MEMORANDUM FOR FILE

April 10, 2014
Revised May 28, 2015 as noted by tracked changes

SUBJECT: Assessment of Radiological Events at the Mesa

EXECUTIVE SUMMARY

During the 1980s, radioactive material that had been inappropriately transferred from the site was discovered at the Mesa. That material was primarily contamination on tools and equipment that had been inadvertently released from the site as a result of a material release program that lacked the necessary rigor and was not well enough implemented to intercept all contaminated items among the thousands of items moved to the Mesa.

Since the Part 50 license did not include the Mesa, the receipt, storage, or use of radioactive material was not permitted there. Consequently, the discovery of anything with radioactive contamination required immediate and complete removal; contaminated items were immediately secured, transferred back to the site, and the area was verified to be free of residual contamination.

This assessment was accomplished through a review of historical records and through interviews with current and former San Onofre employees who have knowledge of the Mesa. The intent of this assessment is to identify those locations at the Mesa that were affected by the inappropriate presence of radioactive materials. In addition, this assessment supports a foundation that will assist in determining, for each specific event and location, whether or not additional radiological surveys are appropriate to confirm the complete cleanup of radioactive materials before termination of appropriate land leases and eventual turnover to the Department of the Navy.

INTRODUCTION

Principle Nuclear Regulatory Commission (NRC) regulations that govern the planning for and decommissioning of a commercial nuclear power plant are 10 CFR 20.1401-1406 "Radiological Criteria for License Termination," 10 CFR 50.82 "Termination of License" and 10 CFR 50.75 (g) "Reporting and Recordkeeping for Decommissioning Planning." Implementation of the radiological assessment requirements are described in NUREG-1575, Rev 1 "Multi- Agency Radiation Survey and Site Investigation Manual (MARSSIM)". MARSSIM Chapter 3 provides guidance for performing a Historical Site Assessment (HSA.)

The Mesa and its facilities were never part of the Part 50 license for the San Onofre Nuclear Generating Station (SONGS) and therefore not intended for receipt, storage, or use of any radioactively contaminated tools, materials, or equipment. As such, the discovery of anything with radioactive contamination required immediate and complete removable with an acceptance criterion of "no detectable." The only acceptable result for each event was

the immediate transfer of the radioactive material to the site and complete decontamination of the area to levels indistinguishable from background.

A dose-based standard, as utilized in license termination proceedings, is not appropriate since the area was not described by a license. Derived Concentration Guideline Levels are not applicable because there is no dose-based acceptance criterion. Therefore, the MARSSIM survey process is not applicable. However, while not applicable, the MARSSIM survey process provides a well-structured approach for any confirmatory surveys that may be necessary to ensure that removal of radioactive materials was complete.

OBJECTIVE

The objective of the HSA is to collect existing information describing a site's history; an early step in the graded radiation survey and site investigation process as defined in MARSSIM. For the area under consideration, the Mesa and its facilities that supported construction and operation of SONGS, the HSA methodology provides an appropriate well-structured approach.

While this document is not technically an HSA, it was researched and assembled with the same level of rigor. Like an HSA, existing information was assembled to allow evaluation of the events in which radioactive materials were inappropriately transferred from SONGS to the Mesa and identification of the specific locations involved. In addition, the evaluation supports a foundation that will assist in determining, for each specific event and location, whether or not additional radiological surveys are appropriate to confirm the complete cleanup of radioactive materials.

The objectives for this assessment support the standardized MARSSIM approach, that is:

1. State the problem – a history of radioactive material discoveries at the Mesa

2. Identify the decision – was the removal of radioactive materials from the area adequate for each event

3. Identify inputs to the decision – interviews and documents associated with each event

4. Define study boundaries – what areas of the Mesa were affected by each event. Are those areas sufficiently intact today such that a confirmatory survey will provide useful information

5. Develop a decision rule – is there sufficient documentation to support a decision that removal of radioactive materials from each area was complete, was any survey or decontamination performed to ensure that no residual contamination remained. The decision rule is "no detectable."

6. Specify limits on decision errors – statistical-based decision errors (such as 95% confidence for Type I errors) are not applicable. If the documentation and/or interview information cannot support a determination that removable of radioactive materials was adequate, then the area should be considered for inclusion in a confirmatory survey.

METHODOLOGY

This assessment was accomplished through a review of historical records and through interviews with current and former San Onofre employees who have knowledge of the Mesa. The Unit 1 HSA and the Interim Units 2 and 3 HSA were referred to extensively. Information contained there was borrowed quite liberally in the preparation of this document.

Relevant documents (including the U1 HSA and the Interim U2/3 HSA) and databases were searched electronically or manually to identify items of potential interest. All documents or items judged to be of potential interest were evaluated. Information that may be of use was extracted, summarized, and evaluated.

The U1 HSA and the Interim U2/3 HSA included a number of interviews of long-experienced SONGS personnel. Those interviews containing information related to the Mesa were evaluated and included in this report. Several additional and follow up interviews were conducted where appropriate.

BRIEF HISTORY OF MESA FACILITIES

San Onofre's involvement at the Mesa began in the early 1970s when it was used as a repository for the significant amount of excavated material from construction of Units 2 and 3. Early structures under the control of Bechtel Power Company were situated in the Northeast corner of the Mesa. Among those was Warehouse "B." Those buildings were eventually removed and replaced by Buildings G-48, G-49, and G-50.

By the late 1970s several facilities had been established on the Mesa. Among those facilities germane to this report were the Mesa Fabrication Shop and the Generation Retrofit Improvement Project (GRIP) Facility. Both of those facilities were established in 1979 and located on Parcel 4 known as the Lower Mesa located along El Camino Real between that road and Interstate-5. Following completion of TMI and seismic upgrades at Unit 1, the GRIP Facility was re-designated the Special Tools and Rigging (STAR) Yard. The Mesa Fabrication Shop later served as the Unit 1 Steam Generator Sleeving Mockup Training Facility.

The Ameron Laydown Area was so named because it was used by the Ameron Company for fabrication of the Units 2 and 3 circulating water system concrete pipelines. After Ameron Company's exit, that area gradually became a storage location for materials no longer needed at the units.

By 1986-1987 the facilities at the Lower Mesa were closed. The STAR Yard was moved to its final location in the Southeastern portion of the Mesa and expanded to include the Ameron Laydown Area. During late 1987 the Mesa lease was renegotiated and the Lower Mesa, designated Parcel 4, consisting of 7.8 acres, left Edison's control. Soon after that, the Navy re-contoured that entire area into a series of percolation ponds. The area is no longer intact, the surface soil having experienced significant disruption.

The Seaweed Drying Pad was established in the 1992-1994 timeframe near the southern boundary of the Mesa. Benthic material from the Units 2 and 3 intake was released via the pad to reduce the moisture content to required specifications. De-watered seaweed was also more cost effective to dispose of due to weight reduction. During the Units 2 and 3 Steam Generator Replacement (SGR) Outages, the drying pad was temporarily moved approximately 50 yards to the East to allow reconfiguring the area as an overflow parking lot for employee automobiles. The pad was re-established in its original location after completion of the Unit 3 SGR outage. There was significant disruption of the surface soil as a result.

Throughout SONGS history, the layout of the Mesa was under constant change to better support the changing needs of the units. Buildings would come and go, replaced by new structures. Surviving buildings would see changes in their craft tenants and entire areas were re-purposed. Attached maps show the areas described above.

INADVERTENT RELEASES OF RADIOACTIVE MATERIALS

Most of the radiological concern for the Mesa stems from inadvertently released radioactive material. For completeness, the SONGS radioactive material control program is briefly described below.

Until April of 1977, station procedures allowed items to be released from Unit 1 without evaluation for fixed contamination. The author recalls discussions with early Unit 1 Chem-Rad Techs describing how they would smear tools and equipment, and finding no activity would release the items for unconditional use, all without evaluation for fixed contamination. By 1980, the release limit was 0.25 mR/hr measured at one inch. While those release procedures were consistent with industry standards at that time, those criteria exceeded the evolving release standards.

In May of 1981 IE Circular No. 81-07: Control of Radioactively Contaminated Material was issued and the SONGS release program was revised to incorporate that guidance. Evaluation for both fixed and removable contamination was required before the unconditional release of suspected items. The initial version of the procedure allowed some discretion and applied only to suspect items. By the end of the 1980s, the program had been strengthened such that all items were monitored at the Radiologically Controlled Area (RCA) exit point. Hand-carried personal items (e.g. lunch box, thermos, and jacket) and the individual were again monitored by a portal monitor at the Protected Area/Restricted Area

(PA/RA) boundary. Large items must exit through the unit hold-down points. Vehicles and their contents were inspected and monitored at the hold-down area before exiting PA/RA.

In spite of those efforts, items with low level contamination occasionally escape detection and pass into the unrestricted area. Such items typically contain very low levels of contamination and have no impact on the environment or on humans. When contaminated tools or equipment were discovered outside the RCA, qualified Health Physics (HP) Technicians would confiscate the item, return it to the site, and verify that the area was free of further contaminated items and residual radioactive material.

The HP Technician present at the time of the initial contaminated item discovery had two distinct advantages over any follow up surveyor. First, knowing the exact location of the contaminated item allowed the Technician to focus additional scrutiny on that spot while surveying the surrounding area for residual activity. Second, after thirty years a significant portion of the contaminant has decayed to levels well below detectability.

DESCRIPTION OF RADIOLOGICAL EVENTS AT THE MESA

Following is a description of 11 events or time periods summarized in the ~~the~~ attached Table 1 in which radiological contamination was traced from the Protected Areas at SONGS to the Mesa. The list of events was assembled from actual documentation and/or from recollections obtained from personnel interviews where no documentation could be located.

1. **Mesa Intersection -- Contaminated Unit 1 Excavation Materials**

   Summary
   In December of 1980, approximately 100 cubic yards of contaminated soil, asphalt, and concrete were excavated from an area close to the Unit 1 containment structure and transferred to the Mesa. The material was dumped on the North side of Mesa Road just east of the intersection with El Camino Real and North of Building E-50.

   Discovery
   During a December 18, 1980 exit interview for IE Inspection 50-206/80-33, an NRC inspector explained that, based on survey records, trace quantities of radioactive material were likely present in material excavated at Unit 1. He warned that the aggregate sum of the material may have exceeded the levels allowed for disposal by burial in soil.

   Magnitude
   On January 7, 1981 a direct radiation survey was performed at the intersection using a Ludlum Model 19 micro-R-meter. General background was determined to range between 8 to 12 uR/hr. Twenty-five measurements were taken on and around the materials ranging from 8 to 25 uR/hr. 13 samples were collected and the highest activity sample was sent for Geli radiometric analysis by an off-site vendor laboratory with the following results: K-40 at 16.6 ± 0.8 pCi/g; Mn-54 at 2.2 ± 0.1 pCi/g; Co-58 at 3.9 ± 0.2 pCi/g; Co-60 at 29 ± 1.0 pCi/g; Cs134 at 8.8 ± 0.4 pCi/g; Cs-137 at 26 ± 1.0 pCi/g; and Ce-144 at 3.5 ± 0 .2 pCi/g.

All of the excavated material was removed from the Mesa by January 15, 1981. Shipping records indicated that 390 fifty-five gallon drums, with a total of 7.5 mCi of licensed material in 108 cubic yards of soil, were shipped from the Mesa to a licensed burial facility in January of 1981.

After the soil was removed, the area was re-surveyed at 5-10 μR/hr. Surface samples revealed the following levels of residual activity: Mn-54 at 0.04 ± 0.02 pCi/g; Cs-137 at 0.53 ± 0.27 pCi/g; Co-60 at 0.57 ± 0.29 pCi/g; and Cd-109 at 0.1 ± 0.05 pCi/g. Inspection Report 50-206/81-02, dated February 13, 1981, describes the NRC Inspector's independent direct radiation survey of 30 locations with levels ranging from 5 to 10 uR/hr. NRC analysis of a soil sample he obtained led the Inspector to conclude that the excavated material containing trace quantities of radionuclides had been effectively removed. The inspection item was closed. No item of noncompliance was identified.

As a direct result of this incident, San Onofre took the precautionary measure of prohibiting future disposal of excavated material from Unit 1 at the Mesa.

Evaluation
Direct radiation levels at the Mesa Intersection site were indistinguishable from background following remediation in January 1981. More than 30 years have passed since then. Residual Co-60 has undergone nearly 6 half-lives diminishing its potential presence to a level below detectability. Any remaining activity due to Cs-137 will have decayed to a level consistent with background.

The Unit 1 HSA concluded that there should be no residual contamination at the Mesa Intersection site. (Unit 1 HSA, Inspection Reports 5-206/80-33 and 81-02, 2012 SONGS Radiological Environmental Operating Report)

2. **Old Highway 101 Landfill – Unit 1 Excavation Materials**

Summary
A large amount of soil, asphalt, and concrete was excavated from the Unit 1 facility and disposed of at the "Old Highway 101 Land Fill," located approximately 1.5 miles south of Building E-50, the Edison Training and Education Center (TEC/EOF.) (It should be noted that the landfill was never part of the Mesa lease but is included here for completeness.) The removal and transfer of the soil to the landfill occurred during the 1976 and 1977 Unit 1 outage when the Sphere Enclosure and Diesel Generator buildings were constructed. It was discovered, four years later, that the excavated material might contain radioactive material.

Discovery
In 1980 and 1981, TMI retrofit projects at Unit 1 required excavation and removal of soil from the restricted area. Analysis of that material revealed the presence of low level radioactive contamination. Consequently, disposal practices for previous excavations at Unit 1 were investigated to determine whether or not contaminated soil might have been inadvertently released. It was discovered that the only significant excavation was conducted during the construction of the Diesel Generator and Biological Shield structures, during the October 1976 through March 1977 outage. The soil had been removed and transferred to the Old Highway 101 Landfill. That discovery prompted an extensive radiological survey.

Magnitude
In February 1981, a three-day effort was launched to obtain direct radiation measurements obtained with a Ludlum Model 19 micro-R-meter at 60 discrete survey points at the Old Highway 101 Landfill. Those measurements revealed no evidence of radioactive contamination above the normal range for natural background radiation. Although the radiation survey map showed a localized area with slightly elevated readings (14-15 μR/hr), these readings were determined to be the result of natural radioactivity from the concrete of the road.

Three samples of the transferred material were obtained and sent to an off-site vendor laboratory for GeLi radiometric analysis. Natural activity was detected in all three samples. The samples showed no cobalt or cesium activity above an LLD of 0.01 pCi/g. Strontium-90 was observed in two of the samples but at environmental levels.

Individual Task Assignment (ITA) #84311 describes a 1984 confirmation of the conclusions reached in the 1981 survey effort.

Evaluation
The Mesa Lease never included the area of the Old Highway 101 Landfill and there was never any indication of contamination as a result of early Unit 1 soil excavation. The 1981 direct radiation survey was extensive and thorough. Off-site analysis of the three soil samples found no cobalt or cesium activity using appropriate LLDs. The Unit 1 HSA concluded that there is no residual contamination in the landfill. (Unit 1 HSA, ITA #84311.)

3. **Contaminated Material Found at Lower Mesa -- 1981**

Summary
In October, 1981, workers at the Lower Mesa notified HP of some yellow bags in their work area. HP responded and found the bags to be free of radioactive contamination. However, while there the HP Technician performed a search for other suspect items and located a 1" galvanized pipe elbow in a tool storage box contaminated with approximately 0.14 uCi of Cs-137.

Expanded surveys of the work area were performed and located two additional items: a forklift battery with 400 cpm/100 cm^2 removable contamination, and several metal pre-filters with a maximum of 300 cpm/100 cm^2 of removable contamination.

The contaminated items were returned to the site leaving no residual contamination. The remainder of the surveyed area was found to be free of detectable contamination by direct frisk.

Evaluation
The contaminated items were found at the Lower Mesa. See the Evaluation of Event Number 4 regarding materials found at the Lower Mesa facilities.

4. **Contaminated Tools and Equipment Discovered at Mesa Facilities 1983 & 1984**

Summary
Until 1980, the release limit was 0.25 mR/hr measured at one inch. While those release procedures were consistent with industry standards at that time, those criteria exceeded

the evolving release standards. Between outages at Unit 1, tools and equipment were routinely stored around the reservoir. When the reservoir was cleared for installation of training trailers, some of those materials found their way to the Off-Shore Pad and the Mesa.

In July, August and September of 1983, a comprehensive effort was made to survey all Mesa storage facilities and a Bechtel warehouse in La Mirada, CA for contaminated tools and equipment. The GRIP Facility, the Bechtel Fabrication Shop and part of the Ameron Laydown area were all included in the Mesa survey. In response to a Notice of Violation (NOV) issued as a result of the NRC Inspection 50-206/80-23 conducted on September 26-30, 1983, a subsequent radiological impact evaluation was also conducted.

Discovery
On July 14, 1983, a contaminated heliarc-welding stand was found at the Bechtel Fabrication Shop at the Mesa with 1,300 cpm/100cm^2. On July 20, 1983, an empty gang box sent from the Mesa GRIP Facility back to Unit 1 was found to have fixed contamination on the inside of the box at 2,100 cpm/100 cm^2. As a result of those two findings and suspecting that more radioactively contaminated material may be present at the Mesa, a comprehensive radiation and contamination survey was initiated of storage areas that could have received materials from Unit 1.

Magnitude
An extensive survey of affected areas at the Mesa was initiated and included the GRIP Facility and Fabrication Shop (20 items found), the Ameron laydown areas (84 items), the Mesa Training center, E-50 (1 item), the Units 2 and 3 laydown area (67 items), Warehouse "B" (1 item), the Paint and Sandblast yard (3 items), and the Edison Warehouse (7 items.) With very few exceptions, when detected the items had fixed, but no accessible removable surface contamination. Most items were found in tool or gang boxes and thus protected from the weather. In all cases the contaminated items were confiscated, returned to the site, and the area was verified by direct frisk to be free of residual contamination.

Over 90 person-months were expended during this effort to detect and recover any and all radioactively contaminated items. Major changes were made to strengthen the material release program.

A letter from Mr. P.J. Knapp, HP Manager to Mr. P.A. Croy, Compliance Manager dated March 21, 1984 provided a final summary of contaminated items found at the Mesa and other locations. This information was forwarded by Mr. C.W. McCarthy, SCE Vice President, to Mr. F.A. Wenslawski, Chief Radiological Safety Branch, NRC Region V on March 29, 1984.

Evaluation
The GRIP Facility, Fabrication Shop, and Training Center were located on the Lower Mesa when the twenty-one items were discovered. As described above, following each discovery, the areas were verified to be free of residual contamination by direct frisk. The lower Mesa was released from Edison control during the late 1980s and was subsequently significantly re-contoured into percolation ponds. The area is no longer intact. Additional survey will not provide useful or meaningful information.

Warehouse "B" was replaced by Building G-49 by the mid-1980s. Only one item with fixed contamination and no removable activity was found there. The building is no longer intact. Additional survey will not provide useful or meaningful information.

Only three items with low levels of fixed contamination and no removable contamination were found at the original Paint/Sandblast Yard. The Paint Shop and the Yard are no longer intact. That area is now paved and houses Buildings G-40 and G-46. Additional survey will not provide useful or meaningful information.

A total of seven contaminated items were found in the Edison Warehouse, Building W-50, during its existence at the Mesa. Two of those items contained removable activity. While areas were verified free of residual contamination by direct frisk following discovery of contaminated items there. This area is considered to have a low probability for detectable residual radioactive contamination.

Sixty-seven contaminated items were discovered in the Units 2 and 3 Laydown. With few exceptions, those items contained only fixed contamination. While it is believed that most items were contained in tool and gang boxes, available data do not make that clear. Exposure to the weather was likely a factor there. Although areas were verified free of residual contamination following discovery of contaminated items, those verifications may not have been as sensitive as modern techniques. Additional survey of this area would provide definitive assurance that no residual contamination remains.

Additional contaminated items were discovered in the Ameron area following the eighty-four described above. See Event Number 6 for further discussion of that area.

5. **Contaminated Pipe Discovered at Lower Mesa – 1986**

Summary
In early December of 1985, the turbine crossover pipe from Unit 1 was removed. This pipe was part of the secondary plant, outside the RCA. Because the pipe came from a system that was presumed to be clean, release surveys in the Unit 1 hold down area were limited to accessible portions of the pipe. At this point, the pipe was found to be free of contamination and was released for storage at the STAR Yard on the Lower Mesa. This area was formerly known as the GRIP Facility.

Discovery
On February 6, 1986, an anonymous letter (86-RV-A-010) alleged that the crossover pipe had been shipped offsite because the craft giving the order was not qualified. As a result of this letter, SCE conducted an investigation. Surveys of other secondary piping revealed contamination inside of the pipes up to 1,000 cpm/100 cm^2, so the crossover pipe stored at the GRIP Facility was resurveyed.

Magnitude
Localized fixed contamination of up to 800 cpm/100 cm^2 was identified inside the pipe near the right angle weld. There was no detectable removable contamination. The pipe was returned to the site and the storage area was verified to be free of residual contamination.

Evaluation
The Unit 1 HSA concluded that there would be no residual contamination from the presence of the pipe. Further, this was a Lower Mesa location as explained in Event Number 3. The area is no longer intact. Additional survey will not provide useful or meaningful information.

6. **Contaminated Tools and Equipment Discovered at STAR Yard 1988-1989**

Summary
In May 1988, SONGS received a refurbished 2,000-pound pressurizer relief valve from Wyle Laboratories. The relief valve was sent back to SONGS contaminated with 93.3 uCi. A month later, a QA Inspector found that contaminated valve in the STAR Yard. The valve was still in the shipping box. The contaminant was fixed with no removable avtivity. (By this date, the STAR Yard had been relocated from the Lower to the Upper Mesa.)

In September, the same QA Inspector identified a fire hose contaminated to a level of 500 ccpm. That hose had been transferred to Building G-20 from the AWS Machine Shop.

