		<input type="checkbox"/>	<input type="checkbox"/>
Total Budget			
PUC Expectations and Recovery of Costs			
<i>Describe whether PUC approval is required and how the project cost will be recovered</i>			

1. RISK MANAGEMENT					
1.1 RISK Management Plan					
<i>Describe how the risks of the project will be identified, mitigated, monitored and accounted for.</i>					
<input type="checkbox"/> The Risk Management Plan is a standalone document. The location address is: <input type="checkbox"/> The Risk Management Plan is described below.					
1.2 Risk Register					
<i>Document the list of risks that may impact the scope, schedule, cost and quality of the project, and each risk's priority ranking, probability (%), cost or schedule impact, response strategy and any adjustment for risk</i>					
<input type="checkbox"/> The Risk Register is a standalone document. The location address is: <input type="checkbox"/> The Risk Register is described below.					
Risk Description	Risk Category	Priority Ranking	Risk Response Strategy	Risk Response Included in Scope?	Adjustment for Risk Amount if any
				<input type="checkbox"/>	
				<input type="checkbox"/>	
				<input type="checkbox"/>	
				<input type="checkbox"/>	

2. QUALITY MANAGEMENT

2.1 QUALITY Management Plan

Describe how the quality of the project will be planned, managed and controlled. Include the quality standards and success criteria that will be used to measure the quality, as well as how quality will be built into the process.

- The Quality Management Plan is a standalone document. The location address is:
 The Quality Management Plan is described below.

Deliverable	Quality Standards and Success Criteria	Quality Control Owner	Quality Control Included in WBS?
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>

3. HUMAN RESOURCE MANAGEMENT

3.1 HUMAN RESOURCE Plan

Describe how the internal and outside labor resources will be planned, utilized and managed for the project. Also summarize the labor resource needs of the project.

- The Human Resource Plan is a standalone document. The location address is:
 The Human Resource Plan is described below.

3.2 Roles and Responsibilities Matrix

Define the roles and responsibilities of Project Manager, Sponsor and team members

- The Roles and Responsibilities Matrix is a standalone document. The location address is:
 The Roles and Responsibilities Matrix is described below.

3.5 Project Organizational Chart

Describe all members of the project team and the structure in a graphical format.

- The Project Organizational Chart is a standalone document. The location address is:
 - The Project Organizational Chart is described below.

4. COMMUNICATIONS MANAGEMENT

4.1 Stakeholder Register

Identify all stakeholders who may be negatively or positively impacted by the project, and to whom communication about the project needs to be provided

- The Stakeholder Register is a standalone document. The location address is:
 - The Stakeholder Register is described below.

Stakeholder	How will the stakeholder be impacted by the project	How the stakeholder should be managed and communicated to	Contact Info

4.2 COMMUNICATIONS Management Plan

Describe all project communication events and the 'what', 'to whom', format, 'how often', 'from whom' of each communicate event.

- The Communications Plan is a standalone document. The location address is:
 - The Communications Plan is described below.

Communication Event	To Whom (Stakeholder)	Communication Format	How Often	From Whom

5. PROCUREMENT MANAGEMENT

5.1 PROCUREMENT Management Plan

Identify the areas in the scope where external materials, labor resources or services will be used for the project, and how the procurement of them will be planned, executed and managed.

The Procurement Management Plan is a standalone document. The location address is:

The Procurement Management Plan is described below.

5.2 Links to Other Procurement Documents

Add links to important procurement documents such as Statement of Work or Request for Proposals, as appropriate.

Store the procurement documents in the proper location in the project documentation structure and include the location address to them below. Add more rows to the table as appropriate.

Name of Procurement Document	Location Address

6. CHANGE MANAGEMENT PLAN

Describe how changes to the project Scope, Schedule and Cost Baselines will be monitored, controlled, reviewed and approved. Also describe how project performance and status will be reported.

- The Change Management Plan is a standalone document. The location address is:
- The Change Management Plan is described below.

7. LINKS TO OTHER PROJECT DOCUMENTS

Add links to any other project documents that should be made part of the Integrated Project Management Plan, as appropriate.

Store the project documents in the proper locations in the project documentation structure and include the location address to them below. Add more rows to the table as appropriate.

Name of Project Document	Location Address

8. APPROVAL SIGNATURES OF INTEGRATED PROJECT MANAGEMENT PLAN

Add more rows to the table as appropriate.

Role	Name	Title	Signature	Date
Project Manager				
Sponsor				

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Project Issue Log

The following template is the current HECO Project Issue Log template version for the tracking and documentation of project issues.

