CITY OF TACOMA

THIS IS NOT AN ORDER
All prices quoted shall be F.O.B. Destination, Freight Prepaid and Allowed

All responses & inquiries must be plainly marked with this

REQUEST FOR QUOTATION 6000048756

Return Bids By 11:00 AM, 12/04/2019 to:sendbid@cityoftacoma.org

Dawn DeJarlais
ABN 4th Floor NE
3628 South 35th Street
Tacoma WA 98409
Fax.253.502.8372

Material will ship to:

Treatment Plant #1
Environmental Services
2201 Portland Ave
Tacoma WA 98421

RFQ Information	
Collective Bid #	ES19-0366N
Bid Issue Date	11/20/2019
Vendor Number	109226 WEB VENDOR FOR RFQ

Vendor Information (vendor to complete)	
Firm Name:	
Address:	
City/State/Zip	**/ /**
Phone/Fax	**/**
E-Mail	
Contact Name	
Payment Terms	**%,** days (e.g. 2% 10,N30)
Tacoma Bus. Lic. #	
Taxpayer ID #	

SIGNATURE OF PERSON AUTHORIZED TO SIGN THIS BID
x_____**DATE:**____ /____ /_____
NAME : _____
TITLE : _____

Item #	Material# Description	Delivery Date	QTY	UM	Net Price	Total
	The City of Tacoma is soliciting bids for specification ES19-0366N Hot Water Boiler Maintenance on three (3) Cleaver Brooks CBI-200-250-125 units. Additional Products: The City of Tacoma reserves the right to add additional products with mutual agreement of the supplier as long as the same pricing structure/discount percentage applies, as given in the original contract. Submittals shall be accepted by the City of Tacoma before the contractor will receive a notice to proceed. Other governmental entities in the State of Washington could potentially enter into contracts with the successful bidder(s) based on the same terms and conditions, through Interlocal Cooperative Purchasing provisions. The estimated usage listed in this solicitation does not include any Interlocal Cooperative usage, nor is it guaranteed. Submittals are accepted by email, facsimile, or mail. The City accepts no responsibility for transmission errors.					

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REQUEST FOR QUOTATION 6000048756

Item #	Material# Description	Delivery Date	QTY	UM	Net Price	Total
	The City of Tacoma will accept e-mailed bid submittals sent to sendbid@cityoftacoma.org for this solicitation. Please include the Collective Bid Number, ES19-0366N, in the subject line of your e-mail. Bids are subject to the submittal deadline noted in the bid solicitation document. The time of e-mail receipt will be considered as the time of submittal. Submittals may be mailed to address on RFQ, faxed to 253-502-8372, or emailed to sendbid@cityoftacoma.org. We are unable to verify receipt of submittals due to the large volume of submittals received. Responses must be submitted on the provided City of Tacoma bid solicitation form. Vendor signature is mandatory. **Paid Leave and Minimum Wage: Effective February 1, 2016, the City of Tacoma requires all employers to provide paid leave and minimum wages, as set forth in Title 18 of the Tacoma Municipal Code. For more information visit www.cityoftacoma.org/employmentstandards. City Contact: Dawn DeJarlais, ddejarlais@cityoftacoma.org Labor provided under this contract/purchase order is subject to state prevailing wage requirements.					
10	**Hot Water Boiler Maintenance** The item covers the following services: Cleaning Services on Cleaver Brooks CB1-	1 AU	**1**	**AU**		

Net Value	**$**
Plus Tax at _____%	**$**
Total Amount	**$**

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ES19-0366N

SUBMITTAL CHECK LIST

This checklist identifies items to be included with your submittal. Any submittal received without these required items may be deemed non-responsive and not be considered for award.

	The following items make up your submittal package: ***(Please do not include the entire specification document with your submittal.)***	
1.	Request for Quotation (Authorized signature required)	
2.	Prime Contractor's Pre-Work Form	
3.	Sustainability Worksheet	

CITY OF TACOMA
STANDARD TERMS AND CONDITIONS
GOVERNS BOTH GOODS AND SERVICES AS APPLICABLE

In the event of an award by the City, these Terms and Conditions stated herein, Additional Contract Documents if issued, Solicitation if issued, Purchase Orders if issued by City, and Supplier's Submittal, if provided, shall constitute the Contract between City and Supplier for the acquisition of goods, including materials, supplies, and equipment or for the provision of services and deliverables.

Said documents represent the entire Contract between the parties and supersede any prior oral statements, discussions, or understandings between the parties, and/or subsequent Supplier invoices. No modification of the Contract shall be effective unless mutually agreed in writing.

The specific terms and conditions of any Solicitation (Specification, Request for Bids, Request for Proposals, Requests for Qualifications, Requests for Quotations, Request for Information, bid documents, request to enter into negotiations, or other form of solicitation issued by City, including any general, special, or technical provisions associated with such Solicitations) are incorporated herein by reference and supersede these Terms and Conditions where there is conflict or inconsistency.

In the event Additional Contract Documents are negotiated and agreed to in writing between Supplier and City, the specific terms of such Additional Contract Documents are incorporated herein by reference and supersede all other terms and conditions where there is conflict or inconsistency.

These Terms and Conditions, Additional Contract Documents if issued, Solicitation if issued, City purchase order if issued, are controlling over Supplier's Submittal if a Submittal is provided. Submittals if provided are incorporated herein by reference.

1.01 SUPPLIER / CONTRACTOR

As used herein, "Supplier" or "Contractor" shall be the Supplier(s) entering a Contract with City, whether designated as a Supplier, Contractor, Vendor, Proposer, Bidder, Respondent, Seller, Merchant, Service Provider, or otherwise.

1.02 SUBMITTAL

Submittal means Bids, Proposals, Quotes, Qualifications or other information, content, records or documents submitted in response to a City Solicitation.

1.03 FORMS OF SUBMITTAL

Unless stated otherwise, all submittals must be in SAP Ariba and submitted exactly as specified or directed, and all required forms must be used.

1.04 COSTS TO PREPARE SUBMITTAL

The City is not liable for any costs incurred by Supplier for the preparation of materials or a Submittal provided in response to a solicitation, conducting presentations to the City, or any other activities related to responding to the City's Solicitation.

1.05 LICENSES/PERMITS

A. Suppliers, if applicable, must have a Washington state business license at the time of Submittal and throughout the term of the Contract. Failure to include a Washington state business license may be grounds for rejection of the Submittal or cancellation of contract award. Information regarding Washington state business licenses may be obtained at http://bls.dor.wa.gov.

B. Upon award, it is the responsibility of the Supplier to register with the City of Tacoma's Tax and License Division, 733 South Market Street, Room 21, Tacoma, WA 98402-3768, 253-591-5252, https://www.cityoftacoma.org/government/city_departments/finance/tax_and_license/. Supplier shall obtain a business license as is required by Tacoma Municipal Code Subtitle 6C.20.

C. During the term of the Contract, Supplier, at its expense, shall obtain and keep in force any and all necessary licenses and permits.

1.06 PUBLIC DISCLOSURE: PROPRIETARY OR CONFIDENTIAL INFORMATION

A. Supplier Submittals, all documents and records comprising the Contract, and all other documents and records provided to the City by Supplier are deemed public records subject to disclosure under the Washington State Public Records Act, Chapter 42.56 RCW (Public Records Act). Thus, City may be required, upon request, to disclose the Contract and documents or records related to it unless an exemption under the Public Records Act or other laws applies. In the event CITY receives a request for such disclosure, determines in its legal judgment that no applicable exemption to disclosure applies, and Supplier has complied with the requirements to mark records considered confidential or proprietary as such requirements are stated below, City agrees to provide Supplier 10 days written notice of impending release. Should legal action thereafter be initiated by Supplier to enjoin or otherwise prevent such release, all expense of any such litigation shall be borne by Supplier, including any damages, attorneys' fees or costs awarded by reason of having opposed disclosure. City shall not be liable for any release where notice was provided and Supplier took no action to oppose the release of information.

B. If Supplier provides City with records or information that Supplier considers confidential or proprietary, Supplier must mark all applicable pages or sections of said record(s) as "Confidential" or "Proprietary." Further, in the case of records or information submitted in response to a Request for Proposals, an index must be provided indicating the affected pages or sections and locations of all such material identified Confidential or Proprietary. Information not included in the required index will not be reviewed for confidentiality or as proprietary before release. If Supplier fails to so mark or index Submittals and related records, then the City, upon request, may release said record(s) without the need to satisfy the requirements of subsection A above; and Supplier expressly waives its right to allege any kind of civil action or claim against the City pertaining to the release of said record(s).

C. Submission of materials in response to City's Solicitation shall constitute assent by Supplier to the foregoing procedure and Supplier shall have no claim against the City on account of actions taken pursuant to such procedure.

1.07 SUSTAINABILITY

A. The City has interest in measures used by its contractors to ensure sustainable operations with minimal adverse impact on the environment. The City seeks to do business with vendors that value community and environmental stewardship that help us meet our sustainable purchasing goals.

B. The City encourages the use of environmentally preferable products or services that help to minimize the environmental and human health impacts of City operations. Suppliers are encouraged to incorporate environmentally preferable products or services into Submittals wherever possible. "Environmentally preferable" means products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose. This comparison may consider raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, or disposal of the product or service.

C. Environmental Standards. The City seeks to ensure that all purchases comply with current environmental standards and product specifications. Where appropriate, third party independent certifiers such as Green Seal and USEPA Standards shall be a minimum specification for products to the City, unless specified otherwise herein.

D. The City encourages the use of sustainability practices and desires any awarded Suppliers to assist in efforts to address such factors when feasible for:

1. Pollutant releases
2. Toxicity of materials used
3. Waste generation
4. Greenhouse gas emissions, including transportation of materials and services
5. Recycle content
6. Energy consumption
7. Depletion of natural resources
8. Potential impact on human health and the environment

1.08 ALTERATIONS NOT ALLOWED

Except as otherwise specifically provided in a Solicitation, Submittals that are incomplete or conditioned in any way, contain erasures, alternatives or items not called for, or not in conformity with law, may be rejected as being non-responsive. Any attempt to condition a Submittal by inserting exceptions to the Solicitation or any conditions, qualifications or additions that vary its terms may result in rejection of the Submittal. The City may reject any submittal containing a material deviation from the Solicitation.

1.09 CORRECTION OF AMBIGUITIES AND OBVIOUS ERRORS

A. The City reserves the right to correct obvious errors in Supplier's Submittal. In this regard, if the unit price does not compute to the extended total price, the unit price shall govern.

B. Supplier shall notify the City of Tacoma Procurement and Payables Division in writing of any ambiguity, conflict, discrepancy, omission or other error in a Solicitation no later than five business days prior to the submittal deadline.

   1. For solicitations conducted in SAP Ariba, Supplier shall notify the City of Tacoma Procurement and Payables Division on the message board of the event.

   2. For all other solicitations, Supplier shall notify the contract person listed in the Solicitation.

C. The City will make necessary modifications by addendum.

D. Supplier is responsible for identifying ambiguities, conflicts, discrepancies, omissions or other errors in the Solicitation prior to providing its Submittal or the ambiguity, conflict, discrepancy, omission, or other error is waived. Any Submittal that includes assumed clarifications and/or corrections without the required authentication of the same is subject to rejection.

1.10 WARRANTIES/GUARANTEE

A. Suppliers warrant that all items, including services, as applicable:

   1. Are merchantable.

   2. Comply with the City's latest drawings and specifications.

   3. Are fit for the City's intended use.

   4. Will be performed according to the skill and care required by customarily accepted good practices and procedures followed by service providers rendering the same or similar type of service.

   5. Are new and unused unless otherwise stated.

   6. Comply with all applicable safety and health standards established for such products by the Occupational Safety and Health Administration (OSHA), Washington Industrial Safety and Health Act (WISHA) and/or Consumer Products Safety Act (CPSA), and all other applicable state and federal laws or agency regulations.

   7. Are properly packaged and contain appropriate instructions or warnings, including applicable MSDS sheets.

1.11 PATENTS, TRADEMARKS AND COPYRIGHTS

Suppliers warrant that equipment and/or materials furnished, including software, do not infringe on any patent, trademark or copyright, and agree to indemnify, defend and hold harmless, the City in the event of any infringement or claim thereof.

1.12 DELIVERY OF SUBMITTALS TO THE CITY’S PROCUREMENT AND PAYABLES DIVISION

A. Submittal packages must be received by the City’s Procurement and Payables Division in SAP Ariba (unless another form of delivery is stated), prior to the scheduled time and date stated in the Solicitation.

B. Supplier is solely responsible for timely delivery of its Submittal.

C. Submittals received after the time stated in the solicitation will not be accepted.

D. For purposes of determining whether a Submittal has been timely received in SAP Ariba, the City's Procurement and Payables Division will rely on the submittal clock in SAP Ariba.

1.13 SUBMITTAL IS NON-COLLUSIVE

Supplier acknowledges that by its delivery of a Submittal to the City in response to a Solicitation, it represents that the prices in such Submittal are neither directly nor indirectly the result of any formal or informal agreement with another Supplier.

1.14 PARTNERSHIPS

The City will allow firms to partner in order to respond to a Solicitation. Multiple suppliers may team under a Prime Supplier's Submittal in order to provide responses to all sections in a single submission; however, each Supplier's participation must be clearly delineated by section. The Prime Supplier will be considered the responding vendor and the responsible party at contract award. All contract negotiations will be conducted only with the Prime Supplier. All contract payments will be made only to the Prime Supplier. Any agreements between the Prime Supplier and other companies will not be a part of the Contract between the City and the Prime Supplier. The City reserves the right to select more than one Prime Supplier.

1.15 WITHDRAWAL OF SUBMITTALS

A. Prior to Submittal Deadline. Submittals may be withdrawn (including in SAP Ariba) prior to the scheduled submittal deadline.

B. After Submittal Deadline. No Submittal can be withdrawn after having been opened before the actual award of the contract, unless the award is delayed more than 90 calendar days beyond the date of opening. If a delay of more than 90 calendar days does occur, Supplier must submit written notice to the City purchasing manager that Supplier is withdrawing its submittal.

1.16 ACCEPTANCE OF SUBMITTALS

A. If the solicitation announcement so states, submittals, unless previously withdrawn, will be read aloud, irrespective of any irregularities or informalities in such submittal, at the time and place specified in the solicitation announcement.

B. All submittals must remain open for acceptance by the City for a period of at least 90 calendar days from the submittal deadline.

1.17 RIGHT TO REJECT

A. The City of Tacoma reserves the right to reject any and all submittals, waive minor deviations or informalities, supplement, amend, reduce or otherwise modify the scope of work or cancel the solicitation, and if necessary, call for new submittals.

1.18 RESERVED RIGHTS

A. By providing a submittal in response to a City solicitation, Supplier acknowledges and consents to the below City rights and conditions. With regard to this procurement process, the City reserves, holds without limitation, and may exercise, at its sole discretion, the following rights and conditions:

1. To terminate the procurement process or decide not to award a contract as a result thereof by written notice to the Suppliers for any reason whatsoever with or without substitution of another solicitation.

2. To waive any defect, technicality, or any other minor informality or irregularity in any submittal, or any other response from Suppliers.

3. To issue addenda for any purpose including:

    a. To make minor or major changes or alterations to the evaluation, selection and/or performance schedule(s) for any events associated with a procurement.

    b. To supplement, amend, reduce, cancel, or otherwise modify a Solicitation, including but not limited to modifications to the description of services and/or products contained in the solicitation, by omitting services/products and/or including services/products.

4. To request clarifications, additional information, and/or revised Submittals from one or more Suppliers.

5. To conduct investigations with respect to the qualifications and experience of Supplier(s), including inspection of facilities and to request additional evidence to support any such information.

6. To eliminate any Supplier that submits an incomplete or inadequate response, or is non-responsive to the requirements of a Solicitation, or is otherwise deemed to be unqualified during any stage of the procurement process.
7. To select and interview a single finalist or multiple finalists to further the City's evaluation of Submittals provided in response to a Solicitation. The City may, in its sole and exclusive discretion as to what is in the City's best interest, elect not to conduct interviews of any or all Suppliers in connection with a solicitation process.
8. Except in the case of Requests for Bids, to negotiate any rate/fee offered by a Supplier. The City shall have the sole right to make the final rate/fee offer during contract negotiations. If the selected Supplier does not accept the City's final offer, the City may, in its sole discretion discontinue contract negotiations and commence negotiations with another Supplier, except as otherwise provided in Chapter 39.80, RCW.
9. To select and enter into a Contract with one or more Suppliers whose Submittal best satisfies the interests of the City and is most responsive, in the sole judgment of the City, to the requirements of a Solicitation.
10. To award by line item or group of line items.
11. To not award one or more items.
12. To issue additional or subsequent solicitations.
13. To seek partnerships between one or more Suppliers.
14. Request additional related products and services from the selected Supplier(s) as necessary throughout the term of the Contract.
15. Negotiate costs or fees in the event of new legislation or regulatory changes, or issuance of related compliance guidance, technology enhancements, and innovative solutions.
16. In the event the City receives questions concerning a Solicitation from one or more Suppliers prior to the deadline for response, the City reserves the right to provide such questions, and the City's responses, if any, to all Suppliers.
17. If an award is made and, prior to entering into a contract, subsequent information indicates that such award is not in the best interest of the City, the City may rescind the award without prior notice to Supplier and either award to another Supplier or reject all submittals or cancel this solicitation.
18. To cancel award of a contract at any time before execution of the Contract by both parties if cancellation is deemed to be in the City's best interest. In providing a submittal, Suppliers agree that the City is not liable for any costs or damages for the cancellation of an award. Supplier assumes the sole risk and responsibility for all expenses connected with the preparation of its submittal.
19. To add additional City departments or divisions to the Contract or develop a separate Contract with the Supplier subject to all terms, conditions and pricing of the original Contract
20. To take any other action affecting a Solicitation or a procurement process that is determined to be in the City's best interests.

1.19 SUBMITTAL CLARIFICATION

Suppliers may be asked to clarify their Submittal. This action shall not be construed as negotiations or any indication of intentions to award. If called upon, Supplier must respond to such requests within two business days or the timeframe set forth by the City in its request for clarification. Supplier's failure to respond to such a request may result in rejection of its Submittal.

1.20 EVALUATION OF SUBMITTALS

A. The City of Tacoma reserves the right to award to the lowest and best responsible Supplier(s) delivering a Submittal in compliance with the Solicitation, provided such Submittals are reasonable and are in the best interest of the City to accept. The City may use a number of criteria for determining award, including evaluation factors set forth in Municipal Code Section 1.06.262. Suppliers who are inexperienced or who fail to properly perform other contracts may have their submittal rejected for such cause.

1. Evaluation Factors. In addition to the factors set forth in Municipal Code Section 1.06.262, the following may be used by the City in determining the lowest and best responsible Submittal:

    a. Compliance with a Solicitation and with applicable City requirements, including by not limited to, the City's Ethics Code and its Small Business Enterprise and Local Employment and Apprenticeship programs.
    b. Submittal prices, listed separately if requested, as well as a lump sum total (if the unit price does not compute to the extended total price, the unit price shall govern).
    c. The total cost to the City, including all applicable taxes, may be the basis for contract award.
    d. Time of delivery and/or completion of performance (delivery date(s) offered).
    e. Warranty terms.
    f. Quality of performance of previous contracts or services, including safety requirements and past compliance with the City's Ethics Code.
    g. Previous and existing compliance with laws and ordinances relating to contracts or services.
    h. Sufficiency of financial resources.
    i. Quality, availability, and adaptability of the supplies or services to the particular use required.
    j. Ability to provide future maintenance and service on a timely basis.
    k. Location of nearest factory authorized warranty repair facility or parts dealership.
    l. Ability, capacity, experience, stability, reputation, integrity, character, judgment, technical qualifications, and skill to perform the contract or provide the services required.

2. Prompt Payment Discount. Payment discount periods of 20 calendar days or more, if offered in the submittal, will be considered in determining the apparent lowest responsible submittal. Discounts will be analyzed in context of their overall cumulative effect.

    a. ePayable/Credit Card Acceptance. Submittals offering ePayable/Credit card acceptance may be compared against submittals offering a prompt payment discount to evaluate the overall cumulative effect of the discount against the advantage to the City of the ePayable/Credit card acceptance, and may be considered in determining the apparent lowest responsible submittal.

3. All other elements or factors, whether or not specifically provided for in a Solicitation, which would affect the final cost to, and the benefits to be derived by, the City, may be considered in determining the award of a Contract. The final award decision will be based on the best interests of the City.

1.21 CONTRACT OBLIGATION

A. The Submittal contents of the successful Supplier will become contractual obligations if a Contract ensues.

B. In the event the City of Tacoma determines to award a Contract, the selected Supplier(s) may be requested to execute Additional Contract Documents.

C. Supplier shall register with the City of Tacoma on the SAP Ariba Network and be enabled for transactions upon request by the City.

D. Suppliers may propose amendments to City's Contract documents or to these Terms and Conditions, but the City retains the right to accept or reject proposed amendments.

E. No costs chargeable for work under the proposed Contract may be incurred before mutual acceptance and execution as directed.

1.22 AWARD

The City reserves the right to award Contracts for any or all items to one or more Suppliers in the best interests of the City.

1.23 SUPPLIER'S REFUSAL TO ENTER INTO CONTRACT

Any Supplier who refuses to enter into a Contract after it has been awarded to the Supplier will be in breach of the agreement to enter the Contract, and Supplier's certified or cashier's check or bid bond, if any, shall be forfeited.

1.24 LEGAL HOLIDAYS

A. The City of Tacoma observes the following holidays, which shall apply to performance of all contracts:

New Year's Day	January 1
Martin Luther King's Birthday	3rd Monday in January

Washington's Birthday	3rd Monday in February
Memorial Day	Last Monday in May
Independence Day	July 4
Labor Day	1st Monday in September
Veteran's Day	November 11
Thanksgiving Day	4th Thursday of November
Day after Thanksgiving	4th Friday of November
Christmas Day	December 25

B. When any of these holidays occur on Saturday or Sunday, the preceding Friday or the following Monday, respectively, is a legal holiday for the City of Tacoma.

1.25 CONTRACT TERM

All services shall be satisfactorily completed and all deliverables provided by the termination date stated, and the Contract shall expire on said date unless mutually extended in writing by the parties.

1.26 EXTENSION OF CONTRACT

Contracts shall be subject to extension at City's sole discretion.

1.27 TERMINATION AND SUSPENSION

A. Supplies. The City reserves the right to terminate a Contract at any time upon prior written notice to Supplier. Upon the effective date of termination specified in such notice, and payment by the City, all conforming supplies, materials, or equipment previously furnished hereunder shall become its property.

B. Services. The City may terminate a Contract at any time, with or without cause, by giving 10 business days written notice to Supplier. In the event of termination, all finished and unfinished work prepared by Supplier pursuant to the Contract shall be provided to the City. In the event City terminates the Contract due to the City's own reasons and without cause due to Supplier's actions or omissions, the City shall pay Supplier the amount due for actual work and services necessarily performed under the Contract up to the effective date of termination, not to exceed the total compensation set forth in the Contract.

C. Suspension. For either services or supplies, the City may suspend a Contract, at its sole discretion, upon three business days' written notice to Supplier. Such notice shall indicate the anticipated period of suspension. Any reimbursement for expenses incurred due to the suspension shall be limited to Supplier's actual expenses and shall be subject to verification. Supplier shall resume performance of services under the Contract without delay when the suspension period ends.

D. Termination or suspension of a Contract by City shall not constitute a waiver of any claims or remaining rights the City may have against Supplier relative to performance under a Contract.

1.28 DEFAULT/BREACH

In the event of material default or breach by Supplier on any of the conditions of a Contract, Supplier agrees that the City may, at its election, procure the goods or services from other sources, and may deduct from the unpaid balance due Supplier, or collect against the bond or security (if any), or may invoice and recover from Supplier all costs paid in excess of the price(s) set forth in the Contract.

A. Supplies. The City at any time by written change order or other form of written contract amendment may make reasonable changes in the place of delivery, installation, or inspection, the method of shipment or packing, identification and ancillary matters that Supplier may accommodate without substantial additional expense.

B. Services. The City shall have the right to make changes within the general scope of services and/or deliverables upon execution in writing of a change order or other written form of contract amendment. If the changes will result in additional work effort by Supplier the City agrees to reasonably compensate Supplier for such additional effort up to the maximum amount specified in the Contract or as otherwise provided by Tacoma Municipal Code. Any new services accepted by the City may be added to the Contract and/or substituted for discontinued services. New services shall meet or exceed all requirements of original award.

C. Expansion Clause. A Contract may be further expanded in writing to include other related services or products normally offered by Supplier, as long as the price of such additional services or products have a profit margin equal to or less than that in place at the time of original submittal. Such additions and prices will be established in writing. New items not meeting these criteria will not be added to the Contract. Supplier profit margins are not to increase as a result any such expansion.

1.29 SCOPE OF SERVICES

Supplier agrees to diligently and completely perform the services required by a Contract.

1.30 SERVICES DO NOT INCLUDE PUBLIC WORK

Unless otherwise stated, the services and/or work contracted for herein exclude public work and improvements as defined in RCW 39.04, as that statute may hereafter be amended.

1.31 PREVAILING WAGES

A. If federal, state, local, or any applicable law requires Supplier to pay prevailing wages in connection with a Contract, and Supplier is so notified by the City, then Supplier shall pay applicable prevailing wages.

B. If applicable, a Schedule of Prevailing Wage Rates for the locality or localities where the Contract will be performed is attached and made of part of the Contract by this reference. If prevailing wages do apply to the Contract, Supplier and its subcontractors shall:

1. Be bound by the provisions of Chapter 39.12 RCW, as amended, relating to prevailing wages and usual fringe benefits,

2. Ensure that no worker, laborer or mechanic employed in the performance of any part of the Contract shall be paid less than the prevailing rate of wage specified on that Schedule, and

3. Immediately upon award of the Contract, contact the Department of Labor and Industries, Prevailing Wages section, Olympia, Washington, to obtain full information, forms and procedures relating to these matters. Per such procedures, a Statement of Intent to Pay Prevailing Wages must be submitted by Contractor and its subcontractors to the City, in the manner requested by the City, prior to any payment by the City hereunder, and an Affidavit of Wages Paid must be received or verified by the City prior to final Contract payment.

1.32 CONTRACT PRICING

A. Submitted prices shall include costs of submittal preparation, servicing of the account, all contractual requirements during contract period such as transportation, permits, insurance costs, bonds, labor, wages, materials, tools, components, equipment, and appurtenances necessary to complete the work, which shall conform to the best practice known to the trade in design, quality, material, and workmanship.

B. Surcharges of any type will not be paid.

C. If applicable, related additional products and corresponding services of benefit to the City not specifically required in a solicitation, but which Supplier offers to provide, may be included with the submittal. Supplier may request to add new products if the City approves them and Supplier can demonstrate the pricing is from the same pricing structure/profit margin.

D. Unless specifically stated otherwise, only firm prices will be accepted and all prices shall remain firm during the term of a Contract.

E. Price increases may at City's discretion be passed along during a contract period if the increase is mandated by statute, or the result of a tariff.

F. By submitting prices, Supplier warrants prices equal to or better than the equivalent prices, terms, and benefits offered by Supplier to any other government unit or commercial customer.

G. Should Supplier, during the term of a Contract, enter into any other contract, agreement or arrangement that provides lower prices, more favorable terms or greater benefits to any other government unit or commercial customer, the Contract with the City shall thereupon be deemed amended to provide the same price or prices, terms and benefits to the City. This provision applies to comparable products and purchase volumes by the City that are not less than the purchase volumes of the government unit or commercial customer that has received the lower prices, greater benefits, or more favorable terms.

H. If at any time during the term of the Contract, Supplier reduces prices to other buyers purchasing approximately the same quantities stated on the Contract, Supplier will immediately notify the City purchasing manager of such fact, and the price(s) for future orders under the Contract shall be reduced accordingly.

I. The City is entitled to any promotional pricing during the Contract period.

J. Price decreases shall be immediately passed on to the City.

K. The City reserves the right to increase or decrease the quantities of any item awarded pursuant to the Contract and pay according to the unit prices quoted in the submittal with no adjustments for anticipated profit.

1.33 APPROVED EQUALS WHEN ALTERNATES ARE ALLOWED

A. Unless an item is indicated as "no substitute," special brands, when named, are intended to describe the standard of quality, performance, or use desired. Equal items will be considered by the City, provided that Supplier specifies the brand and model, and provides all descriptive literature, independent test results, specification sheets, schematic drawings, photographs, product samples, local servicing, parts availability, etc., to enable the City to evaluate the proposed equal. Performance testing in the field may be required.

B. The decision of the City as to what items are equal shall be final and conclusive. If the City elects to purchase a brand represented by Supplier to be an "equal," the City's acceptance of the item is conditioned on the City's inspection and testing after receipt. If, in the sole judgment of the City, the item is determined not to be an equal, the item shall be returned at Supplier's expense.

C. When a brand name or level of quality is not stated in Supplier's submittal, it is understood Supplier's submittal shall exactly confirm with those required in the Contract. If more than one brand name is stated in a Solicitation, Supplier(s) must indicate the brand and model/part number to be supplied.