As a result of those findings, QA issued Corrective Action Report (CAR) SO-P-1171 that addresses issues specific to the HP organization. CAR SO-P-1177 was issued later that month to address problems with Station support of the release program. The response to that document described corrective actions taken by the Health Physics organization and includes a list of 14 additional contaminated items found outside the Restricted Area during September. The documentation does not specify where the items were discovered nor does it describe whether or not removable contamination was present.

During a routine quarterly radiation survey in March 1989, contaminated items were discovered in several locations within the STAR Yard. It was determined that this material had been inappropriately released in February from Unit 1.

Continued survey in the STAR Yard later in March resulted in a find of additional contaminated items on a wooden pallet that had come from Units 2 and 3. In April, six more items associated with stored refueling equipment were found and were noteworthy in that cobalt particles were present. Because of the continuing discoveries of contaminated items, QA issued a Stop Work Order to prevent further releases from the site and the Mesa until corrective actions were implemented.

By Mid-April, 44 additional contaminated items had been found at the STAR Yard and returned to the site.

Unlike Event Number 4 that resulted from legacy items released with inadequate controls and practices, the series of events described for this time period represented an on-going unresolved problem. As a result of a Root Cause Evaluation and much work to satisfy the QA concerns, the release program and implementation of the program was significantly strengthened. Inadvertent releases to the Mesa essentially stopped.

Evaluation
The Upper Mesa STAR Yard suffered the largest number of contaminated item discoveries. Including the earlier findings in the Ameron Laydown area detailed in Event

Number 4, more than 140 items were found there. (Recall that the Upper Mesa STAR Yard included the area formerly known as Ameron.) While the majority of those items had no removable contamination and were found in gang boxes, buildings, or cargo containers, many items were found exposed to the weather. For many of the discovered items the data are incomplete. Several of the interviewed employees recalled that as many as four HIC shields had been stored in the Yard. There was some recollection, but no documentation, that one of the shields may have contained fixed contamination and was possibly decontaminated there. Additional survey of this area would provide definitive assurance that no residual contamination remains.

Boundaries of the STAR Yard at the Upper Mesa have varied over the years. The most heavily affected portion lies along the existing Construction Way cul-de-sac and then extends southeast to include what was originally the Ameron Area. That area is displayed on the attached map as a double cross-hatch area.

An element to the Station's response was to initiate a comprehensive survey of the Mesa. That survey included all areas at the Mesa that contained tools and equipment. Following that survey, Health Physics personnel maintained a presence at the Mesa to survey material transfers to and from the Mesa. Key Mesa locations and facilities were added to the schedule of routine radiation surveys. Those steps were taken to ensure that no items were present at the Mesa that had not be surveyed.

7. Contaminated Items Found at Mesa Salvage Yard

Summary

The Salvage Yard was located in the west end of what was most recently Camp Mesa. A large fenced area, approximately 150 yards by 25 yards, contained scrap materials. During a 1992 radiological survey effort to qualify the material for release, the following items were found to be slightly contaminated: two four-inch pipe sections, two wheels, and one Flexiatallic gasket.

Discovery

During May and June of 1992, the scrap material stored in the Salvage Yard was being evaluated for release. The materials were thought to be free of radioactive contamination. As a precaution the material was evaluated for residual radioactive contamination. The items identified above were found to contain low levels of contamination.

Magnitude

ITA 92-115 describes the two pipe sections reading 360 ccpm each with no removable contamination. GeLi radiometric analysis revealed the source of the activity to be entirely Pb-214, a natural occurring radionuclide. Consequently, the pipe sections are eliminated from further consideration. Two wheels showed 1600 and 1800 ccpm by direct frisk and no removable activity. A Flexiatallic gasket measured 4500 ccpm by direct frisk and was also free from removable contamination. Those three items showed plant produced contaminants. Consistent with protocol, the items were transferred back to the site and the area was verified to be free of residual contamination by direct frisk.

The fence on the East side of the area was removed when it was included as the Western end of Camp Mesa. A significant amount of large size gravel was added to the surface at that time.

Evaluation
Only three items were found in the Salvage Yard. The items demonstrated low level fixed contamination and no removable activity. The area was verified free of residual contamination by direct frisk following removal of the items. This area is considered to have a very low probability for detectable residual radioactive contamination.

8. **Transfer of Seaweed to Mesa Drying Pad**

Summary
Detection of low but statistically significant levels of plant produced radionuclides in Units 2 and 3 intake sludge were reported as early as 1983. Initially, radwaste discharges were suspected to be the source of that activity. Later analysis identified the source to be ocean bottom sediment. Steam generator blowdown from Unit 1 was released to the ocean. Whenever there was primary-to-secondary leakage at Unit 1 there was a strong potential for benthic material to demonstrate levels of activity that would be detectable at Units 2 and 3 just down the coast from Unit 1.

Benthic material was sampled before release. Waste found to contain radio-cesium and/or cobalt was disposed of as radwaste or in accordance with a State of California exemption obtained for specific landfill disposal. Waste showing only I-131 was allowed to decay, be re-sampled, and then disposed of in a landfill.

Following the permanent shutdown and defueling of Unit 1, the release process was modified to allow removal of benthic material without the sampling requirement. (The procedure contained a safeguard that required sampling of benthic releases if the secondary activity of either operating unit exceeded a specified threshold level.)
In the early 1990s, the Seaweed Drying Pad was established in the southern portion of the Upper Mesa. Benthic material from the Units 2 and 3 intake was released via the pad to reduce the moisture content to required specifications. De-watered seaweed was also more cost effective to dispose of due to weight reduction.

The SONGS Annual Radiological Environmental Operating Reports were reviewed from 1984 to the present. Before the shutdown of Unit 1 in 1992 kelp and ocean bottom sediment samples showed low levels of Cs-137 and Co-60. Since the shutdown of Unit 1, ocean bottom sediment samples are free of detectable plant produced activity and kelp samples show only I-131. Incidentally, the levels of I-131 since 1988 have typically been higher in control samples than those associated with the plant. The source of the radioiodine is almost certainly due to sewerage discharges of medical administrations. (SONGS Annual Radiological Environmental Operating Reports.)

Evaluation
Radioiodine was likely present in benthic material deposited at the Seaweed Drying Pad. The source of that radioiodine was sewerage discharges of medical administrations. A decay time exceeding two months would reduce any I-131 to levels below detectability. The material has been free of detectable plant produced radionuclides since the station began using the Drying Pad and is included in this assessment for completeness.

9. **Damaged Exempt Cl-36 Source in HP Classroom in Building G-48**

Summary

Classroom 105 in Building G-48 was used for initial and continuing training of HP Technicians. Several interviewees recalled that an exempt chlorine-36 source was damaged in the classroom and decontamination was required.

The exempt quantity radioactive check source was being used to support instrument training. Once the damage was discovered, the source was secured and the classroom was decontaminated and returned to service. Reportedly, a portion of the carpet was removed before the classroom was declared free of contamination. This event was thought to have occurred in the 1993-1994 time frame. No supporting documentation was found. Personnel that identified or corroborated this information include: Paul Elliott, John Scott, Todd Adler, and Al Gray.

Evaluation

Those interviewed about this event described a small, button source on which the mylar covering had become partially detached. The interviewees described a thorough effort conducted by seasoned HP Technicians to recover the classroom and to ensure that no residual activity remained. While only direct frisking was performed, the Cl-36 beta would have been easily detected. This area is considered to have a very low probability for detectable residual radioactive contamination.

HP Classroom 105 in Building G-48 warrants further consideration.

Though not directly related to the event described above, personnel interview also revealed the existence of a floor safe used to store training's radioactive check sources in what is now known as the Joint Operation Center (JOC.) The floor safe is located in a small adjoining room in the northwest corner of the JOC. That floor safe should be verified free of residual contamination before release of Building E-50.

10. **Contaminated Pliers Found in Building G-44**

Summary

During a late 2001 site-wide sweep for magenta marked items and associated radiological survey, four suspect tools were found in the Building G-44 Mesa Paint Shop. Of those four hand tools, only the pliers were found to be slightly contaminated: 250 ccpm fixed and no removable contamination. All four hand tools were returned to the site.

Evaluation

Only a single hand tool was found with low level fixed contamination and no removable activity. The worker who initially found the pliers and the surrounding area were both frisked and showed no residual activity above background. There was no spread of contamination from the event.

11. **Contaminated Air Hose Found in Building G-40**

Summary

In November 2003 two HVAC workers were assigned to prepare equipment stored at the mesa. A sealed 55-gallon drum was retrieved from storage in a cargo container at the STAR Yard and opened in the G-40 Sheet Metal Shop. When the workers noticed a 12' long ½" diameter air hose with magenta markings in the drum they stopped and contacted Health Physics.

Field surveys verified that the hose contained low level fixed contamination, <600 ccpm by direct frisk. No removable contamination was found on the hose, in the drum, in the work area, or on the HVAC Technicians. The hose and all of the other materials in the drum were returned to the plant for additional surveys. Follow-up surveys of the G-40 shop and the four other HVAC cargo containers were negative, as were surveys of the additional contents of all four drums.

Investigation determined that the drum had been sealed, released from the site, and placed in the Mesa cargo container following a 1998 replacement of the charcoal in the Units 2 and 3 Fuel Handling Building Post Accident Cleanup (PACU) Units.

Evaluation

There was no spread of contamination from the hose to the involved personnel or the surrounding area.

RESULTS OF HISTORICAL INFORMATION SEARCHES

Documents and databases that were reviewed include the Annual Radiological Environmental Reports (1984 - 2013), Health Physics Division Individual Task Assignments (ITAs) (1982 - 2011), PJK Log assignments (1982 – 1990), Integrated Health Physics System (IHPS) database of radiation surveys (1996 - present), the Action Request (AR) system in MOSAIC (1990 – 2008), Nuclear Notifications in SAP (2008 – present), and the Topic Information Server (TIS) database for mention of radioactive material at the Mesa (1987-present.)

The most useful information came from reviewing the ITAs. ITAs were used in the Health Physics Division to document assignments and results beginning in 1982 and remained active through 2011. The first two numbers of an ITA designate the year in which the assignment was made. This system was extensively used by Health Physics to document problems, issues, analyses and practices. Only a hardcopy index remains for the documents maintained there. The hardcopy index was manually reviewed for information about legacy radioactive material at the Mesa. Use of the ITA system declined as the AR system developed into the site-wide method for documenting problems and actions.

The AR system in MOSAIC became the preferred station-wide tool for documenting problems in 1999. Use of the ITA system continued within Health Physics for documentation of items such as technical studies, new equipment evaluations, dose evaluations and some internal audits. The AR system was replaced by the SAP Nuclear Notification system in 2008.

Following is a brief description of the relevant items from the ITA and AR systems:

ITA 82059

This item identifies the presence of three decon showers located on the Mesa. One shower is located in the EOF and two decon showers are located in the Mesa Medical facility. The decon showers all drain to a common 2000 gallon holding tank. Provision for use of the showers is contained in SO123-VIII-40.3, the procedure for the EOF Health Physics Leader. Periodic testing has shown the showers to be operable. The showers have never been used to decontaminate a person, hence, this item is closed.

ITA 83221

This item includes a description of initial contaminated item discoveries of contaminated items at the Lower Mesa and the ensuing investigation. Finding through September 1983 are reported and initial corrective actions are described. (Event Number 4.)

ITA 84311

Confirmation of the results from a radiological survey performed in 1981 of excavated material from Unit 1 that had been transferred to an area southeast of the site called the Old 101 Landfill. (Event Number 2.)

ITAs 84295 and 84331

Some items with low level contamination were discovered on the Mesa and their presence gave cause for issuance of an NRC Notice of Violation in September 1983. The items were believed to have been released between March 1977 and May 1982 as a result of a material release program that lacked the necessary rigor and was not well enough implemented to intercept all contaminated items among the thousands of items moved to the Mesa. The potential impact to the public was evaluated and found to be well below any level of concern. Contained is a final list of contaminated items found through February 1984 for transmittal to the NRC. (Event Number 4.)

ITA 84386

Contaminated items had been found at some previously surveyed locations at the Mesa. Material flow was investigated and traced from SONGS Unit 1 to the Off-Shore Pad, through Units 2 and 3, and eventually to the Mesa. Additional corrective actions were specified. (Event Number 4.)

ITA 89045

This item documents the unintended release from U2/3 of a flatbed truck with equipment and a release of some tools to the STAR yard. The incident was quickly detected, the items were surveyed, and contaminated items were returned to U2/3. Inadequate communication and incorrect assumptions were responsible for the incidents. A formal

root cause evaluation is included. The material release program was further strengthened. (Event Number 6.)

ITA 89061

Documents a business analysis on the cost associated with release of salvage material under the control of the Edison Warehouse. (Event Number 6.)

~~ITA 89069~~

~~Documents a skin dose evaluation of an HP Technician who became contaminated with a fuel fragment while frisking material at the STAR Yard. (Event Number 6.)~~ Due to privacy requirements and not specific relevancy to the lease, this ITA is being strikethrough from this report.

ITA 92115

This item documents the discovery of three contaminated items in the Salvage Yard. That location was later included in the establishment of Camp Mesa. (Event Number 7.)

ITAs 83181, 84319, and 84485

The items document the presence of plant produced radionuclides in seaweed and intake sludge. Disposal options and recommendations are specified. (Event Number 8.)

ITAs 88020 and 90039

Document the discovery of I-131 in benthic material collected at all three units in February 1988. Recommended decay times are calculated and specified. (Event Number ~~6~~ 8.)

ITA 92123

This item documents the last transfer of benthic waste to the Otay Mesa Landfill under a State of California exemption. (Event Number ~~6~~ 8.)

ITA 94267

This item documents an evaluation to allow the release of fish collected during operation of the plants for use as teaching aids. The evaluation References a November 1984 analysis on disposal of Benthic Material. That analysis showed that since the shutdown and defueling of Unit 1, only I-131 was detected in Units 2 and 3 benthic material. The likely source of which is sewerage releases of medical administration of radioiodine. (Event Number ~~6~~ 8.)

ITA 94268

This item documented a validation that appropriate Station organizations had made necessary procedure changes to allow disposal of benthic material without further analysis. (Event Number ~~6~~ 8.)

ITAs for 1995-2012

No ITAs associated with the Mesa were found from 1995 to 2012.

AR #010901163-6

This AR documented a Root Cause Evaluation of several failures in the material release program. Most of those involved non-contaminated but magenta marked tools found outside the RCA. Among those items was the description of four hand tools found at the Mesa Paint Shop, Building G-44. Only the pliers were found to contain low level fixed contamination. The other items were not contaminated. (Event Number 10.)

AR #031100334-1

This AR describes the discovery of an air hose with low level fixed contamination and no removable activity in the Sheet Metal Shop, Building G-40. The hose was believed to have been released from Units 2 and 3 after the equipment was last used there early in 1998. Between that time and its discovery, the hose had stored in a sealed 55-gallon drum in a cargo container at the Mesa. (Event Number 11.)

INTERVIEW RESULTS AND CORROBORATION

Eight interviews that were completed for the U1 HSA and the Interim U2/3 HSA contained recollections of the Mesa. Those interviews are included in this assessment. An additional six interviews and two follow up interviews were conducted specific to findings at the Mesa. The interview results are documented and organized in a separate binder. The results of the interviews are summarized below, as well as any corroboration found during the records review.

Interviews from U1 HSA and the Interim U2/3 HSA:

E. Bennett:	Contaminated items found in Mesa laydown area
W. Frick:	Mesa Unit 1 Steam Generator Sleeving Mockup Training Facility
S. Medling:	Mesa Unit 1 Steam Generator Sleeving Mockup Training Facility
M. Sullivan:	Mesa storage areas
R. Warnock:	Contaminated construction fill at the Mesa
B. McWey:	Stop Work Order for contaminated items found at the STAR Yard
T. Adler:	Contaminated HIC shield at the STAR Yard;
	Damaged exempt Cl-36 source in HP Classroom
P. Elliott:	Contaminated tools and equipment at the STAR Yard
	Damaged exempt Cl-36 source in HP Classroom
A. Gray	Damaged exempt Cl-36 source in HP Classroom 105, Building G-48

Additional and follow up interviews:

S. Folsom:	Validation of survey results for Old Highway 101 Landfill
E. Rinhart	Bechtel Warehouse "B"
	Establishment of Edison Warehouse at Building W-50 location
J. Scott:	Presence of HIC shields at the STAR Yard
	Damaged exempt Cl-36 source in HP Classroom 105 of Building G-48;
	Presence of floor safe in E-50 used to store training check sources
P. Edmonds:	Presence of four HIC shields at the STAR Yard
D. Webb:	Experience as an HP Technician who worked to survey the Mesa in the late 1980s and early 1990s
K. Coffman	Experience as an HP Technician who worked to survey the Mesa in the mid to late 1990s

P. Elliott: Follow up – contaminated HIC Shield may have been decontaminated at the STAR Yard

A. Gray: Follow up – confirmed that the Cl-36 event occurred in HP Classroom 105 of Building G-48

CONCLUSIONS

Most of the radiological concern for the Mesa stems from inadvertently released radioactive material. The items occasionally and inadvertently released from SONGS units typically displayed very low level contamination and had no impact on the environment or on humans.

The items were believed to have been inappropriately released between 1977 and 1989 as a result of a material release program that initially lacked necessary rigor and later was not well enough implemented to intercept all contaminated items among the thousands of items moved to the Mesa. By 1989, the release program had been sufficiently strengthened to essentially stop inadvertent releases to the Mesa. Only a very few isolated events occurred after 1990.

With few exceptions, the items contained only fixed contamination and no removable activity. A majority of items were found in tool and gang boxes or cargo containers. Those factors would mitigate concerns over the spread of contamination. However, weather exposure is a potential concern for some of the discovered items. Unfortunately, available data do not allow definitive identification of those cases.

When contaminated items were found, the situation was corrected at the time of occurrence. Discovered items were confiscated and immediately transferred back to the site. The area was searched for additional contaminated items and the area was direct frisked to ensure the area was free of detectable residual activity.

Based upon the records review and the interviews, the following areas summarized in the attached Table 2 were affected by the presence or potential presence of radioactive materials inappropriately transferred to the Mesa:

a. Mesa Intersection -- where contaminated excavation material from Unit 1 was dumped and subsequently removed. That event is covered as Event Number 1. This area was remediated and verified free of residual radioactive material upon its discovery. The adequacy of the 1981 survey effort should be evaluated and documented by separate memorandum.

b. Old Highway 101 Landfill – where non-contaminated excavation from Unit 1 had been transferred during the late 1970s. That event is covered as Event Number 2. The Mesa Lease never included the area of the Old Highway 101 Landfill and there was never any indication of contamination as a result of early Unit 1 soil excavation. It is included in this assessment only for completeness. The adequacy of the 1981 survey effort should be evaluated and documented by separate memorandum.

c. Lower Mesa – former site of the GRIP Facility/STAR Yard and the Fabrication Shop/Unit 1 Sleeving Mockup Training Facility. Discoveries of contaminated items there are covered in Event Numbers 1, 3, 4, and 5. That location is not a part of the current

Mesa. The area has been re-contoured and re-purposed by the Navy. The area is no longer intact. Additional survey will not provide useful or meaningful information.

d. Bechtel Warehouse "B" – where only one item was discovered with low level fixed contamination and no removable activity. The location has been substantially re-purposed. Covered in Event Number 4. The building is no longer intact. Additional survey will not provide useful or meaningful information.

e. Paint/Sandblast Yard – where only three items with low levels of fixed contamination and no removable contamination were found. The original Paint Shop and the Paint/Sandblast Yard in no longer intact. Additional survey will not provide useful or meaningful information.

f. Edison Warehouse, Building W-50 – where seven contaminated items were discovered. Two of the items contained removable activity. Those discoveries are covered in Event Number 4. Although this area is considered to have a low probability for detectable residual radioactive contamination, it should be included in the confirmatory survey.

g. Units 2 and 3 Laydown Area – where sixty-seven contaminated items were discovered. Those discoveries are covered in Event Number 4. Additional survey of this area would provide definitive assurance that no residual contamination remains. Hence, it should be included in the confirmatory survey.

h. STAR Yard and Ameron Laydown Area – where the majority of inadvertently released contaminated items were discovered. More than 140 contaminated items were found there. Those discoveries are covered in Events Numbers 4 and 6. Additional survey of this area would provide definitive assurance that no residual contamination remains. Hence, it should be included in the confirmatory survey.

i. Mesa Salvage Yard – where only three items with no removable contamination were found. The area was later included as the western end of Camp Mesa. Those discoveries are covered in Event Number 7. Although this area is considered to have a very low probability for detectable residual radioactive contamination, it should be included in the confirmatory survey.

j. Seaweed Drying Pad – where benthic material collected at the site was de-watered before disposal. The material deposited there was free of detectable plant produced radionuclides. The area is included in this assessment only for completeness. Covered in Event Number 8. Further consideration of this area is not warranted.

k. Classroom 105, Building G-48 – where an exempt Cl-36 source was damaged requiring decontamination of the room. Covered as Event Number 9. Although this area is considered to have a very low probability for detectable residual radioactive contamination, it should be included in the confirmatory survey.

l. HP Lab, Building E-50 – personnel interview revealed the existence of a floor safe used to store training radioactive check sources in what is now known as the Joint Operation Center (JOC.) That floor safe should verified free of residual contamination before release of Building E-50. Hence, it should be included in the confirmatory survey.

m. Mesa Paint Shop, Building G-44 – where a pair of pliers with fixed contamination was discovered. Covered as Event Number 10. Further consideration is not warranted.

n. Sheet Metal Shop, Building G-40 – where a contaminated air hose was discovered in a sealed drum. Covered as Event Number 11. Further consideration is not warranted.

RECOMMENDATIONS

1. Evaluate and document in a separate memorandum the adequacy of the 1981 radiological surveys for locations a & b and specify any additional necessary actions.

2. Prepare a Mesa Confirmatory Survey Plan to address affected locations f,g,h,i,k, and l listed above.

DEVELOPMENTAL RESOURCES

NRC Information Circular 81-07: CONTROL OF RADIOACTIVELY CONTAMINATED MATERIAL , May 14, 1981.