Project Change Request

The following template is the current HECO Project Change Request (PCR) template version to be used for the execution of the overall project change requests.

A. General Information

Project Name:	<i><Insert Project Name></i>		
Title of CR:			
Date Submitted:	35T	Change Request ID:	CR-xxx
Requested by:	Your Name/CR initiator	Sponsor:	Sponsor Name
Submitted by:	person writing this request	Assigned Owner:	Owner identified by PM
Priority:			

B. Change Request Information

The requester provides information concerning the requested change along with any supporting documentation.

Proposed Change Description:
Describe the proposed change - a summary version of this is entered into the Change Control Log in "Summary Description." The requester provides the information in this section concerning the requested change along with any supportive documentation.
Proposed Change Justification & Impact of Not Implementing Proposed Change:
Provide a justification for the proposed change and explain the impact of not implementing the proposed change - a summary version of this is entered into the Change Control Log in "Summary Impact if not implemented."
Alternatives:
Identify other actions that may be taken as an alternative to making the proposed change.

C. Change Request Analysis

The change requester or designated owner provides an explanation of the impact that this change will have on the project.

Impact on Budget (Implementation Estimate in Dollars):
Detail the impact of implementing the change to the Project Budget.
Impact on Schedule (Implementation Estimate in Days):
Detail the impact of implementing the change to the Project Schedule.
Describe Impact on other Project Resources:
Detail the impact of implementing the change to other project resources; include other interdependencies within the project or program and additional risks that may result because of the change.

D. Change Request Review

The Project Manager, Program Manager, or other designated Manager acting as the Project Manager conducts an initial review with the project team and subject matter experts and makes a recommendation(s) regarding the implementation of the request before it is proposed to the established Change or Configuration Management Review Body. Results and recommendations based on the review are provided in this section.

Review Date:	35T		
Project Manager:	name		
Review Team Members:	name		
Review Recommendation:			
<input type="checkbox"/> APPROVE	<input type="checkbox"/> DEFER	<input type="checkbox"/> CANCEL	<input type="checkbox"/> REJECT
Rational for Recommendation:			

E. Change or Configuration Management Review Body Decision

The Change or Configuration Management Review Body conducts a final review with the Project Manager and decides to approve or disapprove the request. In the blocks below record and authenticate the decision.

Approval or Disapproval and Special Instructions:					
Final Decision:					
<input type="checkbox"/> APPROVE	<input type="checkbox"/> DEFER	<input type="checkbox"/> CANCEL	<input type="checkbox"/> REJECT		
Change or Configuration Management Reviewing Body Attendees:					
Name:		Position:		Signature/Date:	
Name:		Position:		Signature/Date:	
Name:		Position:		Signature/Date:	
Name:		Position:		Signature/Date:	
Name:		Position:		Signature/Date:	
Name:		Position:		Signature/Date:	

Project Management Document Updates:	
Identify the project management documentation that will be updated to incorporate the change, exclude the Change Log as this should always be updated.	

Project Status Report

The following template is the current HECO Project Status Report (PSR) template version to be used for the execution of the overall project status reporting; which includes Earned Value Management (EVM) reporting.

<p>Project title</p> <p>Hawaiian Electric Company (HECO)</p> <p>as of 1/27/2012</p>		<p>Program Manager:</p> <p>N/A</p>	<p>Program Name (if Applicable):</p> <p>N/A</p>	<p>Grandparent Proj No.:</p> <p>N/A</p>
<p>Program Sponsor:</p> <p>N/A</p>	<p>Project Sponsor Rep:</p> <p>N/A</p>	<p>Project Manager:</p> <p>N/A</p>	<p>Project No.:</p> <p>N/A</p>	<p>Program Description:</p> <p>N/A</p>
<p>Overall</p> <p>Enter comment on overall performance.</p> <p>↑↑↑↑↑</p>	<p>Time</p> <p>Enter comment on Time performance.</p> <p>↑↑↑↑↑</p>	<p>Cost (\$M)</p> <p>Enter comment on Cost performance.</p> <p>↑↑↑↑↑</p>		
<p>Strategic Goal 01 - Renewables</p> <p>Initiative</p> <p>Responsible Area</p> <p>Energy Delivery</p> <p>Project Funding</p> <p>Capital Project/Program</p> <p>Authorization</p> <p>Implementation/Construction</p> <p>PUC Status</p> <p>Application Discovery / IR</p> <p>Project Phase</p> <p>Executing</p> <p>Project Activity</p> <p>Active</p>	<p>Project Milestones</p> <p>Enter Milestone Info here</p> <p>Milestone 1</p> <p>Milestone 2</p> <p>Milestone 3</p> <p>Milestone 4</p> <p>Milestone 5</p> <p>Milestone 6</p>	<p>Actual cost as of</p> <p>xx/xx/xxxx</p> <p>Earned Value (EV)</p> <p>Planned Value (PV)</p> <p>Cost Perf. Index (CPI)</p> <p>Var. at Compl (VAC)</p>	<p>PUC Amount</p> <p>Additional</p> <p>Total Budget</p> <p>Est. at Compl. (EAC)</p> <p>EAC Formula</p> <p>Comments on Cost</p>	<p>Actual Cost (AC)</p>
<p>Project Description</p>	<p>Schedule Variance / Time & Dependency Comments</p>	<p>Budget Variance / Cost Comments</p>		
<p>Quality</p> <p>Enter comment on Quality management.</p> <p>↑↑↑↑↑</p>	<p>Risk</p> <p>Enter comment on Risk management status.</p> <p>↑↑↑↑↑</p>	<p>Misc.</p> <p>Enter comment on Misc. issues.</p> <p>↑↑↑↑↑</p>		
<p>New News This Month</p>				