1.34 RISK OF LOSS, SHIPPING AND DELIVERY

A. Shipping. Prices must be quoted FOB destination (the place of destination as defined in RCW 62A.2-319, as that statute may hereafter be amended), with freight prepaid and allowed (shipping costs included in unit prices), and risk of loss remaining with Supplier until delivery is tendered.

B. Delivery. Delivery will be to the designated addresses set forth in a Solicitation or as otherwise stated in the Contract. Deliveries shall be between 9:00 a.m. and 3:30 p.m., Monday through Friday only, except Legal Holidays. Failure to make timely delivery shall be cause for termination of the contract or order and return of all or part of the items at Supplier's expense except in the case of force majeure.

1.35 DELIVERY OF PRODUCTS AND PROVISION OF SERVICES – IDLING PROHIBITED

A. The City of Tacoma has a commitment to reduction of unnecessary fuel emissions and improving air quality by reducing unnecessary air pollution from idling vehicles. Limiting car and truck idling supports cleaner air, healthier work environments, the efficient use of city resources, the public's enjoyment of City properties and programs, conservation of natural resources, and good stewardship practices.

B. Vehicles and/or diesel fuel trucks shall not idle at the time and location of the delivery to the City of Tacoma for more than three minutes. The City requires contractors to utilize practices that reduce fuel consumption and emission discharge, including turning off trucks and vehicles during delivery of products to the City. Exceptions to this requirement include when associated power is necessary to make a delivery or provide the service, when the engine is used to provide power to another device, and when a running engine is required for proper warm-up and cool-down of the engine.

1.36 PACKING SLIPS AND INVOICES

A. Each invoice shall show City of Tacoma purchase order number, release number if applicable, quantity, unit of measure, item description, unit price and extended price for each line if applicable, services and deliverables provided if applicable. Line totals shall be summed to give a grand total to which sales tax shall be added, if applicable.

1. For transactions conducted in SAP Ariba, invoices shall be submitted through Ariba.
2. For invoices paid by ACH or by check, unless stated otherwise, invoices shall be electronically submitted by email with corresponding PO number listed in the subject line to accountspayable@cityoftacoma.org.
3. For invoices paid by credit card, invoices shall also display the last name of the cardholder and last four digits (only) of the card number (e.g., Jones/6311). Unless stated otherwise, invoices shall be electronically submitted by email with corresponding PO number listed in the subject line to (do not combine different POs into one invoice or charge) to pcardadmin@cityoftacoma.org.

B. Any terms, provisions or language in Supplier's invoice(s) that conflict with the terms of the Contract are superseded and shall not apply to the Contract unless expressly accepted in writing by the City.

C. Packing slips and shipping notices shall be sent to the specific City Division or Department receiving the item(s) at the address stated in City's Solicitation or as otherwise stated in the Contract and include

complete description of items, contents of items if crated or cased, quantity, shipping point, carrier, bill of lading number and City of Tacoma purchase order.

D. Supplier shall package orders, preferably in environmental friendly packaging such as reduced packaging and recyclable packing materials.

1.37 COOPERATIVE PURCHASING

The Washington State Interlocal Cooperation Act RCW 39.34 provides that other governmental agencies may purchase goods and services based on the Contract with the City in accordance with the terms and prices of the Contract if all parties are agreeable. Each public agency shall formulate a separate contract with Supplier, incorporating the terms and conditions of the Contract with the City of Tacoma. The City shall incur no liability in connection with such contracts or purchases by other public agencies thereunder. It will be Supplier's responsibility to inform such public agencies of the Contract with the City. Supplier shall invoice such public agencies as separate entities.

1.38 TAXES

A. Unless otherwise stated, applicable federal, state, City, and local taxes shall be included in the submittal and in contract as indicated below. As used herein, the term "taxes" shall include any and all taxes, assessments, fees, charges, interest, penalties, and/or fines imposed by applicable laws and regulations in connection with the procurement of goods and/or services hereunder.

1. Federal Excise Tax. The City of Tacoma is exempt from federal excise tax. The City will furnish a Federal Excise Tax Exemption certificate, if required. If Supplier fails to include any applicable tax in its submittal, then Supplier shall be solely responsible for the payment of said tax.

2. State and Local Sales Tax. The City of Tacoma is subject to Washington state sales tax. It is Supplier's obligation to state the correct sales tax percentage and include the applicable Washington state, city and local sales tax as a separate line item(s) in the submittal.

3. City of Tacoma Business and Occupation Tax. It is Supplier's obligation to include City of Tacoma Business and Occupation tax in the unit and/or lump sum prices submitted; it shall not be shown separately on the submittal. Per Sub-Title 6A of the City of Tacoma Municipal Code, transactions with the City of Tacoma may be subject to the City's Business and Occupation Tax.

B. Any or All Other Taxes. Any or all other taxes are the responsibility of Supplier unless otherwise required by law. Except for state sales tax, Supplier acknowledges that it is responsible for the payment of all taxes applicable to the Contract and Supplier agrees to comply with all applicable laws regarding the reporting of income, maintenance of records, and all other requirements and obligations imposed pursuant to applicable law.

C. If the City is assessed, made liable, or responsible in any manner for taxes contrary to the provisions of the Contract, Supplier agrees to hold the City harmless from such costs, including attorney's fees. In the event Supplier fails to pay any taxes, assessments, penalties, or fees imposed by any governmental body, including a court of law, other than those taxes the City is required to pay, then Supplier authorizes the City to deduct and withhold or pay over to the appropriate governmental body those unpaid amounts upon demand by the governmental body. It is agreed that this provision shall apply to taxes and fees imposed by City ordinance. Any such payments shall be deducted from Supplier's total compensation.

1.39 COMPENSATION

A. The City shall compensate Supplier in accordance with the Contract. Said compensation shall be the total compensation for Supplier's performance hereunder including, but not limited to, all work, services, deliverables, materials, supplies, equipment, subcontractor's fees and all reimbursable travel and miscellaneous or incidental expenses to be incurred by Supplier. Unless stated otherwise the total stated compensation may not be changed without a written change order or other form of contract amendment.

B. Payment(s) made in accordance with the Contract shall fully compensate Supplier for all risk, loss, damages or expense of whatever nature, and acceptance of payment shall constitute a waiver of all claims submitted by Supplier.

1.40 PAYMENT TERMS

A. Payment shall be made through the City's ordinary payment process, and shall be considered timely if made within 30 days of receipt of a properly completed invoice. All payments shall be subject to adjustment for any amounts, upon audit or otherwise, determined to have been improperly invoiced.

The City may withhold payment to Supplier for any services or deliverables not performed as required hereunder until such time as Supplier modifies such services or deliverables to the satisfaction of the City.

B. Invoices will not be processed for payment, nor will the period of cash discount commence, until all invoiced items are received and satisfactory performance of the Contract has been attained. Upon CITY'S request, Supplier shall submit necessary and appropriate documentation, as determined by the CITY, for all invoiced services and deliverables. If an adjustment in payment is necessary due to damage or dispute, the cash discount period shall commence on the date final approval for payment is authorized.

1.41 PAYMENT METHOD – EPAYABLES – CREDIT CARD ACCEPTANCE – EFT/ACH ACCEPTANCE

A. Payment methods include:

1. EPayables (Payment Plus). This is payment made via a virtual, single use VISA card number provided by the City's commercial card provider. Suppliers accepting this option will receive "due immediately" payment terms. Two options for acceptance are available to suppliers. Both are accompanied by an emailed advice containing complete payment details:

    a. Straight-through processing (buyer initiated). Immediate, exact payments directly deposited to supplier accounts by the City's provider bank; the supplier does not need to know card account details.
    b. Supplier retrieves card account through the secure, on-line portal provided via email notifications sent by the City's commercial card provider.

2. Credit card. Tacoma's VISA procurement card program is supported by standard bank credit suppliers and requires that merchants abide by the VISA merchant operating rules. It provides "due immediately" payment terms.

    a. Suppliers must be PCI-DSS compliant (secure credit card data management) and federal FACTA (sensitive card data display) compliant.
    b. Suppliers must be set up by their card processing equipment provider (merchant acquirer) as a minimum of a Level II merchant with the ability to pass along tax, shipping and merchant references information.

3. Electronic Funds Transfer (EFT) by Automated Clearing House (ACH). Standard terms are net 30 for this payment method.

4. Check or other cash equivalent. Standard terms are net 30 for this payment method.

B. The City's preferred method of payment is by ePayables (Payment Plus) followed by credit card (aka procurement card). Suppliers may be required to have the capability of accepting the City's ePayables or credit card methods of payment**. The City of Tacoma will not accept price changes or pay additional fees when ePayables (Payment Plus) or credit card is used.**

C. The City, in its sole discretion, will determine the method of payment for goods and/or services as part of the Contract.

1.42 NOTICES

Unless otherwise specified, except for routine operational communications, which may be delivered personally or transmitted by electronic mail, all notices required by the Contract shall be in writing and shall be deemed to have been duly given if delivered personally or mailed first-class mail, postage prepaid, to Supplier's registered agent and to the applicable City department representative.

1.43 INDEPENDENT CONTRACTOR STATUS

A. Supplier is considered an independent contractor who shall at all times perform his/her duties and responsibilities and carry out all services as an independent contractor and shall never represent or construe his/her status to be that of an agent or employee of the City, nor shall Supplier be eligible for any employee benefits. No payroll or employment taxes or contributions of any kind shall be withheld or paid by the City with respect to payments to Supplier. Supplier shall be solely responsible for all said payroll or employment taxes and/or contributions including, but not limited to, FICA, FUTA, federal income tax, state personal income tax, state disability insurance tax and state unemployment insurance tax. If the City is assessed, made liable or responsible in any manner for such taxes or contributions, Supplier agrees to indemnify and hold the City harmless from all costs incurred, including attorney fees.

B. Unless otherwise specified in writing, Supplier shall provide at its sole expense all materials, working space, and other necessities and instruments to perform its duties under the Contract. Supplier, at its sole expense, shall obtain and keep in force any and all applicable licenses, permits and tax certificates necessary to perform the Contract.

1.44 NONDISCRIMINATION

Supplier agrees to take all steps necessary to comply with all federal, state, and City laws and policies regarding non-discrimination and equal employment opportunities. Supplier shall not discriminate in any employment action because of race, religion, color, national origin or ancestry, sex, gender identity, sexual orientation, age, marital status, familial status, or the presence of any sensory, mental, or physical handicap. In the event of non-compliance by Supplier with any of the non-discrimination provisions of the Contract, the City shall be deemed to have cause to terminate the Contract, in whole or in part.

1.45 FEDERAL, STATE, AND MUNICIPAL LAWS AND REGULATIONS

Supplier shall comply with all federal, state, municipal, and/or local laws and regulations in the performance of all terms and conditions of the Contract. Supplier shall be solely responsible for all violations of the law from any cause in connection with its performance of work under the Contract.

1.46 FEDERAL AID PROJECTS

The City of Tacoma in accordance with Title VI of the Civil Rights Act of 1964, 78 Stat. 252, 42 U.S.C. 2000d to 2000d-4 and Title 49, Code of Federal Regulations, Department of Transportation, subtitle A, Office of the Secretary, part 21, nondiscrimination in federally assisted programs of the Department of Transportation issued pursuant to such Act, hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises as defined at 49 CFR, part 26, will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, national origin, or sex in consideration for an award.

1.47 REPORTS, RIGHT TO AUDIT, PERSONNEL

A. Reports. Supplier shall, at such times and in such form as the City may reasonably require, furnish the City with periodic status reports pertaining to the services undertaken or goods provided pursuant to the Contract.

B. Right to Audit. Upon City's request, Supplier shall make available to City all accounts, records and documents related to the scope of work for City's inspection, auditing, or evaluation during normal business hours as reasonably needed by City to assess performance, compliance and/or quality assurance under the Contract or in satisfaction of City's public disclosure obligations as applicable.

C. Personnel. If before, during, or after the execution of a Contract, Supplier has represented or represents to the City that certain personnel would or will be responsible for performing services pursuant to the Contract, then Supplier is obligated to ensure that said personnel perform said Contract services to the maximum extent permitted by law. Substantial organizational or personnel changes within Supplier's firm are expected to be communicated to City immediately. Failure to do so could result in termination of the Contract. This provision shall only be waived by written authorization by the City, and on a case-by-case basis.

1.48 INSURANCE

A. During the course and performance of a Contract, Supplier will provide proof and maintain the insurance coverage in the amounts and in the manner specified in the City of Tacoma Insurance Requirements as is applicable to the services, products, and deliverables provided under the Contract. The City of Tacoma Insurance Requirements document, if issued, is fully incorporated into the Contract by reference.

B. Failure by City to identify a deficiency in the insurance documentation provided by Contractor or failure of City to demand verification of coverage or compliance by Contractor with these insurance requirements shall not be construed as a waiver of Contractor's obligation to maintain such insurance.

1.49 INDEMNIFICATION – HOLD HARMLESS

A. Supplier agrees to indemnify, defend, and hold harmless the City of Tacoma, its officers, agents and employees, from and against any and all liability which may accrue to or be sustained by the City of Tacoma for any claim, suit or legal action made or brought against the City for the death of or injury to persons (including Supplier's or subcontractor's employees), or damage to property involving Supplier or subcontractor(s) and their employees or agents, or for any other cause arising out of and in

connection with or incident to the performance of the Contract, except for injuries or damages caused by the sole negligence of the City. In this regard, Supplier recognizes it is waiving immunity under Industrial Insurance Law, Title 51 RCW. This indemnification includes attorney's fees and the cost of establishing the right to indemnification hereunder in favor of the City of Tacoma. By Supplier's acceptance of this order, he/she agrees that this subsection has been mutually negotiated.

B. These indemnifications shall survive the termination of a Contract.

1.50 CONFLICT OF INTEREST

No officer, employee, or agent of the City, nor any member of the immediate family of any such officer, employee or agent as defined by City ordinance, shall have any personal financial interest, direct or indirect, in a Contract, either in fact or in appearance. Supplier shall comply with all federal, state, and City conflict of interest laws, statutes, and regulations. Supplier represents that Supplier presently has no interest and shall not acquire any interest, direct or indirect, in the program to which the Contract pertains that would conflict in any manner or degree with the performance of Supplier's services and obligations hereunder. Supplier further covenants that, in performance of a Contract, no person having any such interest shall be employed. Supplier also agrees that its violation of the City's Code of Ethics contained in Chapter 1.46 of the Tacoma Municipal Code shall constitute a breach of Contract subjecting the Contract to termination.

1.51 CITY OWNERSHIP OF WORK/RIGHTS IN DATA/PUBLICATIONS

A. To the extent that Supplier creates any work subject to the protections of the Copyright Act (Title 17 U.S.C.) in its performance of a Contract, Supplier agrees to the following: The work has been specially ordered and commissioned by the City. Supplier agrees that the work is a "work made for hire" for copyright purposes, with all copyrights in the work owned by City. To the extent that the work does not qualify as a work made for hire under applicable law, and to the extent that the work includes material subject to copyright, Supplier hereby assigns to City, its successors and assigns, all right, title and interest in and to the work, including but not limited to, all copyrights, patent, trade secret and other proprietary rights, and all rights, title and interest in and to any inventions and designs embodied in the work or developed during the course of Supplier's creation of the work.

B. Supplier shall be solely responsible for obtaining releases and/or licenses for the reproduction, distribution, creation of derivative works, performance, display, or other use of copyrighted materials. Should Supplier fail to obtain said releases and/or licenses, Supplier shall indemnify, defend, and hold harmless the City for any claim resulting there from.

1.52 DUTY OF CONFIDENTIALITY

Supplier acknowledges that unauthorized disclosure of information or documentation concerning the Scope of Work hereunder may cause substantial economic loss or harm to the City. Except for disclosure of information and documents to Supplier's employees, agents, or subcontractors who have a substantial need to know such information in connection with Supplier's performance of obligations under the Contract, Supplier shall not without prior written authorization by the City allow the release, dissemination, distribution, sharing, or other publication or disclosure of information or documentation obtained, discovered, shared or produced pursuant to a Contract.

1.53 DISPUTE RESOLUTION

In the event of a dispute pertaining to ta Contract, the parties agree to attempt to negotiate in good faith an acceptable resolution. If a resolution cannot be negotiated, then the parties agree to submit the dispute to voluntary non-binding mediation before pursuing other remedies. This provision does not limit the City's right to terminate.

1.54 GOVERNING LAW AND VENUE

A. Washington law shall govern the interpretation of the Contract. The state or federal courts located in Pierce County Washington shall be the sole venue of any mediation, arbitration, or litigation arising out of the Contract.

B. Respondents providing submittals from outside the legal jurisdiction of the United States of America will be subject to Tacoma's City Attorney's Office (CAO) opinion as to the viability of possible litigation pursuant to a contract resulting from this Specification. If it is the opinion of the CAO that any possible litigation would be beyond reasonable cost and/or enforcement, the submittal may be excluded from evaluation.

1.55 ASSIGNMENT

Supplier shall not assign, subcontract, delegate or transfer any obligation, interest or claim to or under the Contract without the prior written consent of the City.

1.56 WAIVER

A waiver or failure by either party to enforce any provision of the contract shall not be construed as a continuing waiver of such provisions, nor shall the same constitute a waiver of any other provision of the Contract.

1.57 SEVERABILITY AND SURVIVAL

If any term, condition or provision herein or incorporated by reference is declared void or unenforceable or limited in its application or effect, such event shall not affect any other provisions hereof and all other provisions shall remain fully enforceable. The provisions of the Contract, which by their sense and context are reasonably intended to survive the completion, expiration or cancellation of the Contract, shall survive termination of the Contract.

1.58 NO CITY LIABILITY

Neither the City, its officials, staff, agents, employees, representatives, or consultants will be liable for any claims or damages resulting from any aspect of this procurement process.

1.59 SIGNATURES

A signed copy of Submittals, Contract documents, including but not limited to contract amendments, contract exhibits, task orders, statements of work and other such Contract related documents, delivered by email or other means of electronic transmission including by using a third party service, which service is provided primarily for the electronic execution of electronic records, shall be deemed to have the same legal effect as delivery of an original signed copy.

Department of Environmental Services
Plant and Pump Station Maintenance
Hot Water Boiler Maintenance
Bid: ES19-0366N

General: Perform Routine cleaning service on three (3) Cleaver Brooks CBl-200-250-125 hot water boilers. 2 boilers must be on line or able to come on line at all times. These boilers use digester gas as their primary fuel source.

Awarded bidder shall perform this work during December 2019 - January 31, 2020 during working hours Monday through Friday, 7 AM - 3:30 PM. Work shall commence no more 14 days following the notice to proceed is provided to awarded bidder. All cleaning and tuning activities shall be complete and all three boilers shall be returned to full service prior to January 31, 2019.

Specific:

1) Lock out/Tag out, isolate and drain boiler.

2) Brush and vacuum clean fire side of boiler.

3) Flush all loose scale and sludge from waterside.

4) Inspect condition of fire tubes. Rotary brush all fire tubes. Perform annual maintenance on refractory.

5) Inspect waterside condition of tube and boiler shell for scaling and pitting.

6) Check condition of boiler breaching.

7) Notify City to refill boiler with water.

8) Perform Hydrostatic pressure test. Inspect for leaks.

9) Close fireside with new gaskets.

10) Complete boiler "safe" start check.

- Test operation of gas and oil safety shut off valves.
- Check for proper voltage on current/amp draw on motors.
- Check flame safeguard as required for proper cycling and operation.

11) Test operation of all safety and operating controls including:

- Combustion air switch
- Test operation of all Safety interlocks
- Temperature and water level controls

12) Inspect and lubricate modulation/fire rate controls and linkage.

13) Test and set burner combustion for optimum performance and clean fire on digester gas and #2 fuel oil. City of Tacoma's air permit conditions (Puget Sound Clean Air Agency Permit #9594) are shown below for when the boilers are fired on digester gas.
    - Each boiler shall not emit nitrogen oxides (NOx) in excess of 20 parts per million (ppm) on a dry volumetric basis corrected to three percent oxygen (3% 02).
    - Each boiler shall not emit carbon monoxide (CO) in excess of 50 parts per million (ppm) on a dry volumetric basis corrected to three percent oxygen (3% 02).

Compliance of each boiler with the above permit conditions shall be demonstrated by a portable gas analyzer using "Draft Method CTM-034 for the Determination of O2, CO, and (NO and NO2)".

14) Provide City representative with a written report/check list detailing work performed, printed combustion reports with efficiency and emission compliance data, identification of potential problems and a list of recommended actions.

Demonstrate all items listed above and sections of Boiler Manual Chapter 8 have been addressed as part of your checklist with respect to the Semi and Annual Maintenance Requirements. Further clarification regarding Items 13 and 14 are provided below.

After cleaning, testing and setting burner combustion, document compliance with the City of Tacoma's Puget Sound Clean Air Agency Permit #9594 for all three boilers. Document compliance for all 3 boilers at low and high fire and show actual emission measurements (corrected to 3% 02) compared to permit condition limits. Record the measured digester gas flow rate to each boiler (from existing City boiler gas flow meters) corresponding to the low and high fire emission measurements. For the purposes of emission testing, low fire shall be 80 cfm unless otherwise agreed upon by the City during testing. High fire shall be the highest flow rate that can be delivered to the boilers from the boiler gas blowers unless otherwise agreed upon by the City during testing.

15) Place boiler in service and confirm Boiler to control room communications with the Control Room.

Technical Questions:
Technical questions for this specification and item description can be addressed to Dawn DeJarlais @ ddejarlais@cityoftacoma.org.

DEC 06 2007

Methods 1,2,4, & 7E, and 10; or

b) Portable gas analyzer method: CTM-034, Draft Method for the Determination of O2, CO, & (NO and NO2) for Periodic Monitoring.

APPEAL RIGHTS

Pursuant to Puget Sound Clean Air Agency's Regulation I, Section 3.17 and RCW 43.21B.310, this Order may be appealed to the Pollution Control Hearings Board (PCHB). To appeal to the PCHB, a written notice of appeal must be filed with the PCHB and a copy served upon Puget Sound Clean Air Agency within 30 days of the date the applicant receives this Order.

Claude Williams
Reviewing Engineer

Steven Van Slyke
Supervising Engineer

ns

Puget Sound Clean Air Agency

Notice of Construction No. 9594

Registration No. 16330

Date 12/6/2007

HEREBY ISSUES AN ORDER OF APPROVAL TO CONSTRUCT, INSTALL, OR ESTABLISH

Three (3) Cleaver Brooks Firetube Boilers Model No. CBLE-200X-250-125HW, rated for 10.2 MMBTUH of Digester Gas or No. 2 Ultra Low Sulfur Diesel Fuel Oil.

APPLICANT

Garry Wohlgemuth
Tacoma Public Works Sewer Utilities Portland Ave
2201 Portland Ave
Tacoma, WA 98421

OWNER

Tacoma Public Works Sewer Utilities Portland A
2201 Portland Ave
Tacoma, WA 98421

INSTALLATION ADDRESS

Tacoma Public Works Sewer Utilities Portland Ave, 2201 Portland Ave, Tacoma, WA, 98421

THIS ORDER IS ISSUED SUBJECT TO THE FOLLOWING RESTRICTIONS AND CONDITIONS

1. Approval is hereby granted as provided in Article 6 of Regulation I of the Puget Sound Clean Air Agency to the applicant to install or establish the equipment, device or process described hereon at the INSTALLATION ADDRESS in accordance with the plans and specifications on file in the Engineering Division of the Puget Sound Clean Air Agency.

2. This approval does not relieve the applicant or owner of any requirement of any other governmental agency.

3. These boilers are subject to the federal Standards of Performance for Small Industrial-Commercial Units under 40 CFR Part 60, Subpart Dc. Quarterly reports pursuant to Section 60.48c(d and e) are only required for calendar quarters during which a boiler was fired on distillate oil or oil/biodiesel mixes. Records of fuel oil usage pursuant to 60.48c(g) are only required on a monthly basis and may be in the form of fuel bills or meter readings or any other records that adequately document fuel use (e.g., fuel tank gauging). A record of digester gas usage is required on a daily basis.

4. When burning No. 2 distillate oil such oil shall not contain greater than 15 ppm Sulfur.

5. Each boiler shall not emit nitrogen oxides (NOx) in excess of 20 parts per million (ppm) on a dry volumetric basis corrected to three percent oxygen (3% O2). This limit applies to each boiler when it is fired on digester gas.

6. Each boiler shall not emit carbon monoxide (CO) in excess of 50 parts per million (ppm) on a dry volumetric basis corrected to three percent oxygen (3% O2). This limit applies to each boiler when it is fired on digester gas.

7. Each boiler shall not emit any air contaminant that causes greater than 5% opacity at the stack for a period or periods aggregating more than 3 minutes in any 1 hour as determined by WDOE Method 9A.

8. Initial compliance of each boiler with Conditions 5 through 7, while firing digester gas, shall be determined no later than 180 days after initial startup of the boiler by a performance test conducted in accordance with Puget Sound Clean Air Agency Regulation I, Section 3.07, using either of the following test methods:

a) Federal Reference stack test methods, 40 CFR Part 60, Appendix A, Reference

Puget Sound Clean Air Agency

Notice of Construction No. 9594

Registration No. 16330

Date 12/6/2007

HEREBY ISSUES AN ORDER OF APPROVAL TO CONSTRUCT, INSTALL, OR ESTABLISH

Three (3) Cleaver Brooks Firetube Boilers Model No. CBLE-200X-250-125HW, rated for 10.2 MMBTUH of Digester Gas or No. 2 Ultra Low Sulfur Diesel Fuel Oil.

APPLICANT

Garry Wohlgemuth
Tacoma Public Works Sewer Utilities Portland Ave
2201 Portland Ave
Tacoma, WA 98421

OWNER

Tacoma Public Works Sewer Utilities Portland A
2201 Portland Ave
Tacoma, WA 98421

INSTALLATION ADDRESS

Tacoma Public Works Sewer Utilities Portland Ave, 2201 Portland Ave, Tacoma, WA, 98421

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2. This approval does not relieve the applicant or owner of any requirement of any other governmental agency.

3. These boilers are subject to the federal Standards of Performance for Small Industrial-Commercial Units under 40 CFR Part 60, Subpart Dc. Quarterly reports pursuant to Section 60.48c(d and e) are only required for calendar quarters during which a boiler was fired on distillate oil or oil/biodiesel mixes. Records of fuel oil usage pursuant to 60.48c(g) are only required on a monthly basis and may be in the form of fuel bills or meter readings or any other records that adequately document fuel use (e.g., fuel tank gauging). A record of digester gas usage is required on a daily basis.

4. When burning No. 2 distillate oil such oil shall not contain greater than 15 ppm Sulfur.

5. Each boiler shall not emit nitrogen oxides (NOx) in excess of 20 parts per million (ppm) on a dry volumetric basis corrected to three percent oxygen (3% O2). This limit applies to each boiler when it is fired on digester gas.

6. Each boiler shall not emit carbon monoxide (CO) in excess of 50 parts per million (ppm) on a dry volumetric basis corrected to three percent oxygen (3% O2). This limit applies to each boiler when it is fired on digester gas.

7. Each boiler shall not emit any air contaminant that causes greater than 5% opacity at the stack for a period or periods aggregating more than 3 minutes in any 1 hour as determined by WDOE Method 9A.

8. Initial compliance of each boiler with Conditions 5 through 7, while firing digester gas, shall be determined no later than 180 days after initial startup of the boiler by a performance test conducted in accordance with Puget Sound Clean Air Agency Regulation I, Section 3.07, using either of the following test methods:

a) Federal Reference stack test methods, 40 CFR Part 60, Appendix A, Reference

Test Method - Determination of Oxygen, Carbon Monoxide and Oxides of Nitrogen from Stationary Sources

For Periodic Monitoring

(Portable Electrochemical Analyzer Procedure)

1. APPLICABILITY AND PRINCIPLE

1.1 Applicability. This method is applicable to the determination of nitrogen oxides (NO and NO_2), carbon monoxide (CO) and oxygen (O_2) concentrations in controlled and uncontrolled emissions from combustion sources using fuels such as natural gas, propane, butane, and fuel oils. This method is designed to provide a reasonable assurance of compliance using periodic monitoring or testing. This method is not intended for use where an EPA reference test method is required. Due to inherent cross sensitivities of electrochemical (EC) cells, this method should not be applied to other pollutants or emission sources without a complete investigation of possible analytical interferences and a comparative evaluation with other EPA test methods.

1.2 Principle. A gas sample is extracted from a stack and is conveyed to a portable EC analyzer for determination of NO, NO_2, CO and O_2 gas concentrations. Analyzer performance specifications and test procedures are provided to ensure reliable data. Additions to, or modifications of, vendor supplied analyzers (e. g. heated sample lines, thermocouples, flow meters, etc.) may be required to meet the design specifications of this test method. Changes that diminish the analyzer from the as-verified (see Definitions, Section 3.15) configuration are not permitted.