NUREG-1575, Rev1; EPA 402-R-97-016, Rev 1; DOE/EH-0624, Rev 1; "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM); August 2000

Unit 1 Historical Site Assessment, Part I: Historical Site Assessment Report; Part II: Interview Documentation, and Part III: Supporting Documentation.

Interim Historical Site Assessment for Units 2 and 3, Part I: Interim Historical Site Assessment Report; Part II: Interview Documentation; Part III: Supporting Documentation.

Health Physics Procedure SO123-VII-8, "Control of Radiological Material."

Health Physics Procedure SO123-VII-20.9, "Radiological Surveys."

Health Physics Procedure SO123-VII-20.9.2, "Material Release Surveys."

Health Physics Procedure SO123-VII-20.9.3, "Surveys for Release of Liquids Sludges, Slurries, and Sand."

ATTACHMENTS

1. Table 1 – Record of Radiological Events at the Mesa
2. Table 2 – Summary of Affected Areas at the Mesa
3. Mesa Map 1
4. Mesa Map 2

Memorandum Prepared by:
April 10, 2014
Revised on May 28, 2015

Terry Cooper, CHP

Reviewed by:

Stevie Vaughan, DIA RP Representative

Approved by:

Chris Ahola, CHP, Radiation Protection Manager

cc: T. Adler
J.A. Madigan
J. Janke
J.B. Moore (BHI)
CDM

Addendum to Memorandum for File – Assessment of Radiological Events at the Mesa, dated April 11, 2014

SUBJECT: Adequacy of 1981 Radiological Surveys for Mesa Locations a & b

REFERENCES:

1. Assessment of Radiological Events at the Mesa, T. Cooper, April 10, 2014
2. Mesa Survey Plan, E.M. Goldin, April 16, 2014
3. Radionuclide Distribution Profiles: Radiation Dose Contribution and Survey Requirements – REVISED, EM Goldin to JM Sills, February 23, 2006
4. Scanning Sensitivity – Soil/Area Scans of Remediated Areas, SONGS Unit 1 - REVISION 1, E.M. Goldin to J.M. Sills, January 11, 2005
5. United States Nuclear Regulatory Commission (NRC) Inspection Report No. 50-206/81-02, February 13, 1981.
6. Individual Task Assignment (ITA) #84311

Reference 1 documents a retrospective assessment of events that resulted in radioactive material being inappropriately transferred from the San Onofre Nuclear Generation Station (SONGS) to the Mesa. That assessment concluded that fourteen separate locations (Locations a through n) were affected by those transfers. Six of those locations were determined to require additional survey to ensure that the removal of radioactive material was complete:

Location f – Edison Warehouse, Building W-50
Location g – Units 2 and 3 Laydown Area
Location h – STAR Yard and Ameron Laydown Area
Location i – Mesa Salvage Yard
Location k – Cl-36 source in Rm 105, Building G-48
Location l – Source storage vault in Building E-50

Those six locations are addressed in Reference 2.

One location, “a,” the Mesa Intersection, had been contaminated by the inappropriate transfer of soil excavated in support of TMI upgrades at Unit 1 in December 1980. Upon discovery a month later, the contaminated material was immediately removed and sent to a licensed burial facility. A second location, “b,” the Old Highway 101 Landfill, received soil excavated from Unit 1 during the construction of the sphere enclosure and diesel generator buildings. That discovery prompted an extensive radiological survey confirming that no contamination was present.

In both cases, radiological surveys were performed and found levels consistent with natural background. Reference 1 recommended further review of the documentation and interviews associated with each of those two locations to confirm the adequacy of those 1981 surveys.

PURPOSE

Determine whether or not the methods and instrumentation employed during the 1981 radiological surveys were adequately sensitive with appropriate detection efficiency to ensure that the locations were left with levels indistinguishable from background.

RADIONUCLIDE DISTRIBUTION

The material deposited at Mesa Locations a and b originated at SONGS Unit 1. For potential contamination derived from Unit 1, Reference 3 analyzed data from twelve dry active waste (DAW) smear samples collected between 1993 and 2002. Neglecting minor contributors, 97% of the mix is composed of: Fe-55 14%, Co-60 22%, Ni-63 11%, Cs-134 9%, and Cs-137 41%. Cs-134, Cs-137 & Co-60 combined account for more than 70% of the mix and Fe-55 & Ni-63 together about 25%. Those ratios result in a relatively easily detectable contaminant for both beta-gamma or gamma-only detectors. Those ratios also argue against the need to perform specialized analyses for hard-to-detect radionuclides – gamma radiometric analysis of any sample matter is sufficient.

Reference 5 demonstrated that the scan MDC for a SPA-8 (1” x 1” sodium iodide crystal) detector was about 8 pCi/g. That level, incidentally, is well below the NRC screening value of 11 pCi/g for Cs-137 soil contamination.

In conclusion, the radionuclide distribution from Unit 1 yields sufficient beta-gamma radiation emissions such that standard field instruments, e.g., 1”x1” NaI based microR meters, are adequately sensitive with appropriate detection efficiency for direct radiation measurements. Gamma radiometric analysis of samples is adequate. Note that this conclusion accounts for hard-to-detect radionuclides that form a small fraction of each of the distributions.

<u>Location “a” – Mesa Intersection</u>

Reference 5, NRC inspection Report 50-206/81-02 contains the most useful information on the Mesa Intersection Event. In that report NRC Inspector G. P. Yuhas described the licensee’s radiation survey performed with a Ludlum Model 19 Micro R Meter consisting of twenty-five measurements taken on and around the dumped material. He noted general

background levels between 8 to 12 uR/hr, pre-remediation levels between 8 to 25 uR/hr, and that resurvey of the area after material removal showed a return to between 8 to 12 uR/hr. The licensee's collection of thirteen soil samples for relative counting and an independent laboratory analysis of the highest activity sample were also described.

Mr. Yuhas then described his actions:
During the course of this inspection, the inspector reviewed the licensee's data, performed independent radiation surveys using an Eberline PRM-7 Micro R/h Meter serial No. 453, calibrated December 15, 1980, and collected samples for analysis by the NRC laboratory facilities.

On January 20, 1981 the inspector performed an independent direct radiation survey consisting of 30 locations in the general area where the material had been dumped. This survey indicated radiation levels from 5-10 uR/hr with no statistically significant increase in the localized area from where the excavated materials had been removed.

On January 21, 1981 the inspector collected one square meter surface samples from the affected area and from an area considered to be background. The licensee was provided a fraction of each sample for comparative analysis. NRC analysis of the samples performed at Region V using ND6600/intrinsic germanium detector located in the mobile van indicate that virtually all the excavated material containing trace quantities of radionuclides had been effectively removed. The residual activity is noted below:

Isotope	*Activity pCi/g*
Mn-54	*0.04 ± 0.02*
Co-60	*0.57 ± 0.29*
Cd-109	*0.10 ± 0.05*
Cs-137	*0.53 ± 0.27*

Mr. Yuhas concluded:
Since the material was not buried, did not exceed the regulatory limits expressed in 10CFR20.105, "Permissible levels of radiation in unrestricted areas," and was completely removed in an expeditious manner, no item of noncompliance was identified.

Consequently, the finding was formally closed.

Evaluation
In December of 1980, approximately 100 cubic yards of contaminated soil, asphalt, and concrete were excavated from an area close to the Unit 1 containment structure and dumped at the Mesa Intersection. 390 55-gallon drums, nearly 130 cubic yards of material were subsequently removed and transferred for burial in a licensed facility. Based on extensive direct radiation measurements and confirmatory radiometric analysis of soil

samples, the licensee concluded that the excavated material had been completely removed. Based on their independent measurements, the NRC came to the same conclusion.

Direct radiation measurements of the area following removal of the excavated material were indistinguishable from background. More than 30 years have passed since then. Residual Co-60 has undergone nearly 6 half-lives diminishing its potential presence to a level well below detectability. Mn-54 and Cd-109 will have decayed by greater than 30 and 25 half-lives respectively such that those radionuclides are essentially no longer present. Any remaining activity due to Cs-137 will have decayed to a level consistent with background. The SONGS Annual Radiological Environmental Operating Reports (AREOR) for years have noted low levels of Cs-137 in soil samples for both indicator and control locations due to the deposition of weapons test fallout (and Chernobyl and Fukushima.) Those levels are typically a fraction of 1 pCi/g, for example, in the 2012 AREOR, the control location exhibited 0.25 pCi/g Cs-137.

The 1981 radiological surveys at the Mesa Intersection were adequate to ensure that radiological conditions are indistinguishable from background. Further action is not necessary.

Location “b” – Old Highway 101 Landfill

Much of the discussion for the Mesa Intersection Event applies to the Old Highway 101 Landfill since both involved excavation from SONGS Unit 1 and the same instrumentation and methods were applied. The notable difference is that the Mesa Intersection involved known radioactive material while there was never an indication of contamination at the Old Highway 101 Landfill.

Evaluation

As detailed in Reference 1, upon discovery in 1981 that Unit 1 excavated material had been transferred there, a three-day effort was launched to obtain direct radiation measurements obtained with a Ludlum Model 19 micro-R-meter at 60 discrete survey points at the Old Highway 101 Landfill. All survey data was obtained with the meter on the “slow response” setting. The meter was held stationary at each survey point for 15 to 30 seconds to provide stable and reproducible results. Those measurements revealed no evidence of radioactive contamination above the normal range for natural background radiation.

Individual Task Assignment (ITA) #84311 describes a 1984 confirmation of the conclusions reached in the 1981 survey effort.

Also in 1981, three samples of the transferred material were obtained and sent to an off-site vendor laboratory for GeLi radiometric analysis. Naturally occurring radon and thoron

daughter products were detected in all three samples. The samples showed no cobalt or cesium activity above an LLD of 0.01 pCi/g. Strontium-90 was observed in two of the samples but at environmental levels. One sample showed 0.02 ± 0.01 pCi/g and the other 0.04 ± pCi/g. Sr-90 is similar to Cs-137, in that it is commonly found in soil samples for both indicator and control locations due to the deposition of weapons test fallout (and Chernobyl and Fukushima.) SONGS AREORs show detected Sr-90 levels in soil samples from both indicator and control locations over the years 1981 to 1984 in the range of 0.02 to 0.05 pCi/g.

The 1981 direct radiation survey was professionally conducted, extensive, and thorough. It was accompanied by off-site analysis of the three soil samples that found no plant produced radioactive activation or fission products using appropriate LLDs.

The 1981 radiological survey effort for the Old Highway 101 Landfill was adequate to ensure that radiological conditions are indistinguishable from background. Further action is not necessary.

CONCLUSION

The 1981 radiological surveys performed for Locations a & b, Mesa Intersection and Old Highway 101 Landfill, respectively, were adequate to ensure that radiological conditions are indistinguishable from background. Further action is not necessary.

Addendum Prepared by:
April 28, 2014

Terry Cooper, CHP

Reviewed by:

Stevie Vaughan, DIA RP Representative

Approved by:

Chris Ahola, CHP, Radiation Protection Manager

cc: T. Adler
J.A. Madigan
J. Janke
J.B. Moore (BHI)
CDM

MEMORANDUM FOR FILE 10/7/2015

SUBJECT: MESA Radiological Report Support Documentation

The folder with the file name "Redacted docs" contains nineteen portable document files that included two Action Requests (AR's), seventeen Individual Task Assignments (ITA's). All portable document files have had the following information redacted:

- Personally Identifiable Information (PII)
- Health Insurance and Accountability Act of 1996 (HIPPA)
- Signatures
- Initials
- Social Security Numbers
- Names and addresses of non-Edison businesses

Gary Fausett Gary L Fausett 10/7/2015

BHI Energy and Power Services

Root Cause Evaluation

Action Request #: 010901163 -- 06 **Permanently Closed - Migrated to NDMS**

Assignment Type: RCE

Resp Org: H3000 Category: 90 **CLOSED** Priority: 3A

Assignee: [redacted] Forecast Date:

Reference: MATL RELEASE Due Date: 09/30/03

Owner: Health Physics Human/Programmatic Perf: ☒ Common Cause: ☒ Implementation Awaiting Equipment: ☒

Event Title: CCE - ROOT CAUSE INVESTIGATION OF STATION'S MATERIAL RELEASE PROGRAM

General Tab Information:

Originator: [redacted] H4000 86164

Added: [redacted] 11/1/2001 13:34: Updated: PHAMLQ 9/23/2003 07:20:

Problem Description:

NOTIFICATION TEXT -- CONDUCT A ROOT CAUSE INVESTIGATION OF THE STATION'S MATERIAL RELEASE PROGRAM WITH REGARDS TO THE RECENT EVENTS ASSOCIATED WITH THE CONTAMINATED ITEMS FOUND IN AND OUTSIDE OF THE PA.
DESCRIPTION -- INVESTIGATE LOW LEVEL CONTAMINATED EQUIPMENT FOUND IN THE U2,3 RESTRICTED AREA;
REFERENCE AR 010900750, 010901104, 011000911, 011000755.

Reference Tab Information:

Type	Reference	Description
SIG/NOTE4Q01		Material Release Program

Text Tab Information:

EVALUATION----------

DESCRIPTION OF PROBLEM:

In September/October 2001, SONGS personnel identified four instances of radioactively contaminated tools (tools and equipment) outside the Radiological Controlled Areas (RCAs). One of the instances involved two small hand tools (pliers/side cutters) found at the MESA and outside the Restricted Area/Protected Area (RA/PA). The other three instances involved tools outside the RCA but inside the RA/PA. On 11/16/2001, a vendor identified the receipt of a contaminated Unit 1 pipe cutter at their facility that had been released as free from detectable activity from the SONGS Unit 1 RA/PA. A subsequent search in November 2001, as a part of this root cause evaluation, revealed eight instances of magenta tools (non-contaminated) outside the RCA but inside the RA/PA.

These events did not meet management expectations cited in Health Physics Procedure SO123-VII-20.9.2 "Material Release Surveys" which calls for HP evaluations of tools released from RCAs and Radiological Material Areas (RMAs) to ensure the absence of detectable radioactivity. The inadvertent release of the two small hand tools and the Unit 1 pipe cutter outside the RA/PA had regulatory significance as violations of Site procedures, but were not reportable. The radiological significance of these events was low, in that the tools discovered had low levels of fixed activity and no detectable removable activity. Given the low levels of fixed activity, the potential for measurable radiation exposure or an uncontrolled spread of radioactivity was low.

ROOT CAUSE ANALYSIS (including background information, the sequence of events, the evidence/facts):
Background Information

Restricted Area/PA: At SONGS the main Units 2/3 Protected Area is also a Restricted Area as defined in 10 CFR Part 20. At the adjacent Unit 1 property the Industrial Area is a Restricted Area. An additional Restricted Area is located at the South Services Repair Center (SSRC.)

RCA/Hot Tool Crib: The three main RCAs at SONGS are at Units 2/3, Unit 1, and the SSRC. Hot tools

cribs, where RCA tools are issued, are provided at Units 2/3 and Unit 1.

Satellite RCA: Several Areas containing radioactive material exist outside of the main RCAs. An example is the auxillary feedwater buildings, in which the Refueling Water Storage Tanks (RWST) are located. Radioactive tanks, pipes, and sumps physically located outside the main RCA pose a contamination control challenge.

RMA/CA Area: Radioactive Materials Areas (RMA) are posted locations containing licensed radioactivity above a certain minimum quantity. Contaminated Areas (CA) are areas containing loose, removable contamination.

Magenta Tools: Hand tools, power tools, cords, hoses, and safety equipment used in areas containing radioactivity are marked magenta for contamination control purposes. They are intended to be used only in the RCAs and satellite RMAs.

Method of Analysis

An interdisciplinary team performed Process Failure Analysis (PFA) to examine the HP Material Release Process. Team membership included HP Self Assessment (Leader), HP Technical Support, HP Line Supervision, Security, Maintenance, Facilities Maintenance, NORAD, and Programs & Assessment (Coach). The team held frequent meetings to develop actions plans, status actions, clarify process requirements, and formulate new action plans. Upon completion of the actions, the teams reviewed the processes and performance, and identified failure modes and predominant failure modes. During the course of these activities, the team:

- Generated a process map covering RCA Magenta Tool Release Controls, RCA Non-Magenta (Clean) Tool Release Controls, and PA Tool Release Controls.
- Reviewed procedures SO123-XII-20.9.2, SO23-VI-5.3.5 and HP Standard S-10.
- Reviewed 2001 AR ACE/TND data.
- Interviewed workers/supervisors from HP, Security, and craft groups.
- Performed plant walkdowns of Unit 1, Units 2 and 3, and the SSRC.
- Observed release process evolutions at Unit 1, Units 2 and 3, and the SSRC.

Process Failure Analysis Results

RCA Magenta Tool Release Controls
- Stage 1: Workers obtains magenta tools from the RCA Hot Tool Crib
- Stage 2: Workers use magenta tools at job site
- Stage 3: Workers return tools to RCA Hot Tool Crib

Result for Stage 3: Workers return tools to RCA Hot Tool Crib

Workers are required to return magenta tools to RCA Hot Tool Crib. However, contrary to this requirement, 12 of 13 identified problems involved the failure of workers to return magenta tools. The problems include:

- Lifting Shackle: On 9/18/01, a turbine group craft worker reported to Health Physics that he had found a magenta lifting shackle in box of turbine lifting equipment just delivered from the SSRC storage yard. HP surveyed the shackle, locating a 500 ccpm spot. It is unknown how long the box was stored at the SSRC, when it was last used inside the Restricted Area, or where the box was specifically used when last in the Restricted Area (Reference AR 010900750.)

- O2 Monitor: On 10/14/01, a magenta O2 monitor with a 200 ccpm spot was discovered in the K-20 I&C shop. The O2 Monitor was incorrectly turned in to the K-10 toolroom instead of having been turned into the Hot Tool Room. No Tool Attendant recalls accepting the magenta O2 monitor at K-10 (Reference AR 011000755.)

NOT CONTAMINATED

- Mesa Tools: On 10/31/01 a bag containing three magenta hand tools was discovered in the G-44 Mesa paint shop. A set of pliers read 250 ccpm, and a set of sidecutters read 2.0 nCi by SAM-9. The other

magenta tool contained no detectable activity (Reference AR 011000911.)

- November 2001 Search Items: A search in November 2001, as a part of this root cause evaluation, located eight non-contaminated magenta tools outside the RCA but inside the RA/PA.

The procedure reviews, interviews and observations revealed that RCA tools are issued from hot tool cribs located in the Unit 1 and Units 2/3 RCAs. Magenta tools are checked out the RCA via a "conditional release" process for work performed in satellite RMAs. Returning tools to the RCAs after work is solely the responsibility of workers. There are no process controls to ensure tool return, such as logging the tools in and out by unique serial number. Radiation workers are permitted to escort tools to and from satellite areas themselves. There is the potential for workers to inadvertently move magenta tools outside the RCA. The current checkout process is patterned after programs observed at other plants during 1998 material release program benchmarking trips. While successful at other plants with very few satellite RMAs, the check out process has been less than successful at SONGS.

Some magenta tools are not clearly marked, making it difficult to recognize them, especially in poor light conditions and when they are mixed with (or underneath) non-magenta tools in buckets/boxes. After multiple uses and cleanings, the paint can diminish and become difficult to see. At this time, some tools have little to no magenta paint. This increases the probably of workers not returning the tools. There is also no established protocol on how to mark tools magenta or how to maintain the markings over time.

At times many common hand tools are checked out of the RCA for extended periods of time due to the number of satellite RMAs requiring tools and the length of the jobs. Large numbers of tools are used in satellite RMAs where little potential for contamination exists. This volume of tools going in and out of the RCA is difficult to manage and, again, increases the probability of workers not returning tools.

Predominant Failure Mode 1: Workers do not always return magenta tools to RCA Hot Tool Crib.

RCA Non-Magenta (Clean) Tool Release Controls

- Stage 4: Worker requests HP Survey
- Stage 5: HP Technician (HPT) Dispositions Tools for Survey
- Stage 6: HPT Surveys Tools
- Stage 7: HPT Authorizes Tool Release

One event involved discovery of a contaminated tool inside the Restricted Area which was not color-coded magenta, and thus may have been inadvertently released from the RCA.

- Harness: On 9/24/01, a MSG craftsperson brought a safety harness to the K-10 toolroom HP Technician for release from the Restricted Area. The harness had been issued a week earlier from the K-10 clean toolroom, and had been used atop a manlift in painting a turbine crane boom. The SAM-9 alarmed and a 200 ccpm spot was identified using a frisker. It is not known when the harness may have been used in the RCA, or how or where it may have been released (Reference AR 010901104.)

The procedure reviews, assessment of event data, interviews and observations did not any other recent problems with RCA Non-Magenta (Clean) tool release controls. There is no indication of a process problem and no further corrective action is warranted at this time.

PA Tool Release Controls

- Stage 8: Worker request release of tools from PA
- Stage 9: HPT dispositions tools for survey
- Stage 10: HPT surveys tools
- Stage 11: HPT authorizes tool release
- Stage 12: HPT quarantines items awaiting transport
- Stage 13: Security confirms HP Survey Prior to Release at Hold-Downs

Results of Stage 8: Worker request release of tools from PA

Workers are required to request an HPT to release tools from the RA/PA. However, contrary to this requirement, there was a near miss identified involving the failure of a worker to contact an HPT. On 01/01/01 a Bechtel carpenter was observed attempting to leave the Restricted Area via the south Security Processing Facility (SPF) with bags of new bolts which he assumed did need to be surveyed prior to release (Reference AR 010100381.)

Failure Mode: Worker inadvertently attempts to exit without tool survey

- This failure mode (near miss) occurred once in the search for material release problems. It was an inappropriate action by an individual worker. The problem was evaluated and corrected under the referenced AR. Based on procedure reviews, assessment of event data, interviews and observations, there is no indication of a process problem and no further corrective action is warranted at this time. This item is discussed further in the Improvement Items section of this report.