Project Earned Value Management (EVM)

HECO EPMO requires that all projects are evaluated based on a quantitative industry standard project performance measure. EVM provides a quantitative basis for estimating actual completion time and actual cost at completion. Definitions provided below. It is expected that EVM be used in this project to show project progress.

Metric	Abbrev.	Interpretation	Description	Formula/Value
Budget at Completion	BAC	How much did you BUDGET for the TOTAL JOB?	Baseline cost for 100% of project.	N/A
Actual Cost of Work Performed or Actual Costs	ACWP or AC	What is the actual cost incurred?	Total costs actually incurred so far.	N/A
Budgeted Cost of Work Performed or Earned Value	BCWP or EV	What is the estimated value of the work actually accomplished?	Amount of budget earned so far based on physical work accomplished, without reference to actual costs.	N/A
Budgeted Cost of Work Scheduled or Planned Value	BCWS or PV	What is the estimated value of the work planned to be done?	The budget for the physical work scheduled to be completed by the end of the time period.	N/A
Cost Variance	CV	What is the dollar amount variance?	Measure of cost overrun. The difference between the budget for the work actually done so far and the actual costs so far.	Budgeted Cost of Work Performed–Actual Cost of Work Performed BCWP-ACWP
Cost Performance Index	CPI	What percent of cost is the project performing at?	Cost efficiency ratio. A CPI of 1.00 means that the costs so far are exactly the same as the budget for work actually done so far.	Budgeted Cost of Work Performed/ Actual Cost of Work Performed BCWP/ACWP
Schedule Variance	SV	What is the measure of time variance?	Measure of schedule slippage. The difference between the budget for the work actually done so far and the budgeted cost of work scheduled.	Budgeted Cost of Work Performed–Budgeted Cost of Work Scheduled BCWP-BCWS
Schedule Performance Index	SPI	What percent of schedule is the project performing at?	The schedule efficiency ratio. An SPI of 1.0 means that the project is exactly on schedule.	BCWP/BCWS
Estimate to Completion	ETC	From this point on, how much MORE do we expect it to cost to finish the job?	The expected additional cost to complete.	Estimate at Completion–Actual Cost Work Performed EAC-ACWP
Estimate at Completion	EAC	What do we currently expect the TOTAL project to cost?	Expected total cost based on the current cost efficiency ratio.	BAC/CPI ¹ AC + BAC - EV ² AC + (BAC - EV) / CPI ³ AC + ETC ⁴
Variance at Completion	VAC	How much over or under budget do we expect to be?	Estimated cost overrun at the end of project.	Budget at Completion–Estimate at Completion BAC-EAC
Status		calculation of the current status in time	Average of CPI & SPI.	(Cost Performance Index+Schedule Performance Index)/2 (CPI+SPI)/2
			GREEN = On track	>1.0
			YELLOW = Slightly behind schedule or budget	>0.85
			RED = Needs immediate attention	>0.65
			BLACK = Killed or Restore	<0.65

¹Used if no variances from the BAC have occurred

²Actual to date plus remaining budget. Used when current variances are atypical.

³Actual to date plus remaining budget modified by performance. When current variances are typical.

⁴Actual plus a new estimate for remaining work. Used when original estimate was fundamentally flawed.