2. RANGE AND SENSITIVITY

2.1 Analytical Range. The instrument and EC cell design will determine the analytical range for each gas component. The nominal range is defined by choosing a span gas concentration near the maximum anticipated flue gas concentration for that constituent or near the permitted level as determined by the appropriate regulatory agency.

2.1.1 NO, NO_2 and CO Span Gases. Choose a span gas concentration such that the average stack gas reading for each test run is between 25 and 150 percent of the span gas concentration. Alternatively, choose the span gas such that it does not exceed twice the concentration equivalent to the permitted level. If the actual emissions exceed 150 percent of the span gas value at any time during the sampling run, the test run for that channel shall be invalid. The NO_2 span gas concentration should be selected at a level within the NO_2 sensor's measuring range, but for span gas stability and availbility considerations, above 75 ppm (in a base of air)is acceptable.

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2.1.2 O_2 Span Gas. The difference between the span gas concentration and the average stack gas reading for each sample run shall be less than 15% O_2. Where the stack oxygen readings are above 6%, dry ambient air (20.9% O_2) may be used for the span gas. Oxygen readings below 6% should be verified with low concentration calibration gas.

2.2 Sensitivity Range. The minimum detectable limit depends on the nominal range and resolution of the electrochemical cell and signal to noise ratio of the measurement system. The minimum detectable limit should be 2 percent of the nominal range or 1 ppm, whichever is less restrictive.

3. DEFINITIONS

3.1 Measurement System. The total equipment required for the determination of gas species concentrations. The measurement system consists of the following major subsystems:

3.1.1 Sample Interface. The portion of a system used for one or more of the following: sample acquisition, sample transport, sample conditioning or protection of the analyzer from the effects of the stack effluent, particulate matter and condensed moisture.

3.1.2 Interference Gas Scrubber. A device used to remove or neutralize compounds likely to interfere with the selective operation of the cell.

3.1.3 Electrochemical Cell. A device, similar to a fuel cell, that senses a specific gas and generates a current output proportional to the gas concentration.

3.1.4 Moisture Removal System. Any device used to reduce the concentration of moisture in the sample stream for protecting the EC cells from the damaging effects of condensation and for minimizing errors in readings caused by the scrubbing of soluble gases.

3.1.5 Data Recorder. A strip chart recorder, computer or digital recorder for logging measurement data from the analyzer output. The digital data display may be used when taking manual measurements.

3.2 Nominal Range. The range of concentrations over which each cell is operated (25% to 150% of span gas value). Several nominal ranges may be used for any given cell as long as the calibration and repeatability check for that range remains within specification.

3.3 Span Gas. A known concentration of a gas in an appropriate diluent gas.

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3.4 Zero Calibration Error. The gas concentration output exhibited by the gas analyzer in response to zero-level calibration gas.

3.5 Span Calibration Error. The difference between the gas concentration exhibited by the gas analyzer and the known concentration of the span gas.

3.6 Interference Check. A method of quantifying analytical interference from components in the stack gases other than the targeted analyte.

3.7 Repeatability Check. A method of demonstrating that an EC operated over a given nominal range provides a stable and consistent response and is not significantly affected by repeated exposure to the targeted analyte.

3.8 Response Time. The amount of time required for the measurement system to display 95 percent of a step change in gas concentration.

3.9 Initial EC Cell Temperature. The temperature of the EC cells recorded during the most recent pretest calibration check.

3.10 Sample Flow Rate. The flow rate of the gas sample through the analyzer. In some situations, EC cells can experience drift with the changes in flow rate. The flow rate must be monitored during calibration and testing.

3.11 Measurement Cycle. A timed three-phase cycle whereby an analyzer's response rises through a ramp-up phase followed by a stable test data collection phase then purged of the gas sample during a refresh phase. The "Ramp-up Phase" exposes the analyzer to the gas sample for 5 minutes ($t_0 - t_5$). The "Test Data Phase" is the time of the stabilized gas sample measurements ($t_5 - t_7$) with recordings starting at $t_{5:15}$. The "Refresh Phase" is the timed process where the EC cells are purged or flushed with fresh air ($t_7 - t_{15}$). The refresh phase replenishes requisite O_2 and moisture in the electrolyte reserve and provides a mechanism to de-gas (desorption) the interference gas scrubbers and filters to ensure a stable and accurate EC cell response. A diagram of this measurement cycle is shown in Figure 1A. Measurement cycles can be coupled together for evaluations lasting hours providing all other test method specifications are met. Measurement cycles may deviate from those recommended in this protocol if they are approved by the applicable regulatory agency.

3.12 Test Day. A time not to exceed twelve hours from the time of the pre-test verification to the post-test verification. During this time, testing may occur without further need of calibration providing all other testing specifications have been met.

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3.13 Pre-Test/Post-Test Verification. The procedure executed at the beginning and end of each test day to bracket test readings with a controlled performance assurance test.

3.14 NO_x Measurement. If the NO_2 percentage of NO_x is less than 10 percent, you may either measure NO_2 or estimate total NO_x by adding to the NO measurement that amount representing the estimated percentage of NO_2. Historical values may be used to establish the percent of NO_2 provided the determination of NO_2 was based on a stack test. Direct measurement of NO_2 shall be required if the NO_2 percentage is greater than 10 percent of the total NO_X.

3.15 "As-verified". Refers to the analyzer and sampling system configuration as was tested by independent third party organizations (i.e. EPA ETV, SCAQMD, TUV or equivalent).

4. MEASUREMENT SYSTEM PERFORMANCE SPECIFICATIONS

4.1 Zero Calibration Error. The zero level output shall be less than or equal to ± 3 percent of the span gas value or ± 1 ppm, whichever is less restrictive, for the NO, NO_2 and CO channels and less than or equal to ± 0.3 percent O_2 for the O_2 channel (see Section 6.2.1 for zero calibration procedure).

4.2 Span Calibration Error. The average calculated "test data phase" error shall be less than or equal to ± 5 percent of the span gas value or ± 1 ppm, whichever is less restrictive, for the NO, NO_2, CO and O_2 channels. The maximum allowable deviation of any single "test data phase" reading shall be less than or equal to ± 2 percent or 1ppm, whichever is less restrictive, of the average (see Section 6.2.2 for span calibration procedure).

4.3 Interference Response. The CO, NO, and NO_2 interference response must be less than or equal to ± 5 percent of the span gas concentration. Analyzers that have been verified for interference response by a recognized agency (Section 5.1.10) shall be considered in compliance with this interference check specification. The potential for interference from other flue gas constituents should be reviewed with the analyzer manufacturer based on site-specific data (see Section 6.3 for interference response procedure).

4.4 Repeatability Check Response. The calculated average of the "test data phase" for the NO, NO_2 and CO span gases shall not vary more than ± 3 percent or ± 1 ppm, whichever is less restrictive, of the span gas value over four measurement cycles (see Section 6.4 for repeatability check procedure).

5. APPARATUS AND REAGENTS

5.1 Measurement System. Use any measurement system that meets the performance and design

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specifications in Sections 4 and 5 of this method. The sampling system shall maintain the gas sample at conditions that will prevent condensation in the lines or when it contacts the EC cells. A diagram of an acceptable measurement system is shown in Figure 2. The essential components of the measurement system are described below.

5.1.1 Sample Probe. Glass, stainless steel or other non-reactive material of sufficient length to traverse the sample points. The sample probe shall be designed to prevent condensation.

5.1.2 Sample Line. Non-reactive tubing designed to transport the effluent from the sample probe to the moisture removal system. The sample line shall be designed to prevent condensation.

5.1.3 Sample Transport Lines. Non-reactive tubing to transport the sample from the moisture removal system to the electrochemical cell.

5.1.4 Calibration Assembly. A three-way valve assembly, tee or equivalent for introducing calibration gases at ambient pressure to the sample probe during calibration checks. The assembly shall be designed such that only calibration gas is processed and that calibration gases flow through all gas path filters.

5.1.5 Moisture Removal System. A chilled condenser or similar device to remove condensate continuously from the sample gas while maintaining minimal contact between the condensate and the sample gas shall be required if the NO_2 portion of NO_x is greater than 10 percent. Alternatively, for gas streams with less than 10 percent NO_2, a device that uses ambient means to condense moisture from the gas stream before the EC cells is acceptable for this method.

5.1.6 Particulate Filter. Filters before the inlet of the analyzer may be used to prevent accumulation of particulate material in the measurement system and extend the useful life of the components. All filters shall be fabricated of materials that are non-reactive to the gas being sampled.

5.1.7 Sample Pump. A leak-free pump that will provide the sample gas to the system at a flow rate sufficient to minimize the response time of the measurement system. If upstream of the EC cells, the pump shall be constructed of any material that is non-reactive to the gas being sampled.

5.1.8 Sample Flow Rate Monitoring. A rotameter or equivalent device must be used to measure the sample flow rate through the analyzer such that either:

1. The analyzer sample flow rate must not vary by more than ± 10% throughout the pre-test & post-test verification calibrations and source measurement cycles, or
2. The analyzer sample flow rate must be maintained within a tolerance range that does not affect the gas concentration readings by more than ± 3%. This flow rate tolerance range must be as-verified or

certified by the analyzer manufacturer. (Appendix B)

5.1.9 Sample Gas Manifold. A manifold used to divert a portion of the sample gas stream to the analyzer and the remainder to the by-pass discharge vent. This is to be used on high pressure exhaust streams to prevent damage to the measurement system and to avoid false readings. The sample gas manifold should also include provisions for introducing calibration gases directly to the analyzer. The manifold may be constructed of any material that is non-reactive to the gas being sampled.

5.1.10 Gas Analyzer. A device containing EC cells to determine the NO, NO_2, CO and O_2 concentrations in the sample gas stream and, if necessary, to correct for interference effects. The analyzer shall meet the applicable performance specifications of Section 4 and 5 of this method. It is recommended that the analyzer shall be verified for NO_x measurements by a recognized testing agency (e.g. ETV, SCAQMD or TUV) or as approved by EPA Method 301 verification.

5.1.11 Data Recorder. A strip chart recorder, computer or digital recorder for logging analyzer output data. The data recorder resolution (i. e. readability) shall be at least 1 ppm for CO, NO and NO_2; 0.1% for O_2; and one degree (C or F) for temperature. Alternatively, a digital or analog meter having the same resolution may be used to obtain the analyzer responses and the readings may be recorded manually.

5.1.12 Interference Gas Scrubber. A device used by some analyzers to remove interfering compounds upstream of a CO electrochemical cell. If external interference gas scrubbers are required in the original as-verified configuration, they must be used with this protocol. The gas scrubber should have a means to determine when the agent is exhausted. The scrubbing agent shall be changed in accordance with the manufacturer's recommendations.

5.1.13 EC Cell Temperature Indicator. The analyzer shall be equipped with a temperature measurement device (e.g. thermocouple, thermistor or equivalent) to monitor the EC cell temperature. The temperature may be monitored at the surface, within the cell, or in close proximity to the cells such that it indicates the operating temperature of the cells. At no time shall the analyzer be used outside the manufacturer's recommended operating range.

5.2 Calibration Gases. The calibration gases for the gas analyzer shall be CO in nitrogen or CO in nitrogen and O_2, NO in nitrogen, NO_2 in air and O_2 in nitrogen. Clean, dry air (20.9 percent O_2) may be used for calibration of the O_2 cell.

5.2.1 Span Gases. Used for calibration and error checking. Select concentrations according to procedures specified in Section 2.

5.2.2 Zero Gas. Concentration of less than 0.25 percent of the span gas for each component. Fresh air, free from ambient CO and NOx or other combustion gases, may be used.

6. MEASUREMENT SYSTEM PERFORMANCE CHECK PROCEDURES

The following procedures define the process to follow in order to verify analyzer performance and accuracy during the test day measurement cycles.

6.1 Calibration Gas Concentration Verification. For the span gases, use certified calibration gases. For O_2 calibration and CO and NO_x zero gas, fresh air, free from ambient CO and NO_x shall be permitted. Alternative certification techniques may be used if they are approved in writing by the applicable regulatory agency.

6.2 Pre-Test Verification (Calibration). Conduct the following procedure once for each nominal range that is to be used on each EC cell before taking test data during the field test day. Repeat the calibration check if a cell is replaced. There is no prescribed order that the EC cells must be calibrated in. However, each cell must complete the measurement cycle during the calibration check. Assemble the measurement system by following the manufacturer's recommended procedures for preparing and preconditioning the gas analyzer. Assure the system has no leaks and verify the gas scrubbing agent is not depleted.

6.2.1 Zero Calibration Check Procedure. Calibrate the O_2 EC cell at 20.9 percent using fresh air. For the O_2, CO, NO and NO_2 EC cells introduce the zero gas and record the reading. Include the time, EC cell temperature, and sample flow rate on a form similar to Figure 3 (see Section 4.1 for specifications).

6.2.2 Span Calibration Check Procedure. Individually inject each span gas into the analyzer and record the zero start time (t_0). Record all analyzer output responses, the EC cell temperature, and the flow rate during this “ramp-up phase” once per minute for the first 5 minutes. At 5 minutes (t_5) begin the “test data phase” and record readings every 15 seconds for a total of two minutes ($t_{5:15} – t_7$) or as required by permit conditions. The “refresh phase” will be performed for the next eight minutes ($t_7 – t_{15}$) with fresh air, free from CO, NOx and other pollutants. Record data every minute. Repeat the steps in Section 6.2.2 to verify the calibration for each component gas. Gases shall be injected through the entire sample handling system.

6.2.3 Calibration Check Calculation. Calculate mean average of the readings from the “test data phase” ($t_5 - t_7$). The acceptable mean average is within ± 5 percent of the span gas concentration and the maximum deviation from the average for each of the individual readings ($t_{5:15} – t_7$) is less than or equal to ±

2 percent. Record the average value and maximum deviation for each species monitored. Data shall conform to Section 4.2. If an invalid calibration is exhibited, take corrective action and repeat the analyzer calibration check until acceptable performance is achieved (see Figure 1B). The flow rate and EC cell temperature shall conform to the specifications in Section 5.1.8 and 5.1.13, respectively.

Example: If the span gas value is 100 ppm, the average of the readings for that parameter may be within ±5 ppm of 100 ppm, i.e. 95 to 105 ppm. The test cycle is invalid if the maximum deviation of any single reading comprising that average is greater than ±2% or 2 ppm (i.e. average = 102 ppm; single readings of below 100 ppm and above 104 ppm are disallowed).

6.3 Interference Check. During the calibration check of a single gas species (e.g. CO), record the response displayed by the other EC cells (i.e. NO & NO_2). Record the interference response for each EC cell to each calibration gas. The interference will conform to the specifications in Section 4.3.

6.4 Repeatability Check. Conduct the following procedure once for each nominal range that is to be used on each electrochemical cell (NO, NO_2 and CO) within five days prior to each field test program. If a field-test program lasts longer than five days, this procedure shall be performed before each five days of analyzer operation. Perform the repeatability check if a cell is replaced or if a cell is exposed to gas concentrations greater than 150 percent of the highest span gas concentration.

6.4.1 Repeatability Check Procedures. Perform a measurement cycle by injecting the span gas into the analyzer and record the readings. Follow Section 6.2.2 procedures. Record the readings on a form similar to the one found in Figure 3. Repeat the measurements for a total of four cycles. During the repeatability checks, do not adjust the system except where necessary to achieve the correct calibration gas flow rate at the analyzer.

6.4.2 Repeatability Check Calculations. Determine the highest and lowest average "test data phase" concentration recorded from the repeatability check and record the results on a form similar to Figure 3. The absolute value of the difference between the maximum and minimum average values recorded during the test must not vary more than ± 3 percent or 1 ppm whichever is less restrictive of the span gas concentration results (see Figure 1C).

6.5 Post-Test Verification (Calibration). Perform the post-test verification calibration check in the same manner as shown in Section 6.2 of this method at the end of each test day. If the post-test verification calibration checks do not meet the specifications, all test data for that component, based upon that test day calibration are null and void and re-calibration and re-testing is required. Make no changes to the sampling system or analyzer calibration until all of the post-test verification checks have been recorded.

7. EMISSION TEST PROCEDURE

7.1 Selection of Sampling Site and Sampling Points.

7.1.1 Reciprocating Engines. Select a sampling site located at least two stack diameters downstream of any disturbance (e.g. turbocharger exhaust, crossover junction or recirculation take-off) and one-half stack diameter upstream of the gas discharge to the atmosphere. Use a sampling location at a single point near the center of the duct or use the point required by the local regulator.

7.1.2 Combustion Turbines. Select a sampling site and sample points according to the procedures in 40 CFR, Part 60, Appendix A, Method 20. An alternative sampling location and/or sample from a single point in the center of the duct may be used if previous test data demonstrate that the stack gas concentrations of CO, NO_x and O_2 do not vary significantly across the duct diameter. Use of the point required by the local regulator is also acceptable.

7.1.3 Process Boilers. Select a sampling site located at least two stack diameters downstream of any disturbance and one-half stack diameter upstream of the gas discharge to atmosphere. Use a sampling location at a single point near the center of the duct or use the point required by the local regulator.

7.2 Sample Collection. Prior to sample collection, ensure that the pre-test verification has been performed in accordance with Section 6.2. Zero the analyzer with fresh air. Position the probe at the first sampling point and begin the measurement cycle at the same flow rate used during the calibration check. Begin the 5-minute "ramp-up phase" (t_0 - t_5). Record the gas sample readings, sample flow rate and EC cell temperature on a form similar to Figure 3. The "test data phase" runs for two minutes ($t_5 - t_7$). Record the readings at 15-second intervals beginning at $t_{5:15}$. The "refresh phase" begins at t_7 and runs for 8 minutes (t_7 to t_{15}) or until the analyzer has "refreshed" in accordance with the manufacturer's specification. Record the readings. For each run use the "test data phase" measurements to calculate the average effluent concentration.

7.3 EC Cell Temperature and Flow Monitoring. For each measurement cycle, the temperature measurement of the EC cells shall not vary more than ± 10^0F. The overall EC cell temperature variation shall be less than ± 20^0F from the pre-test verification check to the final post-test verification check. The sample flow rate shall be in accordance with Section 5.1.8.

7.4 Post-Test Verification Check. Conduct the post-test verification check after the test run or set of

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test runs and within 12 hours of the initial calibration check. Conduct span and zero calibration checks using the procedure in Section 6.2. Make no changes to the sampling system or analyzer calibration until all post-test verification checks have been recorded. If the zero or span calibration error exceeds the specification in Sections 4.1 and 4.2 then all test data collected since the previous successful calibration checks are invalid and re-calibration and re-testing is required. If the sampling system is disassembled or the analyzer calibration is adjusted, repeat the calibration check before conducting the next source test.

8. EMISSION CALCULATION

The average gas effluent concentration is determined from the mean average gas concentration calculated using the emissions data collected during the "test data phase". Emissions may be calculated and reported in units of the allowable emission limit as specified in the permit or as required by the local agency for purposes of facility compliance. The emissions may be stated in units of pounds per hour (lbs/hr), grams per horsepower-hour (gm/hp-hr), pounds per million Btu (lbs/MMBtu) or as required for the facility. Appendix A provides example test result forms with emission rate calculations, f-factors, and the flow rate certification procedure for analyzer manufactures. Alternately, EPA Reference Method 19 may also be used as the basis for calculating the emissions and EPA Reference Methods 1-4 may be used to obtain a stack volumetric flow rate.

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5. "Code of Federal Regulations", Protection of Environment, 40 CFR, Part 60, Appendix A, Methods, 1-4, 19, 20.

FIGURES

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FIGURES - 1A, 1B, 1C

Figure 1A - Measurement Cycle, 15 Min. (For calibration and source measurements)

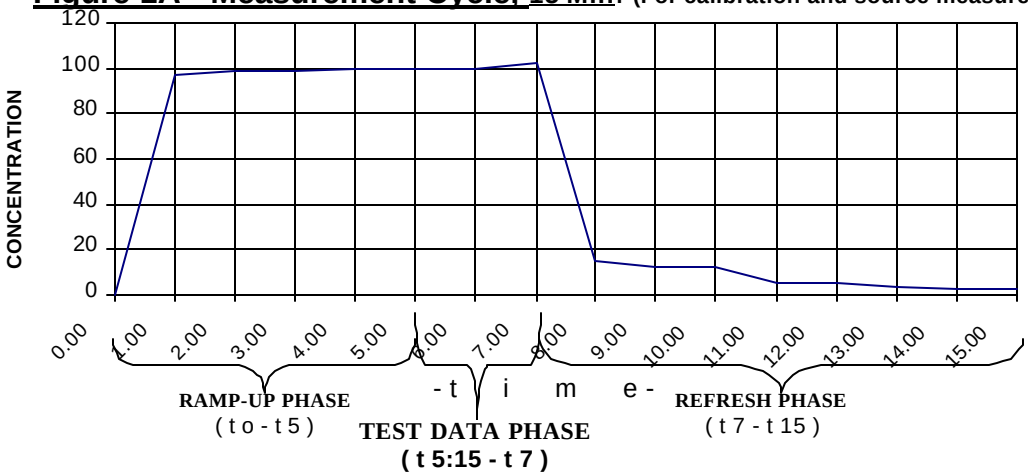

Figure 1B - Span Calibration (For span calibration only)

Span Calibration Error - The calculated "TEST DATA PHASE" average shall be less than ± 5% of the span or ± 1ppm whichever is less restrictive for NO, NO2, CO and O2. The **Maximum Allowable Deviation** of any single "test data phase" reading shall be ± 2% or 1ppm. Whichever is less restrictive, of the average. (The example below does not meet this specification)

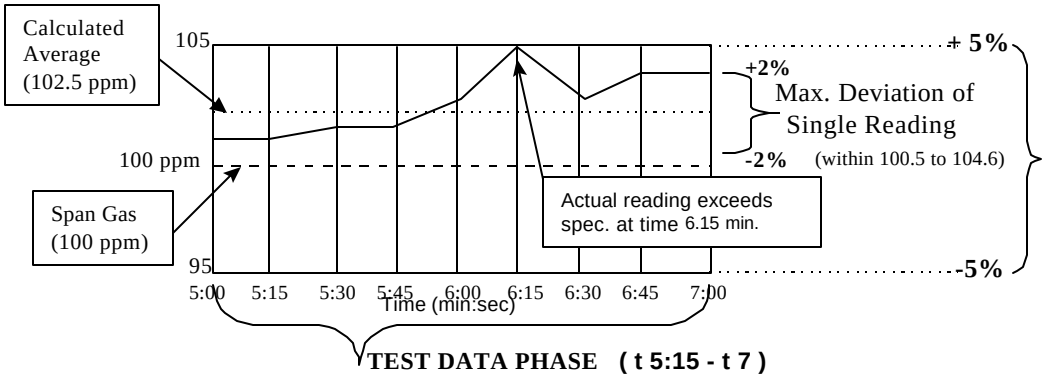

Figure 1C - Repeatability 4 Measurement cycles = 1 hour (for repeatability calibration only)

Repeatability - The calculated average for the "TEST DATA PHASE" for NO, NO2 & CO shall not vary more than ± 3% or ± 1 ppm, whichever is less restrictive, of the span gas value for 4 measurement cycles

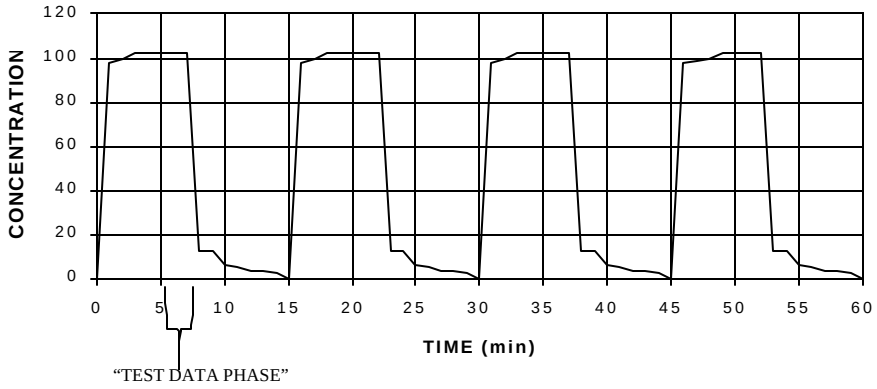

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Figure 2 - Calibration & Testing Schematic

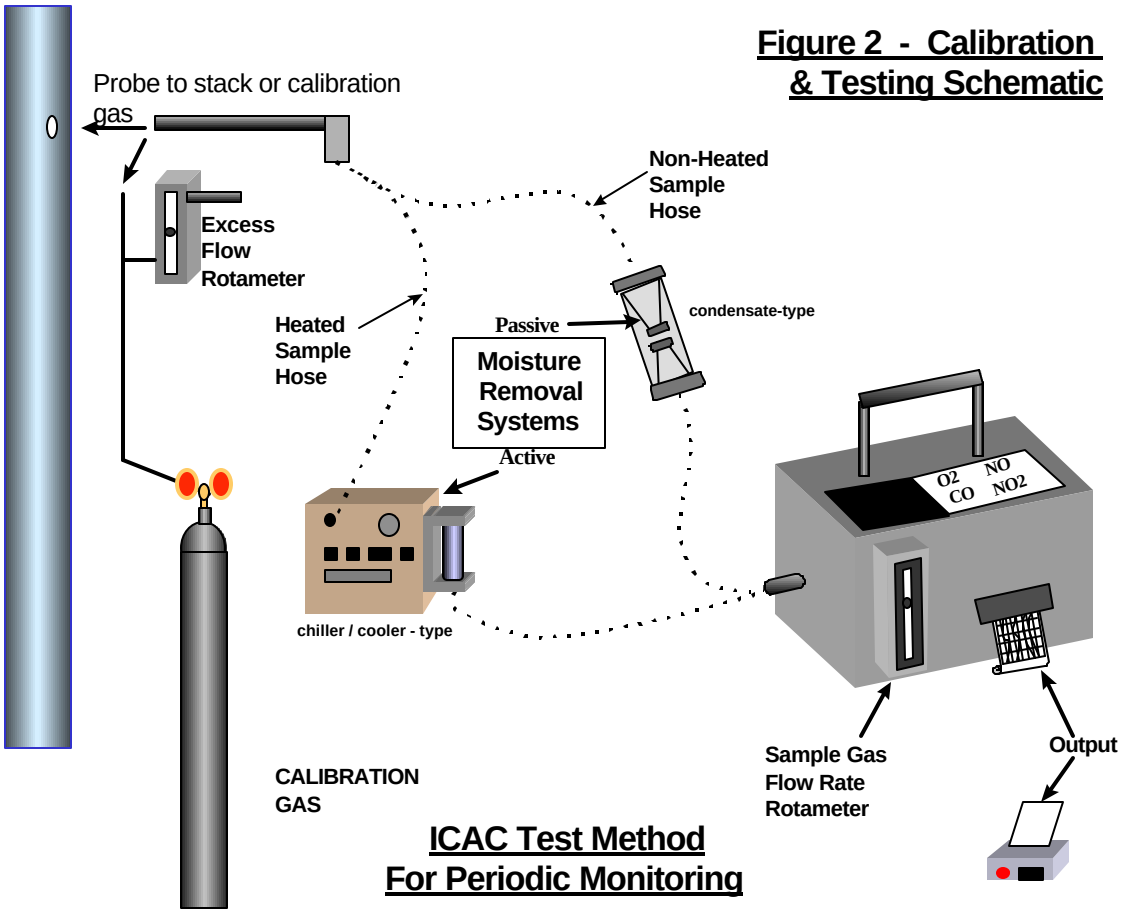

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Figure 3 - Periodic Monitoring Report

Facility Name & Address Phone				**Emission Point**			
Analyzer make & model:				**Serial #**			
Calibration Gas Verification Information							
Calibration Gas Info. (manufacturer, expiration, etc.)	**Gas type**	**O_2 %**	**CO ppm**	**NO ppm**	**NO_2 ppm**		
	Concent.						

MEASUREMENT CYCLE (circle measurement task below)

Pre-Test Verification *(zero, span, interference)* / ***Repeatability*** *(once per five days)* / ***Source Test*** *(_____)* / ***Post-Test Verification*** *(zero, span Interference)*

	Date:	**Analyzer Response**				**Cell Temp**	**Flow Rate**
Three Phases	**Start time**: AM /	**O_2%**	**CO ppm**	**NO ppm**	**NO_2 ppm**		
RAMP-UP Phase	t_1						
	t_2						
	t_3						
	t_4						
	t_5						
TEST DATA Phase	$t_{5:15}$						
	$t_{5:30}$						
	$t_{5:45}$						
	$t_{6:00}$						
	$t_{6:15}$						
	$t_{6:30}$						
	$t_{6:45}$						
	$t_{7:00}$						
Mean Average Concentration (sum of $t_{5:15}$ through $t_{7:00}$ ÷ 8)							
Maximum Deviation (no single reading exceeds ± 2% of mean average)							
Acceptable "Test Data Phase"		***Yes or No***	***Yes or No***	***Yes or No***	***Yes or No***		
RE-FRESH Phase	t_7						
	t_8						
	t_9						
	t_{10}						
	t_{11}						
	t_{12}						
	t_{13}						
	t_{14}						
	t_{15}						
Stop Time AM / PM							
Cell Temperature (± 10°F for each run, Not to exceed 20° F for test day) and Sample Flow Rate are within specifications (± 10% or as verified)						***Yes or No***	***Yes or No***

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APPENDIX A

Test Results - Boilers & Heaters
(Operated at 90% of permitted load or greater during test? Yes or NO)

Facility name, address		**Emission Point:**
		Test date:

NAME: **DATE:**

Fuel Consumption (cf/hr, or gal/hr, etc...)	Fuel Heat Content (Btu/cf, or Btu/gal, etc...)	Boiler / Heater tested firing rate (MMBtu/hr, or hp/hr, etc...)