Results for Stage 10: HPT surveys tools

Tools and equipment exiting the Restricted Area must be evaluated by qualified HP personnel to ensure the absence of detectable activity. However, contrary to this requirement, Unit 1 Health Physics Technicians surveyed and free released from the Site a Unit 1 Decommissioning Project Tri-Tool 36" clamshell pipe cutter which was subsequently discovered to be contaminated. On 10/3/01 the Unit 1 Tri-tool, following extensive decontamination, was released and shipped back to the Sacramento-area tool vendor. The vendor frisked the "clean" tool upon receipt, finding three spots of detectable contamination in his 25 cpm background. When returned to SONGS, the tool was confirmed to have four spots of fixed contamination near the limits of detectability by direct frisk, as well as a Co-60 particle. Investigation determined that the releasing HPTs had failed to thoroughly survey the tool, miscommunicating among themselves and supervision as to who had surveyed what, and how thoroughly.

Failure Mode: HPT fails to adequately survey equipment

- This failure mode occurred once in the 14 identified material release problems. It was an inappropriate action by a pair HPTs. They did not ensure that the Tri-tool was thoroughly surveyed in a low background area before releasing it. The problem was evaluated and corrected under AR 011000911. Based on procedure reviews, assessment of event data, interviews and observations, there is no indication of a process problem and no further corrective action is warranted at this time.

Results for Stage 12: HPT quarantines items awaiting transport

HPT surveys tools and authorize release. However, based on procedure reviews, interviews and observations, a potential process problem does exist that warrants cause/corrective action. If a worker request the release of tools and the HPT surveys and releases the tools, the tools may sit unattended in the RA/PA pending transport out of the RA/PA. While unattended, the items could get mixed with other items that have not been evaluated for release.

The Mesa paint sprayer pallet tools event appears to be an example of this issue. The releasing HPT properly surveyed all of the equipment on the subject pallet on the afternoon of 10/11/01. Because he had no area to lock the pallet, he wrote his name and the date on piece of masking tape, affixed the tape to the bulldog sprayer, and left the pallet unattended until it was transported out of the Restricted Area the next day. It is likely that the bag of magenta tools, improperly removed from the RCA by some unknown route, was inadvertently placed on the pallet after the HP left.

Once materials are surveyed in the field, the Technician must either control or quarantine the load until it is removed from the RA to ensure no unsurveyed material is added to the load. At Unit 1 a lockable quarantine area is provided for this purpose. No quarantine area is provided at Units 2/3, causing the Technicians to mark the load with tape, recheck loads later, or rely on word of mouth to ensure compliance.

Failure Mode 1: HPT does not adequately quarantine evaluated tools/materials.

Results for Stage 13: Security request and HPT confirms survey of tools prior to transport out hold-downs

Security is required to confirm HPT tool surveys prior to release. When the load is trucked out of the RA/PA, Security Officers are directed to ensure that HP has approved the release by direct communication. However, based on procedure reviews, assessment of event data, interviews and observations, direct communication does not always occur. HPTs survey and evaluate hand carried and vehicular loads, logging releases and communicating concurrence to the nearby Unit 3 hold down Security Officers. During interviewees, personnel indicated some deviations occur in which loads are released on word of mouth, phone call or written note.

The Mesa tools event appears an example, in which a pallet of painting equipment was surveyed, marked by the HP with tape rather than quarantined, and removed from the Restricted Area the next day without further HP concurrence.

Predominant Failure Mode 2: HPT does not provide real time verification/face-to-face confirmation prior to tool release at hold-downs.

ROOT AND CONTRIBUTING CAUSES:
There are two predominant failure modes/causes that result in the majority of material release problems. First, there are inadequate process controls to ensure the return of magenta tools back to the RCA after use and, secondly, there are inadequate standards for HP to verify confirmation of tools prior to release/transport from hold-downs. Another failure mode/cause involves the lack of quarantine areas in Units 2/3 to assist HP in maintaining control of tools prior to release/transport out of holddowns (RA/PA boundary.)

Predominant Failure Mode 1: Workers do not always return magenta tools to RCA Hot Tool Crib.

Root Cause 1: Program Management/Other - Inadequate Process Controls: The process controls for the release/return of magenta tools are inadequate

The failure to return magenta tools to the RCA is the result of not having adequate process controls to ensure that tools released from the RCA are returned to the RCA. The process relies solely on workers to remember and implement the rule to return magenta tools and, although the failure rate is relatively low, its is unacceptable for this activity. Management's expectations are to have no magenta tools inadvertently get outside the RA/PA or get misplaced within the RA/PA. In addition, there is no established protocol on how to mark tools magenta or to maintain the markings over time. After multiple uses and cleanings, the paint can diminish and become difficult to see. For some tools, it is likely that the worker may have never recognized that the tool was a magenta tool for return to the RCA. To improve performance it will be necessary to improve the controls over the release/return of tools from the RCA, and to improve the markings on tools (Reference CA 1-5.)

Predominant Failure Mode 2: HP does not provide real time verification/face-to-face confirmation prior to tool release at hold-downs

Root Cause 2: Inadequate Procedure/Inadequate Information: The standards and facilities for verifying confirmation of tools prior to release/transport are inadequate.

The few, but more significant problems, involving contaminated tools leaving the RA/PA is the result of a lack of standards/formality in the conduct of HPT activities when confirming surveys prior to release/transport. The final barrier to tools leaving the hold down (RA/PA boundary) is a reliance on Security to confirm HP survey prior to release. Given the duties/training of Security Officers, it is realistic to limit their function to simply contacting an HPT. The HPT should then conduct all activities necessary to ensure proper survey/release at the point of survey/release. To ensure consistency in implementation, there will need to be more detail and clarity in existing procedures (Reference CA 6.) Also, the establishment of quarantine areas, as discussed below under Failure Mode 1, will improve implementation (Reference CA 7.)

Failure Mode 1: HPT does not adequately quarantine evaluated tools/materials.

Apparent Cause 1: Program Management/Other - Inadequate Process Controls - No quarantine areas in Unit 2/3 to assist HPTs in the quarantine of tools/materials

The Material Release Program relies on HP Technicians to assure that tools/materials are evaluated prior to transport out of the hold downs (RA/PA boundary), but does not provide quarantine areas to assist in them is quarantining tools/material until transport. Also, the roving Restricted Area material release HP Technician answers requests to release tools and material from the Restricted Area. A logbook, instrument cabinet, and SAM-9 are located in the K-10 foyer, but the Technician has no workstation in the field. He writes his name and beeper number on a nearby whiteboard and answers pages throughout the dayshift. Establishing work areas (quarantine areas) would assist HPTs in conducting business. It would be prudent to establish quarantine/work areas (Reference CA 7.)

RADIATION PROTECTION / REGULATORY SIGNIFICANCE

The radiological significance of the SONGS events was low. Magenta tools found in the Restricted Area do not meet Program expectations, but are not precluded by the Material Release procedure. Each of the contaminated tools discovered in the Units 2/3 Restricted Area contained only very low levels of fixed activity. No removable activity was detected. The potential for measurable radiation exposure or the uncontrolled spread of radioactivity was therefore low.

Radioactively contaminated items discovered outside the Restricted Area are significant. The small hand tools discovered at the Mesa, and a previous event in November 2000 involving a work boot (AR 001100473) released offsite have regulatory significance. The inadvertent release of licensed activity outside the Restricted Area is contravenes procedural and regulatory requirements.

The dose impact was calculated for each incident in which detectable radioactive material was discovered outside the Restricted Area. In each case calculated doses were well below 0.005 Rem total effective dose equivalent. Dose calculation documentation is on file with SONGS Health Physics Technical Support.

GENERIC ISSUE EVALUATION:
A generic issue involves the potential for other material release problems given the root causes involving the adequacy of process controls for the release/return of magenta tools and the standards for verifying confirmation of tools prior to release/transport. However, the extensive efforts during this evaluation involving searching the AR data base and site wide work areas flushed out previously not identified problems (8 instances of magenta tools outside the RCA but inside the RA/PA). Regarding the potential for other radiation release process weaknesses, none were identified during the procedure reviews, interviews and observations conducted as a part of this evaluation.

INDUSTRY/SITE EXPERIENCE EVALUATION:
Site Experience Before 1999

In June 1998 Common Cause Evaluation 980603570 was documented to examine four contaminated items found outside the RCA from 3/31/98 to 6/1/98. Two magenta tools, a ladder, and waste gas sample pump parts were involved. Although no common cause was identified, it was clear there were worker knowledge/accountability issues, and the corrective actions were fashioned primarily to address those issues. Those actions included:

- Clarification and training on proper SAM-9 use.
- Sitewide Intranet training module on tool control and material release rules.
- Test a pilot magenta tool checkout program for satellite RMAs.
- Run a material control video at control points.
- Create an HP Material Release Standard to clarify program expectations.
- Hold an HP Division Material Release standown.
- HP Manager train site supervisors and managers during July 1998 Mgt. Retraining.
- Enhance CBT by adding RCA tool control rules.
- Contractor workforce standown 12/16/98. Hot topics training Dec. 1998.
- QA surveillance SOS-043-98.
- Reconfigure the SSRC RMA.

The corrective actions to address the worker knowledge/accountability issues along with continuing communications appear to have been effective. In conducting employee interviews, the 2001 PFA team found that HPs, Security Officers, and workers appeared to have a good understanding of the Material Release Program rules. Workers know that magenta tools are for RCA/RMA use only, that all materials are required to be surveyed by HP for RCA removal, and that all tools and equipment removed from the Restricted Area must be approved by HP.

One 1998 pilot program in particular appears to warrant reexamination. Benchmarking of 11 material release programs in 1998 produced the trial of a "conditional release" program for magenta tools. Work is performed in RMAs outside the main RCA with magenta tools. Before 1998 tools were bagged in the RCA and escorted by HP out to the satellite RMA, where the posting indicated "HP approval required to remove any items." At the conclusion of the job, magenta tools were escorted back to the RCA. In 1998, use of the conditional release log was instituted. All magenta tools were itemized and logged out of the RCA in an attempt to maintain accountability. Escort rules were revised to allow workers to transport magenta tools without HP escort.

Due to plant design, SONGS has numerous satellite RMAs. Radioactive areas outside the main RCA include Blowdown Processing Systems, the Aux. Feedwater Buildings, Tendon Galleries, and several other areas. Checking magenta tools out to those areas proved cumbersome and added little value. Tools are not serialized; thus it was impossible to determine if all of the right tools were eventually recovered. Although not conclusively determined, it is believed that worker escorting and use of conditionally released magenta tools may be responsible for some of the observed errors since 1998.

2001 corrective actions will therefore terminate the conditional release program and the liberalized escorting rules. Magenta tools will only be used outside the RCA for contaminated area work, hopefully resulting in far fewer magenta tools used outside the RCA (Reference CA-3.)

Site Experience Since 1999

On 11/1/00, a HPT released to a worker a decontaminated work boot. The boot was stored in the worker's truck for a few days before it was discovered that there was residual radioactivity (Reference AR 001100473.)

Failure Mode: HPT failed to detect residual activity during survey.

- This failure mode occurred once out of the thirteen identified problems and was the result of an inappropriate action by an individual HPT. The HPT did not follow post decontamination survey procedures requiring that surveyed articles not be damp. The problem was evaluated and corrected under the referenced AR. There is no indication of a process problem, and no further action is warranted at this time.

On 8/17/00 a magenta utility knife was found on a picnic bench outside the Restricted Area near the AWS building. The knife did not contain reliably detectable activity, although it did alarm the SAM-9 on 2 of 5 tries. Investigation was unable to discover how the knife was removed from the RCA and Restricted Area. Most likely the knife was inadvertently carried out at lunch in a worker's pocket and left behind to avoid discovery upon reentering the Security Processing Facility.

Failure Mode: Worker misjudgment in discarding knife inadvertently carried out.

- This failure mode occurred once in the thirteen events analyzed. The problem was addressed by publication and by unannounced Restricted Area exit inspections (Reference AR 000800974.) There is no indication of a process problem, and no further action is warranted at this time.

Recent Industry Experience

At Callaway Station Inspectors in 2001 identified that the licensee had not adequately surveyed items released from the radiologically controlled area. This finding was a violation of 10 CFR 20.1501(a).

The inspectors identified that the licensee had not evaluated personnel contamination monitors, portable frisking instruments, and tool monitors to determine their capability of detecting all radionuclides that could be released from the radiologically controlled area. Analysis of waste stream data confirmed that the primary isotope of interest in the waste stream was Iron-55. Since Iron-55 decays by electron capture and emits only a low energy x-ray, this makes it difficult to detect utilizing the licensee's instruments. The licensee had not evaluated the ability of its personnel contamination monitors, portable frisking instruments, and tool monitors to identify all radionuclides that might be present on items released from its control. Without this evaluation, the licensee could not ensure that release surveys were adequately performed.

The significance of this violation was determined to be more than minor, because it could be reasonably viewed as a precursor to a significant event and it involved an occurrence in the radioactive material control program. This violation was processed through the public radiation safety significance determination process and determined to be of very low safety significance (Green), because it did not result in public dose greater than 0.005 rem, and there were no more than five related events.

Applicability to SONGS: The event is applicable to SONGS in that SONGS uses similar instruments and also has electron capture isotopes comprising a significant fraction of the waste stream. We have performed the required evaluations, however, to assure that the instruments used in performing material releases are adequate.

IMPROVEMENT ITEMS

The interviews, plant walk downs, observations and analysis by the RCE team reveal the following items for improvement:

Item 1: Evaluate signage for RMA exits to prevent inadvertent removal of tools.

- RMA postings prohibiting removal of items are visible upon entry to the area. It may add value to have a similar reminder visible on the backside of the sign, facing the worker who is exiting the RMA (Reference Improvement Action 8.)

Item 2: Evaluate improving Restricted Area and Industrial Area exit signage and amnesty drums.

- Tools and equipment require HP evaluation for release from the Restricted Area at SONGS; a release barrier outside the RCA employed at SONGS and only a few other plants. Signage at the Restricted Area pedestrian exits reminds workers to contact HP if removing tools or equipment from the Restricted Area. Tool amnesty drums are provided into which workers may deposit tools which require HP survey for removal from the Restricted Area, but which the worker need not actually remove. Most tools and equipment removed from the Restricted Area exit via the vehicle gates. Security Officers man the gates, and are directed by procedure to ensure that tools and equipment leaving the Restricted Area have been evaluated by Health Physics. Workers and Security Officers appear to have a good working knowledge of the rules. (Reference Improvement Action 9.)

Item 3: Evaluate the applicability of available large area probes and bag monitors to the Material Release Program.

- Conventional GM friskers and scintillation tool monitors are used in the material release program. Large area probes and bag monitors may offer improved performance in some situations. (Reference Improvement Action 10.)

Item 4: Evaluate and eliminate, if practical, candidate satellite RMAs.

- The existence of satellite RMAs challenges contamination control efforts. While most satellite RMAs exist by plant design, it is possible that concerted effort may eliminate one or two existing satellite RMAs (Reference Improvement Action 11.)

Item 5: Prohibit free release of clean common hand tools from the RCA..

- Workers exiting the RCAs self-survey hand carried personal effects using the SAM-9 tool monitor. Tools and equipment are presented to HP for release at the RCA control points and at the Units 2/3 truckbay. Materials are surveyed using the SAM-9 and friskers, and are released if no detectable activity is found. Common hand tools are presently free released from the RCA with supervisory concurrence. If no common hand tools were released from the RCA, challenges to the release program would be fewer (Reference Improvement Action 12.)

COMPLETED CORRECTIVE ACTIONS (Reference the tracking document):
On 11/2/01 the following interim corrective actions were implemented by sitewide communication:

- Hand tools will not be released from Radiologically Controlled Areas. Exceptions require HP Manager approval. (Tracking Document: No exceptions approved through 12/07/01.)

- Other materials, tools, and equipment submitted for release from the Restricted Areas or the Units 2/3 truckbay will be subject to second checks by qualified HP Technicians. (Tracking Document: Material Release Logbooks.)

- Division Managers will coordinate searches of all SONGS' shops, tool boxes, laydown areas and offices for magenta tools adrift outside approved Radioactive Materials Areas. (Objective Evidence of Completion: AR 010901163, assignments 7-28.)

Reference: E-Mail, from HP Manager [redacted] to Site Personnel, dated 11/2/01, Subject: Material Release Restrictions (See Notes tab for copy):

PLANNED REQUIRED CORRECTIVE ACTIONS [must be linked on CA Tab]:

1) Develop and implement standardized RCA tool marking protocol to conspicuously identify RCA tools (CA for Root Cause 1).
2) Revise SO123-XV-30 to incorporate magenta tool program responsibilities presently carried in HP procedures (CA for Root Cause 1).
3) Revise appropriate HP program documents and training materials to specify magenta tools use in remote contaminated areas only (CA for Root Cause 1).
4) Revise appropriate program documents and training materials to require HP escort of magenta tools used outside the main RCAs (CA for Root Cause 1).
5) Prohibit the release of common hand tools from the RCA (CA for Root Cause 1).
6) Revise appropriate HP and Security procedures to require face-to-face HP concurrence for release of tools and equipment, subject to reasonable exceptions, from the Restricted Area (CA for Root Cause 2).
7) Provide Material Release quarantine areas and workstations near the U3 vehicle exits (CA of Apparent Cause 1).

OTHER ACTIONS NOT REQUIRED AS DEFINED PER SO123-XV-50:
Improvement Items:
8) Improve signage for RMA exits to prevent inadvertent removal of tools.
9) Improve Restricted Area and Industrial Area exit signage and amnesty drums.
10) Make available large area probes and bag monitors to the Material Release Program where practical.
11) Evaluate and eliminate, if practical, candidate satellite RMAs.

Approval Tab Information:

Code	To Status	From	By	Timestamp	Pax
CHG-RESTR			[redacted]	9/23/2003 14:11:43	
AR Restraint has changed for assignment: 6 Type: RCE old value was "0.0"					
A	90	80	[redacted]	9/23/2003 14:11:36	86164
A	80	50	SYSTEM	9/23/2003 07:20:31	
Child assignments closed					
DASSOC			[redacted]	8/13/2003 11:47:22	
Disassociated assignment AR#: 010901163 Seq: 56					

Code	To Status	From	By	Timestamp	Pax
CHG-RQD			[redacted]	8/13/2003 11:47:08	
Basis for Assignment Required status change: this CWO (MO assignment #56) has been superceded by the CWO of assignment #60 (per K. Weiss) #60 is now linked, will unlink #56					
CA TAB			[redacted]	8/13/2003 11:46:02	
REQUIRED_FLAG was changed by: [redacted] old value: Y new value: N					
ASSOC			[redacted]	8/13/2003 11:45:37	
Associated assignment AR#: 010901163 Seq: 60					
CHG-DD			[redacted]	6/25/2003 12:10:36	
Due date not valid, due date reassessed by assignee/supervisor (describe in COMMENTS)					
CHG-DD			[redacted]	6/25/2003 12:10:36	
Due Date has changed for assignment: 6 Type: RCE Old value was "4/15/2003 00:00:00"					
CHG-DD			[redacted]	6/25/2003 12:10:36	
Due date established to match sub-assignments 55 & 56 of this AR.					
ASSOC			[redacted]	3/26/2003 10:33:57	
Associated assignment AR#: 010901163 Seq: 58					
DASSOC			[redacted]	3/26/2003 10:33:23	
Disassociated assignment AR#: 010901163 Seq: 58					
CHG-RQD			[redacted]	3/26/2003 10:33:10	
Basis for Assignment Required status change: need to temporally disassociate assignment to fix ar assignment screen display to eliminate secondary linkage to caf and associate properly to RCE					
CA TAB			[redacted]	3/26/2003 10:33:03	
REQUIRED_FLAG was changed by: [redacted] old value: Y new value: N					
ASSOC			[redacted]	3/26/2003 10:31:47	
Associated assignment AR#: 010901163 Seq: 56					
DASSOC			[redacted]	3/26/2003 10:31:05	
Disassociated assignment AR#: 010901163 Seq: 56					
CHG-RQD			[redacted]	3/26/2003 10:29:19	
Basis for Assignment Required status change: need to temporally disassociate assignment to fix ar assignment screen display to eliminate secondary linkage to caf and associate properly to RCE					
CA TAB			[redacted]	3/26/2003 10:27:18	
REQUIRED_FLAG was changed by: [redacted] old value: Y new value: N					
ASSOC			[redacted]	3/26/2003 09:57:18	
Associated assignment AR#: 010901163 Seq: 58					
ASSOC			[redacted]	3/26/2003 09:56:32	
Associated assignment AR#: 010901163 Seq: 57					
ASSOC			[redacted]	3/26/2003 09:56:21	
Associated assignment AR#: 010901163 Seq: 56					
ASSOC			[redacted]	3/26/2003 09:56:06	
Associated assignment AR#: 010901163 Seq: 55					
CHG-CE			[redacted]	3/18/2003 14:46:58	
Implementation Awaiting Equipment has changed for assignment: 6 Type: RCE old value was "N"					
CHG-DD			[redacted]	2/24/2003 07:23:25	
due date extended to meet Laydown sub-assignment closure date.					
CHG-DD			[redacted]	2/24/2003 07:23:25	
Due Date has changed for assignment: 6 Type: RCE Old value was "2/24/2003 00:00:00"					
CHG-DD			[redacted]	2/24/2003 07:23:25	

Code	To Status	From	By	Timestamp	Pax
CHG-DD			[redacted]	12/19/2002 08:13:16	
CHG-DD			[redacted]	12/19/2002 08:13:16	
due changed to reflect assignment time frame to complete laydown ar assignment; temporary quarantine area at U2,3 constructed to receive materials in the PA prior to release from the site					
CHG-DD			[redacted]	12/19/2002 08:13:16	
Due Date has changed for assignment: 6 Type: RCE Old value was "12/30/2001 00:00:00"					
EST-DD			[redacted]	12/2/2002 15:17:46	
Due Date has changed for assignment: 6 Type: RCE Old value was "4/30/2002 00:00:00"					
EST-DD			[redacted]	12/2/2002 15:17:46	
Interim U2,3 quarantine area established for material release program. Remaining RCE action will close pending management review of RCE corrective actions; RCE extened pending this review.					
EST-DD			[redacted]	12/2/2002 15:17:46	
CHG-RESTR			[redacted]	10/30/2002 09:27:22	
AR Restraint has changed for assignment: 6 Type: RCE old value was ""					
A1	50	45	[redacted]	10/30/2002 09:26:54	89485
Re-Opened RCE and associated assignments #47 and #49					
ASSOC			[redacted]	10/30/2002 09:25:57	
Associated assignment AR#: 010901163 Seq: 49					
ASSOC			[redacted]	10/30/2002 09:25:24	
Associated assignment AR#: 010901163 Seq: 47					
CHG-RESTR			[redacted]	10/30/2002 09:24:52	
AR Restraint has changed for assignment: 6 Type: RCE old value was ""					
D2	45	90	[redacted]	10/30/2002 09:24:14	89485
Re-Opened to incorporated comments from CAT (Asmgt 45).					
A	90	50	[redacted]	4/25/2002 13:16:28	
Child assignments closed.					
CHG-RESTR			[redacted]	12/18/2001 14:16:42	
AR Restraint has changed for assignment: 6 Type: RCE old value was ""					
GEN-TND			[redacted]	12/18/2001 14:16:42	
Created Assignment Type: TND from RCE/ACE/RCT process					
CHG-DUE			[redacted]	12/18/2001 14:16:40	
Due Date has changed for assignment: Old value:12/1/01New value: 4/30/02					
A	50	40	[redacted]	12/18/2001 14:16:29	87780
CHG-RESTR			[redacted]	12/14/2001 13:09:19	
AR Restraint has changed for assignment: 6 Type: RCE old value was ""					
A	40	30	[redacted]	12/14/2001 13:09:12	86661
CHG-RESTR			[redacted]	12/14/2001 09:43:41	
AR Restraint has changed for assignment: 6 Type: RCE old value was ""					
A	30	20	[redacted]	12/14/2001 09:43:33	86164
CHG-RESTR			[redacted]	12/14/2001 09:43:29	
AR Restraint has changed for assignment: 6 Type: RCE old value was ""					
A	20	10	[redacted]	12/14/2001 09:43:14	86164

Code	To Status	From	By	Timestamp	Pax
CHG-RESTR			[redacted]	11/1/2001 13:34:37	

AR Restraint has changed for assignment: 6 Type: RCE old value was "null"

Notes Tab Information:

Reference: Copy of E-Mail from HP Manager [redacted] to Site Personnel as Interim Corrective Action:

[redacted] (Broadcast)
Sent by: NETWORK SECURITY-SONGS
11/02/01 05:33 PM

SITE PERSONNEL

Contaminated magenta tools have been discovered adrift outside Radiologically Controlled Areas (RCAs) on three separate occasions in the last six weeks. The third incident occurred this week, with the discovery of a bag containing several contaminated magenta hand tools at a Mesa craft shop. Interim corrective actions implemented immediately to prevent further errors include:

Hand tools will not be released from Radiologically Controlled Areas. Exceptions require HP Manager approval.

Other materials, tools, and equipment submitted for release from the Restricted Areas or the Units 2/3 truckbay will be subject to second checks by qualified HP Technicians.

Division Managers will coordinate searches of all SONGS shops, tool boxes, laydown areas and offices for magenta tools adrift outside approved Radioactive Materials Areas.

Control of radioactive materials in general, and magenta color coded "hot tools" in specific, is essential. Your cooperation in tightening existing and interim controls is appreciated. Questions regarding the release of tools or material from the RCA or the Restricted Area/Protected Area should be directed to the HP Control Point at [redacted]

[redacted]
Manager, Health Physics

CA Tab Information:

AR/SEQ/TYPE			Resp Org	Assignee	Due Date	Status	QA	REQ	Priority	MO Type
010901163	48	CAF	N2400	[redacted]	1/15/2002	90		N	3A	

PERFORM INTERIM CAF TO VERIFY EFFECTIVENESS OF COMPLETED INTERIM ACTIONS TO PREVENT RECURRENCE, (ROOT CAUSE INVESTIGATION OF STATION'S MATERIAL RELEASE PROGRAM)

010901163	30	OTH	H3000	[redacted]	04/12/2002	90		Y	3A	

DEVELOP AND IMPLEMENT STANDARDIZED RCA TOOL MARKING PROTOCOL TO CONSPICUOUSLY IDENTIFY RCA TOOLS (CA FOR ROOT CAUSE 1).

010901163	31	PRO	H3000	[redacted]	04/12/2002	90		Y	3A	

REVISE SO123-XV-30 TO INCORPORATE MAGENTA TOOL PROGRAM RESPONSIBILITIES PRESENTLY CARRIED IN HP PROCEDURES (CA FOR ROOT CAUSE 1).

010901163	32	TRN	H3000	[redacted]	04/12/2002	90		Y	3A	

REVISE APPROPRIATE HP PROGRAM DOCUMENTS AND TRAINING MATERIALS TO SPECIFY MAGENTA TOOLS USE IN REMOTE CONTAMINATED AREAS ONLY (CA FOR ROOT CAUSE 1).

010901163	33	TRN	H3000	[redacted]	04/12/2002	90		Y	3A	

REVISE APPROPRIATE PROGRAM DOCUMENTS AND TRAINING MATERIALS TO REQUIRE HP ESCORT OF MAGENTA TOOLS USED OUTSIDE THE MAIN RCAS (CA FOR ROOT CAUSE 1).

010901163	34	OTH	H3000	[redacted]	04/12/2002	90		Y	3A	

PROHIBIT THE RELEASE OF COMMON HAND TOOLS FROM THE RCA (CA FOR ROOT CAUSE 1).

010901163	35	PRO	H3000	[redacted]	04/12/2002	90		Y	3A	

6) REVISE APPROPRIATE HP AND SECURITY PROCEDURES TO REQUIRE FACE-TO-FACE HP CONCURRENCE FOR RELEASE OF TOOLS AND EQUIPMENT, SUBJECT TO REASONABLE EXCEPTIONS, FROM THE RESTRICTED AREA (CA FOR ROOT CAUSE 2).

010901163	36	OTH	H3000	[redacted]	04/12/2002	90		Y	3A	

7) PROVIDE MATERIAL RELEASE QUARANTINE AREAS AND WORKSTATIONS NEAR THE U3 VEHICLE EXITS (CA OF APPARENT CAUSE 1).

CA Tab Information:

AR/SEQ/TYPE			Resp Org	Assignee	Due Date	Status	QA	REQ	Priority	MO Type
010901163	47	LAY	H3000	[redacted]	04/15/2003	90		Y	3C	

Notification text -- Non-outage laydown area requested per the referenced AR. Request approx. 10' x 20' fenced, gated HP Material Release quarantine area sited near the U3 LCS. Critical corrective action per the referenced RCE.
DESCRIPTION -- INVESTIGATE LOW LEVEL CONTAMINATED EQUIPMENT FOUND IN THE U2,3 RESTRICTED AREA;
REFERENCE AR 010900750 & 010901104.

010901163	49	EEB	C2100	[redacted]	02/24/2003	90		Y	3C	

Notification text -- Engineering modification request for Gatekeeper review and processing. Need Engineering approval to erect 12' x 20' chain link fence HP Lockdown area just south of the Unit 3 HUT. Laydown request has been approved by all affected parties.
DESCRIPTION -- INVESTIGATE LOW LEVEL CONTAMINATED EQUIPMENT FOUND IN THE U2,3 RESTRICTED AREA;
REFERENCE AR 010900750 & 010901104.

010901163	55	ECP	C2100	[redacted]	09/30/2003	90		Y	3A	

NOTIFICATION TEXT -- PROCESS ENGINEERING CHANGE IAW THE GUIDANCE OF SO123-XXIV-10.1 ERECT 12' X 20' CHAIN LINK FENCE HP LOCKDOWN AREA JUST SOUTH OF THE UNIT 3 HUT. REFER TO EEB ASIGNMENT 49. SEE NOTE TAB OF THIS ASSIGNMENT FOR ADDITIONAL INFO.
DESCRIPTION -- INVESTIGATE LOW LEVEL CONTAMINATED EQUIPMENT FOUND IN THE U2,3 RESTRICTED AREA;
REFERENCE AR 010900750 & 010901104.

010901163	57	SCN	C2100	[redacted]	01/06/2003	99		Y	3C	

Notification text -- Document 50.59 screening for the proposed change/activity
DESCRIPTION -- INVESTIGATE LOW LEVEL CONTAMINATED EQUIPMENT FOUND IN THE U2,3 RESTRICTED AREA;
REFERENCE AR 010900750 & 010901104.

010901163	58	SCN	C2100	[redacted]	09/01/2003	90		Y	3A	

Notification text -- Document 50.59 screening for the proposed change/activity
DESCRIPTION -- INVESTIGATE LOW LEVEL CONTAMINATED EQUIPMENT FOUND IN THE U2,3 RESTRICTED AREA;
REFERENCE AR 010900750 & 010901104.

010901163	60	MO	W0010	[redacted]	09/19/2003	90		Y	4	CW

Notification text -- Write CWO to supersede CWO 02120032000 for Implementation of ECP 010901163-55, Install HP Quarantine Fence
DESCRIPTION -- INVESTIGATE LOW LEVEL CONTAMINATED EQUIPMENT FOUND IN THE U2,3 RESTRICTED AREA;
REFERENCE AR 010900750 & 010901104.

----- END OF REPORT -----

SONGS RADIOLOGICAL SURVEY

DATE 10/31/01 TIME ~11:30A Page ___ of ___

UNIT	N	SURVEY REASON	☐ Post-Decon ☐ Pre-Job	SURVEY NO.	011031-017
AREA	S4F	☐ Routine	☐ Shipment/Receipt	MO NO.	N/A
ELEV	117	☐ Job Coverage	☐ Source/Leak Test	REP NO.	N/A
ROOM		☐ Pwr Entry ___%	☒ Other MAGENTA TOOL SURVEY	EQUIP. ID.	

HAND TOOLS FOUND AT MESA	MASSLINN SMEARS IN DPM/100cm²	DIRECT FRISK	SAM 9
*10" CHANNEL LOCKS	<1K	~250 NCPM	11.1 nci
* ADJUSTABLE WRENCH	<1K	<100 NCPM	2.3 nci cleared
* DIAGONAL CUTTERS	<1K	<100 NCPM	CLEARED 2.8 nci
TIN SNIPS	<1K	<100 NCPM	CLEARED

* - TOOLS PAINTED MAGENTA

** - BACKGROUND READING BETWEEN 80 - 100 CPM

UPON ARRIVAL AT G-44 PAINT SHOP AT MESA, WAS DIRECTED TO A BAG OF HAND TOOLS CONTAINING THE ABOVE LISTED ITEMS. AFTER CHECKING THE TOOLS FOR SMEARABLE + FIXED CONTAMINATION, WAS DIRECTED TO THE PALLET WHERE THE TOOLS WERE FOUND. SPOT CHECK DIRECT FRISK OF PALLET (WOODEN) AND EQUIPMENT LOCATED IN THE GENERAL AREA AND ON THE PALLET WAS PERFORMED. ALL DIRECT FRISK READINGS WERE <100 NCPM. SMEARS TAKE IN SAME LOCATION WERE ALL <1K DPM/100cm². WORKER WHO INITIALLY FOUND THE BAG OF TOOLS FRISKED HIS HANDS AS WELL - NO DETECTABLE COUNTS ABOVE BACKGROUND WERE NOTED. SUPERVISOR - [redacted] - REQUESTED A WEIGHT ON THE CHANNEL LOCKS FOR CURIE CONTENT CALCULATION. WEIGHT OBTAINED FROM TRIPLE BEAM SCALE - 425 GRAMS. SUPERVISOR AUTHORIZED TRANSFER OF EQUIPMENT FROM MESA TO SSRC RMA. PERFORMED SAM9 SURVEY AT SSRC.

NO.	β⁻γ DPM/100cm² or mr/hr/100cm² OW-CW	α DPM 100cm² or <MDCR	NO.	β⁻γ DPM/100cm² or mr/hr/100cm² OW-CW	α DPM 100cm² or <MDCR	Masslinn NO.	Masslinn Max net cpm	Masslinn Hot Part. (Y/N)
1			16			A		
2			17			B		
3			18			C		
4			19			D		
5			20			E	N/A	
6			21			F		
7			22	N/A				
8	N/A		23					
9			24					
10			25					
11								
12								
13								
14								
15								

SURVEY CLASS
- ☐ Boundary
- ☐ Trend Pt.
- ☒ General Area
- ☐ Component
- ☐ Individual

SURVEY DESCRIPTION: MAGENTA TOOLS FOUND AT G-44 PAINT SHOP - MESA

REMARKS:

TOOLS CURRENTLY BEING HELD AT SSRC RMA PER M. LEWIS' REQUEST

Instruments used

Model	ASP1-GN	SAM9		
Serial No.	1035	145		

TECHNICIAN

Print [redacted]

Sign [redacted]

APPROVED BY

Print [redacted]

Sign [redacted]

Approval Date: 10-31 Time: 1350

Page 1 of 1 (for this survey)

Reference Number SO123-VII-20.9

Form Number SCE HP (2/3) 1259-1000 REV. 1 11/1/94

Originator File Copy

Apparent Cause Evaluation

Action Request #: 031100334 -- 01 Permanently Closed - Migrated to NDMS

Assignment Type: ACE

Resp Org: H3000 Category: 90 CLOSED Priority: 3A

Assignee: [redacted] Forecast Date:

Reference: Due Date: 01/10/04

Owner: Health Physics Human/Programmatic Perf: ☒ Common Cause: ☐ Implementation Awaiting Equipment: ☐

Event Title: INVESTIGATE DISCOVERY OF FIXED CONTAMINATED MAGENTA AIR HOSE IN MESA G40 SHOP

General Tab Information:

Originator: [redacted] H3000 89117

Added: [redacted] 11/6/2003 13:10: Updated: [redacted] 1/22/2004 11:16:

Problem Description:

Notification text -- PERFORM AN APPARENT CAUSE EVALUATION OF THE EVENT(S) ON THE REFERENCED AR
DESCRIPTION -- INVESTIGATE FIXED-CONTAMINATED MAGENTA AIR HOSE DISCOVERED IN MESA G-40 METAL SHOP OUTSIDE THE RESTRICTED AREA.

Reference Tab Information:

Text Tab Information:

EVALUATION---------- Document the ACE in accordance with SO123-XV-50.39, Attachment 2. Do Not Delete the Default Template.

TITLE: Contaminated Magenta Hose Discovered on Mesa

ACE EVALUATOR: [redacted] Health Physics Technical Specialist

PROBLEM STATEMENT: A magenta radioactively contaminated 1/2" diameter air hose was discovered in a 55-gallon drum normally stored at the Mesa storage yard (Staryard) on Thursday, November 6 2003.

Health Physics personnel evaluate materials removed from Radiologically Controlled Areas (RCAs) to ensure that no detectable activity is ultimately released from the Restricted Area. This event is being evaluated to determine why the RCA evaluation barrier failed to contain this source as intended.

Because the radioactive source was discovered inside a sealed drum which had been unopened since removal from the Restricted Area, radiological significance is low. No measurable exposure or spread of contamination to areas accessible by Site staff or members of the public resulted.

There are no related source documents, LERs, NCVs, or NOVs that pertain to this event.

AS-FOUND EVIDENCE AND FACTS:

Maintenance Division HVAC staff store excess supplies and infrequently used equipment in four locked cargotainers in the staryard or temporarily moved to the G-40 sheet metal shop on the Mesa.

In November 2003 the Maintenance HVAC crew was assigned to perform infrequent maintenance on a Units 2/3 CREACUS HVAC unit. Special equipment was to be used to evacuate and replace the HVAC unit charcoal bed.

Hoses, cords, tubing, and other materials associated with the special charcoal replacement rig were stored in four 55-gallon drums located inside one of the Mesa cargo containers. Each drum was bolted

shut and marked with tape indicating that the drum(s) had been released from the RCA 1/15/98. January, 1998 was the last time HVAC charcoal replacement had been performed in the plant.

When opened on November 6 in the G-40 shop by two HVAC Technicians preparing equipment for the CREACUS job, one of the drums was discovered to contain a single 12' magenta air hose located at the bottom of the drum.

The magenta hose was not discovered during a late 2001 sitewide magenta tool sweep that followed the discovery of two contaminated magenta tools on the Mesa. HVAC did not open or inspect any of the MESA cargo containers or any of their contents in the directed inspection of late 2001.

SEQUENCE OF EVENTS:

In January, 1998 SCE HVAC Technicians replaced the charcoal in the Units 2/3 Fuel Handling Building Post Accident Cleanup (PACU) Units. The charcoal is normally recharged on a 10 year cycle. Anticipating no need for the specialized charcoal moving equipment for several years, the Technicians and HP prepared the equipment inside the RCA for storage at the Mesa at the conclusion of the job. Health Physics surveyed and released the equipment from the RCA, as indicated by tape affixed to the top of the equipment drums. The tape read "Released to the Mesa 1/15/98" and was initialed by an SCE HP Technician. The drums were transported to the Mesa for storage in locked HVAC cargotainers.

On October 31, 2001 two contaminated magenta hand tools were discovered in a Maintenance shop on the Mesa. Root Cause Evaluation 010901163 was performed. Site Division Managers were assigned in December, 2001 to make detailed searches of all shops, tools boxes, laydown and storage areas, and offices for additional magenta tools and equipment outside the RCA. Communications between the HP Manager and the Maintenance Manager at that time sought to clarify the extent of the intended searches. The searches then performed by Maintenance, documented on AR 010901163-8, discovered no further magenta tools outside the Restricted Area.

On Wednesday November 5 2003 two SCE Maintenance HVAC Technicians were assigned to prepare equipment stored at the Mesa . Using a forklift, they removed four 55-gallon drums of materials from one of four locked HVAC cargotainers and moved them to the nearby G-40 Sheet Metal Shop. They also removed a skid-mounted charcoal replacement rig, and began assembling the rig in the metal shop as assigned. The materials were scheduled to be used in the plant the following week to replace charcoal in a CREACUS HVAC unit.

On Thursday morning, November 6 the two HVAC Technicians began opening the drums and removing the hoses, cords, tubing, and other materials needed to assemble and test the charcoal replacement rig. Each drum was secured with a ring and bolt, and was marked on top with white tape indicating that the drums had last been released from the plant by Health Physics on 1/15/98. The HVAC Supervisor recalled that charcoal maintenance was last performed in the plant in January, 1998 when the FHB PACU units were serviced.

One of the drums was opened and materials were removed and stacked next to the drum. As they emptied the drum the Technicians saw that the last item in the drums was a 12' long 1/2" diameter air hose with Chicago fittings. The hose was clearly marked with magenta spray paint. They immediately stopped working and contacted both Health Physics and their Supervisor.

HP responded immediately with a Technician who was working at the nearby G-48 Training building. That Technician secured the area and personnel until an on-shift Technician and HP Technical Specialist responded shortly thereafter. Field surveys verified that hose contained low level fixed contamination. No removable contamination was found on the hose, in the drum, in the work area, or on the HVAC Technicians. The hose and all of the other materials in the drum were returned to the plant for additional surveys. Follow-up surveys of the G-40 shop and the four HVAC cargotainers were negative, as were surveys of the additional contents of all four drums.

ANALYSIS AND CAUSES:

Method of Analysis: [mark with X to identify the method(s) of analysis]:

_X_ Event and Causal Factors Analysis - operating events, equipment, human performance
___ Process Analysis - common cause/repetitive problems within a process
___ Supplemental Analysis: __Barrier, __Change, __Failure Modes, __ Task, __Technical
___ Other Method - describe methods and identify approving manager

Analysis Summary for Inappropriate Action:

Personnel involved in the 1998 removal of the HVAC charcoal replacement equipment do not remember the specifics of how or where the charcoal replacement equipment was released from the RCA. Since the PACU work was performed inside the main RCA, it would have been appropriate for HVAC to have used magenta air hoses from the hot tool inventory. It is therefore likely that, when drumming the materials for transport to the Mesa at the end of the job, workers and HP failed to notice the clearly magenta markings an air hose used during the PACU job.

INAPPROPRIATE ACTION 1: Workers and HP preparing materials for transport to the Mesa following completion of PACU maintenance in 1998 failed to notice the magenta markings on the RCA air hose and presumably placed the hose in a drum intended to contain only clean, releasable equipment.

SUMMARY OF ANALYSIS: Numerous corrective actions recently taken to improve the material release program were not yet in place when the HVAC equipment was processed and released to the Mesa in January 1998. Since 1998 the entire site population has been retrained on magenta tool control. A material release standard has been published to clarify process elements and expectations. An HP second check of all releases from the Restricted Area has been implemented, new videos and signage has been used to promote awareness of magenta control, and the temporary use of magenta tools outside RCAs has been severely limited. Sufficient barriers therefore exist to preclude a similar event in 2003.

The 1998 air hose was conspicuously marked in several places with bright magenta paint. Radiation Worker training and annual refresher training thoroughly cover the topic of hot tool marking and handling. Since the event occurred almost 6 years earlier, however, no direct evidence is available as to precisely how or why the magenta hose was not recognized and segregated for retention in the RCA. Inattention to detail is therefore assumed.

APPARENT CAUSE: Inattention to detail.

Health Physics Procedure SO123-20.9.2 "Material Release Surveys" controlled the release of the drummed HVAC equipment, requiring evaluation by a Health Physics Technician to ensure that no licensed activity was released from the Restricted Area. The involved HP Technician initialed the tape on top of the drums on 1/15/98. The Technician was unable recall any of the events of that time period. Under the requirements of the procedure the Technician likely performed masslinn and direct frisk surveys of the HVAC equipment at the FHB jobsite as the material was being drummed for transport to the Mesa. No additional surveys or oversight was required by the procedure at that time.

INAPPROPRIATE ACTION 2: The SCE Health Physics Technician failed to properly evaluate the HVAC equipment for contamination as required by HPP SO123-VII-20.9.2 "Material Release Surveys."