The tester may chose to correct the emissions data for a test run using the pre-test verification calibration and post-test verifications results. Use equation below for this correction.

$$C_{GAS} = (C_A - C_{PO}) \times \frac{C_S}{C_{PS} - C_{PO}}$$

- C_{GAS} = corrected flue gas concentration
- C_A = "Test Data Phase" average concentration indicated by portable analyzer
- C_{PO} = average of Pre-test and Post-test Zero check
- C_{PS} = average of Pre-test and Post-test Span checks
- C_S = actual concentration of span gas

Emission Calculations:

$$\text{lb/MMBtu NOx} = (\text{ppm NOx}_{\text{corrected}})\ (1.19\times10^{-7})\ (\text{F Factor}_{\text{Note 1}})\ \left(\frac{20.9}{20.9 - O_2\%_{\text{corrected}}}\right)$$

$$\text{lb/MMBtu CO} = (\text{ppm CO}_{\text{corrected}})\ (7.27\times10^{-8})\ (\text{F Factor}_{\text{Note 1}})\ \left(\frac{20.9}{20.9 - O_2\%_{\text{corrected}}}\right)$$

$$\text{lb/hr NOx} = (\text{lb/MMBtu NOx})\ (\text{Heat Input}_{\text{Note 2}})$$

$$\text{lb/hr CO} = (\text{lb/MMBtu CO})\ (\text{Heat Input}_{\text{Note 2}})$$

Note 1: Use "F Factor" unless calculated based on the actual fuel gas composition and the higher heating value of the fuel.

Note 2: Heat input shall be based on the average hourly fuel usage rate during the test and the higher heating value of the fuel consumed if the boiler / heater is equipped with a fuel meter or the permitted maximum heat input if a fuel meter is

NOx (NO + NO_2) Results

Ave. Tested NO ppm	NO ppm (corrected)	Ave. Tested NO_2 ppm	NO_2 ppm (corrected)	NOx ppm (corrected)	As Tested	Allowable
					lb/MMBtu =	lb/MMBtu =
					lb/hr =	lb/hr =

O_2 Results		**CO Results**			
Ave. Tested O_2 %	O_2 % (corrected)	Ave. Tested CO ppm	CO ppm (corrected)	As Tested	Allowable
				lb/MMBtu =	lb/MMBtu =
				lb/hr =	lb/hr =

Test Results - Reciprocating Engines - Below 500 HP
(Operated at 90% of permitted load or greater during test? YES or NO)

Facility name, address		**Emission Point:**
		Test date:

NAME: **DATE:**

Suction/ Discharge Pressure	RPM	Fuel Throughput "compressed"	Fuel consumed "burned"	Fuel Heat Content	Unit Fuel Useage Spec.	Engine Tested Horsepower

The tester may chose to correct the emissions data for a test run using the pre-test verification calibration and post-test verifications results. Use equation below for this correction.

$$C_{GAS} = (C_A - C_{PO}) \times \frac{C_S}{C_{PS} - C_{PO}}$$

C_{GAS} = corrected flue gas concentration
C_A = "Test Data Phase" average concentration indicated by portable analyzer
C_{PO} = average of Pre-test and Post-test Zero check
C_{PS} = average of Pre-test and Post-test Span checks
C_S = actual concentration of span gas

Emission Calculations:

$$\text{gm/hp-hr NOx} = (\text{ppm NOx}_{\text{corrected}})(1.19\times10^{-7})(\text{F Factor}_{\text{Note 1}})\left(\frac{20.9}{20.9-O_2\%_{\text{corrected}}}\right)(\text{Specific Fuel Consumption}_{\text{Note 2}})(10^{-6})(454)$$

$$\text{gm/hp-hr CO} = (\text{ppm CO}_{\text{corrected}})(7.27\times10^{-8})(\text{F Factor}_{\text{Note 1}})\left(\frac{20.9}{20.9-O_2\%_{\text{corrected}}}\right)(\text{Specific Fuel Consumption}_{\text{Note 2}})(10^{-6})(454)$$

$$\text{lb/hr NOx} = \frac{(\text{gm/hp-hr NOx})(\text{Engine Horsepower}_{\text{Note 3}})}{454}$$

$$\text{lb/hr CO} = \frac{(\text{gm/hp-hr CO})(\text{Engine Horsepower}_{\text{Note 3}})}{454}$$

Note 1: Use "F Factor" unless calculated based on the actual fuel gas composition and the higher heating value of the fuel.
Note 2: Use Manufacture's specific fuel composition based on the higher heating value of the fuel. If the manufacturer does not provide a lower heating value, then multiply by 1.11 to obtain the specific fuel consumption based upon the higher heating value of the fuel
Note 3: Use derived operating horsepower (include calculation method). If derived horsepower is not available or cannot be obtained, use site rated horsepower.

NOx (NO + NO_2) Results

Ave. Tested NO ppm	NO ppm (corrected)	Ave. Tested NO_2 ppm	NO_2 ppm (corrected)	NOx ppm (corrected)	As Tested	Allowable
					gm/hp-hrs =	gm/hp-hrs =
					lb/hr =	lb/hr =

O_2 Results		CO Results			
Ave. Tested O_2 %	O_2 % (corrected)	Ave. Tested CO ppm	CO ppm (corrected)	As Tested	Allowable
				gm/hp-hrs =	gm/hp-hrs =
				lb/hr =	lb/hr =

Test Results - Reciprocating Engines - Above 500 HP Not Equipped w/ Fuel Meter
(Operated at 90% of permitted load or greater during test? YES or NO)

Facility name, address		**Emission Point:**
		Test date:

NAME: **DATE:**

Suction/ Discharge Pressure	RPM	Fuel Throughput "compressed"	Fuel consumed "burned"	Fuel Heat Content	Unit Fuel Useage Spec.	Engine Tested Horsepower

The tester may chose to correct the emissions data for a test run using the pre-test verification calibration and post-test verifications results. Use equation below for this correction.

$$C_{GAS} = (C_A - C_{PO}) \times \frac{C_S}{C_{PS} - C_{PO}}$$

C_{GAS} = corrected flue gas concentration
C_A = "Test Data Phase" average concentration indicated by portable analyzer
C_{PO} = average of Pre-test and Post-test Zero check
C_{PS} = average of Pre-test and Post-test Span checks
C_S = actual concentration of span gas

Emission Calculations:

$$\text{gm/hp-hr NOx} = (\text{ppm NOx}_{\text{corrected}})\,(1.19\times10^{-7})\,(\text{F Factor}_{\text{Note 1}})\left(\frac{20.9}{20.9-O_2\%_{\text{corrected}}}\right)(\text{Specific Fuel Consumption}_{\text{Note 2}})\,(10^{-6})\,(454)$$

$$\text{gm/hp-hr CO} = (\text{ppm CO}_{\text{corrected}})\,(7.27\times10^{-8})\,(\text{F Factor}_{\text{Note 1}})\left(\frac{20.9}{20.9-O_2\%_{\text{corrected}}}\right)(\text{Specific Fuel Consumption}_{\text{Note 2}})\,(10^{-6})\,(454)$$

$$\text{lb/hr NOx} = \frac{(\text{gm/hp-hr NOx})(\text{Engine Horsepower}_{\text{Note 3}})}{454}$$

$$\text{lb/hr CO} = \frac{(\text{gm/hp-hr CO})(\text{Engine Horsepower}_{\text{Note 3}})}{454}$$

Note 1: Use "F Factor" unless calculated based on the actual fuel gas composition and the higher heating value of the fuel.
Note 2: Default Specific Fuel Consumption (Btu/hp-hr) shall be as defined below for the particular type of engine.
Use 9,400 Btu/hp-hr (as default) for 4-cycle and 2-cycle lean burn engines.
Use 11,000 Btu/hp-hr (as default) for 2-cycle non-lean burn engines.
Note 3: Site-rated engine horsepower

NOx (NO + NO_2) Results

Ave. Tested NO ppm	NO ppm (corrected)	Ave. Tested NO_2 ppm	NO_2 ppm (corrected)	NOx ppm (corrected)	As Tested	Allowable
					gm/hp-hrs =	gm/hp-hrs =
					lb/hr =	lb/hr =

O_2 Results		**CO Results**			
Ave. Tested O_2 %	O_2 % (corrected)	Ave. Tested CO ppm	CO ppm (corrected)	As Tested	Allowable
				gm/hp-hrs =	gm/hp-hrs =

				lb/hr =	lb/hr =

Test Results - Reciprocating Engines & Combustion Turbines - Above 500 HP w/ Fuel Meter

(Operated at 90% of permitted load or greater during test? YES or NO)

Facility name, address		**Emission Point:**
		Test date:

NAME: **DATE:**

Suction/ Discharge Pressure	RPM	Fuel Throughput "compressed"	Fuel consumed "burned"	Fuel Heat Content	Unit Fuel Useage Spec.	Engine Tested Horsepower

The tester may chose to correct the emissions data for a test run using the pre-test verification calibration and post-test verifications results. Use equation below for this correction.

$$C_{GAS} = (C_A - C_{PO}) \times \frac{C_S}{C_{PS} - C_{PO}}$$

C_{GAS} = corrected flue gas concentration
C_A = "Test Data Phase" average concentration indicated by portable analyzer
C_{PO} = average of Pre-test and Post-test Zero check
C_{PS} = average of Pre-test and Post-test Span checks
C_S = actual concentration of span gas

Emission Calculations:

$$\text{lb/hr NOx} = (\text{ppm NOx}_{\text{corrected}})\,(1.19\times10^{-7})\,(\text{F Factor}_{\text{Note 1}})\left(\frac{20.9}{20.9-O_2\%_{\text{corrected}}}\right)(\text{Heat Input / hr}_{\text{Note 2}})$$

$$\text{lb/hr CO} = (\text{ppm CO}_{\text{corrected}})\,(7.27\times10^{-8})\,(\text{F Factor}_{\text{Note 1}})\left(\frac{20.9}{20.9-O_2\%_{\text{corrected}}}\right)(\text{Heat Input / hr}_{\text{Note 2}})$$

$$\text{gm/hp-hr NOx} = \frac{(\text{lb/hr NOx})\,(454)}{(\text{Tested Horsepower}_{\text{Note 3}}) \text{ or } (\text{Calculated Engine Horsepower}_{\text{note 4}})}$$

$$\text{gm/hp-hr CO} = \frac{(\text{lb/hr CO})\,(454)}{(\text{Tested Horsepower}_{\text{Note 3}}) \text{ or } (\text{Calculated Engine Horsepower}_{\text{note 4}})}$$

Note 1: Use "F-factor" unless calculated based on the actual fuel gas composition and the higher heating value of the fuel.
Note 2: Heat input / hr. (MMBtu/hr) shall be based on the average hourly fuel usage during the test and the higher heating value of the fuel consumed
Note 3: Tested Horsepower is directly determined during test.
Note 4: Calculated Engine Horsepower = $\frac{(\text{Heat Input per Hour}_{\text{Note 2}})\,(10^6)}{(\text{Specific Fuel Consumption}_{\text{- See default below*}})}$

* use 9,400 Btu/hp-hr (as default) for 4-cycle and 2-cycle lean burn engines
* use 11,000 Btu/hp-hr (as default) for 2-cycle non-lean burn engines

For combustion turbine horsepower that cannot be determined during testing, the emissions shall be reported in terms of concentration (ppm by volume, dry basis) corrected to 15 percent O_2 . Calculation to corrected to 15% O_2 is shown below:

ppm $NOx_{@ 15\% O2}$ = ppm NOx corrected (5.9) ppm $CO_{@ 15\% O2}$ = ppm CO corrected (5.9)

NOx (NO + NO_2) Results

Ave.Tested NO ppm	NO ppm (corrected)	Ave.Tested NO_2 ppm	NO_2 ppm (corrected)	NOx ppm (corrected)	As Tested	Allowable
					gm/hp-hrs =	gm/hp-hrs =
					lb/hr =	lb/hr =

O_2 Results		CO Results			
Ave. Tested O_2 %	O_2 % (corrected)	Ave. Tested CO ppm	CO ppm (corrected)	As Tested	Allowable
				gm/hp-hrs =	gm/hp-hrs =
				lb/hr =	lb/hr =

F-Factors

An “F-Factor” is the ratio of the gas volume of the products of combustion to the heat content of the fuel.

F_d - Dry Factor, Includes all components of combustion less water.

F_w - Wet Factor, Includes all components of combustion.

F_c - Carbon Factor, Includes only carbon dioxide

Note: Since F-Factors include water resulting only from combustion of hydrogen in the fuel, The procedures using F_w factors are not applicable for computing emissions from steam generating units with wet scrubbers or with other processes that add water (e.g. steam injection).

F- Factors for Various Fuels [1]

	F_d		F_w		F_c	
Fuel Type	**dscm /J**	**dscf /10^6 Btu**	**wscm / J**	**wscm /10^6 Btu**	**scm / J**	**scf /10^6 Btu**
Coal:						
Anthracite[2]	$2.71 * 10^{-7}$	10000	$2.83 * 10^{-7}$	10540	$0.530 * 10^{-7}$	1970
Bituminus[2]	$2.63 * 10^{-7}$	9780	$2.86 * 10^{-7}$	10640	$0.484 * 10^{-7}$	1800
Lignite	$2.65 * 10^{-7}$	9860	$3.21 * 10^{-7}$	11950	$0.513 * 10^{-7}$	1910
Oil[3]	$2.47 * 10^{-7}$		$2.77 * 10^{-7}$	10320	$0.383 * 10^{-7}$	1420
Gas:						
Natural	$2.43 * 10^{-7}$	8710	$2.85 * 10^{-7}$	10610	$0.287 * 10^{-7}$	1040
Propane	$2.34 * 10^{-7}$	8710	$2.74 * 10^{-7}$	10200	$0.321 * 10^{-7}$	1190
Butane	$2.34 * 10^{-7}$	8710	$2.79 * 10^{-7}$	10390	$0.337 * 10^{-7}$	1250
Wood	$2.48 * 10^{-7}$	9240			$0.492 * 10^{-7}$	1830
Wood bark	$2.58 * 10^{-7}$	9600			$0.516 * 10^{-7}$	1920
Municiple	$2.57 * 10^{-7}$	9570			$0.488 * 10^{-7}$	1820
Solid Waste	********					

[1] Determined at standard conditions : 20° C (68° F) and 760 mm (29.92 in Hg).

[2] As classified according to ASTM D388-77.

[3] Crude, residual, or distillate.

Reader note: F-Factor table copied from US EPA 40 CFR, Pt 60, Appendix A, Method 19 -Determination of Sulfur Dioxide Removal efficiency and Particulate Martter, Sulfer Dioxide and Nitrogen Oxides Emissions Rates.

APPENDIX B

Batch Testing of Portable Gas Analyzer Flow Rate.

Background

In order to meet the requirements of Section 5.1.8 for sample flow rate, the manufacturer has the option of providing the user with a maximum and minimum allowable sample flow rate (outside of the method specified ± 10 percent) provided that the manufacturer performs a batch certification of flow rate vs. gas reading shift.

Procedure

Size of Batch

The manufacturer must randomly sample a portable gas analyzer once every three months or every 50 units, whichever comes first, from a production batch.

Testing

The manufacturer must monitor the flow rate of the sample and the gas concentration of the calibration (pollutant) gas continuously. Once the analyzer has reached a stable gas reading. The flow rate and concentration are recorded. The sample flow rate is then changed to the minimum recommended flow rate in 0.1 liter increments / min, through the full range of certified flow. The manufacturer must record the gas readings for each increment and compare these against the initial analyzer reading.

Each test must consist of three (3) identical runs. Each error band must include a standard deviation at 95 percent confidence level interval (per US EPA 40 CFR 60 Appendix B, PS1).

Documentation

The manufacturer must provide a certificate with each analyzer indicating conformance with the requirements of Section 5.1.8.

DEC 06 2007

Methods 1,2,4, & 7E, and 10; or

b) Portable gas analyzer method: CTM-034, Draft Method for the Determination of O2, CO, & (NO and NO2) for Periodic Monitoring.

APPEAL RIGHTS

Pursuant to Puget Sound Clean Air Agency's Regulation I, Section 3.17 and RCW 43.21B.310, this Order may be appealed to the Pollution Control Hearings Board (PCHB). To appeal to the PCHB, a written notice of appeal must be filed with the PCHB and a copy served upon Puget Sound Clean Air Agency within 30 days of the date the applicant receives this Order.

Claude Williams
Reviewing Engineer
ns

Steven Van Slyke
Supervising Engineer

CHAPTER 8 *Inspection and Maintenance*

8.1 — Overview

NOTE: For more information on your flame safeguard system, refer to the appropriate manual that was provided with your boiler.

⚠ Caution

Inspection and maintenance should be performed only by trained personnel who are familiar with this equipment. Failure to follow these instructions could result in equipment damage.

A well planned maintenance program will help avoid unnecessary downtime or costly repairs, promote safety, and aid boiler inspectors. An inspection schedule with a listing of procedures should be established. It is recommended that a boiler room log or record be maintained. Recording of daily, weekly, monthly, and yearly maintenance activities provides a valuable guide and aids in obtaining economical and lengthy service from Cleaver-Brooks equipment. A sample boiler inspection schedule is provided at the end of this chapter. It is important to realize that the frequency of inspection will depend on variable conditions such as load, fuel, system requirements, boiler environment (indoor/outdoor), etc.

Good housekeeping helps maintain a professional appearing boiler room. Only trained and authorized personnel should be permitted to operate, adjust, or repair the boiler and its related equipment. The boiler room should be kept free of all material and equipment not necessary to the operation of the boiler or heating system.

Even though the boiler has electrical and mechanical devices that make it automatic or semi-automatic in operation, the devices require systematic and periodic maintenance. Any automatic feature does not relieve the operator from responsibility, but rather frees the operator from certain repetitive chores providing time to devote to upkeep and maintenance.

Alertness in recognizing an unusual noise, improper gauge reading, leaks, etc., can make the operator aware of a developing malfunction and permit prompt corrective action that may prevent extensive repairs or unexpected downtime. Any leaks — fuel, water, steam, exhaust gas — should be repaired promptly and under conditions that

observe necessary safety precautions. Preventive maintenance measures, such as regularly checking the tightness of connections, locknuts, setscrews, packing glands, etc., should be included in regular maintenance activities.

8.1.1 — Periodic Inspection

Insurance regulations and local laws require periodic inspection of the pressure vessel by an authorized inspector. Section 3.8 in Chapter 3 contains information relative to the inspection.

Inspections are usually, though not necessarily, scheduled for periods of normal boiler downtime, such as an off season. This major inspection can often be used to accomplish maintenance, replacement or repairs that cannot easily be done at other times. Inspection also serves as a good basis for establishing a schedule for annual, monthly, or other periodic maintenance programs.

While the inspection pertains primarily to the waterside and fireside surfaces of the pressure vessel it provides the operator an excellent opportunity for detailed inspection and check of all components of the boiler, including piping, valves, pumps, gaskets, refractory, etc. Comprehensive cleaning, spot painting or repainting, and the replacement of expendable items should be planned for and taken care of during this time. Any major repairs or replacements that may be required should also, if possible, be coordinated with the period of boiler shutdown.

Replacement spare parts, if not on hand, should be ordered sufficiently prior to shutdown.

> **NOTE:** Cleaver-Brooks genuine parts should be used to ensure proper operation. Contact your local Cleaver-Brooks representative for parts information and ordering.

Cleaver-Brooks boilers are designed, engineered, and built to provide long life and excellent service. Good operating practices and conscientious maintenance and care will assure efficiency and economy from their operation, and will contribute to many years of performance.

A total protection plan includes a Planned Maintenance Program that covers many of the items included in this chapter.

For information regarding a total protection plan, contact your local Cleaver-Brooks authorized representative.

8.2 — Fireside Cleaning

Soot and non-combustibles are effective insulators, and, if allowed to accumulate, will reduce heat transfer to the water and increase fuel consumption. Soot and other deposits can be very moisture-absorbent, and may attract moisture to form corrosive acids that will deteriorate fireside metal.

Cleanout should be performed at regular and frequent intervals, depending upon load, type, and quality of fuel. internal boiler temperature, and combustion efficiency. A stack temperature thermometer can be used as a guide to cleanout intervals since an accumulation of soot deposits will raise the flue gas temperature.

Tube cleaning is accomplished by opening the front and rear doors. Tubes may be brushed from either end. All loose soot and accumulations should be removed. Any soot, or other deposits, should be removed from the furnace and tube sheets.

Refer to Section 8.17 for instructions on properly closing rear heads.

The flue gas outlet and stack should be inspected annually and cleaned as necessary. Commercial firms are available to perform the work. The stack should be inspected for damage and repaired as required.

The fireside should be thoroughly cleaned prior to any extended lay-up of the boiler. Depending upon circumstances, a protective coating may be required. See Section 3.9 in Chapter 3.

8.3 — Water Level Controls

The need to periodically check water level controls and the waterside of the pressure vessel cannot be overemphasized. Most instances of major boiler damage are the result of operating with low water, or the use of untreated (or incorrectly treated) water.

Always be sure of the boiler water level. On steam boilers, the water column should be blown down daily. Check samples of boiler water and condensate in accordance with procedures recommended by your local Cleaver-Brooks authorized representative. Refer to Sections 3.7 and 3.8 in Chapter 3 for blowdown instructions and internal inspection procedures.

Since low-water cutoff devices are generally set by the original manufacturer, no attempt should be made to adjust these controls to alter the point of low-water cutoff or point of pump cut-in or cut-out. If a low-water device should become erratic in operation, of if its setting changes from previously established levels, contact your local Cleaver-Brooks authorized representative.

8.3.1 — Steam Boiler

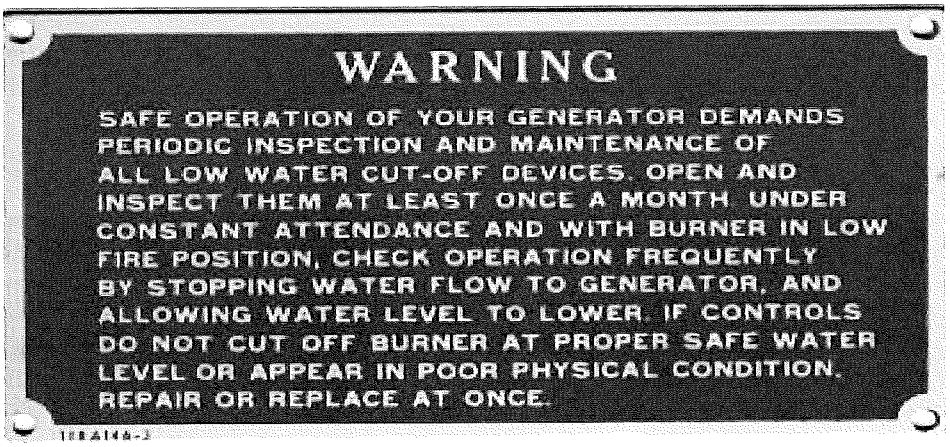

FIGURE 8-1. Low-Water Plate

Figure 8-1 shows the low-water cutoff plate which is attached to a steam boiler. The instructions should be followed on a definite schedule.

The low water cutoff controls normally function for long periods of time, which may lead to laxity in testing on the assumption that normal operation will continue indefinitely.

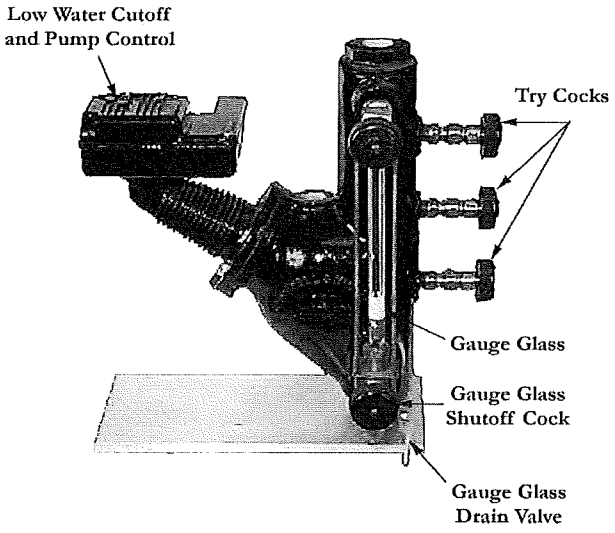

FIGURE 8-2. **Low Water Cutoff**

On a steam boiler, the head mechanism of the low water cutoff device(s) should be removed from the bowl at least semi-annually to check and clean the float ball, the internal moving parts, and the bowl or water column.

Remove the pipe plugs from the tees or crosses and make certain the cross-connecting piping is clean and free of obstructions. Controls must be mounted in a plumb position for proper performance. Determine that piping is vertically aligned after shipment and installation and throughout life of the equipment.

A blowdown of the water controls on a steam boiler should be performed daily.

8.3.2 — Hot Water Boiler

It is impractical to blowdown the low water cutoff device(s) on a hot water boiler since the entire water content of the system would become involved. Many hot water systems are fully closed and any loss of water will require make-up and additional feedwater treatment that might not otherwise be necessary. Since the boiler and system arrangement usually make it impractical to perform daily and monthly maintenance of the low water cutoff device(s), it is essential to verify proper operation. Remove the operating mechanism from the bowl annually or more frequently, if possible, to check and clean the float ball, internal moving parts, and the bowl housing. Also check the cross-connecting piping to be certain that it is clean and free of obstruction.

8.4 — Water Gauge Glass

A broken or discolored glass should be replaced at once. Periodic replacement should be a part of the maintenance program. Always use new gaskets when replacing a glass. Use a Proper size rubber packing. Do not use loose packing, which could be forced below the glass and possibly plug the valve opening.

1. Close the valves when replacing the glass.
2. Slip a packing nut, a packing washer, and packing ring onto each end of the glass. Insert one end of the glass into the upper gauge valve body far enough to allow the lower end to be dropped into the lower body.
3. Slide the packing nuts onto each valve and tighten.
4. It is recommended that the boiler is off and cool when the glass is replaced. However, if the glass is replaced while the boiler is in service, open the blowdown and slowly bring the glass to operating temperature by opening the gauge valves slightly.
5. After the glass is warmed up, close the blowdown valve and open the gauge valves completely.

⚠ Warning

Do not attempt to change the gauge glass while the boiler is in service. Failure to follow these instructions could result in serious injury or death.

6. Check try cocks and gauge cocks for freedom of operation and clean as required. It is imperative that the gauge cocks are mounted in exact alignment. If they are not, the glass will be strained and may fail prematurely.

8.5 — Electrical Controls

The operating controls should be inspected monthly. Examine tightness of electrical connections and keep the controls clean. Remove any dust that accumulates in the interior of the control using a low pressure air. Take care not to damage the mechanism.

Examine any mercury tube switches (if older device is being used) for damage or cracks. Dark scum over the normally bright surface of the mercury may lead to erratic switching action. Be certain that controls are correctly leveled. The piping leading to the pressure control actuators should be cleaned, if necessary. Covers should be left on controls at all times.

Dust and dirt can cause excessive wear and overheating of motor starter and relay contacts. Use a burnishing tool or a hard surface paper to clean and polish contacts. Starter contacts are plated with silver and are not harmed by discoloration and slight pitting. Replacement of the contacts is necessary only if the silver has worn thin.

⚠ Caution

Do not use files or abrasive materials such as sandpaper on the contact points. Failure to follow these instructions could result in equipment damage.

MOTOR, OIL HEATER, & CCT FUSE SIZING
RECOMMENDED MAXIMUM "FUSETRON" FUSE SIZES

ELECTRICAL LOAD	SINGLE PHASE 50/60 HERTZ		THREE PHASE 50/60 HERTZ				
	110-120 V	220-240 V	200-208 V	220-240 V	346-416 V	440-480 V	550-660 V
1/4 HP MOTOR	FRN-8	FRN-4-1/2	FRN-1-8/10	FRN-1-8/10		FRS-1	FRS-8/10
1/3 HP MOTOR	FRN-9	FRN-4-1/2	FRN-1-8/10	FRN-1-8/10		FRS-1	FRS-8/10
1/2 HP MOTOR	FRN-12	FRN-6-1/4	FRN-2-8/10	FRN-2-8/10	FRS-1-8/10	FRS-1-4/10	FRS-1
3/4 HP MOTOR	FRN-17-1/2	FRN-9	FRN-4-1/2	FRN-4-1/2	FRS-2-1/4	FRS-1-8/10	FRS-1-4/10
1 HP MOTOR	FRN-20	FRN-10	FRN-5	FRN-5	FRS-3-2/10	FRS-2-1/4	FRS-1-8/10
1-1/2 HP MOTOR	FRN-25	FRN-12	FRN-7	FRN-7	FRS-4	FRS-3-2/10	FRS-2-1/2
2 HP MOTOR	FRN-30	FRN-15	FRN-9	FRN-9	FRS-5-6/10	FRS-4-1/2	FRS-3-1/2
3 HP MOTOR	FRN-40	FRN-20	FRN-12	FRN-12	FRS-8	FRS-6-1/4	FRS-5
5 HP MOTOR		FRN-35	FRN-20	FRN-20	FRS-12	FRS-10	FRS-8
7-1/2 HP MOTOR		FRN-50	FRN-30	FRN-30	FRS-17-1/2	FRS-15	FRS-12
10 HP MOTOR		FRN-60	FRN-40	FRN-35	FRS-20	FRS-17-1/2	FRS-15
15 HP MOTOR			FRN-60	FRN-50	FRS-30	FRS-25	FRS-20
20 HP MOTOR			FRN-70	FRN-70	FRS-40	FRS-35	FRS-25
25 HP MOTOR			FRN-90	FRN-80	FRS-50	FRS-40	FRS-35
30 HP MOTOR			FRN-100	FRN-100	FRS-60	FRS-50	FRS-40
40 HP MOTOR			FRN-150	FRN-150	FRS-80	FRS-70	FRS-50
50 HP MOTOR			FRN-175	FRN-175	FRS-100	FRS-80	FRS-70
60 HP MOTOR			FRN-200	FRN-200	FRS-125	FRS-100	FRS-80
75 HP MOTOR			FRN-250	FRN-250	FRS-150	FRS-125	FRS-100
100 HP MOTOR			FRN-350	FRN-300		FRS-150	FRS-125
125 HP MOTOR			FRN-450	FRN-400		FRS-200	FRS-150
150 HP MOTOR			FRN-500	FRN-450		FRS-225	FRS-200
200 HP MOTOR				FRN-600		FRS-300	FRS-250
2 KW HEATER	FRN-20	FRN-12	FRN-7	FRN-7		FRS-4-1/2	FRS-3-2/10
3 KW HEATER	FRN-30	FRN-15	FRN-10	FRN-10	FRS-6-1/4	FRS-5-6/10	FRS-4-1/2
5 KW HEATER	FRN-50	FRN-25	FRN-15	FRN-15	FRS-10	FRS-8	FRS-6-1/4
7-1/2 KW HEATER			FRN-25	FRN-25	FRS-15	FRS-12	FRS-10
10 KW HEATER			FRN-30	FRN-30	FRS-25	FRS-17-1/2	FRS-12
15 KW HEATER			FRN-45	FRN-45	FRS-35	FRS-25	FRS-20

CONTROL CIRCUIT XFMR VOLTAGE	1/2 KVA.	1 KVA	1-1/2 KVA	2 KVA
110-120	FRN-7	FRN-15	FRN-17-1/2	FRN-25
200-208	FRN-4	FRN-8	FRN-12	FRN-15
220-240	FRN-3-1/2	FRN-7	FRN-10	FRN-12
346-416	FRS-2-8/10	FRS-4	FRS-6-1/4	FRS-8
440-480	FRS-2-1/2	FRS-3-1/2	FRS-5-6/10	FRS-7
550-600	FRS-2	FRS-3-1/2	FRS-4-1/2	FRS-5-6/10
SECONDARY FUSE	FRN-5-6/10	FRN-12	FRN-15	FRN-20

CONSULT CLEAVER-BROOKS ELECTRICAL ENGINEERING DEPT. FOR "FUSETRON" FUSE SIZE FOR POWER SYSTEMS WITH VOLTAGE, FREQUENCY OR PHASE NOT MENTIONED ABOVE.

FIGURE 8-3. **Recommended Maximum "Fusetron" Fuse Sizes**

Thermal relay units (overloads) are of the melting-alloy type and, when tripped, the alloy must be given time to re-solidify before relay can be reset. IF the overloads trip out repeatedly when the motor current is normal, replace them with new overloads. If the condition continues after replacement, it will be necessary to determine the cause of excessive current draw at the overloads.

Power supply to the boiler must be protected with dual element fuses (fusetrons) or circuit breakers. Similar fuses should be used in branch circuits. Standard one-shot fuses are not recommended. Refer to the chart in Figure 8-2 for fuse requirement guidance.

8.6 — Flame Safety Control

The microprocessor based control requires minimal maintenance because the safety and logic timings are inaccessible. There also are not any accessible contacts. Check to see that the retaining screw is securely holding the chassis to the mounting base. Also check to see that the amplifier and the program module are tightly inserted.

The relay's self-diagnostic ability includes advising when it or its plug-in modules are at fault and require replacement.

Your spare control should be stored in a dry atmosphere and wrapped in plastic. During an extended shutdown (e.g., seasonal) the active control should be removed and stored. Moisture can cause problems with control operation.

It is recommended that service be rotated between the active and a spare control to assure a working replacement is available.

⚠ Warning

When replacing a control, be sure to lock out the main power supply switch since the control is "hot" even though the burner switch is off. Failure to follow these instructions could result in serious injury or death.

Be sure the connecting contacts on the control and its base are not bent out of position.

The flame detector lens should be cleaned as often as operating conditions demand. Use a soft cloth moistened with detergent to clean the lens.

A safety check procedure should be established to test the complete safeguard system at least once a month, or more often. Tests should verify safety shutdown and a safety lockout upon failure to ignite the pilot, upon failure to ignite the main flame, and upon loss of flame. Each of the conditions should be checked on a scheduled basis.

The following tests should be used to test the complete safeguard system. If the sequence of events is not as described, then a problem may exist. Contact your local Cleaver-Brooks authorized representative for assistance.

8.6.1 — Checking Pilot Flame Failure

1. Close the gas pilot shutoff cock and shut off the main fuel supply.
2. Turn the burner switch "on."

   The pilot ignition circuit will be energized at the end of the pre-purge period. There should be an ignition spark, but no flame. Since there is no flame to be detected, the program relay will signal the condition. The ignition circuit will de-energize and the control will lock out on a safety shutdown. The flame failure light (and optional alarm) will be activated. The blower motor will run through the post-purge and stop.
3. Turn the burner switch "off."
4. Reset the safety switch.
5. Re-open the gas pilot shutoff cock and re-establish main fuel supply.

8.6.2 — Checking Failure to Light Main Flame

1. Leave the gas pilot shutoff cock open.
2. Shut off the main burner fuel supply.
3. Turn the burner switch "on."

   The pilot will light upon completion of the pre-purge period. The main fuel valve(s) will be energized, but there should be no main flame.

   The fuel valve(s) de-energize within 4 seconds after the main burner ignition trial ends. The control will lock out on a safety shutdown. The flame failure light (and optional alarm) will be activated. The blower motor will run through the post-purge and stop.
4. Turn the burner switch "off."
5. Reset the safety switch.
6. Re-establish main fuel supply.

8.6.3 — Checking Loss of Flame

1. With the burner in normal operation, shut off the main burner fuel supply to extinguish main flame.

   The fuel valve(s) will be de-energized and the relay will signal the condition within 4 seconds. The control will then lock out on a safety shutdown. The flame failure light (and optional alarm) will be activated. The blower motor will run through the post-purge and stop.
2. Turn the burner switch "off."
3. Reset the safety switch.
4. Re-establish main fuel supply.
5. The flame detector lens should be cleaned as often as operating conditions demand. Use a soft cloth moistened with detergent, if necessary.

8.7 — Oil Burner Maintenance

The burner should be inspected for evidence of damage due to improperly adjusted combustion. Any soot buildup on the diffuser or the oil nozzle should be removed. The setting of the oil nozzle in relation to the diffuser and other components is important for proper firing and should be checked.

8.7.1 — Oil Strainers

Oil strainers should be cleaned frequently to maintain a free and full flow of fuel.

8.7.2 — Light Oil Strainers

The fuel oil strainer screen must be removed and cleaned at regular intervals. It is advisable to remove the screen each month and clean thoroughly by immersing it in solvent and blowing it dry with compressed air. To remove:

1. Loosen the cover cap screw, being careful not to lose the copper gasket. If necessary, tap the strainer cover gently to loosen.
2. Check the cover gasket for damage and replace if necessary.
3. Slip pliers into the cross on the top of the strainer and twist counterclockwise to remove the basket.

4. Reassemble in reverse order.

8.7.3 — Heavy Oil Strainers

Keep the cartridge of the oil strainer clear by regularly giving the exterior handle one complete turn in either direction. Do this often until experience indicates the frequency of cleaning necessary to maintain optimum condition of flow. If the handle turns hard, rotate the handle back and forward until it can be turned through a complete revolution. Do not force it with a wrench or other tool.

Drain the sump as often until experience indicates the draining frequency necessary to maintain optimum condition. Remove the sump, or the head and cartridge assembly, for thorough cleaning and inspection at frequent intervals. Exercise care not to damage the cartridge discs or the cleaner blades. Wash the cartridge in solvents. Do not attempt to disassemble the cartridge.

8.7.4 — Cleaning the Oil Nozzle

The design of the burner, together with the oil purge system on a heavy oil burner, make it unnecessary to clean the oil nozzle during periods of operation. A routine check and any necessary cleaning should be made during off periods or when the burner is firing on gas.

If at any time the burner flame appears "stringy" or "lazy," it is possible that the nozzle tip or swirler has become partially clogged or worn. Any blockage within the tip will cause the air pressure gauge to increase above its normal value.

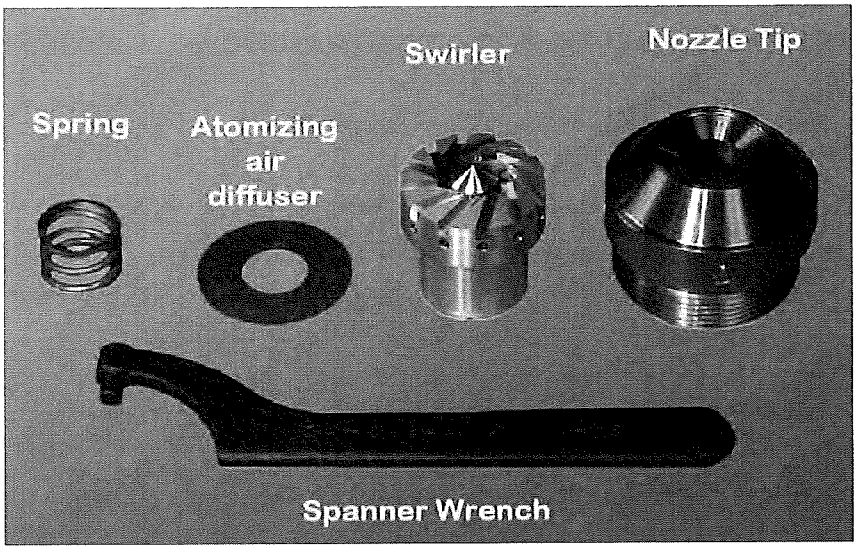

FIGURE 8-4. Standard Burner Nozzle Components

Disassemble with the power off:

1. Unlatch and withdraw the burner gun.
2. Insert the nozzle body into the hanger vise and use the spanner wrench to remove the tip.
3. Carefully remove the swirler and seating spring being careful not to drop or damage any parts.

4. Perform any necessary cleaning with a suitable solvent. Take the necessary precautions when working with solvents. Use a soft fiber brush or pointed piece of soft wood for cleaning. Do not use wire or a sharp metallic object, which could scratch or deform the orifices as well as the precision ground surfaces of the swirler and tip.
5. Inspect for scratches or signs of wear or erosion, which may make the nozzle unfit for further use.

   The tip and swirler are a matched set, which are precision lapped at the time of assembly. The close fit of the lapped surfaces must be maintained in order to provide optimum performance. Additional lapping may be required to provide better atomization for more efficient combustion. Do not interchange parts if a spare is kept.
6. In reassembling, be certain that the seating spring is in place and that it is holding the swirler tightly against the tip. The swirler is stationary and does not rotate, but rather imparts a swirling motion to the oil.
7. See that the plugged hole is at the bottom of the nozzle body when the gun is installed.

8.7.5 — Cleaning Air Purge Nozzle (No. 6 Oil) and Back Pressure Orifice Nozzle (No. 2 Oil)

The air purge nozzle and its strainer should be inspected periodically and cleaned. The nozzle consists of a tip and internal core.

1. Clean all internal surfaces of the tip and the slotted parts of the core using a wood splinter to avoid damage from scratching.
2. Replace the core, setting it tightly but not excessively so.
3. Clean the strainer screen carefully to remove any foreign matter. Use suitable solvents for cleaning. Extremely hot water at high velocity is also helpful in cleaning.
4. Replace strainer by screwing it into the nozzle body only finger tight. Do not use an orifice of a size other than originally installed.

8.7.6 — Ignition System

For best results, maintain the proper gap and dimensions of the ignition electrode(s).

1. Inspect the electrode tip for signs of pitting or combustion deposits and dress as required with a fine file.
2. Inspect the porcelain insulator(s) for any cracks that might be present. If cracks are present, replace the electrode since cracks in the insulator can cause grounding of the ignition voltage.
3. Wipe the insulating portion of the electrode(s) clean of any carbon, if present. Carbon is an electrical conductor. Ammonia will aid in removing carbon and soot.
4. Check the ignition cables for cracks in the insulation.
5. Check to see that all connections between the transformer and the electrodes are tight.
6. Periodically remove the access plug from the gas pilot aspirator and clean out any accumulated lint or other foreign material.

8.8 — Gas Burner Maintenance

The gas burner components should be inspected for evidence of damage due to improperly adjusted combustion. Combustion adjustments should be checked monthly.

Check periodically for a proper seal between the end of the burner housing and boiler refractory. Any deterioration of the seal should be corrected, as an improper or poor seal allows air leaks, which can cause overheating or burning of the burner housing.

Whenever the burner is removed, the diffuser, gas housing and gas spuds (HTB model only) should be checked for any deterioration. Verify that the diffuser skirt conforms to the bore of the burner housing so as to minimize the amount of combustion air which bypasses the diffuser. If the burner is a high turndown burner (HTB) model, check to see that the diffuser is properly located in reference to the gas spuds. There should be 1/4" between the edge of the diffuser fins and the gas spuds when the burner is installed. Check to see that the diffuser fins don not interfere with the gas ports or gas spuds in the burner housing.

Check the electrode setting for any cracks that might be present on the porcelain insulator. Replace the electrode if cracking is evident, since cracking can cause grounding of the ignition voltage. Inspect the tip of the electrode for signs of pitting, combustion deposits, and wear, and dress as required with a fine file.

Periodically remove the access plug from the gas pilot aspirator and clean out any accumulated lint or other foreign material.

Check the ignition cables for cracks in the insulation. Verify that all connections between the transformer and the electrode are tight.

8.9 — Motorized Gas Valve

The motorized gas valve (hydramotor) operating mechanism is completely immersed in oil and little maintenance is required because of the sealed design. However, proper operation should be checked on a routine periodic basis.

Keep outer parts of the valve clean, especially the stem between the operator and the valve. A nicked, scored or otherwise damaged valve stem can cause leakage. Do not remove dust covers if installed.

The packing gland is of the O-ring type. If oil is noticed around the operator base or if leakage occurs, repair by replacing any leaking O-rings and refilling the actuator with oil.

If the actuator is sluggish or fails to operate, even after the oil level is checked, replace the entire operator portion.

8.10 — Solenoid Valves

Foreign matter between the valve seat and seat disc can cause leakage. Valves are readily disassembled, however, care must be used during disassembly to be sure that internal parts are not damaged during the removal and that reassembly is in proper order.

A low hum or buzzing will normally be audible when the coil is energized. If the valve develops a loud buzzing or chattering noise, check for proper voltage and clean the plunger assembly and interior plunger tube thoroughly. Do not use any oil. Be sure that the plunger tube and solenoid are tight when reassembled. Take care not to nick, dent, or damage the plunger tube.

Coils may be replaced without removing the valve from the line.

⚠ Warning

Be sure to turn off power to the valve in order to avoid electrical shock. Failure to follow these instructions could result in serious injury or death.

Check coil position and make sure that any insulating washers or retaining springs are reinstalled in proper order.

8.11 — Air Control Damper, Linkage, and Cam Spring

The burner air control damper should be checked for free movement as a part of the monthly inspection. With the burner off and the jackshaft damper control rod disconnected, the air control damper should rotate freely through its entire range of movement. Any resistance to movement or excessive play in the support bearing should be investigated and corrected before the burner is put back in operation.

The overall tightness of the linkage assembly should be checked monthly. If necessary, tighten the setscrews and the connections at the uniballs. Check the uniballs for wear and replace if necessary.

The linkage assembly should be tight but should not bind. If the linkage assembly is binding, determine the cause of the binding and correct as necessary.

Linkage rod end attachment points should be marked on the variable displacement linkage arms as an aid in subsequent reassembly.

Inspection of the air damper and linkage bearings should be performed on a more frequent basis if the boiler is operating in a dirty environment.

The fuel cam profile spring should be inspected monthly for wear, scoring or distortion. If any of the questionable conditions are found, the spring must be replaced immediately to avoid the possibility of breakage in service. Use care to avoid damaging the cam or spring during installation.

Lubricate occasionally with a non-gumming, dripless, high-temperature lubricant such as graphite or a silicone derivative.

⚠ Caution

Combustion should be checked and readjusted whenever the burner is removed or any control linkage is disturbed. Failure to follow these instructions could result in equipment damage.

8.12 — Forced Draft Fan

The position of the fan housing and the clearance between it and the fan (impeller) is extremely important to the output capacity of the fan.

To install and adjust:

1. Bolt the motor securely to the head.
2. Slide the fan onto the shaft, but do not tighten the setscrews.
3. Turn the spacers on the studs until they contact the headplate.
4. Place external tooth lockwashers next to the spacers and install the fan housing on the studs.
5. Hold the fan housing in place with nuts and lockwashers. Tighten the nuts by hand.
6. Slide the impeller outward until its vanes contact the fan housing. The housing must be parallel to the impeller. Adjust the spacers as necessary to align the housing with the impeller.
7. Slide the impeller toward the motor. Use a feeler gauge to obtain a .030" - .050" clearance between the impeller and the housing.
8. Secure the key and then tighten the impeller hub setscrews.
9. Using a selected vane, rotate the impeller while checking to see that the clearance between the impeller and the housing remains constant and within the specified .030" - .050" clearance.
10. Install the air duct assembly through the head opening. Tighten the screws securing the air duct to the fan housing only enough to create a seal between the neoprene gasket and the housing.
11. After connecting the motor leads, verify that the impeller rotation is counterclockwise when viewed from the motor end.

NOTE: If the boiler is installed in a dusty location, check the vanes occasionally for deposits of dust or dirt. These buildups can cause a decrease in air capacity, or lead to an unbalanced condition or cause damage to the equipment.

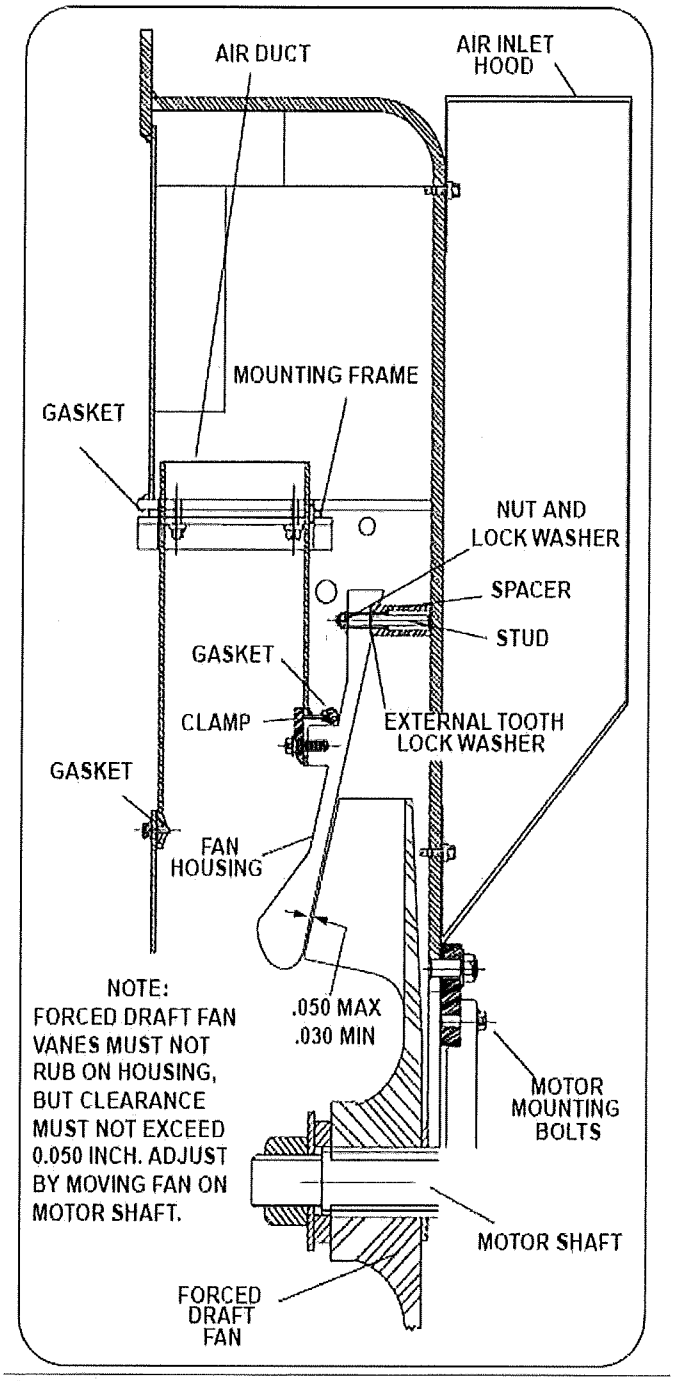

FIGURE 8-5. Forced Draft Fan Mounting

8.13 — Fan/Motor Cassette Removal

Before the boiler is commissioned at the job site, the IFGR system should be visually inspected. The fan/motor cassette should be removed to expose the internal IFGR linkage and damper. To remove the fan/motor:

⚠ Warning

Disconnect and lock out electrical power to the boiler before removing the fan/motor cassette. Failure to follow these instructions could result in serious injury or death.

1. Disconnect and lock out electric power to the boiler.
2. Ensure the front door is securely bolted to the boiler.

⚠ Warning

Do not remove the davit arm assembly without first ensuring that the front door is securely bolted to the boiler. Failure to follow these instructions could result in serious injury or death.

3. Release the davit arm by removing the retaining bolt at the top center of the boiler.

⚠ Warning

When suspending the fan/motor cassette from the davit arm, all equipment used must be of adequate strength to safely support the complete cassette. Failure to follow these instructions could result in serious injury or death.

4. Connect the davit arm to the fan/motor cassette using the suspension system.

⚠ Warning

Chains or other devices used to attach a lifting device to the fan/motor cassette must be arranged so the cassette does not rotate or tilt when removed from the front head. Failure to follow these instructions could result in serious injury or death.

5. Arrange the attaching chains so the lifting point is over the motor shaft centerline and the center of balance for the fan/motor cassette. This point is approximately 4 inches from the motor backplate for 600 - 800 hp units, and 3 inches for 250 - 500 hp units.
6. Remove the fan/motor cassette fastening nuts.
7. Swing the fan/motor cassette to the side and secure it to the boiler using high strength cord. Do not over extend the motor wires.

⚠ Caution

Be sure that the fan motor wiring and conduit are not stretched during the fan/motor cassette removal. Failure to follow these instructions could result in equipment damage.

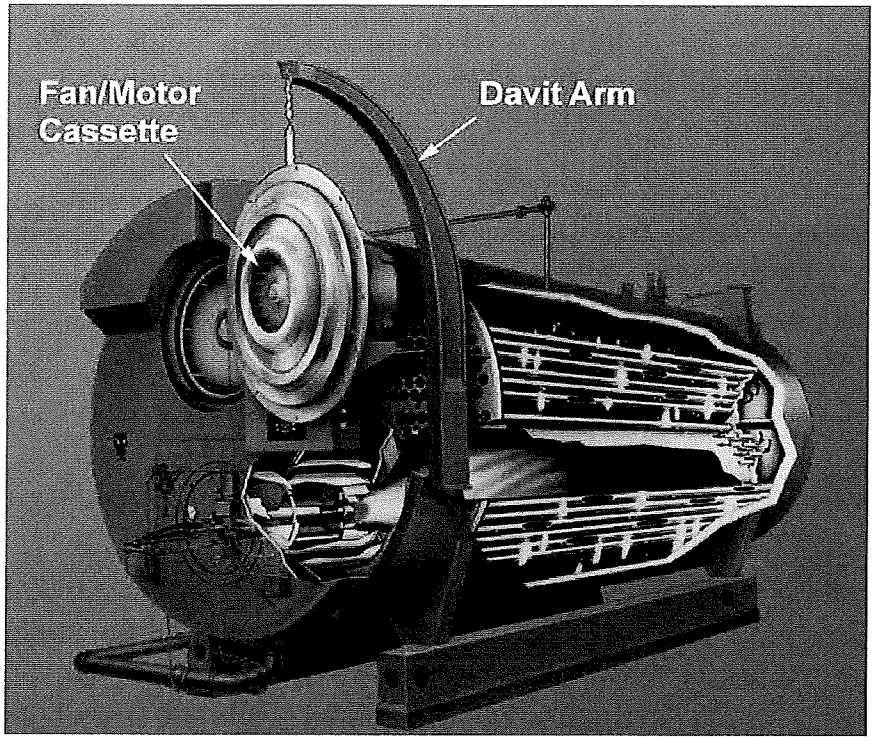

FIGURE 8-6. **Fan/Motor Cassette Removal**

8.14 — Inspection and Adjustment

NOx levels should be checked periodically to ensure compliance with all local and federal regulations, as well as to ensure that the boiler is operating at maximum efficiency. Linkages should be inspected and free movement (no binding) of the IFGR damper confirmed.

Increasing or decreasing NOx levels could indicate incorrect damper positioning, loose linkages, an improper air-to-fuel ratio, or stack draft changes. If adjustment is required, or if problems persist, contact your local Cleaver-Brooks authorized representative for further assistance.

As ash and products of combustion pass through the IFGR damper, there will be some accumulation on the damper, windbox, and other parts of the IFGR system and burner.

To ensure proper operation of the IFGR system and burner, inspection and cleaning should be performed at regular intervals, depending on the load, type of fuel, and combustion temperatures.

1. With the IFGR damper exposed, inspect the internal linkages for secure connections, and check for free movement of the linkage arms and the IFGR damper assembly. Check for free movement of the linkage by separating the external linkage from the jackshaft drive arm(s) and cycling the exterior linkage through its range of movement.

2. Check the clearance between the impeller and backplate (see Figure 8-6). Adjust, if necessary.

Standard 60 PPM	30 PPM 25 PPM	20 PPM
.040 ± .010	.050 + .010/-.005	.060 + .005/-.000

FIGURE 8-7. Impeller Clearances

3. The impeller clearance is checked by inserting a long feeler gauge of the proper thickness between the impeller and the impeller housing. Impeller clearances should be checked at the highest fin on the impeller (that fin which is closest to the impeller housing), and must be checked at each point where the housing is attached to the motor backplate.
4. If the impeller clearance is not correct at all points, adjust as necessary:
   A. Loosen retaining nuts on both sides of the impeller housing.
   B. Adjust retainers for the correct impeller clearance at two housing attachment points 180° apart.
   C. Adjust retainers for correct clearance at the housing attachment points 90° from those initially adjusted.
   D. Adjust for correct impeller clearance at the remaining attachment points.
5. Check and replace any gaskets that have been damaged. Gaskets that have been in use for one year or more should be replaced. In particular, inspect the airbox gasket for damage and replace if necessary.

8.15 — Airbox Gasket Installation

If the fan/motor cassette is opened for any reason after the unit has been in operation for one year, the airbox gasket should be replaced.

⚠ Caution

When replacing the airbox gasket, use only Cleaver-Brooks components. Failure to use components designed for this application can result in improper combustion. Failure to follow these instructions could result in equipment damage.

Attach the airbox gasket to the inlet box with high-temperature silicone adhesive/sealant, using two beads of silicone about 1/4" in from each side of the gasket (gasket surface is 2" wide).

1. Secure the gasket in position with clamps, using strips of wood on top of the gasket for a bearing surface.
2. After the silicone has dried (approximately 24 hours), remove the clamps and strips of wood.