SUMMARY OF ANALYSIS: While it is not known how or whether the HPT visually examined and surveyed the HVAC equipment, that evaluation was deficient in that it failed to detect the presence of the contaminated magenta hose in the bottom of one of the four drums.

APPARENT CAUSE: Inattention to detail.

INAPPROPRIATE ACTION 3: 2001 Communications between Maintenance and HP regarding the scope of intended RCE follow-up magenta searches resulted in searches inadequate to discover the Mesa HVAC hose stored there since January 1998.

SUMMARY OF ANALYSIS: Upon accepting the 2001 assignment to search facilities for magenta tools, Maintenance sought logistical information and clarification from Health Physics regarding the scope of the intended sweep. HP approved an exception for cargo containers and large storage containers of secondary plant outage equipment and materials which could be best searched when next opened for outage

use. Communications regarding such issues appear to have resulted in a misinterpretation of intent, resulting in the HVAC section of Maintenance inspecting only those materials stored inside the Protected Area.

Since 2001 the Site has developed and disseminated Human Performance Tools which emphasize formal communication standards in extensive detail. Maintenance and HP management have been personally involved in crafting and teaching formal communication standards. It is therefore unlikely such a miscommunication would occur today.

APPARENT CAUSE: Inadequate communication. Communications between Maintenance and HP, and subsequent direction from Maintenance management implementing magenta searches, were inadequate in failing to cause the discovery of the Mesa HVAC hose.

GENERIC ISSUES:

As detailed in IA-3, a communication weakness apparently caused the Maintenance HVAC Group to confine its magenta tool search to the Protected Area in 2001. Other groups with facilities on the Mesa which store materials used in the PA may also have failed to search their Mesa locations. It will be necessary to evaluate that condition and search the remaining facilities, if any, which were not properly searched in 2001.

RADIOLOGICAL SIGNIFICANCE:

Radiological significance was very low. The hose was contained in a sealed drum from the time it left the RCA in 1998 until discovery, virtually eliminating the likelihood of exposure. No removable activity was detected. Fixed activity consisted of a few spots less than 15 cm2 in area reading less than 600 ncpm. Total activity was estimated at 40 nCi by SAM-9. No spread of contamination occurred when the hose was discovered.

OPERATING EXPERIENCE:

Although related events have occurred, since the errors which precipitated this event occurred in 1998, the event is not properly characterized as a "repeat event." Numerous corrective actions taken to remedy other program deficiencies have been implemented since the HVAC equipment was processed and released to the Mesa in January 1998. Since 1998 the entire site population has been retrained on magenta tool control. An HP quarantine area has been constructed. A material release standard has been published to clarify process elements and expectations. An HP second check of all releases from the Restricted Area has been implemented, new videos and signage has been used to promote awareness of magenta control, and the temporary use of magenta tools outside RCAs has been severely limited. Sufficient barriers therefore exist to preclude a similar event in 2003.

Several Industry and SONGS were noted involving discoveries of contaminated material in the clean Restricted Area trash. Three events were germane to the subject event, and are reviewed below. The Operating Experience Search system was searched for the terms "trash," "material release, and " radioactive scrap."

Site Operating Experience

Document Number: CCE 980603570
Title: SONGS Material Release Program Common Cause Evaluation.
Date: June, 1998
Applicability to Event: Four contaminated items found outside the RCA from 3/31/98 to 6/1/98. Two magenta tools, a ladder, and waste gas sample pump parts were involved. Although no common cause was identified, it was clear there were worker knowledge/accountability issues, and the corrective actions were fashioned primarily to address those issues. Those actions included:

- Clarification and training on proper SAM-9 use.
- Sitewide intranet training module on tool control and material release rules.

- Test a pilot magenta tool checkout program for satellite RMAs.
- Run a material control video at control points.
- Create an HP Material Release Standard to clarify program expectations.
- Hold an HP Division Material Release standown.
- HP Manager train site supervisors and managers during July 1998 Mgt. Retraining.
- Enhance CBT by adding RCA tool control rules.
- Contractor workforce standown 12/16/98. Hot topics training Dec. 1998.
- QA surveillance SOS-043-98.
- Reconfigure the SSRC RMA.

Document Number: 010901163
Title: SONGS Material Release Program RCE
Date: 10/31/01
Applicability to Event: Two contaminated magenta hand tools were discovered at the Mesa on a pallet of painting equipment recently removed from the RCA. Several other material release events were analyzed by an interdisciplinary team. Corrective actions completed included the following:

- One satellite RMA was evaluated and eliminated.
- Free release of clean common hand tools from the RCA was prohibited by procedure.
- A second check of materials, tools, and equipment submitted for release from the Restricted Areas was implemented.
- Division Managers coordinated searches of all SONGS' shops, tool boxes, laydown areas and offices for magenta tools adrift outside approved Radioactive Materials Areas. Eight magenta tools were found.
- A standardized RCA tool marking protocol to conspicuously identify RCA tools was developed.
- SO123-XV-30 was revised to incorporate magenta tool program responsibilities.
- HP program documents and training materials were revised to specify magenta tools use in remote contaminated areas only.
- Program documents and training materials were revised to require HP escort of magenta tools used outside the main RCAs.
- HP and Security procedures were revised to require face-to-face HP concurrence for release of tools and equipment from the Restricted Area.
- A Material Release quarantine area was established at Units 2/3.

Repeat Site Problem: _X_Yes __No

Industry Operating Experience

Document Number: OE9873
Title: Contaminated Chem Sample in Clinton Clean Trash
Date: 1/08/02
Applicability to Event: A contaminated chemistry sample was disposed of in 'green is clean' trash, which was released from the RCA in error. The cause was indeterminate, but an error-likely situation was recognized in keeping clean trash and contaminated trash in close proximity to each other.

Document Number: S-2002-3478
Title: Surry Worker Exits PA with Particle in Jacket
Date: 11/02
Applicability to Event: Worker's jacket and tools discovered contaminated offsite. Relaxed HP controls at the Surry ISFSI facility failed to detect contamination after maintenance was performed on a spent fuel shipping cask.

Repeat Site Problem: __Yes _X_No

COMPLETED CORRECTIVE ACTIONS

1. Root Cause Analysis 010901163 and its numerous corrective actions and followup verifications was

completed to preclude recurrence of similar events since the October 2001 initiating event.

2. The contaminated magenta hose was confiscated, analyzed, and returned to the RCA for disposal on 11/6/03.

3. Follow-up surveys of G-30, the four drums of HVAC equipment, the materials in the hose drum, and all four HVAC cargotainers were performed with negative results.

4. Apparent Cause 2: The involved Health Physics Technician received appropriate counseling.

5. Generic Issue 1: Evaluate Mesa facilities which may contain material used in the PA and identify where searches may not have been completed in 2001. Resp[redacted]

PLANNED CORRECTIVE ACTIONS [must be linked on CA Tab]:

1. Apparent Cause 1: HVAC Maintenance Supervision will review this incident with applicable staff and will reinforce the importance of identifying and controlling potentially contaminated materials. Resp: [redacted]

2. Apparent Cause 1: Site Workers will be reminded of the importance of identifying and controlling potentially contaminated materials via U2RFO Hot Topics communication. Resp: [redacted]

3. Generic Issue 1: Maintenance and HP Inspect identified areas outside the PA for potential radioactive material items in drums, cargo containers, shops and storage areas. Resp: [redacted]

4. Apparent Cause 3: Remind appropriate Maintenance and HP personnel of the importance of employing formal communication tools to avoid miscommunications of this type. Resp: [redacted]

OTHER ACTIONS:

None.

SUPPORTING EVALUATIONS

NA

----------EVALUATION-
CONT.----------

Approval Tab Information:

Code	To Status	From	By	Timestamp	Pax
CHG-RESTR			[redacted]	1/22/2004 11:18:00	
AR Restraint has changed for assignment: 1 Type: ACE old value was "0.0"					
A	90	80	[redacted]	1/22/2004 11:17:56	86164
CHG-RESTR			[redacted]	1/22/2004 11:16:40	
AR Restraint has changed for assignment: 1 Type: ACE old value was ""					
A	80	50	SYSTEM	1/22/2004 11:16:40	
Child assignments closed					
A	50	20	[redacted]	1/22/2004 11:16:34	89439
CHG-RESTR			[redacted]	1/22/2004 11:16:21	
AR Restraint has changed for assignment: 1 Type: ACE old value was ""					

Code	To Status	From	By	Timestamp	Pax
D1	20	90	[redacted]	1/22/2004 11:14:26	89439
	Assignment approval logic is incorrect. Assignment should have gone to cat. 80 after advancing out of 45 but did not. Will move to cat. 50 to allow auto advance to cat 80 so line can approve.				
CHG-RESTR			[redacted]	1/22/2004 10:48:03	
	AR Restraint has changed for assignment: 1 Type: ACE old value was "0.0"				
A	90	45	[redacted]	1/22/2004 10:47:25	89439
	CARB comments incorporated into existing ACE Text.				
ASSOC			[redacted]	12/18/2003 13:18:28	
	Associated assignment AR#: 031100334 Seq: 11				
ASSOC			[redacted]	12/18/2003 13:18:23	
	Associated assignment AR#: 031100334 Seq: 12				
ASSOC			[redacted]	12/18/2003 13:14:10	
	Associated assignment AR#: 031100334 Seq: 10				
CHG-DD			[redacted]	12/17/2003 09:56:21	
	Due date updated to allow 30 days to incorporate CARB comments on 12/10/2003				
CHG-DD			[redacted]	12/17/2003 09:56:21	
	Due date not valid, due date reassessed by assignee/supervisor (describe in COMMENTS)				
CHG-DD			[redacted]	12/17/2003 09:56:21	
	Due Date has changed for assignment: 1 Type: ACE Old value was "2/15/2004 00:00:00"				
CHG-DD			[redacted]	12/17/2003 09:52:21	
	Alignment of parent assignment to daughter assignments (RCE, ACE, SAF, OE, etc.)				
EST-DD			[redacted]	12/17/2003 09:52:12	
	Prior to plant need				
EST-DD			[redacted]	12/17/2003 09:52:12	
	Due Date has changed for assignment: 1 Type: ACE Old value was "5/4/2004 00:00:00"				
CHG-RESTR			[redacted]	12/17/2003 09:45:05	
	AR Restraint has changed for assignment: 1 Type: ACE old value was ""				
D1	45	50	[redacted]	12/17/2003 09:44:02	86661
	Reopened evaluation to incorp CARB comments on 12/10/03: See Notes tab for CARB comments.				
CHG-DUE			[redacted]	12/10/2003 11:14:23	
	Due Date has changed for assignment: Old value:5/4/2004New value: 5/4/2004				
CHG-RESTR			[redacted]	12/10/2003 11:14:23	
	AR Restraint has changed for assignment: 1 Type: ACE old value was ""				
A1	50	45	[redacted]	12/10/2003 11:14:12	86164
CHG-RESTR			[redacted]	12/10/2003 08:33:50	
	AR Restraint has changed for assignment: 1 Type: ACE old value was ""				
D1	45	50	[redacted]	12/10/2003 08:33:35	89439
	Return to cat. 45 to incorporate VP comments				
CHG-RESTR			[redacted]	12/5/2003 15:18:43	
	AR Restraint has changed for assignment: 1 Type: ACE old value was ""				
CHG-DUE			[redacted]	12/5/2003 15:18:42	
	Due Date has changed for assignment: Old value:12/6/2003New value: 5/4/2004				
GEN-TND			[redacted]	12/5/2003 15:18:42	
	Created Assignment Type: TND from RCE/ACE/RCT process				
A	50	20	[redacted]	12/5/2003 15:18:36	89115

Code	To Status	From	By	Timestamp	Pax
ASSOC			[redacted]	12/3/2003 10:09:44	
Associated assignment AR#: 031100334 Seq: 7					
ASSOC			[redacted]	12/3/2003 10:09:41	
Associated assignment AR#: 031100334 Seq: 6					
ASSOC			[redacted]	12/3/2003 10:09:38	
Associated assignment AR#: 031100334 Seq: 5					
ASSOC			[redacted]	12/3/2003 10:09:36	
Associated assignment AR#: 031100334 Seq: 4					
ASSOC			[redacted]	12/3/2003 10:09:33	
Associated assignment AR#: 031100334 Seq: 3					
ASSOC			[redacted]	12/3/2003 10:09:20	
Associated assignment AR#: 031100334 Seq: 2					
CHG-RESTR			[redacted]	12/3/2003 09:39:06	
AR Restraint has changed for assignment: 1 Type: ACE old value was ""					
A	20	10	[redacted]	12/3/2003 09:38:51	89117

Notes Tab Information:

User ID: [redacted] me: 12/17/2003 09:50:00
Text:

CARB comment from Meeting on 12/10/03

1) Under IA-1 compare the past process controls for surveying/releasing drums to the current controls leading to the conclusion that the problem could not occur today. Update the CAs to reflect the completion of the CAs from RCE 010901163.
2) Update the OE section to meet the procedural requirement "If a repeat problem, identify the ...corrective action that will ensure sustained incorporation of the operating experience." - i.e., why the CAs will prevent the problem in the future. [Ref. Att. 2 of the 50.39 procedure]
3) Generic Issue section should identify the potential for other containers not searched during the RCE CA and capture your planned action to search the staryard.
4) Rework/clarify the facts/analysis leading to AC-3 (inadequate communication) and define the CA for the inadequate communication.
5) Delete the CA to Maintenance conduct a cause evaluation given the inadequate search was the result of inadequate communication between HP and Maintenance.
6) HP to provide Maintenance [redacted] he revised ACE for review/concurrence.

CA Tab Information:

AR/SEQ/TYPE			Resp Org	Assignee	Due Date	Status	QA	REQ	Priority	MO Type
031100334	9	TND	H4000	[redacted]	2/26/2003	99		N	3C	
Trending Assignment created from RCE/ACE/RCT process										
031100334	2	TND	H4000	[redacted]	12/12/2003	90		Y	3C	

NOTIFICATION TEXT -- EVALUATE THE ISSUE IDENTIFIED ON THE AR AND SUMMARIZE THE FOLLOWING INFORMATION ON THE DESCRIPTION TAB: WHAT HAPPENED, WHY IT HAPPENED, AND WHAT IS THE SIGNIFICANCE OF THE ISSUE. CODE ON THE TRENDING TAB.
DESCRIPTION -- INVESTIGATE FIXED-CONTAMINATED MAGENTA AIR HOSE DISCOVERED IN MESA G-40 METAL SHOP OUTSIDE THE RESTRICTED AREA.

SEE TEXT FROM ACE ASSIGNMENT 1 OF THIS AR FOR A DETAILED ACCOUNT OF THE EVENT'S CIRCUMSTANCES/CAUSE ANALYSIS.

CA Tab Information:

AR/SEQ/TYPE			Resp Org	Assignee	Due Date	Status	QA	REQ	Priority	MO Type
031100334	3	OTH	M5500	[redacted]	12/17/2003	90		Y		3C

Notification text -- HVAC Maintenance Supervision will review this incident with applicable staff and will reinforce the importance of identifying and controlling potentially contaminated materials. Resp: [redacted]

DESCRIPTION -- INVESTIGATE FIXED-CONTAMINATED MAGENTA AIR HOSE DISCOVERED IN MESA G-40 METAL SHOP OUTSIDE THE RESTRICTED AREA.

031100334	4	OTH	H4000	[redacted]	02/01/2004	90		Y		3C

Notification text -- Site Workers will be reminded of the importance of identifying and controlling potentially contaminated materials via U2RFO Hot Topics communication. Resp: [redacted]
DESCRIPTION -- INVESTIGATE FIXED-CONTAMINATED MAGENTA AIR HOSE DISCOVERED IN MESA G-40 METAL SHOP OUTSIDE THE RESTRICTED AREA.

031100334	5	OTH	H2000	[redacted]	12/17/2003	90		Y		3C

Notification text -- The Health Physics Technician will be coached regarding Material Release performance expectations. Resp: [redacted]

DESCRIPTION -- INVESTIGATE FIXED-CONTAMINATED MAGENTA AIR HOSE DISCOVERED IN MESA G-40 METAL SHOP OUTSIDE THE RESTRICTED AREA.

031100334	6	OTH	M5500	[redacted]	12/17/2003	99		Y		3C

Notification text -- Investigate and determine the cause of incomplete 2001 Mesa Maintenance storage area magenta tool searches. Resp: [redacted]

DESCRIPTION -- INVESTIGATE FIXED-CONTAMINATED MAGENTA AIR HOSE DISCOVERED IN MESA G-40 METAL SHOP OUTSIDE THE RESTRICTED AREA.

031100334	7	OTH	M7400	[redacted]	01/23/2004	90		Y		3C

NOTIFICATION TEXT -- MAINTENANCE AND HP INSPECT AREAS OUTSIDE THE PA FOR POTENTIAL RADIOACTIVE MATERIAL ITEMS IN DRUMS, CARGO CONTAINERS, SHOPS AND STORAGE AREAS. RESP: [redacted]
DESCRIPTION -- INVESTIGATE FIXED-CONTAMINATED MAGENTA AIR HOSE DISCOVERED IN MESA G-40 METAL SHOP OUTSIDE THE RESTRICTED AREA.

031100334	10	OTH	M7400	[redacted]	01/01/2004	90		Y		3C

Notification text -- Evaluate Mesa facilities which may contain material used in the PA and identify where searches may not have been completed in 2001.
DESCRIPTION -- INVESTIGATE FIXED-CONTAMINATED MAGENTA AIR HOSE DISCOVERED IN MESA G-40 METAL SHOP OUTSIDE THE RESTRICTED AREA.

031100334	11	OTH	H0000	[redacted]	01/01/2004	90		Y		3C

Notification text -- Remind appropriate HP personnel of the importance of employing formal communication tools to avoid miscommunications of this type.
DESCRIPTION -- INVESTIGATE FIXED-CONTAMINATED MAGENTA AIR HOSE DISCOVERED IN MESA G-40 METAL SHOP OUTSIDE THE RESTRICTED AREA.

031100334	12	OTH	M0000	[redacted]	01/01/2004	90		Y		3C

Notification text -- Remind appropriate Maintenance personnel of the importance of employing formal communication tools to avoid miscommunications of this type.
DESCRIPTION -- INVESTIGATE FIXED-CONTAMINATED MAGENTA AIR HOSE DISCOVERED IN MESA G-40 METAL SHOP OUTSIDE THE RESTRICTED AREA.

----- END OF REPORT -----

A. DESCRIPTION OF TASK

look into decon showers in new medical facility. They appear to be of the cold water deluge type.

B. TAC # E82-059

C. ALL CROSS REFERENCE DESIGNATORS:

CAR # —

AIRS # —

OTHER # —

OTHER # —

D. ASSIGNED TO: [redacted]

DATE ACTION MUST BE COMPLETED 8-6-82

STATEMENT OF WHAT COMPLETION ACTION CONSISTS OF

① Prepare memo from [redacted] to [redacted] identifying decon shower problem if there is a problem or ② respond to [redacted] that there is no problem.

E. ASSIGNED BY [redacted] initials [redacted]

1) Was Assignment Discussed With Assignee?

✓ Yes Date Done 7-30

2) Are all documents necessary to understand and complete this task (which are not easily available to the assignee) Attached ?

Yes NA

3) Has a copy of this form with attachments been delivered to assignee?

✓ Yes Date Done 7-30

Assignment is not effective until the above are complete.

DATE ASSIGNMENT EFFECTIVE 7-30

This date must coincide with or be later than the latest date above.

F. REQUEST TO RESCHEDULE COMPLETION DATE (NOTE: this section is not to be used because of an unsatisfactory outcome of the Assignment discussion in E.1) which must be dealt with informally before the original assignment date is specified.)

1) Date of request for reschedule _____ 2) initials of requestor _____

3) Reason why assigned completion date cannot be met:

4) Requested New Completion Date _____

5) Requested New Completion Date Approved ? ___ yes Date of Approval _____

6) Request Approved by _____

G. 1) Statement of Completed Action: Memo: [redacted] to [redacted] drafted 3 Showers (2-Medical +1-EOF) are improperly designed - suggested design change be initiated

2) Date Completed 8/4/82

3) Is a copy of completion document attached X yes (ACTION IS NOT COMPLETE WITHOUT THIS)

4) Signature of Assignee [redacted]

INSTRUCTIONS:

1) Form is to have at least three copies.
2) Original with Attachments goes to Assignee.
3) One copy is kept by the Assignor.
4) One Copy goes to the HP Manager.
5) Whenever Section F. or Section G. is filled out it is to be done on the original and copies are immediately sent to the Assignee and the HP Manager.
6) When Action is complete copies of completion documents supplied to Assignor.

August 4, 1982

[redacted]

SUBJECT: TAC Item E82-059 Decon Showers in the Medical Facility

It has been determined that there are two decon showers in the Mesa Medical Facility, both of which are of the cold water deluge type. Additionally, a decon shower having only cold water piping is planned for the EOF - Training Facility. The waste water from all three of these showers is routed to a 2000 gal hold up tank.

These findings were verified with construction personnel from [redacted]

The following drawings were examined to make this determination:

1. San Onofre Mesa Medical Facility
   5166379-1 P-2 "Floor Plan, Plumbing & Details"

2. San Onofre Mesa EOF - Training Facility
   715827 P2.1 "Plumbing Site Plan"

3. San Onofre Mesa EOF - Training Facility
   715828 P3.1 "Hot, Cold & Dionized Water Plan"

4. San Onofre Mesa EOF - Training Facility
   715684 A3.1 "Floor Plan"

[redacted]

[redacted]

[redacted]

E82-059

August 6, 1982

[redacted]

SUBJECT: Personnel Decontamination Showers at the San Onofre Mesa Medical Facility and EOF - Training Facility

A review of the subject facilities by station health physics engineering personnel indicates that the personnel decontamination showers are of the cold water deluge type. Such showers are not generally desirable for the intended purpose because (1) cold water causes the pores in the skin to close and entrap contamination, (2) a deluge type shower may cause the spread of localized contamination and, (3) an injured-contaminated person may not be able to withstand the physical shock of being deluged with cold water.