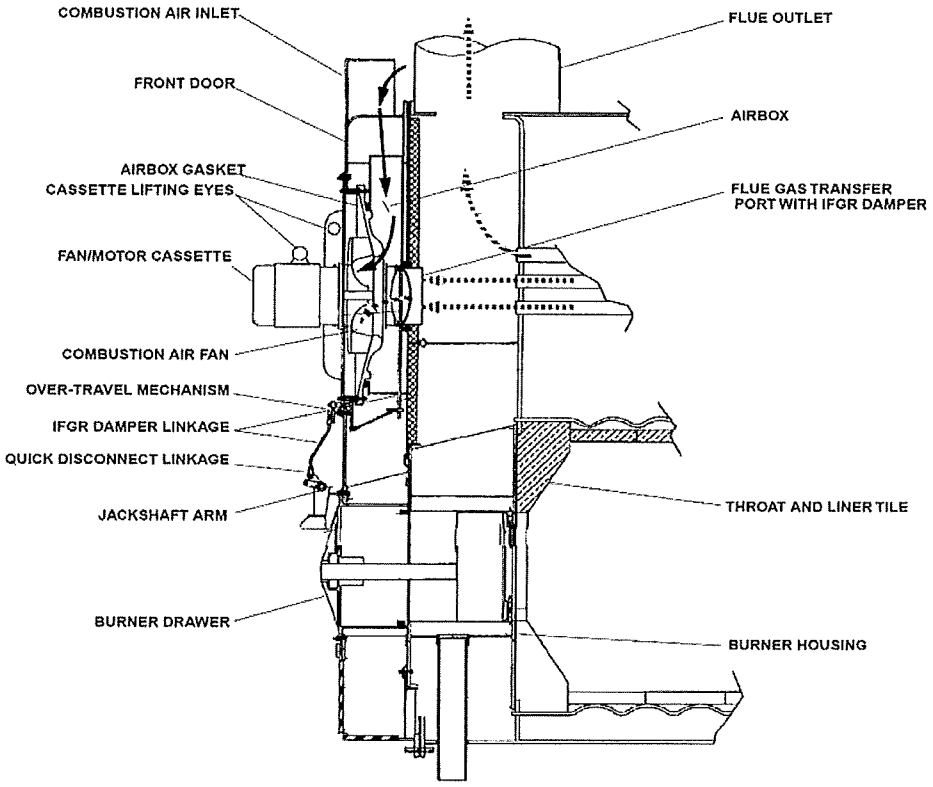

FIGURE 8-8. **Induced Flue Gas Recirculation System (IFGR)**

8.16 — Fan/Motor Cassette Installation

To close the fan/motor cassette:

1. Check that all adjustment screws are tight, and check the linkage and IFGR damper for free movement before closing the unit.
2. Position the cassette into the front door.
3. Slide the cassette into position until it begins to contact the inlet gasket, then measure the clearance between the cassette flange and the front door mounting face. There must be clearance of at least 1/4" to provide adequate gasket compression when the cassette is mounted tightly to the door.
4. Secure the cassette with the fastening nuts.

⚠ Warning

Do not remove the davit arm assembly from the motor/fan cassette without first verifying that the cassette is securely bolted to the boiler. Failure to follow these instructions could result in serious injury or death.

5. After the cassette has been secured to the front head, reconnect the davit to the front door by screwing in the retaining bolt at the top centerline.

6. Check occasionally that the fan is securely tightened to the motor shaft. Check the clearance between the fan vanes and housing.

8.17 — Safety Valves

The safety valve is a very important safety device and deserves attention accordingly.

Follow the recommendations of your boiler inspector regarding valve inspection and testing. The frequency of testing, either by the use of the lifting lever or by raising the steam pressure, should be based on the recommendation of your boiler inspector and/or the valve manufacturer, and in accordance with sections VI and VII of the ASME Boiler and Pressure Vessel Code.

Avoid excessive operation of the safety valve — even one opening can provide a means of leakage. Safety valves should be operated only often enough to assure that they ar in good working order. When a pop test is required, raise the operating pressure to the set pressure of the safety valve, allowing it to open and reseat as it would in normal service.

Do not hand operate the valve with less than 75% of the stamped set pressure exerted on the underside of the disc. When hand operating, be sure to hold the valve in an open position long enough to purge accumulated foreign material from the seat area and then allow the valve to snap shut.

Frequent usage of the safety valve will cause the seat and disc to become wire drawn or steam cut. This will cause the valve to leak and necessitate downtime of the boiler for valve repair or replacement. Repair of a valve must be done only by the manufacturer or his authorized representative.

Avoid having the operating pressure too near the safety valve set pressure. A 10% differential is recommended. An even greater differential is desirable and will assure better seat tightness and valve longevity.

8.18 — Fuel Oil Metering Valve, Adjusting, and Relief Valves

In the event that a leak occurs in the packing of the metering valve, the packing nut should be snugged gradually to stop the leak.

⚠ Caution

Do not over tighten the metering valve packing nut. Excessive tightening of the packing nut prevents free movement of the metering stem. Failure to follow these instructions could result in equipment damage.

If replacement of the metering valve packing is necessary, procure kit P/N 880-370 and install:

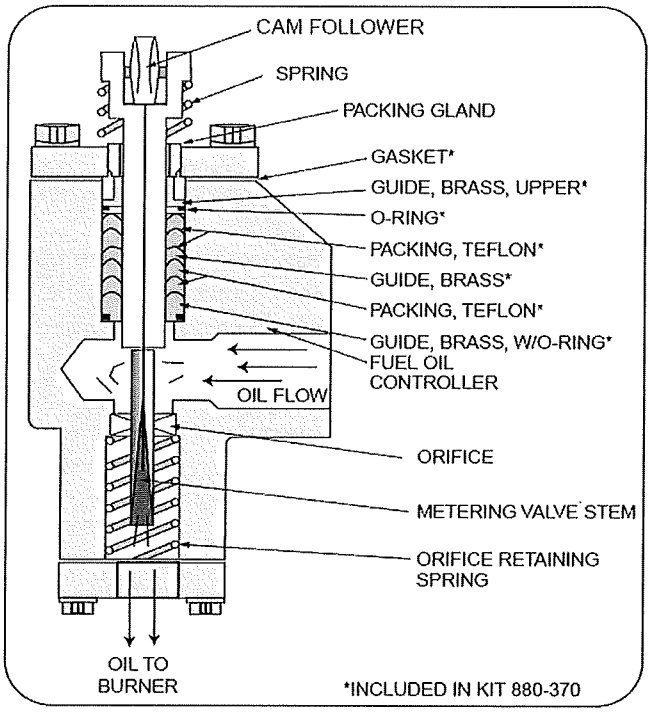

FIGURE 8-9. Metering Valve Packing Sequence

1. Shut off the oil flow. Be sure no pressure shows on the gauge.
2. Match-mark the cam hub and drive shaft. Match-marking will enable replacement of the cam in its original position and result in a minimum of cam adjustment when the burner is refired.
3. Clamp or hold the metering stem in the down position.
4. Loosen the setscrews in the cam hub and rotate, or move the cam to a position where it does not interfere with stem removal.
5. Withdraw the metering valve stem and spring. Do not drop or mishandle. Check for nicks or scratches. Check that the pin holding the metering portion is not protruding. Back off the packing gland.
6. Remove the capscrews holding the jackshaft support bracket so that the bracket can be moved. It may also be necessary to loosen the supporting bracket on the far end of the shaft.
7. Remove the existing packing and guides. Do not reuse the packing and guides.
8. Lightly coat the stem with the lubricant provided with the packing kit. Place the new packing, O-rings and guides onto the stem in the sequence shown in Figure 8-8. The beveled face of the guides and the teflon rings must face upward, with the exception of the upper brass guide which is facing down. Be sure that the O-rings are properly located.
9. Using the stem as a guide, insert the assembled packing into the cavity, then withdraw the stem.
10. In the event the packing is too high, remove one teflon packing from each side of the middle brass guide as needed.

    Under no circumstance eliminate the two teflon packings on only one side of the brass guide.

11. Replace the gasket, put the support in place, and secure all fastenings.
12. Replace the metering stem and spring. Lightly lubricate the stem to facilitate insertion and easy movement. Use care when inserting so that the orifice and the stem are not damaged.
13. Snug the packing gland, but only sufficiently to place slight tension on the packing. The stem must move freely from the force of the spring.
14. Work the stem up and down several times to ensure that it moves freely.
15. Depress the valve stem and replace the cam. Mate the match-marks and secure the setscrews. Be sure the cam spring is centered in the roller.
16. Restore oil flow. Test fire the burner at various firing rates being certain that the metering stem freely follows the cam.
17. Tighten the packing gland after a period of operation, if necessary, to maintain proper tension on the packing. Do not over tighten.

If there are indications that the oil metering valve has become clogged at its orifice, it will be necessary to disassemble the control to remove the obstruction. Clean the slotted stem of the oil metering valve with suitable solvent and blow-dry with an air line. Follow the procedure outlined above when removing or reinstalling the metering valve stem. Also check all fuel line strainers.

Should a pressure adjusting or relief valve become clogged, disassemble by releasing the locknut and backing off the screw to relieve tension on the diaphragm. Remove the valve cover and the diaphragm to expose any dirt or foreign material which may have entered the valves. The diaphragms should be replaced annually.

8.19 — Air Pump and Lubricating System

8.19.1 — Air Compressor

The air pump requires little maintenance. However, the life of the pump is dependent upon a sufficient supply of clean cool lubricating oil. The oil level in the air-oil tank must be observed closely. Lack of oil will damage the pump making replacement necessary. Disassembly or field repairs to the pump are not recommended.

8.19.2 — Lubricating Oil

Lubricating oil must be visible in the gauge glass at all times. There is no specific level required as long as oil is visible. Do not operate if oil is not visible.

Oil with proper viscosity must be used. SAE 20 detergent is recommended, although SAE 10 detergent is also permissible.

When adding oil:

1. Remove the cover from the fill pipe and add oil through the conical strainer in the pipe with the unit running.

⚠ Caution

Oil must NEVER be added unless the pump is in operation and the strainer screen is in place. Failure to follow these instructions could result in equipment damage.

The oil and its container should be clean. Although there is a strainer in the lube oil line, its purpose is to remove any unwanted materials rather than to act as a filter for unclean oil.

8.19.3 — Lubricating Oil Strainer and Cooling Coil

Air pressure from the pump forces lubricating oil from the tank through a cooling coil to the pump. The oil lubricates the pump bearings and also provides a seal and lubrication for the pump vanes.

The cooled oil flows to the pump through the strainer in the filler pipe. It is possible to visually verify oil flow during operation by removing the filler cap and checking the flow. If necessary, the strainer may be cleaned during operation.

In the event it is necessary to clean the strainer during operation, clean it an replace immediately. It can be cleaned by immersing in solvent and blowing it dry with compressed air. Do not operate without the strainer any longer than necessary, and never add new oil unless it is in place. A spare strainer basket can be obtained, if desired, and used on a rotating basis while the other is serviced.

8.19.4 — Air Cleaner

Never operate the air pump without the air cleaner in place. The cleaner itself must be periodically checked and its element flushed and cleaned semi-annually.

8.19.5 — Air-Oil Tank

Pads of steel wool are used in the air oil receiver tank as a filtering medium to separate the lube oil from the compressed air.

The pads play a very important role and should be replaced semi-annually. It is also important that a proper grade of steel wool be used. Only No. 3 coarse grade American steel wool or equivalent (CB919-124) should be used. Three pads are required. When replacing the wool:

1. Insert two pads into the cylinder.
2. Alternate the grain of the pads.
3. Install the spacer with its stub end toward the opening and fit one pad over the stub. Be careful not to overly compress the wool and be sure that it is fluffed out to fill all available space. Improper packing can cause high oil consumption.
4. After the last pad is in place, slip the retainer screen onto the cylinder.

5. Be sure to fit an O-ring gasket under the cover so that a tight seal is obtained.

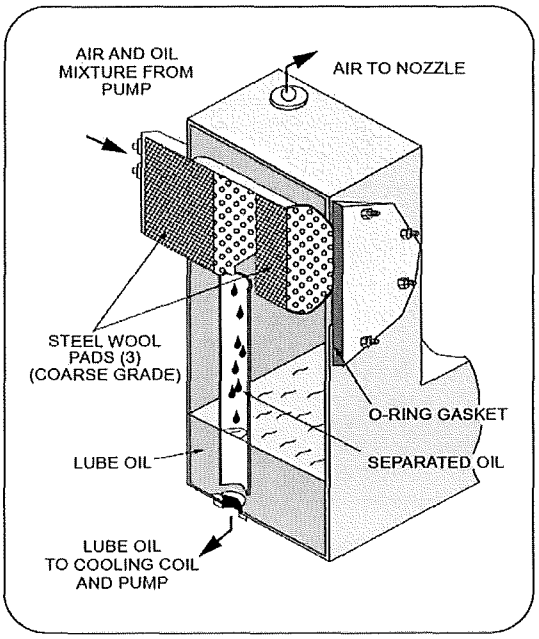

FIGURE 8-10. **Air Oil Receiver Tank**

8.19.6 — Lube Oil Cooling Coil

The fins on the tubing must be kept clean and free of any dust or dirt that would resist air flow and cause overheating. Use an air hose to blow away debris. Internal cleaning of the tubes is seldom required if a good quality lube oil is used.

8.19.7 — Flexible Coupling Alignment

Alignment of the pump and motor through the flexible coupling is extremely important for trouble free operation. Check the coupling alignment semi-annually and replace the coupling insert as required. Keep the coupling guard in place.

The most commonly used tools for checking alignment are a small straightedge and a thickness gauge.

The coupling must be checked for both parallel (offset) alignment and angular (gap) alignment. Parallel misalignment exists when shaft axes are parallel but not concentric. Angular misalignment is the reverse situation — shaft axes concentric, but not parallel.

Checking parallel alignment, both horizontal and vertical can be accomplished, by laying a straightedge across the coupling halves and checking with a thickness gauge to obtain the amount of misalignment. The check should be done on the top of the coupling and at 90 degrees. A useful practice is to hold a flashlight behind the straightedge so that any gap can readily be seen.

Shim stock of appropriate thickness and area is then used under either the feet of the pump or the motor to establish parallel alignment. A tolerance of .008" is a permissible limit.

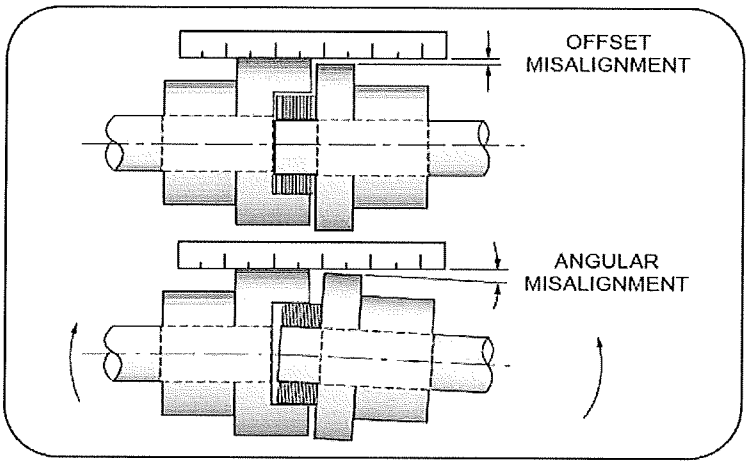

FIGURE 8-11. **Coupling Alignment**

After parallel alignment is established, check for angular alignment, which is done by checking the gap between the coupling halves. The coupling should have a minimum gap of 1/16" and a maximum of 3/32".

Set the spacing between the halves at one point by using a thickness gauge and then rotate the coupling slowly to be sure that clearance at that point remains the same through 360 degrees of rotation. Adjust to obtain proper gap by loosening the hold-down bolts and shifting either the pump or the motor as required. Generally, a slight tapping on either the front or rear legs is all that is needed to obtain lateral adjustment. Rear legs may require shimming for vertical correction.

Tighten the hold-down bolts after adjustments are made and recheck alignment.

Calipers can also be used to check angular alignment. Measure the overall distance of the outer ends of the coupling halves at 90° intervals. Shift the pump or motor, as required, so that the ends of the coupling are the same distance apart at all points. The coupling will then have proper angular alignment.

Remember that alignment in one direction may alter alignment in another. Recheck both angular and parallel alignment procedures after making any alteration.

A properly aligned coupling will last longer and will provide trouble free mechanical operation.

8.19.8 — Air Compressor Replacement

Use the following procedures when replacing the pump. Be sure to tag the motor leads if disconnected to simplify reconnection.

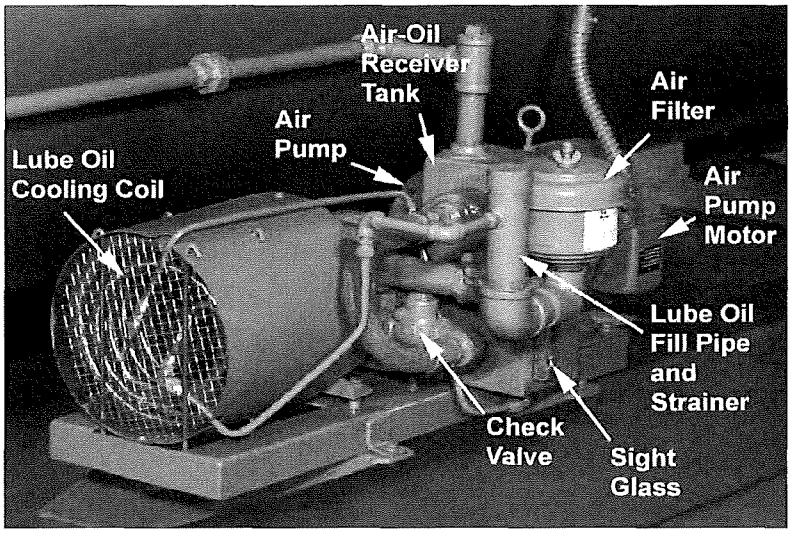

FIGURE 8-12. Air Compressor

8.19.8.1 — Dismantling

1. Lift out the two front cylinder pins that hold the screen and remove the screen.
2. Disconnect the flared nut on tubing (behind screen) and lift tubing high enough to prevent drainage of lubricating oil from the tank.
3. Disconnect the flared nut at the orifice fitting.
4. Remove the two sheet metal screws that hold the cylinder in place. One screw is located at the top rear of the cylinder, the other is at the bottom front.
5. Remove the entire heat exchange assembly, consisting of the cylinder, the finned tubing, and the oil line.
6. Remove the fan from the air pump.
7. Disconnect the flexible air line from the lube tank.
8. Remove the coupling guard by pushing in on both sides until it clears the clamp.
9. Loosen the clamp at the rear of the tank and remove the tank with copper tubing attached.
10. Leave the rear pump bracket (coupling end) in place to aid in realignment of the replacement pump. Do this by removing the two capscrews that extend through the bracket into the pump housing. Temporarily leave the front bracket attached to the pump.
11. Remove the screws holding the front bracket to the base and lift off the pump with its attachments. Note the location of the pipe fittings and brackets prior to removing for installation on the replacement pump. If piping is dismantled, be sure that the check valve is reinstalled so the gate swings towards the pump.

8.19.8.2 — Reassembly

Reassemble in reverse order of disassembly. With the rear pump bracket left in place, realignment and spacing between the pump shaft and the motor shaft is greatly simplified.

There should be approximately 7/8" space between the two shafts. Place the coupling insert between the coupling halves prior to reassembly. Check that both shafts rotate freely.

Refer to the previous section on coupling alignment instructions.

If shims were used originally under either pump brackets or motor feet, be sure that they are correctly reinstalled.

When reinstalling the fan, slide the hub on the pump shaft so that it is bottomed. Tighten the setscrew and cap screws. If the fan blades were removed from the hub, be sure that the side of the blade marked "Blower" faces the hub when reassembling. When tightening the coupling halves or the fan hub, tighten the setscrews against the key first, then tighten the setscrew against the shaft. Clean or remove any dust or grime from the blades prior to reinstalling.

When replacing the retainer screen, a slight force may be required to push the cooling coil into the air cylinder so that the pins may be fitted into place.

Be sure that all piping connections are tight.

If the motor was replaced or if motor leads were disconnected, be sure that pump rotation is proper before starting operation. The air pump should rotate in a clockwise direction, as viewed from the drive shaft end.

NOTE: Keep the motor and other components free from dust and dirt to prevent overheating and damage. Motor lubrication should follow manufacturer's recommendations.

8.20 — Refractory

The boiler is shipped with completely installed refractory. The refractory consists of the rear head, the inner door, and the furnace liner. Normal maintenance requires little time and expense, and prolongs the operating life of the refractory.

Preventive maintenance through periodic inspection will keep the operator informed of the condition of the refractory, and will guard against unexpected and unwanted downtime and major repairs.

Frequent wash coating of the refractory surfaces is recommended. High-temperature bonding, air-dry type mortar, diluted with water to the consistency of light cream, is used for wash coating. Re-coating intervals will vary with operating loads and are best determined by the operator when the boiler is opened for inspection.

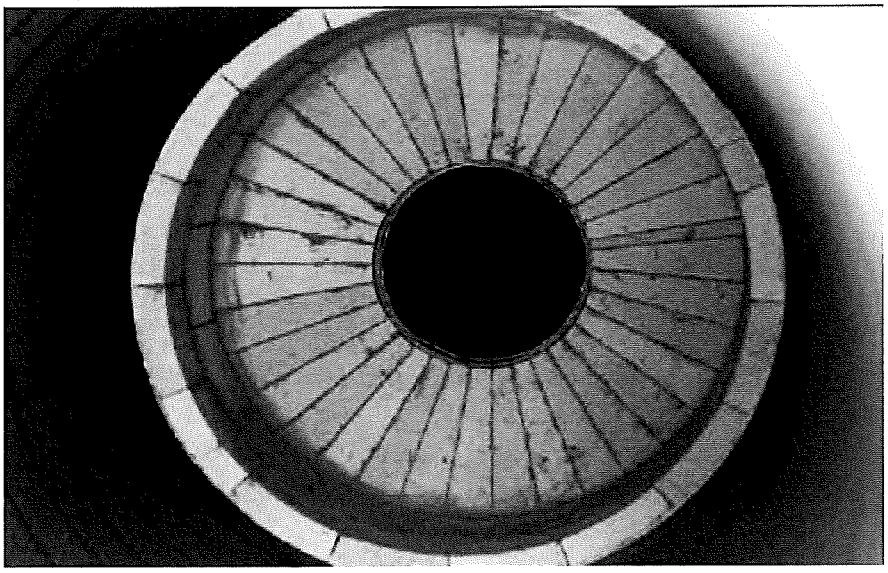

FIGURE 8-13. **Refractory Liner Tile**

8.20.1 — Furnace Liner

Maintenance consists of occasional wash coating of the entire liner. Face all joints or cracks by applying high temperature bonding mortar with a trowel or fingertips. Wash coating should be done as soon as cracks are detected.

Should segments of the liner burn away or fall out, replace the entire refractory. Any refractory that may break out should be removed as soon as detected so that it will not fuse to the bottom of the furnace and obstruct the flame.

If replacement is necessary, refer to Chapter 9 and order proper replacement materials. Remove existing refractory. Thoroughly clean the furnace to remove all old refractory cement or other foreign material to ensure the new liner seats firmly against the steel. Inspect the furnace metal.

Depending upon the design pressure of the boiler, the furnace may be of the corrugated type. It is necessary to fill in the corrugation valleys under the furnace liner tile from 4 o'clock to 8 o'clock with insulating cement. The liner tile should be fitted tightly against the crown of the corrugation.

NOTE: The area between the burner housing and the throat tile requires a good seal. An improper or poor seal allows air leaks that can cause overheating and burning of the burner housing metal. The area should be inspected semi-annually. Contact your local Cleaver-Brooks representative for information and service.

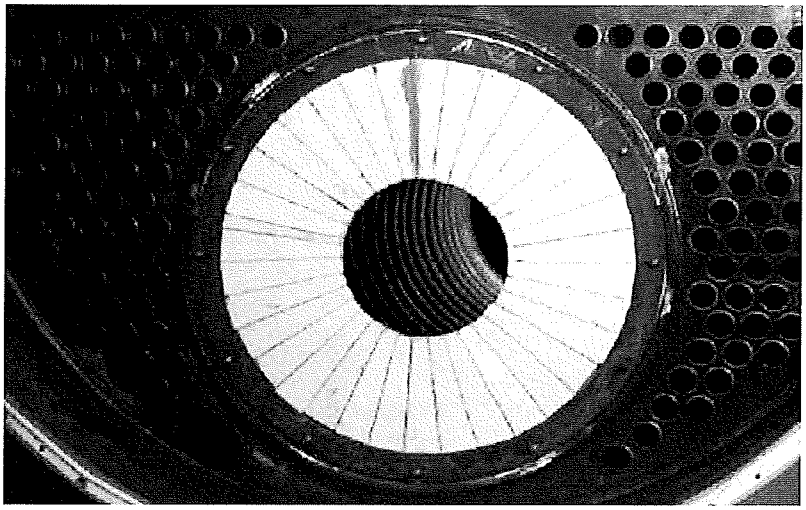

FIGURE 8-14. Refractory Throat Tile

8.20.2 — Throat Tile and Liner Installation

The throat tile must be installed to maintain an approximately 12" inside diameter, and be centered in the furnace. Since the thickness of the furnace metal varies with the boiler design pressure, a shim of appropriate thickness must be used to compensate for the variance. A layer or two of insulating board or equal, or a bed of refractory material, may be used to center the ring.

The liner tile can be fitted tightly against the furnace, since the finished diameter is not critical.

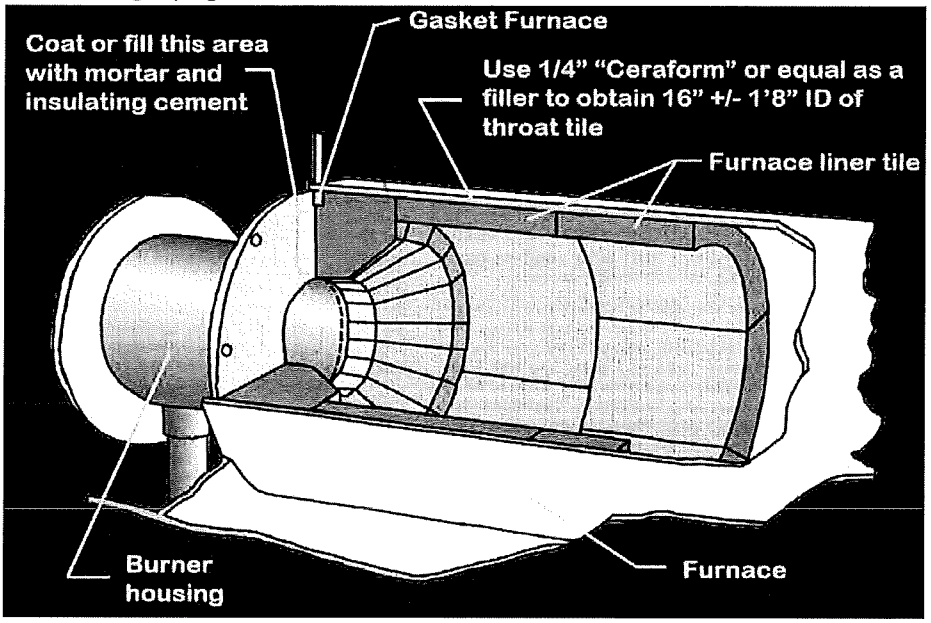

FIGURE 8-15. Furnace Liner Refractory

It is recommended that the tile be dry-fitted, match-marked, removed, and then reinstalled with the proper amount of refractory cement. Thin joints (less than 1/16") are desirable. Generally, it will be necessary to shave a portion from one or more tiles to obtain a fit. If a fill piece is required, cut it to fit and install the piece at the bottom of the furnace. When installing the housing, or the tile against the housing, liberally coat the surface with refractory cement. Remove any cement that is squeezed out.

Allow refractory to air dry as long as possible. If immediate use is required, fire intermittently at a low rate for several hours to thoroughly dry the refractory.

For detailed information, request Bulletin C10-5921 from your local Cleaver-Brooks representative.

8.20.3 — Installation

The following procedure is typical for all standard diameter boilers with the exception of steps 6, 7, and 8 which are not used for an 1.p. (plain furnace) boiler. Disregard these steps when working with 1.p. boilers.