It is recommended that the subject showers be supplied with both hot and cold water and that the deluge shower heads be replaced with shower heads on short hoses so that they can be used either as stall showers or as a hand held shower.

Please communicate these concerns to the responsible Project personnel and keep me informed of corrective actions which are planned.

[redacted]

[redacted]

SONGS HP INDIVIDUAL TASK ASSIGNMENT (ITA)

A. ORIGINATOR: Complete this Section, individual assigning ITA is to complete Section B.

1) Name (Print) [redacted] 2) Enter your next ITA number E83-181

3) Describe Task Investigate contaminated sludge found in SONGS 2+3 Intake Structures. See attached.

4). Describe what constitutes completion As above, memo to [redacted]

5) List appropriate references [redacted] has analytical data. has some plant survey data.

6) Sign and Date [redacted] 5-10-83

B. ASSIGNOR(S): Compliance with this Section is indicated by your signature or initials below.

1) All necessary documents are to be referenced and/or readily available and/or attached.

2) Prime assignor and assignee discuss this ITA and agree on Prime Due Date, assignor enters:
PRIME DUE DATE* of 6-10-83 Assigned [redacted] By [redacted] On 5-17-83

3) Subsequent assignor and assignee discuss and agree on Sub Due Date, assignor enters:
SUB DUE DATE* of _____ Assigned to _____ By _____ On _____

4) Assignor(s) gives original ITA to assignee and forwards a copy to TAC Coordinator.

*Prime Due Dates should be at least 5 calendar days beyond the date when task first assigned and Sub Due Dates must not be later than Prime Due Dates.

C. DUE DATE EXTENTION REQUEST: This Section is not a substitute for the Prime Due Date in Section B which must be agreed to between assignor/assignee prior to establishment. Required extensions, initiated by assignee, are to be requested as far in advance of the pending due date(s) as possible whenever completion date problems are identified.

1) New SUB DUE DATE of _____ Requested By _____ On _____

2) New PRIME DUE DATE of 6/23/83 Requested By [redacted] On 6/15/83

3) Reason why due date cannot be met Waiting for more samples to be counted by Radwaste.

4) New SUB DUE DATE of _____ Approved By _____ On _____

5) New PRIME DUTE DATE of 6-23-83 Approved By [redacted] On 6-14-83

6) Copy of ITA forwarded to TAC Coordinator By _____

D. TASK COMPLETION: To be completed by assignee and forwarded to originator.

1) Statement of completed action Enclosed memo

2) Date completed 7/6/83

3) Is a copy of completion document attached YES Yes (ACTION IS NOT COMPLETE WITHOUT THIS)

4) Signature of Assignee [redacted]

5) Originator is to forward original ITA and supporting documentation to TAC Coordinator.

To TACC on _____ date, By _____

Distribution: White - Originator Canary & Pink - Assignee Goldenrod - TAC Coordinator

SCE SO(123) 197 REV. 0 11/24/82

5-12-83 [redacted]

1. What is the source and how did it get there? Observed to contain Co^{60} + Cs-137

2. Have we released any material in the past?

3. Does this point to some other, larger problem?

4. Where does this material go in the plant (condensers, circ pumps, screens and rakes, CCW system ...) that might cause contamination / waste problems in the future?

5. Should we apply 10CFR20.302 + IE Notice 83-05 to dispose of this material?

E83-181

May 23, 1983

[redacted]

SUBJECT: Preliminary Report on Contaminated Unit 3 Intake Sludge

REFERENCE: Individual Task Assignment E83-181

The following information has been acquired regarding the detection of ^{60}Co and ^{137}Cs in sludge from the Unit 3 intake:

A) Source of the Contamination

It is conceivable that liquid radwaste discharged into the seal weir vent could cross over to the intake side through the recirculation gate. One attempt to demonstrate this cross-over was unsuccessful. A diver is scheduled to be onsite Monday, May 23, to obtain additional samples from various locations of the intake structure.

B) ^{58}Co Anomaly

Radwaste discharges have typically had at least ten times more ^{58}Co than ^{60}Co. For example, during the months of February, March and April 1983, the ratios of ^{58}Co to ^{60}Co were 14, 13 and 9 respectively. Since the half-life of ^{58}Co is 71 days, the amount of ^{58}Co should be at least the same order of magnitude as ^{60}Co, yet ^{60}Co is present in all samples, and ^{58}Co is not detected in any of the samples.

C) Counting Statistics

Although the levels of ^{60}Co and ^{137}Cs which were detected are very low, the results are, nevertheless, statistically significant. The ^{60}Co photo peaks typically had errors of 10%, while the ^{137}Cs photopeak usually had an error of about 15%. Both of these two isotopes were detected in all twelve of the samples counted.

D) Detectability

The two isotopes of interest (^{60}Co and ^{137}Cs) were reported in all samples. It is possible that sample inhomogeneity could account for detection of these activation and fission products. This is possible if the detector "saw" ^{60}Co and ^{137}Cs at very low levels in portions of the sample which settled to the bottom of the flask, close to the detector. The analysis program would assume that this quantity is uniformly dispersed throughout the sample, thereby artificially increasing the value for the amount detected, and declaring the isotope to be statistically significant above background. (Note that inhomogeneity could also artificially reduce the quantity if the contaminated materials were far from the detector).

Continuation of the investigation can be pursued in at least four directions.

1) Dispose of the sludge as low-level radwaste. This would be expensive, but may be necessary.

2) Dilute the sludge with additional sludge (not-contaminated) and dispose of the entirety as simple waste. This technique is apparently not a viable solution.

3) Continue the investigation into the source of the contamination, to resolve "A" above. The samples taken by the diver may help to identify the source.

4) Perform additional, carefully controlled GeLi counts to determine if the sludge is truly contaminated. This would cover "C" and "D" above, and perhaps "B". Carefully controlled sampling and counting might also render the ^{60}Co and ^{137}Cs isotopes as being below detectable limits, resolving "B" above, and allowing disposal of the sludge as clean waste. The additional samples to be obtained by the diver should be useful in this regard.

Note that this report is preliminary, and answers to the E83-181 questions require substantial additonal information. ALARA is continuing the investigation.

[redacted]
ALARA Engineers

[redacted]/0272K:[redacted]

cc: [redacted]
CDM files

July 6, 1983

MESSRS. [redacted]

SUBJECT: SONGS Unit 3 Intake Sludge

REFERENCES:

1) Memo to [redacted] from [redacted] dated May 23, 1983; Subject: Preliminary Report on Contaminated Unit 3 Intake Sludge

2) Annual Operating Report of SONGS Unit 1 for 1982, Radiological Environmental Monitoring Evaluation

3) Individual Task Assignment E83-181

During early May, 1983, a quantity of sludge was removed from the SONGS Unit 3 intake structure. Gamma spectral analysis of this sludge revealed very low levels of ^{60}Co and ^{137}Cs in all samples. The levels of contamination were reported to average 2.95×10^{-7} µCi/gm of ^{60}Co and 1.01×10^{-7} µCi/gm of ^{137}Cs. Some of the biowaste was drummed and shipped to the burial site as radwaste. The remaining 60 drums contain primarily sand.

A number of questions arose concerning how the intake sludge became contaminated; what was the source of contamination, and how should the sludge be disposed? The following discussion is the Station ALARA Engineering evaluation of the situation.

Source: The contamination is probably due to intake of ocean bottom sediment. This conclusion was reached by elimination of the possibility of Unit 3 radwaste discharge being recirculated through Gate 4 into the intake structure. The major releases of radwaste from Unit 2 were discharged during February, March and April 1983, through the Unit 3 radwaste discharge line (Unit 2 line was inoperable due to construction in the seal weir vent). These discharges had, respectively, 14, 13, and 9 times more ^{58}Co than ^{60}Co. Even with the relatively short half-life of ^{58}Co (71 days), any detection of this discharge would certainly show ^{58}Co activity along with ^{60}Co. This was not evident in the intake sludge samples.

The only other source of activity identified was ocean bottom sediment. The Annual Operating Report of SONGS Unit 1 for 1982, Radiological Environmental Monitoring Evaluation, reported that ocean bottom sediment contained small quantities of ^{60}Co and ^{137}Cs. Three of eight samples showed ^{60}Co in a range of 1.3 to 5.8 x 10^{-7} µCi/gm, with a mean of 2.8 x 10^{-7} µCi/gm, very comparable to the values reported for the intake sludge samples (2.95 x 10^{-7} µCi/gm). In the three of eight ocean bottom sediment samples, ^{137}Cs was reported at 0.5 to 1.3 x 10^{-7} µCi/gm, with a mean of 0.833 x 10^{-7} µCi/gm, also comparable to the values reported for the intake sludge samples (1.01 x 10^{-7} µCi/gm). (Note that page F-2 of the Annual Report states that no accumulation of ^{60}Co or ^{137}Cs could be related to effluents from Unit 1.) ^{58}Co was not detected. The attached graphs show the activity levels in ocean bottom sediment. Attachment 3 tabulates the counting data.

Unfortunately, the samples taken offshore at the intake structure did not demonstrate any detectable ^{60}Co or ^{137}Cs. This does not support the reported activity in the Environmental Report for ocean bottom sediment. However, with the recent heavy storms, turnover of the ocean bottom material could easily explain the lack of activity in our recently collected samples.

During recent work on the Unit 2 Circulating Water System (6/24 - 6/30), samples of sludge from the forebay were collected and counted. These two samples showed ^{60}Co and ^{137}Cs in barely detectable, but not statistically significant, levels.

Conclusions:

1) The source of the contamination is ocean bottom sediment.

2) Depending on storms and ocean activity, it is quite conceivable that in the future, contaminated sediments could again be deposited in either Unit 2 or 3 intake structures.

3) The remaining sludge (as well as any future sludge with similar levels of radioactive contaminants) should be disposed of as "very-low-level" waste. The recommendation below identifies the suggested process for disposal.

4) Radwaste discharges appear to be ruled out as a source of contamination, suggesting no serious design problem.

Recommendation:

Dispose the remaining sludge as "very-low-level" contaminated waste in accordance with the recommendation in IE Information Notice No. 83-05: Obtaining Approval for Disposing of Very-Low-Level Radioactive Waste. This Notice calls out the use of 10 CFR 20.302(a), which permits burial of licensed material contaminated at very low levels, on either Federal or State-owned land.

Please direct any questions to Station ALARA Engineering at PAX 56178.

[redacted]
ALARA Engineer

[redacted]
ALARA Engineer

[redacted]:0371K/[redacted]
Attachments

cc: [redacted]
CDM files

CESIUM--137 Activity in Ocean Bottom Sediment

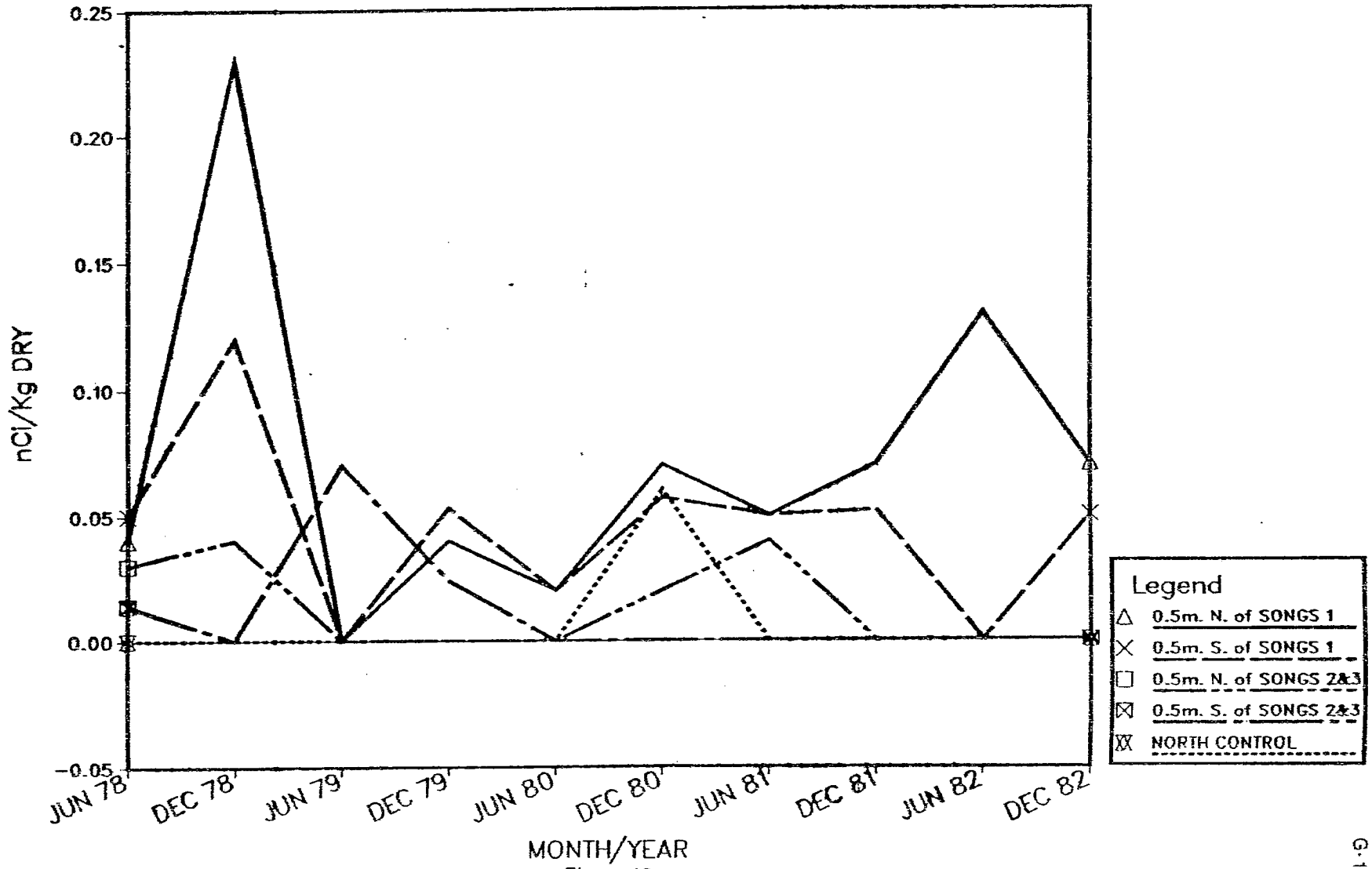


Figure 16

COBALT–60 ACTIVITY
IN
OCEAN BOTTOM SEDIMENT

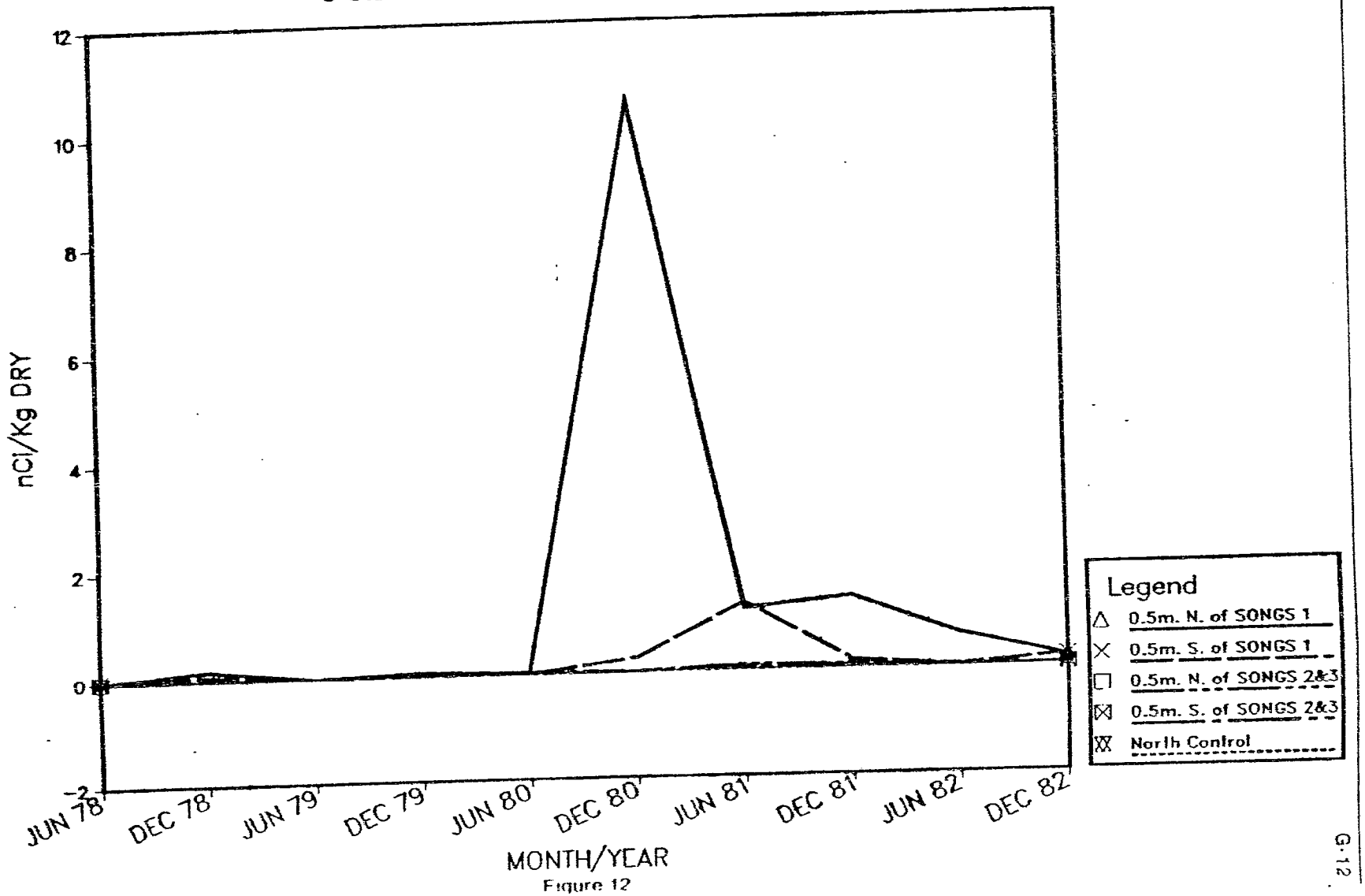


Figure 12

ATTACHMENT 3

Sample	^{60}Co(µCi/gm x 10-^{7})	^{137}Cs (µCi/gm x 10-^{7})
Sludge - white	1.88 ± .33	0.91 ± .22
Sludge - white	2.16 ± .28	1.03 ± .21
Sludge - green	3.43 ± .32	0.85 ± .20
Sea-growth-white	0.99 ± .19	0.67 ± .13
Green - sludge	3.07 ± .19	0.77 ± .11
#3	3.74 ± .20	1.08 ± .12
#1	3.32 ± .21	1.05 ± .14
#2 Sludge	3.08 ± .30	1.01 ± .19
#3 Sludge	3.26 ± .33	1.22 ± .19
Sludge (sand)	2.92 ± .33	1.47 ± .23
#2 Sump (sand)	4.11 ± .37	1.05 ± .22
#1 Sump (sand)	3.49 ± .35	1.01 ± .31
Average	2.95	1.01

In order to authenticate SONGS counting data, two composite samples were taken from the remaining drums (primarily sand). These two samples wre counted by [redacted] and reported below. The results are comparable to data from the SONGS H.P. counting facility and, therefore, confirm the detection of the two radioisotopes in the intake sludge.

1-GM-620	3.5 ± .37	2.8 ± .27
2-GM-620	4.4 ± .46	1.1 ± .10

SONGS HP INDIVIDUAL TASK ASSIGNMENT (ITA)

A. ORIGINATOR: Complete this Section, individual assigning ITA is to complete Section B.

1) Name (Print) [redacted] 2) Enter your next ITA number E83-321

3) Describe Task See attached.

4) Describe what constitutes completion Memo describing results of investigation, recommendations

5) List appropriate references See [redacted] for available survey data.

6) Sign and Date [redacted]

B. ASSIGNOR(S): Compliance with this Section is indicated by your signature or initials below.

1) All necessary documents are to be referenced and/or readily available and/or attached.

2) Prime assignor and assignee discuss this ITA and agree on Prime Due Date, assignor enters:
PRIME DUE DATE* of _____ Assigned to [redacted] By [redacted] On 7-27-83

3) Subsequent assignor and assignee discuss and agree on Sub Due Date, assignor enters:
SUB DUE DATE* of _____ Assigned to _____ By _____ On _____

4) Assignor(s) gives original ITA to assignee and forwards a copy to TAC Coordinator.

*Prime Due Dates should be at least 5 calendar days beyond the date when task first assigned and Sub Due Dates must not be later than Prime Due Dates.

C. DUE DATE EXTENTION REQUEST: This Section is not a substitute for the Prime Due Date in Section B which must be agreed to between assignor/assignee prior to establishment. Required extensions, initiated by assignee, are to be requested as far in advance of the pending due date(s) as possible whenever completion date problems are identified.

1) New SUB DUE DATE of [redacted] Requested By [redacted] On _____

2) New PRIME DUE DATE of _____ Requested By _____ On _____

3) Reason why due date cannot be met _____

4) New SUB DUE DATE of _____ Approved By _____ On _____

5) New PRIME DUTE DATE of _____ Approved By _____ On _____

6) Copy of ITA forwarded to TAC Coordinator By _____

D. TASK COMPLETION: To be completed by assignee and forwarded to originator.

1) Statement of completed action COMPLETED MEMO REQUESTED IN SECTION A4, ABOVE.

2) Date completed 9/22/83

3) Is a copy of completion document attached ✓ Yes (ACTION IS NOT COMPLETE WITHOUT THIS)

4) Signature of Assignee [redacted]

5) Originator is to forward original ITA and supporting documentation to TAC Coordinator.

To TACC on _____ date, By _____

Distribution: White - Originator Canary & Pink - Assignee Goldenrod - TAC Coordinator

SCE 50(123) 197 REV. 0 11/24/82

7-29-83

1. Determine past history and source of materials / equipment in GRIP / Bechtel Fab Shop and in Ameron area on MESA.

2. Determine whether or not we can use of State of CA Materials license which permits off-site work to "cover" our situation. We presently have RAM in an area where we are not licensed to have RAM

3. If item (2) answer is NO, request SCE licensing to request a change which will permit us to have SONGS RAM on the Mesa.