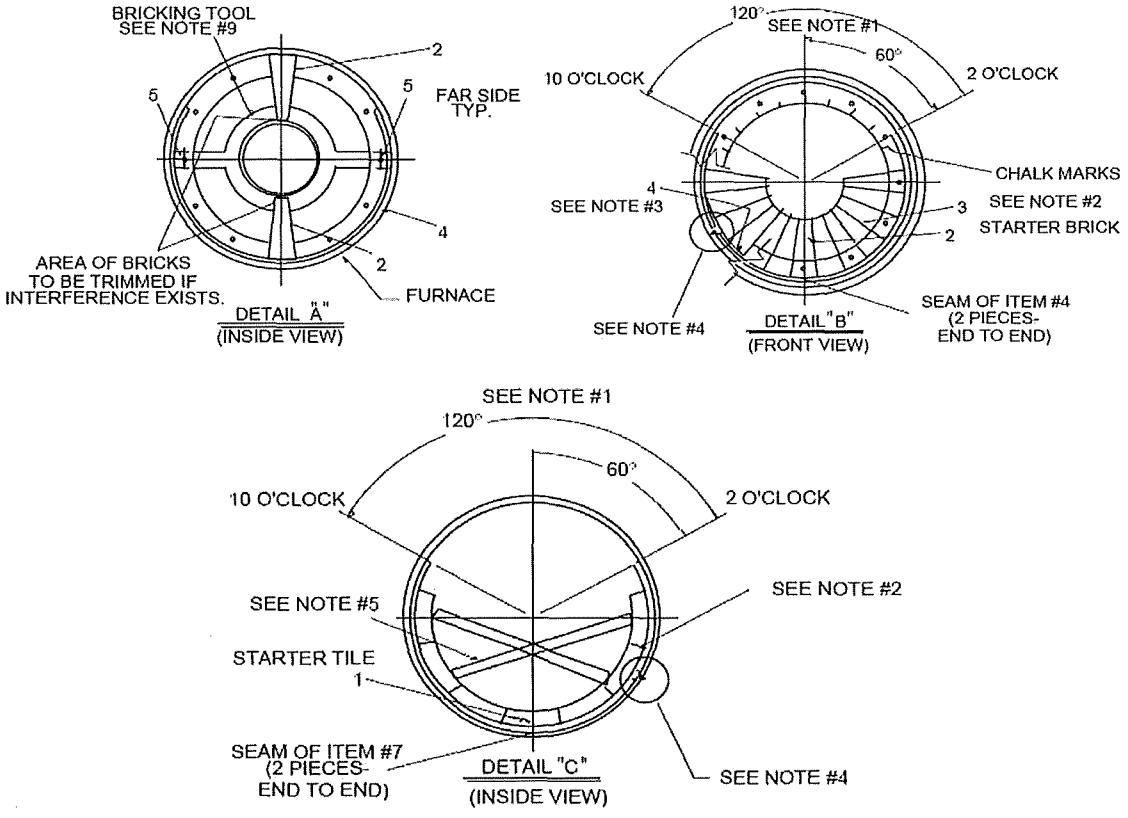

FIGURE 8-16. Throat Tile and Furnace Liner

1. Install studs, bricking tool, creafelt, bottom and top arch bricks as shown on "Detail A" to check for correct fit up. If interference is present at the arch brick, measure this distance and trim inside diameter (I.D.) of all bricks.

NOTE: The arch bricks must be trimmed to 12" on excessive pressures to maintain brick I.D.

2. Install the bottom half of arch bricks as shown on "Detail B."

3. Mix the vee block to a mortar-like consistency (per manufacturer's instructions) and pack the front valleys of the furnace corrugations with the mixture, flush with the furnace I.D. up to 3 o'clock and 9 o'clock from the centerline of the furnace. Install both pieces of cerafelt to insulate the tile from the corrugation and begin bottom half of first row of tiles as shown on "Detail C."
4. To begin top half of arch bricks and tiles, measure off upper half of furnace arch bricks and tiles with templates, mark with chalk, and determine if a cut brick or cut tile is needed (see "Detail B"). If a cut brick is required, locate it below the 2 o'clock and 10 o'clock positions. If the brick is cut, the angle of the cut surface should be the same as the original brick. If cut brick or tile measures less than 1/2 full width, cut two pieces.
5. Install bricking tool as shown on "Detail A" and continue installing upper half by alternating one arch brick and one corresponding tile.
6. For the last two rows of tiles, pack all remaining valleys of furnace corrugations (measure 36" from inside surface of arch bricks) with vee block mixture flush with furnace I.D. up to the 3 o'clock and 9 o'clock centerline of the furnace.
7. After joint cement hardens (approximately 2 hours), remove bricking tool, wooden tile supports, and discard cerafelt shims.

INSTALLATION NOTES:

1. No cerafelt, cut bricks, or cut tiles to be installed in the upper 120° section of the furnace. See "Detail A" and "Detail B."
2. Pack all bricks and tiles tightly with mallet and remove excess cement: 1/16" typical joint, 1/8" maximum.
3. No cement applied between cerafelt and bricks, tiles, or furnace. Only applied between bricks and tiles.
4. Do not cover furnace weld seam with cerafelt. cut and space to suit as shown on "Detail B" and "Detail C."
5. Support upper tiles with wooden boards to suit assembly. Two boards per tile as shown on "Detail C." (For 96" diameter, use 3/4" x 1-1/2" x 38". For 78" diameter, use 3/4" x 1-1/2" x 28".)
6. To insure tight fit and maximum I.S. of arch bricks, cut a 3" square piece of scrap cerafelt and use as a shim between bricking tool O.D. and I.D. of upper half of bricks.
7. Stagger cemented joints (seams) between all arch bricks and tiles.
8. After each half course of bricks or tiles installed, clean up excessive cement and fill open joint areas where necessary.
9. For 78" diameter boilers, use bricking tool #98-d-280 and fasten with two 1/2"-13 nuts. For 96" boilers, use bricking tool #98-d-279 and fasten with two 5/8"-11 nuts.

8.20.4 — Rear Door

The rear door is a steel shell lined with insulation material and castable refractory.

Burned or discolored paint on the outer surface of the door does not necessarily indicate refractory trouble, but may be an indication of other conditions such as:

- Leaking gaskets.
- Improper seal.
- Door retaining bolts insufficiently or unevenly tightened.
- The air line to the rear sight tube may be blocked or loose.
- Door was repainted with other than heat resistant paint.

Therefore, before assuming that the refractory requires reworking:

- Check the condition of the tadpole gasket and rope seal.
- Check for cracks in the castable refractory.
- Check the tightness of the door bolts.
- See that the air line to the sight tube is clear, and that the connections are tight. If necessary, blow the line clear with an air hose.

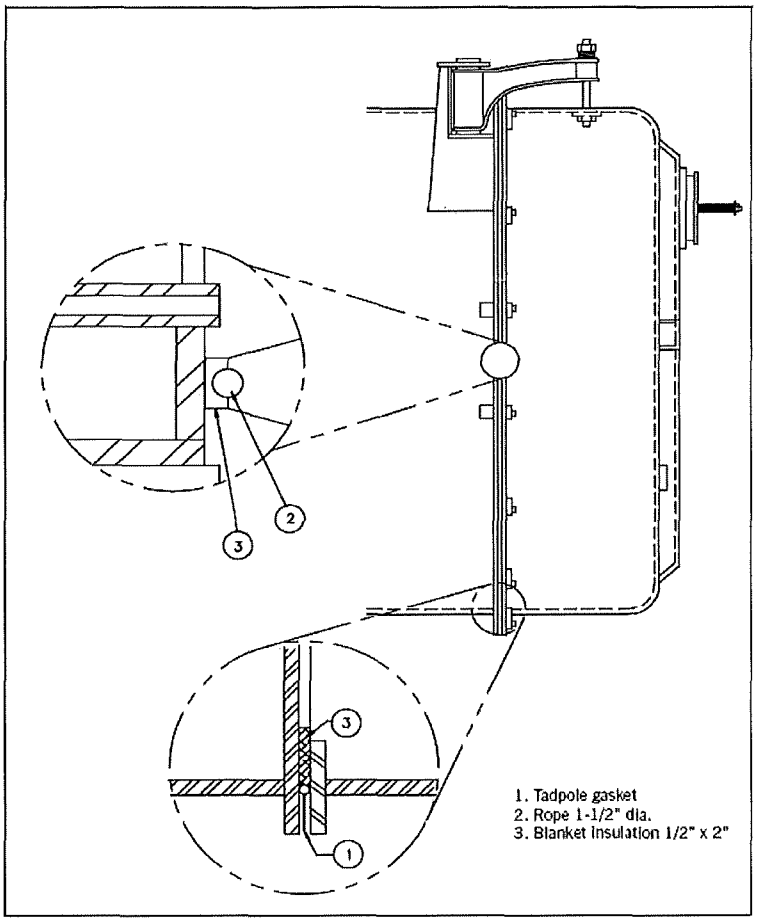

FIGURE 8-17. Rear Door Sealing

It is normal for refractories exposed to hot gasses to develop thin "hairline" cracks. This is not an indication of improper design or workmanship. Since refractory materials expand and contract with changes in temperature, they should be expected to show minor cracks due to contraction when examined at low temperatures. Cracks to approximately 1/8" across may be expected to close at high temperature. If there are any cracks that are relatively large (1/8" to 1/4" in width), clean and fill them with high-temperature bonding mortar. Any gap that may show between the castable refractory and the baffle tile should be filled in a similar manner.

After opening the rear door, clean the flange with a scraper or wire brush. Clean the surface of the refractory carefully with a fiber brush to avoid damaging the surface. Clean the mating surfaces of the baffle tile and the boiler shell. Remove all dried seating material. Wash-coat the lower half of the rear door refractory prior to closing.

The upper half of the door contains a lightweight insulating material, similar to that used in the inner door. A thin wash-coat mixture, applied gently with a brush, is helpful in maintaining a hard surface.

If the baffle tile or the refractory require replacement, contact your local Cleaver-Brooks authorized representative.

8.20.5 — Front Inner Door

The front inner door is lined with a lightweight castable insulation material. Thin "hairline" cracks may develop after a period of time. However, the cracks will generally close die to expansion when the boiler is fired.

A thin wash-coat mixture, applied gently with a brush, is helpful in maintaining a hard surface.

Minor repairs can be accomplished by enlarging or cutting out affected areas, being certain that they are clean, and then patching as required. Should the entire insulation require replacement, remove existing material and clean to bare metal. Inspect the retaining pins and replace if necessary. Reinforcing wire, suitably attached may also be used. The recommended insulation is "Vee Block Mix" and is available in 50 lb. bags (Cleaver-Brooks P/N 872-162).

Mix the material with water to a troweling consistency. Mixing should be completely uniform with no portion either wetter or drier than another. Trowel the mixture into any areas that are being patched. If replacing complete insulation, begin at the bottom of the door and apply the mixture to a thickness equal to the protecting shroud. With a trowel, apply horizontally back and forth across the door in layers until the required thickness is reached.

Allow to air-dry as long as possible. If immediate use of the boiler is required, fire as slowly as possible to avoid rapid drying of the material.

8.21 — Opening and Closing Rear Door

A good seal between the rear door and the pressure vessel is necessary to prevent leakage of combustion gasses, loss of heat, and to aid in obtaining operating efficiency. Leaks can also cause hot spots that can lead to premature refractory failure and/or damage to the door metal.

When opening the door, either for routine maintenance of for an annual inspection, do not do so when the boiler or the door is hot. The refractory will hold its temperature for some time and exposure to ambient temperature or rapid cooling may cause refractory cracking and/or harm to the boiler and door metal.

⚠ Warning

Be certain that the davit arm is under tension before opening. Failure to follow these instructions could result in serious injury or death.

Before loosening the door bolts, tighten the nut on the davit stud to ensure tension on the davit arm. Putting the davit arm under tension will help eliminate sagging, and will facilitate opening and closing.

The opened door should be supported by blocking or jacking to eliminate possible deformation of the door.

Prior to closing, check all gaskets and sealing surfaces. If the door gasket is hard or brittle, it should be replaced. The fiberglass ropes used for the baffle seal and for the door gasket seal should not be reused. The door flange and the tube sheet area of the baffle seal should be clean and free of old sealing material, scale, etc. Be sure that all of the gasket retaining fasteners are in place.

Remove the old rope and insulating cement from the baffle tile or refractory. Be careful not to chip or crack the refractory. The rope is placed in the groove of the monolithic design and on top of the lip of the tile baffle type construction.

Attach a new length of 1-1/4" diameter fiberglass rope (P/N 853-982) to the baffle. Be certain that it is properly positioned and use a rapid setting adhesive (P/N 872-481) to hold it in place.

NOTE: A boiler built for high pressure design, such as 150 psi or higher steam or for 60 psi or higher hot water, is constructed with a flanged tube sheet that fits inside the boiler shell and door flange.

The area between the curved portion of the sheet and the flange is packed with fiberglass rope and covered with cement to fill the void and to provide a smooth sealing area.

Replacement is not normally necessary, but, if it is, completely remove the old material. Firmly caulk a layer of 1/2" diameter rope (P/N 853-996) into the area. Tamp a second layer of 1" diameter rope (P/N 853-999) over the first layer. Apply a coating of insulating cement pulp (P/N 872-26) over the ropes to form a smooth surface. Allow the cement pulp to harden before closing the door.

8.21.1 — Closing and Sealing

Coat the door gasket with an oil and graphite mixture. Apply a small amount of a pulp mixture, consisting of P/N 872-26 cement and water around the inner circumference of the gasket. Press rope into this area. Use 1/2" diameter rope (P/N 853-996) for a boiler of low pressure design. Use 1" diameter rope (P/N 853-999) for a high pressure boiler.

After the rope is installed, the entire rope and gasket area, and the baffle area, should be liberally coated with the pulp mixture. When the door is closed, the pulp will compress to protect the tadpole gasket and form a seal between the refractory surface and the tube sheet.

Door bolts should be run in snug and tightened evenly to avoid cocking the door and damaging the gasket. Start tightening at top center and alternate between the top and bottom bolts until both are tight. Do not over tighten. Tighten alternate bolts until the door is secured and gas tight. After the boiler is back in operation, retighten the bolts to compensate for any expansion. Loosen the nut on the davit stud to release tension from the davit arm.

8.22 — Lubrication

8.22.1 — Electric Motors

Manufacturers of electric motors vary in their specifications for lubrication and care of motor bearings, however, their specific recommendations should be followed.

Ball-bearing equipped motors are pre-lubricated. The length of time a bearing can run without having grease added will depend upon many factors, including the rating of the motor, type of motor enclosure, duty, atmospheric conditions, humidity, and ambient temperatures.

Complete renewal of grease, when necessary, can be accomplished by forcing out the old grease with the new grease:

1. Thoroughly wipe those portions of the housing around the filler and drain plugs (above and below bearings).
2. Remove the drain plug (bottom) and free the drain hole of any hardened grease which may have accumulated.
3. With the motor not running, add new grease through the filler hole until clear grease starts to come out of the drain hole.
4. Before replacing the drain plug, run the motor for 10 to 20 minutes to expel any excess grease.
5. The filler and drain plugs should be thoroughly cleaned before they are replaced.

The lubricant used should be clean and equal to one of the good commercial grades of grease locally available. Some lubricants that are distributed nationally are:

- Gulf Oil - Precision Grease No. 2
- Humble Oil - Andok B
- Texaco - Multifak No. 2
- Phillips - 1B + RB No. 2
- Fiske Bros. - Ball Bearing Lubricant
- Standard/Mobil - Mobilux No. 2

NOTE: Siemens TEFC motors use a different and incompatible grease to those listed above.

For Siemens Motors: Contains re-greasable bearings. The shaft end (impeller end) requires the use of CB's high temperature auto grease system (PN 884-133) for proper lubrication.

The opposite shaft end (end opposite impeller) can be greased by the auto grease system or by hand pump, using two or three pumps every three months with a grease compatible with a high temperature aluminum complex grease.

Daily	• Check visually for free movement of IFGR linkage.
Quarterly	• Manually check for free movement of IFGR linkage. • Inspect and clean IFGR damper (oil-fueled system). • Inspect and clean fan and burner (oil-fueled system). • Grease fan motor.
Semi-Annually	• Inspect and clean IFGR damper (gas-fueled system). • Inspect and clean fan and burner (gas-fueled system). • Open motor/fan cassette to check for free movement of IFGR linkage and damper assembly.
Annually	• Inspect fan impeller. • Check emissions. • Change inlet gasket.

8.22.2 — Control Linkage

Apply a non-gumming, dripless, high-temperature lubricant, such as graphite or a silicone derivative to all pivot points and moving parts. Work lubricant in well and wipe away excess. Repeat application at regular intervals to maintain freedom of motion of parts.

8.22.3 — Solenoid and Motorized Valves

Solenoid valves and motorized valves require no lubrication.

8.22.4 — IFGR Lubrication

Motors should be lightly lubricated at startup.

⚠ Warning

Disconnect and lock out electrical power to the boiler before lubricating the fan motor. Failure to follow these instructions could result in serious injury or death.

1. Disconnect and lock out electrical power to the boiler.
2. Wipe clean all grease fittings (fill and drain fittings).
3. Remove the fill and drain plugs from the motor end cap.
4. Free the drain hole of any hard grease (if necessary, use a piece of wire).
5. Add grease using a low-pressure grease gun.

NOTE: The amount and type of grease is very important. Only enough grease should be added to replace the grease used by the bearing. Either too much or too little grease can be harmful. The grease cavity should be filled 1/3 to 1/2 full, using Chevron SRI 2 grease or equivalent. Shell Dolium R is a suitable substitute lubricant.

6. With the fill and drain plugs still removed, apply electric power to the boiler, start the motor, and let it run for approximately 30 minutes.
7. Turn the boiler off.

⚠ Warning

Disconnect and lock out electrical power to the boiler before lubricating the fan motor. Failure to follow these instructions could result in serious injury or death.

8. Disconnect and lock out electrical power to the boiler.
9. Wipe excess grease from the motor, and install the fill and drain plugs. The motor is ready for operation.
10. Reconnect electrical power.

8.23 — Oil Heater: Electric, Steam, Hot Water

An annual maintenance of the heaters consists primarily of removing the heating element from the shell and scraping any accumulation of carbonized oil or sludge deposits that may have collected on the heat exchanging surfaces.

Before breaking any of the electrical connections to the electric heating elements, mark all wires and terminals to assure rapid and correct replacement of wires.

Finish the cleaning process with a cleaning solvent to cut all hardened deposits from the heater element. Because of the insulating effect of carbon and sludge, periodic cleaning is necessary to prevent overheating of the elements. If operation of the heater becomes sluggish, examine the elements at once and clean as required.

Inspect the shell or tank each time the heater is removed. Flush all accumulated sludge and sediment from the tank before reinstalling the heater.

The condensate from steam oil heaters must be safely discharged to waste. The waste should be checked periodically for any traces of oil that would indicate leaking tubes within the heater.

The hot water oil heater contains a heat transfer solution. Oil flows through an inner tube while boiler water surrounds the outer tube. The space between the two tubes is filled with the heat transfer solution and is connected to an expansion chamber on the rear of the heater. A visual indicator on the chamber reveals the presence of any oil if an oil leak occurs.

A 50/50 solution of permanent antifreeze and water is generally used as the heat transfer solution. If there is no danger of freezing, plain water may be used as a replenishment if necessary to refill.

Evidence of oil in either the steam heater condensate or in the water heater indicator demands prompt repairs.

8.24 — Combustion

The frequency of burner adjustments depends upon several factors, including type of burner, type of fuel, load conditions, ambient temperature, climatic variables, and general maintenance practices.

The air-fuel ratio should be checked monthly in order to alert the operator to losses in efficiency, which do not produce visible flame change. Any time maintenance is performed on the burner linkage, the air-fuel ratio should be checked. Readjustment of the burner may be required due to variations in fuel composition. A combustion analyzer should be used to adjust air-fuel ratio for maximum operating efficiency. If your burner requires adjustments, contact your local Cleaver-Brooks authorized representative for assistance.

8.25 — Air Pump Belt

The V-belt driving the air pump requires no servicing and no preservatives or dressing compounds should be used. Belts normally stretch with use and proper tension should be maintained. Do not apply excessive tension. The air pump can be moved the small distance necessary for belt adjustment without any change of piping.

On a combination fired unit it is an acceptable practice to remove the belt when gas is being used for extended periods. It is not absolutely necessary to do this, however, pump and belt life will be extended if the belt is removed.

8.26 — Recommended Boiler Inspection Schedule

Daily	Monthly	Semi-Annually	Annually
• Check water level • Check combustion visually • Blow down boiler • Blow down water column • Record feedwater pressure/temperature • Record flue gas temperature • Record oil pressure and temperature • Record gas pressure • Treat water according to the established program • Record atomizing air pressure	• Inspect burner • Inspect for flue gas leak • Inspect for hot spots • Check cams • Check for tight closing of fuel valve • Check fuel and air linkage • Check indicating lights and alarms • Check operating and limit controls • Check safety and interlock controls • Check for leaks, noise, vibration, unusual conditions, etc. • Check low water cutoff operation	• Clean low water cutoff • Clean oil pump strainer, filter • Clean air cleaner and air/oil separator • Inspect refractory • Remove and clean oil preheater • Check air pump coupling alignment • Inspect/repair burner housing to refractory seal	• Clean fireside surfaces • Clean breeching • Inspect waterside surfaces • Check operation of safety valves

City of Tacoma
Community & Economic Development
Office of Small Business Enterprise
747 Market Street, Room 808
Tacoma, WA 98402
253-594-7933 or 253-591-5224

PRIME CONTRACTOR'S PRE-WORK FORM

Company Name _____ **Telephone** _____

Address/City/State/Zip Code _____

Specification Number _____ **Specification Title** _____

JOB CATEGORIES SPECIFY	TOTAL EMPLOYEES		TOTAL MINORITY EMPLOYEES		BLACK		ASIAN or PACIFIC ISLANDER		AMERICAN INDIAN or ALASKAN NATIVE		HISPANIC	
	M	F	M	F	M	F	M	F	M	F	M	F
Officer / Managers												
Supervisors												
Project Managers												
Office / Clerical												
Apprentices												
Trainees												
TOTALS												

CONTRACTOR'S PROJECTED WORK FORCE - THIS PROJECT

Superintendent												
Foreman												
Operators												
Laborers												
Apprentice												
Trainee												
TOTALS												

Type or Print Name of Responsible Officer / Title _____ **Signature of Responsible Officer** _____ **Date** _____

INSTRUCTIONS FOR COMPLETING
PRIME CONTRACTOR'S PRE-WORK FORM

This form only applies to employees who will be working on this specific project.

1. "Heading" the company name and address should reflect the prime contractor actually doing business with the City of Tacoma. If this address is different from that of the Equal Employment Opportunity Officer that administers the EEO programs of the company, the Equal Employment Opportunity Officer's address should be noted in the "Comments" section at the bottom of the form. "Telephone" should contain the area code, telephone number and extension (if any) for the Equal Employment Officer or the responsible official.

2. "Job Categories" at the extreme left hand column of the form specifying "Job Categories" lists "Officials & Managers." You are to list in addition to Officials & Managers any appropriate job titles such as Sales Workers, Office/Clerical, Professionals, Technical, etc., as they apply to your own company and only as pertains to this specific project.

3. The "M" and "F" headings at the top of each column refer to "Male" and "Female."

4. The "Total Employees" column should list the total number of male employees under "M" and the total female number of female employees under "F" for each job category listed. They should be listed in a similar manner in the "Total" category at the bottom of the form. The "Total Employees" column should include all those employees listed under "Non-Minority" and "Total Minorities." "Non-Minority" should include all employees not listed in the minority columns.

5. "Total Minorities" should include all employees listed under the "Black," "Asian or Pacific Islander" (A person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands. This area includes, for example, China, India, Japan, Korea, the Philippine Islands, and Samoa.), "American Indian or Alaskan Native," and "Hispanic" columns. These columns should include only employees who are members of that particular minority group. Designation and definitions of ethnic/national origin status follow the instructions and definitions of the Federal EEO-1 Form of the U. S. Equal Employment Opportunity Commission.

6. "Totals" this line should reflect the total of all lines in each of the above columns.

7. The signature of your company's designated responsible official or similar official responsible for equal employment opportunity must appear in the designated space at the bottom of the form. Please PRINT OR TYPE the person's name on the top line across from the signature. This is required since some signatures are difficult to read.

8. "Comments" this section is to be used as needed for explanations to under utilization rate or lack of turnover, proposed expansion or reduction of staff or any other pertinent information you believe will help clarify or explain the data presented on the form. If you need additional space, please explain on a separate sheet of paper.

9. If you need assistance or have questions regarding the completion of this form, please call the SBE Office at 253-594-7933 or 253-591-5224.

Sustainability Worksheet

The City has an interest in sustainable operations with minimal adverse impact on the environment. The City seeks to do business with vendors that value community and environmental stewardship that help us meet our sustainable purchasing goals.

1. Have you incorporated sustainability into your everyday business practices? Y/N Please describe

_____
_____
_____
_____

2. Have you taken measures to minimize impacts to the environment in the delivery of proposed goods and/or services? Y/N Please describe.

_____
_____
_____
_____

3. Please describe the estimated percentage of material to be recycled or reused under this project _____%.

CHAPTER 1.07
SMALL BUSINESS ENTERPRISE

Sections:

1.07.010 Policy and purpose.

It is the policy of the City of Tacoma that citizens be afforded an opportunity for full participation in our free enterprise system and that historically underutilized business enterprises shall have an equitable opportunity to participate in the performance of City contracts. The City finds that in its contracting for supplies, services and public works there has been historical underutilization of small businesses located in certain geographically and economically disfavored locations and that this underutilization has had a deleterious impact on the economic well-being of the City. The purpose of this chapter is to remedy the effects of such underutilization through use of reasonably achievable goals to increase opportunities for historically underutilized businesses to participate in City contracts. It is the goal of this chapter to facilitate a substantial procurement, education, and mentorship program designed to promote equitable participation by historically underutilized businesses in the provision of supplies, services, and public works to the City. It is not the purpose of this chapter to provide any person or entity with any right, privilege, or claim, not shared by the public, generally, and this chapter shall not be construed to do so. This chapter is adopted in accordance with Chapter 35.22 RCW and RCW 49.60.400.

(Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.020 Definitions.

Terms used in this chapter shall have the following meanings unless defined elsewhere in the Tacoma Municipal Code ("TMC"), or unless the context in which they are used clearly indicates a different meaning.

A. "Affidavit of Small Business Enterprise Certification" means the fully completed, signed, and notarized affidavit that must be submitted with an application for SBE certification. Representations and certifications made by the applicant in this Affidavit are made under penalty of perjury and will be used and relied upon by City to verify SBE eligibility and compliance with SBE certification and documentation requirements.

B. "Base Bid" means a Bid for Public Works to be performed or Supplies or Services to be furnished under a City Contract, including additives, alternates, deductives, excluding force accounts, and taxes collected separately pursuant to Washington Administrative Code ("WAC") 458-20-171.

C. "Bid" means an offer submitted by a Respondent to furnish Supplies, Services, and/or Public Works in conformity with the Specifications and any other written terms and conditions included in a City request for such offer.

D. "Bidder" means an entity or individual who submits a Bid, Proposal or Quote. See also "Respondent."

E. "City" means all Departments, Divisions and agencies of the City of Tacoma.

F. "Contract" means any type of legally binding agreement regardless of form or title that governs the terms and conditions for procurement of Public Works and Improvements and/or Non-Public Works and Improvements Supplies and Services. Contracts include the terms and conditions found in Specifications, Bidder or Respondent Submittals, and purchase orders issued by the City. A "Contract" as used in this chapter shall include an agreement between the City and a non-profit entity to perform construction-related services for Public Works. A "Contract" does not include: (1) awards made by the City with federal/state grant or City general funds monies to a non-profit entity where the City offers assistance, guidance, or supervision on a project or program, and the recipient of the grant awards uses the grant moneys to provide services to the

community; (2) sales transactions where the City sells its personal or real property; (3) a loan transaction where the City is acting as a debtor or a creditor; (4) lease, franchise; (5) agreements to use City real property (such as Licenses, Permits and Easements) and, (6) banking and other financial or investment services.

G. "Contractor" means any Person that presents a Submittal to the City, enters into a Contract with the City, and/or performs all or any part of a Contract awarded by the City, for the provision of Public Works, or Non-Public Works and Improvements, Supplies or Services.

H. "Evaluated Bid" means a Bid that factors each Respondent's Base Bid including any alternates, deductive and additives selected by the City that will result in a weighed reduction based on that Respondent's percentage of SBE participation, as defined by formula set forth in this chapter or in the SBE Regulations adopted pursuant to this chapter.

I. "Goals" means the annual level of participation by SBEs in City Contracts as established in this chapter, the SBE Regulations, or as necessary to comply with applicable federal and state nondiscrimination laws and regulations. Goals for individual Contracts may be adjusted as provided for in this chapter and shall not be construed as a minimum for any particular Contract or for any particular geographical area.

J. "SBE Certified Business" (or "SBEs") means a business that meets the criteria set forth in Section 1.07.050 of this chapter and has been certified as meeting that criteria by the Community and Economic Development Department-SBE Program Coordinator.

K. "SBE Program Coordinator" means the individual appointed, from time to time, by the City's Community and Economic Development Director to administer the SBE Regulations.

L. "SBE Regulations" shall mean the written regulations and procedures adopted pursuant to this chapter for procurement of Supplies, Services and Public Works.

M. "Lowest and Best Responsible Bidder" means the Bidder submitting the lowest Bid received that is within the range of acceptable bids, that also has the ability to timely perform the Contract bid upon considering such factors as financial resources, skills, quality of materials, past work record, and ability to comply with state, federal, and local requirements, including those set forth in the SBE Regulations.

N. "Non-Public Works and Improvements" means all competitively solicited procurement of Supplies and/or Services by the City not solicited as Public Works.

O. "Person" means individuals, companies, corporations, partnerships, associations, cooperatives, any other legally recognized business entity, legal representative, trustee, or receivers.

P. "Proposal" means a written offer to furnish Supplies or Services in response to a Request for Proposals. This term may be further defined in the Purchasing Policy Manual and/or in competitive solicitations issued by the City.

Q. "Public Works (or "Public Works and Improvements)" means all work, construction, alteration, repair, or improvement other than ordinary maintenance, executed at the cost of the City, or that is by law a lien or charge on any property therein. This term includes all Supplies, materials, tools, and equipment to be furnished in accordance with the Contract for such work, construction, alteration, repair, or improvement.

R. "Quote" means a competitively solicited written offer to furnish Supplies or Services by a method of procurement that is less formalized than a Bid or a Proposal. This term may be further defined in the Purchasing Policy Manual.

S. "Respondent" means any entity or Person, other than a City employee, that provides a Submittal in response to a request for Bids, Request for Proposals, Request for Qualifications, request for quotes or other request for information, as such terms are defined in Section 1.06.251 TMC. This term includes any such entity or Person whether designated as a supplier, seller, vendor, proposer, Bidder, Contractor, consultant, merchant, or service provider that; (1) assumes a contractual responsibility to the City for provision of Supplies, Services, and/or Public Works; (2) is recognized by its industry as a provider of such Supplies, Services, and/or Public works; (3) has facilities similar to those commonly used by Persons engaged in the same or similar business; and/or (4) distributes, delivers, sells, or services a product or performs a Commercially Useful Function.

T. "Services" means non-Public Works and Improvements services and includes professional services, personal services, and purchased services, as such terms are defined in Section 1.06.251 TMC and/or the City's Purchasing Policy Manual.

U. "Submittal" means Bids, Proposals, Quotes, qualifications or other information submitted in response to requests for Bids, Requests for Proposals, Requests for Qualifications, requests for Quotations, or other City requests for information, as such terms are defined in Section 1.06.251 TMC.

V. "Supplies" means materials, Supplies, and other products that are procured by the City through a competitive process for either Public Works procurement or Non-Public Works and Improvements procurement unless an approved waiver has been granted by the appropriate authority.

(Ord. 28274 Ex. A; passed Dec. 16, 2014: Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.030 Discrimination prohibited.

A. No person that is engaged in the construction of public works for the City, engaged in the furnishing of laborers or craftspeople for public works of the City, or is engaged for compensation in the provision of non-public works and improvements supplies and/or services to the City, shall discriminate against any other person on the basis of race, religion, color, national origin or ancestry, sex, gender identity, sexual orientation, age, marital status, familial status, or the presence of any sensory, mental or physical disability in employment. Such discrimination includes the unfair treatment or denial of normal privileges to a person as manifested in employment upgrades, demotions, transfers, layoffs, termination, rates of pay, recruitment of employees, or advertisement for employment.

B. The violation of the terms of RCW 49.60 or Chapter 1.29 TMC by any person that is engaged in the construction of public works for the City, is engaged in the furnishing of laborers or craftspeople for public works of the City, or is engaged for compensation in the provision of non-public works and improvements supplies and/or services shall result in the rebuttable presumption that the terms of this chapter have also been violated. Such violation may result in termination of any City contract the violator may have with the City and/or the violator's ineligibility for further City Contracts.

(Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.040 Program administration.

A. The Community and Economic Development Director, or his or her designated SBE Program Coordinator, shall be responsible for administering this chapter and obtaining compliance with respect to contracts entered into by the City and/or its contractors. It shall be the duty of the Director to pursue the objectives of this chapter by conference, conciliation, persuasion, investigation, or enforcement action, as may be necessary under the circumstances. The Director is authorized to implement an administrative and compliance program to meet these responsibilities and objectives.

B. The Director is hereby authorized to adopt and to amend administrative rules and regulations known as the SBE Regulations to properly implement and administer the provisions of this chapter. The SBE Regulations shall be in conformance with City of Tacoma policies and state and federal laws and be designed to encourage achievement of the SBE goals set forth herein. The SBE Regulations shall become effective following public notice and an opportunity to comment by the public.

C. The SBE Regulations adopted pursuant to this section are for the administrative and procedural guidance of the officers and employees of the City and are further expressions of the public policy of the City. The SBE Regulations, when adopted, shall not confer an independent cause of action or claim for relief cognizable in the courts of the state of Washington or the United States of America to any third parties, and such provisions shall not be used as the basis for a lawsuit in any court of competent jurisdiction challenging the award of any contract by the City.

(Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 28110 Ex. B; passed Dec. 4, 2012: Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.050 Certification.

A. The SBE Program Coordinator shall approve a person as a SBE Certified Business if all of the following criteria are satisfied:

1. Each person with an ownership interest in the company has a personal net worth of less than $1,320,000 excluding one personal residence and the net worth of the business;

2. The company's total gross receipts for any consecutive three year period within the last six years is not more than $36,500,000 for public works companies and not more than $15,000,000 for non-public works and improvements companies;

3. The owner(s) of the company executes an Affidavit of Small Business Enterprise Certification and files it with the City which states that all information submitted on the SBE application is accurate, that the business has sought or intends to do business with the City and/or within the Pierce County area and has experienced or expects to experience difficulty competing for such business due to financial limitations that impair its ability to compete against larger firms; and

4. The company can demonstrate that it also meets at least one of the following additional requirements:

a. The company's business offices, or the personal residence of the owner, is located within a City of Tacoma designated Renewal Community/Community Empowerment Zone, prior to designation as a SBE, or

b. The company's business offices, or the personal residence of the owner, is located within the City of Tacoma for at least six months prior to designation as a SBE; or

c. The company's business offices are located in a federally designated HUBZONE in Pierce County or any adjacent county for at least 12 months prior to designation as a SBE; or

d. The company's business offices are located in a federally designated HUBZONE in a County wherein the work will be performed, or an adjacent county, for at least 12 months prior to designation as a SBE.

B. Application Process. The SBE Program Coordinator shall make the initial determination regarding certification or recertification. Each SBE applicant shall provide the following documents; as such documents are more fully described in the SBE Regulations, to the SBE Program Coordinator:

1. A completed Statement of Personal Net Worth form;

2. A completed, signed, and notarized Affidavit of Small Business Enterprise Certification that affirms compliance with the certification and documentation requirements of this section;

3. List of equipment and vehicles used by the SBE;

4. Description of company structure and owners;

5. Such additional information as the SBE Program Coordinator or designee may require.

When another governmental entity has an equivalent SBE classification process the City may enter into an interlocal cooperative agreement for mutual recognition of certifications.

C. Recertification. A SBE qualified business shall demonstrate annually to the satisfaction of the SBE Program Coordinator that the following SBE qualifications are still in effect for such business:

1. That the company still meets all of the criteria set forth in subsection 1.07.050.A. TMC, and

2. That the company has maintained all applicable and necessary licenses in the intervening period, and

3. That the company demonstrates that the owner and/or designated employees have completed the minimum annual continuing business education training requirements set forth in the SBE Regulations.

D. Appeals. The applicant may appeal any certification determination by the SBE Program Coordinator under this chapter to the Director. The appeal must be made in writing and must set forth the specific reasons for the appeal. The Director shall make a decision on the appeal request within a reasonable time, which decision shall be final unless further appeal is made to the Hearing Examiner. In that event, the Hearing Examiner Rules of Procedure for Hearings, Chapter 1.23 TMC, shall be applicable to that appeal proceeding.

(Ord. 28274 Ex. A; passed Dec. 16, 2014: Ord. 28147 Ex. A; passed May 7, 2013: Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 28110 Ex. B; passed Dec. 4, 2012: Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.060 Program requirements.

A. Establishment of Annual SBE Goals. The SBE Regulations adopted pursuant to this chapter shall state reasonably achievable cumulative annual goals for utilization of SBEs in the provision of supplies, services, and public works procured by the City. Cumulative annual goals for the participation of SBEs in City contracts shall be based on the number of qualified SBEs operating within Pierce County or in a county that is adjacent to Pierce County or in a HUBZone in a county where the supplies, services and/or public works will be delivered or performed. The dollar value of all contracts awarded by the City to SBEs in the procurement of supplies, services, and public works shall be counted toward the accomplishment of the applicable SBE goal. The initial cumulative annual SBE goal for all public works, non-public works and improvements supplies and services procured by the City of Tacoma is 22 percent.

B. Revision of Annual SBE Goals. SBE utilization goals for supplies, services, and public works shall be reviewed annually to determine the total level of SBE participation reasonably attainable. If no certified SBEs are available to provide supplies, services, and/or public works, the dollar value of such supplies, services, or public works shall be exempt from the calculation of the cumulative annual goals set forth in the SBE Regulations. Proposed reduction of the cumulative annual SBE goals shall be in accordance with the SBE Regulations.

C. Application of SBE Goals to Contracts. The SBE Program Coordinator shall consult with City departments/divisions to establish the SBE goal for competitively solicited contracts of $25,000 and above, in accordance with this chapter and the SBE Regulations. No SBE goal will be established if no certified SBEs are available to provide supplies, services and/or public works.

D. Waivers. City departments/divisions or the SBE Program Coordinator may request to waive one or more of the requirements of this chapter as they apply to a particular contract or contracts. Waivers may be granted in any one or more of the following circumstances:

1. Emergency: The supplies, services and/or public works must be provided with such immediacy that neither the City nor the contractor can comply with the requirements herein. Such emergency and waiver must be documented by the department/division awarding the contract.

2. Not Practicable: Compliance with the requirements of this chapter would impose an unwarranted economic burden or risk to the City after consideration of existing budgetary approvals.

3. Sole source: The supplies, services, and/or public works are available from only one source, and subcontracting possibilities do not reasonably exist as determined by the finance purchasing manager.

4. Government purchasing. The City is a party to or included in a federal, state or inter-local government purchasing agreement as approved by the finance purchasing manager.

5. Lack of SBEs: An insufficient number of qualified SBE contractors exist to create SBE utilization opportunities.

6. Best interests of the City: Waiver of SBE goals is in the best interests of the City due to unforeseen circumstances, provided that said circumstances are set forth in writing by the requestor.

E. Review of Waivers. A waiver determination by the finance purchasing manager may be reviewed by the Board of Contracts and Awards (C&A Board). The C&A Board may also review a request to reduce or waive the SBE utilization goals based on Not Practicable or Best Interests of the City circumstances. The C&A Board shall determine whether compliance with such goals would impose unwarranted economic burden on, or risk to, the City of Tacoma as compared with the degree to which the purposes and policies of this chapter would be furthered by requiring compliance. If the determination of the C&A Board does not resolve the matter, a final determination shall be made by the City Council or Public Utility Board, as the case may be.

(Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.070 Evaluation of submittals.

A. All submittals for a supplies, services, or public works and improvements contract valued at $25,000 or more shall be evaluated for attainment of the SBE goal established for that contract in accordance with this chapter and the SBE Regulations.

B. The determination of SBE usage and the calculation of SBE goal attainment per this section shall include the following considerations:

1. General. The dollar value of the contract awarded by the City to a SBE in the procurement of supplies, services, or public works shall be counted toward achievement of the SBE goal.

2. Supplies. A public works and improvements contractor may receive credit toward attainment of the SBE goal for expenditures for supplies obtained from a SBE; provided such SBE assumes the actual and contractual responsibility for delivering the supplies with its resources. The contractor may also receive credit toward attainment of the SBE goal for the amount of the commission paid to a SBE resulting from a supplies contract with the City; provided the SBE performs a commercially useful function in the process.

3. Services and Public Works subcontracts. Any bid by a certified SBE or a bidder that utilizes a certified SBE shall receive credit toward SBE goal attainment based on the percentage of SBE usage demonstrated in the bid. A contractor that utilizes a SBE-certified subcontractor to provide services or public works shall receive a credit toward the contractor’s attainment of the SBE goal based on the value of the subcontract with that SBE.

4. Brokers, Fronts, or Similar Pass-Through Arrangements. SBEs acting as brokers, fronts, or similar pass-through arrangements (as such terms are defined in the SBE Regulations) shall not count toward SBE goal attainment unless the activity reflects normal industry practices and the broker performs a commercially useful function.

C. Evaluation of competitively solicited submittals for public works and improvements and for services when a SBE utilization goal has been established for the contract to be awarded shall be as follows:

1. When contract award is based on price. The lowest priced bid submitted by a responsive and responsible bidder will be reviewed to determine if it meets the SBE goal. Such low bid shall be determined to meet the SBE goal if the bidder is a certified SBE.

a. If the low bidder meets the SBE goal, the bid shall be presumed the lowest and best responsible bid for contract award.

b. If the lowest priced bid does not meet the SBE goal, but the bid of any other responsive and responsible bidder does, and such other bid(s) is or are priced within five percent of the lowest bid, then the following formula shall be applied to each such other bid:

$$\text{(Base Bid)} - \left[\frac{\text{SBE Usage Percentages}}{\text{SBE Goal Percentages}} \text{ X (.05 X Low Base Bid)} \right] = \text{Evaluated Bid}$$

c. The lowest evaluated bid after applying said evaluation formula shall be presumed the lowest and best responsible bid for contract award.

d. In no event shall a bidder's evaluated bid price be adjusted more than 5 percent from its base bid price for purposes of contract award.

2. When contract award is based on qualifications or other performance criteria in addition to price. Solicitations shall utilize a scoring system that promotes participation by certified SBEs. Submittals by respondents determined to be qualified may be further evaluated based on price using the formula applicable to price based contract awards above. The SBE Regulations may establish further requirements and procedures for final selection and contract award, including:

a. Evaluation of solicitations for Architectural and Engineering (A&E) services;

b. Evaluation and selection of submittals in response to requests for proposals; and

c. Selection of contractors from pre-qualified roster(s).

D. Evaluation of competitively solicited submittals for supplies when no SBE utilization goal has been established for the contract to be awarded shall encourage SBE participation as follows:

1. A submittal from a responsive certified SBE that is priced within five percent of the otherwise lowest responsive bid shall be recommended for award. Otherwise, the lowest responsive bidder shall be recommended for contract award.

E. The SBE Regulations may establish further SBE goal evaluation requirements and procedures for award of contracts between $5,000 and $25,000.00 and for non-competitively solicited contracts. City departments/divisions shall use due diligence to encourage and obtain SBE participation for supplies, services, and public works contracts under $5,000.

(Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.080 Contract compliance.

A. The contractor awarded a contract based on SBE participation shall, during the term of the contract, comply with the SBE goal established in said contract. To ensure compliance with this requirement following contract award, the following provisions apply:

1. Any substitutions for or failure to utilize SBEs projected to be used must be approved in advance by the SBE Program Coordinator. Substitution of one SBE with another shall be allowed where there has been a refusal to execute necessary agreements by the original SBE, a default on agreements previously made or other reasonable excuse; provided that the substitution does not increase the dollar amount of the bid.

2. Where it is shown that no other SBE is available as a substitute and that failure to secure participation by the SBE identified in the solicitation is not the fault of the respondent, substitution with a non-SBE shall be allowed; provided, that, the substitution does not increase the dollar amount of the bid.

3. If the SBE Program Coordinator determines that the contractor has not reasonably and actively pursued the use of replacement SBE(s), such contractor shall be deemed to be in non-compliance.

B. Record Keeping. All contracts shall require contractors to maintain relevant records and information necessary to document compliance with this chapter and the contractor's utilization of SBEs, and shall include the right of the City to inspect such records.

(Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.090 Program monitoring.

A. The SBE Program Coordinator shall monitor compliance with all provisions of this chapter and the SBE Regulations. The SBE Program Coordinator shall establish procedures to collect data and monitor the effect of the provisions of this chapter to assure, insofar as is practical, that the remedies set forth herein do not disproportionately favor one or more racial, gender, ethnic, or other protected groups, and that the remedies do not remain in effect beyond the point that they are required to eliminate the effects of under utilization in City contracting. The SBE Program Coordinator shall have the authority to obtain

from City departments/divisions, respondents, and contractors such relevant records, documents, and other information as is reasonably necessary to determine compliance.

B. The SBE Program Coordinator shall submit an annual report to the Community and Economic Development Director, Director of Utilities, and the City Manager detailing performance of the program. The report shall document SBE utilization levels, waivers, proposed modifications to the program, and such other matters as may be specified in the SBE Regulations.

(Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 28110 Ex. B; passed Dec. 4, 2012: Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.100 Enforcement.

The Director, or his or her designee, may investigate the employment practices of contractors to determine whether or not the requirements of this chapter have been violated. Such investigation shall be conducted in accordance with the procedures established in the SBE Regulations.

(Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 28110 Ex. B; passed Dec. 4, 2012: Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.110 Remedies.

A. Upon receipt of a determination of contractor violation by the SBE Program Coordinator, the City Manager or Director of Utilities, as appropriate, may take the following actions, singly or together, as appropriate:

1. Forfeit the contractor's bid bond and/or performance bond;

2. Publish notice of the contractor's noncompliance;

3. Cancel, terminate, or suspend the contractor's contract, or portion thereof;

4. Withhold funds due contractor until compliance is achieved; and/or

5. Recommend appropriate action including, but not limited to, disqualification of eligibility for future contract awards by the City (debarment) per Section 1.06.279 TMC;

B. Prior to exercise of any of the foregoing remedies, the City shall provide written notice to the contractor specifying the violation and the City's intent to exercise such remedy or remedies. The notice shall provide that each specified remedy becomes effective within ten business days of receipt unless the contractor appeals said action to the Hearing Examiner pursuant to Chapter 1.23 TMC.

C. When non-compliance with this chapter or the SBE Regulations has occurred, the SBE Program Coordinator and the department/division responsible for enforcement of the contract may allow continuation of the contract upon the contractor's development of a plan for compliance acceptable to the Director.

(Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 28110 Ex. B; passed Dec. 4, 2012: Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.120 Unlawful acts.

It shall be unlawful for any Person to willfully prevent or attempt to prevent, by intimidation, threats, coercion, or otherwise, any Person from complying with the provisions of this chapter.

(Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.130 Severability.

If any section of this chapter or its application to any Person or circumstance is held invalid by a court of competent jurisdiction, then the remaining sections of this chapter, or the application of the provisions to other Persons or circumstances, shall not be affected.

(Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.140 Sunset and review of program.

This chapter shall be in effect through and until December 31, 2019, unless the City Council shall determine at an earlier date that the requirements of this chapter are no longer necessary. If this chapter has not been repealed by July 1, 2019, the City Council shall determine by the end of that year whether substantial effects or lack of opportunity of SBEs remain true in the relevant market and whether, and for how long, some or all of the requirements of this chapter should remain in effect.

(Ord. 28274 Ex. A; passed Dec. 16, 2014: Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 27867 Ex. A; passed Dec. 15, 2009)

ES19-0366N Boiler Cleaning
CITY OF TACOMA INSURANCE REQUIREMENTS

The Contractor (Contractor) shall obtain and maintain the minimum insurance set forth below. By requiring such minimum insurance, the City of Tacoma (City) shall not be deemed or construed to have assessed the risk that may be applicable to Contractor under this Contract. Contractor shall assess its own risks and, if it deems appropriate and /or prudent, maintain greater limits and/or broader coverage.

1. GENERAL REQUIREMENTS

The following General Requirements apply to Contractor and to Subcontractor(s) of every tier performing services or activities pursuant to the terms of this Contract. Contractor acknowledges and agrees to the following insurance requirements applicable to Contractor and Contractor's Subcontractor(s):

1.1. City reserves the right to approve or reject the insurance provided based upon the insurer, terms and coverage, the Certificate of Insurance, and/or endorsements.

1.2. The insurance must be written by companies licensed in the State of Washington pursuant to RCW 48 with an (A-) VII or higher in the A.M. Best's Key Rating Guide www.ambest.com.

1.3. Contractor shall keep this insurance in force during the entire term of the Contract and for thirty (30) calendar days after completion of all work required by the Contract, unless otherwise provided herein.

1.4. Policies of Insurance, *such as Commercial General Liability or Commercial Auto Liability or Marine General Liability or Aircraft General liability or Excess Liability,* required under this Contract that name City as Additional Insured shall:

1.4.1. Be considered primary and non-contributory for all claims.
1.4.2. Contain a "Severability of Insureds", "Separation of Interest", or "Cross Liability" provision and a "Waiver of Subrogation" clause in favor of City.

1.5. A Waiver of Subrogation in favor of City for General Liability and Automobile Liability.

1.6. Insurance limits shown below may be written with an excess policy that follows the form of an underlying primary liability policy or an excess policy providing the required limit.

1.7. Insurance policy(ies) shall be written on an "occurrence" form, except for Professional Liability/Errors and Omissions, Pollution Liability, and Cyber/Privacy and Security.

1.8. If coverage is approved and purchased on a "Claims-Made" basis, Contractor warrants continuation of coverage, either through policy renewals or by the purchase of an extended reporting period endorsement as set forth below.

1.9. Contractor shall provide City notice of any cancellation or non-renewal of this required insurance within 30 calendar days.

1.10. Contractor shall not begin work under the Contract until the required insurance has been obtained and approved by City.

1.11. Contractor shall not allow any insurance to be cancelled or lapse during any term of this Contract, otherwise it shall constitute a material breach of the Contract, upon which City may, after giving five (5) business day notice to Contractor to correct the breach, immediately

terminate the Contract or, at its discretion, procure or renew such insurance and pay any and all premiums in connection therewith; with any sums so expended to be repaid to City by Contractor upon demand, or at the sole discretion of City, offset against funds due Contractor from City.

1.12. Contractor shall be responsible for all premiums, deductibles and self-insured retentions. All deductibles and self-insured retained limits shall be shown on the Certificates of Insurance. Any deductible or self-insured retained limits in excess of Ten Thousand Dollars ($10,000) must be approved by City Risk Management Division.

1.13. Insurance coverages specified in this Contract are not intended and will not be interpreted to limit the responsibility or liability of Contractor or Subcontractor(s).

1.14. City reserves the right to review insurance requirements during any term of the Contract and to require that Contractor make reasonable adjustments when the scope of services has been expanded.

1.15. All costs for insurance shall be incidental to and included in the unit or lump sum prices of the Contract and no additional payment will be made by City to Contractor.

1.16. City, including its officers, elected officials, employees, agents, and authorized volunteers, and any other entities, as required by the Contract, shall be named as additional insured(s) by endorsement for all liability insurance policies set forth below. No specific person or department should be identified as the additional insured.

1.17. Contractor shall deliver a Certificate of Insurance for each policy of insurance meeting the requirements set forth herein when Contractor delivers the signed Contract for the work to City. Contractor shall deliver copies of any applicable Additional Insured, Waiver of Subrogation, and primary and non-contributory endorsements. Contract or Permit number and the City Department must be shown on the Certificate of Insurance.

1.18. Failure by City to identify a deficiency in the insurance documentation provided by Contractor or failure of City to demand verification of coverage or compliance by Contractor with these insurance requirements shall not be construed as a waiver of Contractor's obligation to maintain such insurance.

2. SUBCONTRACTORS

It is Contractor's responsibility to ensure that each subcontractor obtain and maintain adequate liability insurance coverage. Contractor shall provide evidence of such insurance upon City's request.

3. REQUIRED INSURANCE AND LIMITS

The insurance policies shall provide the minimum coverages and limits set forth below. Providing coverage in these stated minimum limits shall not be construed to relieve Contractor from liability in excess of such limits.

3.1. Commercial General Liability (CGL) Insurance

The CGL insurance policy must provide limits not less than One Million Dollars ($1,000,000) each occurrence and Two Million Dollars ($2,000,000) annual aggregate.

The CGL policy shall be written on an Insurance Services Office (ISO) form CG 00 01 (04-13) or its equivalent. Products and Completed Operations shall be maintained for a period of one year following final acceptance of the work. The CGL policy shall be endorsed to include:

3.1.1 A per project aggregate policy limit.
3.1.2 Contractual Liability-Railroad using ISO form CG 24 17 (10-01) or equivalent if Contractor is performing work within fifty (50) feet of a City railroad right of way.
3.1.3 City as additional insured using ISO form endorsements CG 20 10 (04-13) and CG 20 37 (04-13) or equivalent for ongoing and completed operations, or using ISO form endorsement CG 20 26 (04-13) or equivalent for Facility Use Agreements. Neither additional insured provisions within an insurance policy form, nor blanket additional insured endorsements will be accepted in lieu of the endorsements specified herein.

3.2 Workers' Compensation

Contractor shall comply with Workers' Compensation coverage as required by the Industrial Insurance laws of the State of Washington, as well as any other similar coverage required for this work by applicable federal laws of other states.

3.3 Employers' Liability (EL) (Stop-Gap) Insurance

Contractor shall maintain EL coverage with limits not less than One Million Dollars ($1,000,000) each employee, One Million Dollars ($1,000,000) each accident, and One Million Dollars ($1,000,000) policy limit.

3.4 Other Insurance

Other insurance may be deemed appropriate to cover risks and exposures related to the scope of work or changes to the scope of work required by City. The costs of such necessary and appropriate insurance coverage shall be borne by Contractor.

4. CONTRACTOR

As used herein, "Contractor" shall be the Supplier(s) entering a Contract with City, whether designated as a Supplier, Contractor, Vendor, Proposer, Bidder, Respondent, Seller, Merchant, Service Provider, or otherwise.

CONTRACT

Resolution No.
Contract No.

This Contract is made and entered into effective this _____ day of Choose an item. 20 , ("Effective Date") by and between the City of Tacoma, a Municipal Corporation of the State of Washington ("City"), and ("Contractor").

That in consideration of the mutual promises and obligations hereinafter set forth the Parties hereto agree as follows:

I. Contractor shall fully execute and diligently and completely perform all work and provide all services and deliverables described herein and in the items listed below each of which are fully incorporated herein and which collectively are referred to as "Contract Documents":

1. Specification No. and together with all authorized addenda.
2. Contractor's submittal (or specifically described portions thereof) dated submitted in response to Specification No. and .
3. Describe with specific detail and list separately any other documents that will make up the contract (fee schedule, work schedule, authorized personnel etc.) or any other additional items mutually intended to be binding upon the parties.

Remove this paragraph and #1 and #2 if there are no additional attachments to the contract (attachments would be things other than a specific, contract, or bonds).

In the event of a conflict or inconsistency between the terms and conditions contained in this document entitled Contract and any terms and conditions contained the above referenced Contract Documents the following order of precedence applies with the first listed item being the most controlling and the last listed item the least controlling:

1. Contract
2. List remaining Contract Documents in applicable controlling order.

II. The total price to be paid by City for Contracts full and complete performance hereunder may not exceed: , plus applicable sales tax.

III. Contractor agrees to accept as full payment hereunder the amounts specified herein and in Contract Documents, and the City agrees to make payments at the times and in the manner and upon the terms and conditions specified. Except as may be otherwise provided herein or in Contract Documents Contractor shall provide and bear the expense of all equipment, work and labor of any sort whatsoever that may be required for the transfer of materials and for constructing and completing the work and providing the services and deliverables required by this Contract.

IV. Contractor acknowledges, and by signing this Contract agrees, that the Indemnification provisions set forth in the controlling Contract Documents, including the Industrial Insurance immunity waiver (if applicable), are totally and fully part of this Contract and, within the context of the competitive bidding laws, have been mutually negotiated by the Parties hereto.

V. Contractor and for its heirs, executors, administrators, successors, and assigns, does hereby agree to the full performance of all the requirements contained herein and in Contract Documents.

VI. It is further provided that no liability shall attach to City by reason of entering into this Contract, except as expressly provided herein.

IN WITNESS WHEREOF, the Parties hereto have accepted and executed, as of the Effective Date stated above, which shall be Effective Date for bonding purposes as applicable.

CITY OF TACOMA:	CONTRACTOR:
By: _____	By: _____
Enter title of dept or div staff w/auth to sign for this $ amt	*Signature*
By: _____	_____
Choose an item.	*Printed Name*

By: _____ _____

Director of Finance *Title*

APPROVED AS TO FORM:

By: _____

City Attorney

PREVAILING WAGE RATES

This project requires prevailing wages under chapter 39.12 RCW. Any worker, laborer, or mechanic employed in the performance of any part of the work shall be paid not less than the applicable prevailing rate of wage.

The project site is located in Pierce County.

The effective date for prevailing wages on this project will be the **submittal deadline** with these exceptions:

a. If the project is not awarded within six months of the submittal deadline, the award date is the effective date.
b. If the project is not awarded pursuant to a competitive solicitation, the date the contract is executed is the effective date.
c. Janitorial contracts follow WAC 296-127-023.

Except for janitorial contracts, these rates shall apply for the duration of the contract unless otherwise noted in the solicitation.

Look up prevailing rates of pay, benefits, and overtime codes from this link:
http://www.lni.wa.gov/TradesLicensing/PrevWage/WageRates/default.asp

REQUIRED DOCUMENTS

The Contractor shall submit to the City the following Department of Labor and Industries (L&I) forms for itself and for each firm covered under 39.12 RCW that provided work and materials for the Contract:

1. A copy of an approved Statement of Intent to Pay Prevailing Wages, L&I form number F700-029-000. The City will make no payment under this Contract for the Work performed until this statement has been approved by L&I and a copy of the approved form has been submitted to the City.

2. A copy of an approved Affidavit of Prevailing Wages Paid, L&I form number F700-007-000. The Contracting Agency will not grant completion or release retainage held under chapter 60.28 RCW until all approved Affidavit of Wages paid for Contractor and all Subcontractors have been received by the City.