4. Be sure areas found to contain RAM are posted + controlled ([redacted] probably has this done).

5. Work with [redacted] to systematically survey + release or reclaim all material in question on Mesa.

6. Take photos, get map + diagrams of areas

7. Inspect all other areas of Mesa used by SCE/Bechtel for other possible problems.

September 21, 1983

MR. [redacted]

SUBJECT: Contaminated Material Released from SONGS, Unit 1

Attached for your information and use is the September 20, 1983 Memorandum For File addressing radioactively contaminated material released from SONGS, Unit 1.

For your convenience, I have prepared and attached a summary of all contaminated items found during the investigation. A detailed description of the items and the activities detected is included in the memorandum and the attached surveys.

Per your request, copies of the attached have been forwarded to Messrs. [redacted] and [redacted]

Should you have any questions or comments, please contact me.

[redacted]

[redacted]0669K/[redacted]
Attachment

cc: CDM files
[redacted]

MEMORANDUM FOR FILE

September 20, 1983

SUBJECT: Contaminated Material Released from SONGS Unit 1

REFERENCES: (1) Memorandum, [redacted] to [redacted] dated July 28, 1983, (attached)

(2) Memorandum, [redacted] to [redacted] dated August 5, 1983, (attached)

On July 14, 1983, personnel from the [redacted] Fabrication Shop at the Mesa contacted SONGS Unit 1 Health Physics expressing concern about the possible radiation hazard of some "old" material which had been stored in the Fabrication Shop yard for several years. A survey performed of the area revealed the presence of a heliarc welding stand with 13,200 dpm/100 cm^2 fixed contamination. No other contaminated items were identified. The welding stand was removed to the Unit 1 Restricted Area for decontamination.

On July 20, 1983, an empty gang box was delivered to the Unit 1 Restricted Area from the Mesa GRIP Facility for loading of small hand tools and subsequent transport back to the Mesa Facility. Before the tools were loaded, a contamination survey revealed fixed contamination on the inside of the box of 21,000 dpm/100 cm^2 and a meter deflection on an Eberline E-520 with an HP-270 Probe to 4 on the 0-20 mR/hr scale with the instrument probe located 1/2 inch from the surface of the contamination were observed. No dose rate above background was detected at 1 foot from the surface of the isolated "Hot Spot". Since this instrument is designed and calibrated to measure only uniform gamma radiation fields and certain narrowly defined beta fields, it was not possible to measure the actual radiation field present. Further, it was not necessary to make a more precise measurement because there was no personnel exposure and the contaminated spot was removed. A sample smear obtained from the inside of the box revealed approximately 43 dpm/100cm^2 cobalt-60, and 6 dpm/100 cm^2 cesium-137. No direct radiation or contamination could be detected on the exterior of the gang box. The gang box was retained by Health Physics for additional evaluation and decontamination. (A detailed account of the initial findings is contained in Reference 1.)

Mr. [redacted] a [redacted] Teamster who had worked at the GRIP Facility for several years, was questioned by Messrs. [redacted] and [redacted] Unit 1 Radwaste Personnel, regarding the history of the contaminated gang box. It was determined that the box had been stored at the Mesa for "over two years," and that other material present in the yard may have been received from the jobsite during the same time period.

IMMEDIATE ACTION

Following the realization that additional radioactively contaminated material might be present at the Mesa, Health Physics established a program which included:

1. Initiation of comprehensive radiation and contamination surveys of all Mesa Facilities which could have received materials from the Unit 1 Restricted Area.

2. Imposition of material accountability controls at the affected Mesa Facilities such that no materials could be removed without a Health Physics release.

3. Initiation of an investigation to determine the source of the contaminated material at the Mesa and whether or not similar potentially contaminated items had been released from these facilities in the past.

Description of Involved Mesa Facilities and Survey Findings

The map included as Attachment 1 to this memorandum shows the location of each of the involved Mesa Facilities.

The Mesa Fabrication Shop has been controlled by [redacted] since its establishment in 1979. The shop was used during the 1980 sleeving and present Unit 1 outages to fabricate components in support of the TMI and seismic upgrade projects. Most recently, the shop was used for "small tool" segregation. The inventory of Unit 1 small hand tools and equipment used during the past extended Unit 1 outages was divided between [redacted] and Edison.

Thorough radiation and contamination surveys of the entire Mesa Fabrication Shop area, which included opening boxes and evaluating items individually for contamination, revealed: an impact hammer with a maximum of 70,000 dpm/100 cm^2 fixed $\beta\gamma$ contamination; a cable choker with a maximum of 13,000 dpm/100 cm^2 fixed $\beta\gamma$; a core drill with a maximum of 2,000 dpm fixed $\beta\gamma$ on one small spot; an 8 inch tap and a 10 inch wrench, both with 6,700 dpm/100cm^2 fixed $\beta\gamma$; and a dynameter with a maximum of 26,700 dpm/100 cm^2 fixed $\beta\gamma$. In each case, removable contamination was <1000 dpm/100 cm^2. Each contaminated item was properly labeled as radioactive material and transported to the Unit 1 Restricted Area for decontamination or disposal.

The Generation Retrofit Improvement Project (GRIP) Facility, also established in 1979, was under [redacted] direction until Edison assumed control in June, 1983. The GRIP Facility functioned as a receiving and distribution area in support of the TMI and seismic upgrade projects at SONGS Unit 1. Construction materials were assembled into packages and delivered to the Mesa Fabrication Shop or the Unit 1 Restricted Area as needed. Surplus materials and Project equipment no longer required at Unit 1 were removed to the GRIP Facility for storage and salvage. An intensive radiation and contamination survey of the Mesa GRIP Facility was performed. No contaminated items were found. A substantial amount of material contained in large storage containers is yet to be surveyed. In the interim, controls have been instituted to prevent the removal of any material from the facility until the materials are evaluated

for contamination and are cleared by Health Physics for release. This material control program will remain in effect until all material at the facility is verified to be free of contamination.

The scope of the search for contaminated materials was expanded to include the [redacted] Laydown Area, so named since it was used by the Ameron Company for fabrication of the Units 2 and 3 circulating water system concrete pipline. The area has been essentially devoid of activity since the completion of that structure, and it gradually became a storage location for materials no longer needed at the units.

A comprehensive radiation and contamination survey of the [redacted] Laydown Area was initiated on July 29, 1983. Because of the large area and the number of items involved, approximately 40 man-days have been expended on the survey and retrieval effort. Though all identified contaminated items have been returned to Unit 1, an estimated 6 man-days of radiation survey remain until the area is declared free of radioactive material. Thirty-three items have been identified with fixed $\beta\gamma$ contamination ranging from approximately 6,000 dpm/100 cm² to 670,000 dpm/100 cm². Three aluminum pipes were found with 1,100 dpm/100 cm² removable $\beta\gamma$ on their internal surfaces. No removable contamination was detected on the remainder of the material. Each of these items is described in Attachment 2.

Appropriate soil samples were obtained and analyzed. No activity (other than natural products) was detected.

On July 29, 1983, a guard was stationed at the entrance to the [redacted] Laydown Area to ensure that no material would be delivered or removed without proper authorization. The area was, and will be, locked when the guard is not present. These controls will remain in place until all contaminated material is removed.

The involved area was roped-off to restrict personnel access. As each contaminated item was discovered, a label was attached which identified it as radioactive material. On August 19, 1983, the radioactively contaminated material uncovered in the initial survey effort was prepared and transported back to the Unit 1 Restricted Area.

The surveys were obtained using an Eberline E-520 with a Model HP-270 external G-M hand probe, and an Eberline RM-14 with a Model HP-260 external G-M pancake probe.

Readings obtained from items with uniformly deposited fixed contamination were corrected by the following method:

> Assume an item is found with uniformly deposited contamination. A reading of 5,000 cpm above background is obtained with an HP-260 G-M pancake probe whose window area is 15cm². The corrected surface contamination expressed per 100 cm² is:

$$5000 \text{ (cpm/probe area)} \times 6.7 \left(\frac{\text{probe areas}}{100 \text{ cm}^2} \right) \times \frac{10 (\text{dpm})}{\text{cpm}} = 330{,}000 \frac{(\text{dpm})}{100 \text{ cm}^2}$$

Source of the Contaminated Material

Since the Mesa Fabrication Shop and GRIP Facilities handle only Unit 1 materials, and based on information supplied by the workers there, it appears that the contaminated items were released from Unit 1 several years ago.

Personnel from the Station Maintenance Division, the Project Management Organization, and other employees with several years experience at SONGS were assembled at the [redacted] Laydown Area and were asked to identify the contaminated items. All of the contaminated items that could be identified were recognized as having been used at Unit 1 several years ago. It was also established that many of the items had previously been stored for at least four years at the Reservoir, north of Unit 1. That material was removed to the [redacted] Laydown Area when trailers were located at the Reservoir during the second calendar quarter of 1982. An area survey performed at the Reservoir showed no residual contamination.

SUBSEQUENT INVESTIGATION

The Health Physics Division recognized that present licensing does not permit byproduct material other than radioactive calibration sources at the Mesa. An initial action taken by Health Physics was to request Nuclear Engineering Safety and Licensing to obtain a license permitting the presence of the material at the Mesa while the contaminated items were identified and prepared for decontamination or disposal. However, by September 16, 1983, it was determined that all contaminated items had been located and returned to areas covered by license. It was also concluded that the total activity found did not constitute a quantity large enough to require licensing action. Accordingly, that line of action was terminated.

The question of whether or not materials had been shipped from the involved Mesa Facilities to locations other than SONGS, Unit 1 was evaluated.

Material Sent to Alhambra

Mr. [redacted] Project Construction Engineer, was interviewed regarding material movement into and out of the GRIP and Fabrication Shop Facilities. While actual supervision and control of the Mesa Facilities was the responsibility of [redacted] Mr. [redacted] was the Edison employee who represented Edison's interests there.

It was known that material leaving Unit 1 could go either to the Fabrication Shop or the GRIP Area. However, Mr. [redacted] stated that procedures allowed offsite release of material only through the GRIP Facility. Therefore, scrap and salvagable material present at the Fabrication Shop was transferred to the GRIP yard before removal from the Mesa.

All salvage activity at the GRIP Facility was handled by the Edison Material and Equipment Sales Department. Scrap and salvagable material was segregated in a designated area within the GRIP yard and subsequently removed to the Edison Salvage Facility in Alhambra. A few of those shipments occurred before Edison took control of the GRIP Facility in June, 1983.

Mr. [redacted] Supervisor of the Edison Material and Equipment Sales Department was contacted regarding handling of material which was salvaged from the SONGS GRIP Facility. Mr. [redacted] explained that material received from all Edison Divisions at the facility is immediately sorted by material type and is distributed to existing storage areas within the salvage yard.

On August 11, 1983 I was accompanied by Mr. [redacted] Radwaste Technician, to the Edison salvage yard in [redacted] We were escorted through the yard by Mr. [redacted] Material Expediter, who indicated areas where SONGS material may have been stored. Each of those areas, and any material present in them was evaluated with Eberline PRM-7 Micro "R" meters. No readings in excess of natural background (on the order of 15μR/hr) were observed.

Mr. [redacted] stated that salvaged material was routinely held for as short a time as possible due to space limitations at the yard. With few exceptions, Mr. [redacted] explained salvaged material was sold to salvage vendors and loaded the same day on ships destined for Taiwan.

Both Mr. [redacted] and I were aware of the potential for creating undue concern to workers at the salvage yard. We spent considerable time explaining the types of radiation, the basic interactions with matter, the operation of our detection instruments, and SONGS material release procedures. The comments we received indicated that we were successful in assuaging their fears.

The movement of tools and equipment from the Fabrication Shop was not as tightly controlled as was the movement of material. Therefore, the possibility existed that tools and equipment could have been released from the Fabrication Shop, bypassing the GRIP Facility. However, [redacted] felt that with the level of work experienced at Unit 1 during the past several years, few, if any tools or pieces of equipment, would have been permanently removed from the Fabrication Shop. Following the 1980 Unit 1 Sleeving/TMI Outage, tools and equipment were moved to the GRIP Facility for storage. Those same items were transferred back to Unit 1 for use during the present Outage.

Messrs. [redacted] Materials Controller at the Mesa Fabrication Shop, and [redacted] Edison Foreman at the GRIP Facility, were also interviewed and confirmed [redacted] account of material handling at the Mesa Facilities.

Items Sent to [redacted]

Because a [redacted] Teamster who had worked at the Mesa Fabrication Shop alleged that potentially radioactively contaminated tools and equipment may have been transported to [redacted] that possibility was also investigated.

The [redacted] Facility is housed in a single structure, deignated building B41, located at [redacted] The largest portion of the building is used as a warehouse, under the supervision of Mr. [redacted] (Mr. [redacted] had previously worked as a materials inspector for the AEC. Because of his past experience, [redacted] was able to view this matter from a realistic perspective and thus avoid the undue concern of his warehouse personnel.) Until recently, Mr. [redacted] explained, his facility had had limited contact with SONGS. In past years, various tools requiring

calibration or repair were channeled through his facility where they would be directed to an outside calibration lab or a repair shop. Mr. [redacted] assured me that in all cases, after caibration or repair, the items were returned to SONGS.

[redacted] has now been tasked with preparing a detailed inventory of [redacted] tools and equipment salvaged from SONGS. The first shipment of SONGS material contained on pallets and in gang boxes was received on August 2, 1983 from the Mesa Fabrication Shop. The contents of eight subsequent shipments from SONGS were also present at the warehouse. The most recent shipments of SONGS material were temporarily being stored on two truck trailers at a local freight company due to space limitations at the warehouse. Arrangements were made by Mr. [redacted] to have the material transferred from the freight company to his facility. He informed me that these were the last expected shipments of SONGS equipment.

On September 1, 1983, Mr. [redacted] Radwaste Technician, and I went to the [redacted] Warehouse in [redacted] to evaluate items they had received from SONGS. Because of the large number of items involved, additional help was required and another Radwaste Technician, Mr. [redacted] was assigned to the survey effort.

The first phase of the survey consisted of unloading the pallets and gang boxes received from SONGS during August 1983 and evaluating each item individually for contamination. Of the thousands of recently received items that were inspected, a drill stand and three hoses were found with detectable contamination. A detailed description of the contaminated items is contained in Attachment 3 to this Memorandum (Item Nos. 19 through 22, and Item 23).

The survey was then expanded to include all tools and equipment present in the warehouse. Nineteen additional contaminated items were identified during the second phase of the survey. Fixed contamination levels on those items ranged from 5,000 dpm/100 cm^2 on a rubber hose to greater than 500,000 dpm/probe area on an impact wrench. Removable contamination above SONGS release limits was detected on three items: 1,120 dpm/100 cm^2 $\beta\gamma$ on a rubber hose; 1,500 dpm/100 cm^2 $\beta\gamma$ on a welding connector; and 35,100 dpm/100 cm^2 $\beta\gamma$ and 40 dpm/100 cm^2 α inside the previously mentioned impact wrench. The contaminated items were being stored on shelves in a low occupancy area within the Warehouse. Even in the most extreme case, the impact wrench, the dose rate in the adjacent walkway was elevated by only a few µR/hr. A detailed description of the contaminated items found during this phase of the survey is also contained in Attachment 3 (Item Nos. 1 through 18 and Item 24.)

The contaminated items were segregated and subsequently removed to the SONGS Unit 1 Restricted Area. All areas within the warehouse which had contained the contaminated items were checked and found to be free of residual contamination.

[redacted] was surprised that we found contamination on items that were not part of the recent shipments from SONGS. Since all items received previously at the warehouse from SONGS were always returned after the necessary calibrations or repairs were performed, [redacted] was initially skeptical that any of those contaminated items had ever been to SONGS. However, since isotopic analyses performed on smears obtained from those items revealed typical power plant contaminants, it was assumed that the items came from

SONGS. The most probable, explanation is that items sent to the warehouse for repair were occasionally replaced by identical pieces and the actual repaired tool was placed in stock at the warehouse.

The contaminated material found at the [redacted] falls into three categories:

The first category includes the four contaminated items identified as part of the August 1983 shipments from SONGS which should have been found during the surveys performed before the material was released from the Fabrication Shop at the Mesa.

The second category includes the two impact wrenches, the air-powered grinder, and the two hoses, Item Nos. 3, 16, 17, 18, and 24 of Attachment 3. Through interview of the [redacted] Warehouse crew, it was established that those items had been present at the warehouse for at least two to three years. As explained earlier, it is suspected that items in this second category were sent to the warehouse for repair and retained as stock at the warehouse while replacement items were sent to SONGS. Many tools stored in the same location as those in this second category had been used for another Bechtel construction project earlier this year. However, the invoice which accompanied the return of the tools from that project was reviewed and it did not include any items of the type we found to be contaminated.

The third category includes the twelve welding connectors and the two gate valves, Item Nos. 1, 2, and 4 through 15. Those items were part of the existing stock which was moved five to six years ago from the previous Southgate location the present warehouse location in LaMirada.

Because of the isolated locations occupied by the contaminated material and the dose rates involved, the warehouse personnel were subjected to negligible radiation exposure.

To ensure a complete assessment of contaminated material associated with the [redacted] their repair and calibration methods were further investigated.

[redacted] has a contract with [redacted] to repair damaged tools and equipment. [redacted] acts as an intermediary; their representative picks up damaged items from the [redacted] (which includes equipment received from SONGS), delivers the items to any of several outside independent repair shops, and returns the repaired items to the warehouse. The equipment is then returned to SONGS, even if repairs could not be made. Since no items were presently out for repair, that area of concern is closed.

Three independent vendors are used by the [redacted] to perform calibrations on tools and equipment: [redacted] both in [redacted] had no items for calibration. An ammeter had been sent to [redacted] and a torque meter and several electrical cable crimpers had been sent to [redacted] Corporation for calibration. The ammeter and the torque meter were returned to the warehouse on September 12, 1983. I made an additional trip to the [redacted] to check the two items before they were shipped back to SONGS. Both meters were free of radioactive contamination.

All of the crimpers were determined to be damaged and were sent by the calibration lab to the manufacturer for repair. In view of the way the crimpers are used, they are not expected to be contaminated. Additional efforts to evaluate the crimpers would be difficult, and could cause undue concern by outside vendors. For these reasons, I recommend considering this area closed.

Another concern raised during the investigation was the possibility of contamination on tools and eqipment used by Edison Steam Generation Division Maintenance.

Division Maintenance is a support organization which dispatches maintenance workers, tools, and equipment to assist Edison Stations during unit outages and other large projects.

[redacted] of Division Maintenance was contacted by telephone regarding the availability of their tools and equipment for the purposes of a contamination survey. He informed me that more than half of their tool inventory was currently at the [redacted] Generating Station and that we were welcome to perform our survey. (The remainder of their equipment was being used on jobs at three different Edison Stations.) [redacted] further informed me that even though his crews bring a complete set of tools, every effort is made at SONGS to use only Station tools in Red Badge Areas.

On August 18, 1983, I was again accompanied by Mr. [redacted] to the [redacted] Station. A comprehensive survey of all available tools was performed including an entire trailer of equipment which had recently returned from SONGS, Unit 1. No readings above natural background were observed.

We were again aware that our presence could cause the undue concern of Division Maintenance personnel. However, all of the workers we encountered had previously performed maintenance at SONGS and therefore had received Basic Radiation Training. Instead of concern, the workers expressed appreciation for our evaluating their equipment for residual contamination.

Since more than half of their tool inventory was found to be free of radioactive contamination, and because additional efforts could cause undue concern, I recommend that this area also be considered closed.

Two comments are in order as a result of our experience at the [redacted]

First, the Micro "R" meters which were used during the warehouse survey proved invaluable in locating contaminated materials. Use of those instruments reduced to at least one-half the time required to perform the survey and allowed us to find contaminated items that otherwise could have been missed.

Second, it should also be mentioned that [redacted] and his entire warehouse crew at the [redacted] could not have been more helpful and cooperative. The extensive survey effort was made possible only through their efforts.

CORRECTIVE ACTIONS

As directed by the Health Physics Manager:

1. The Health Physics personnel involved with the inadvertent release of the four radioactively contaminated items from the Mesa Fabricated Shop to the [redacted] have been counselled.

2. Two Eberline PRM-7 Micro "R" meters have been made available for use in the hold-down areas.

3. The Radwaste Group has initiated random surveys of material released through the hold-down areas. A minimum of two releasable (green-tagged) items per day are subjected to a thorough evaluation for the presence of residual contamination. This measure provides an additional means to identify any weakness in release methods.

CONCLUSIONS

The extensive investigation described above has verified that there are no avenues remaining for the release of radioactive material to the public.

The evidence indicates that the contaminated items were released from Unit 1 several years ago. Before 1980, SONGS Health Physics' staffing and methods were such that low level contaminated items must have been inadvertently occasionally released. Since that time, Station procedures regarding the proper release of material from the Restricted Area were more strictly followed. Control was substantially increased in April 1983, by assigning full release control responsibility to a single Supervisor and by providing a substantial number of additional personnel.

With the Health Physics controls presently in place and with the corrective measures taken concerning the four items released in the August 1983 shipments to [redacted], the release of radioactively contaminated material from Restricted Areas at SONGS is adequately prevented.

RECOMMENDATIONS

The one disconcerting finding of the investigation was the discovery of the four contaminated items released to the [redacted] from the Mesa Fabrication Shop. Even though those items represented a negligible percentage of the total amount of released material, it is the policy of SONGS Health Physics Division that no radioactive material be inadvertently released. The following recommendations are intended as aids to guarantying that this policy is achieved:

1. The Micro "R" meters proved to be invaluable tools in locating contaminated items in large groups of material. Sufficient instruments of this type should be made available for use in SONGS hold-down areas.

   ACTION ITEM

   The Manager of Health Physics has directed that a total of three Micro "R" meters will be made available for use in SONGS hold-down areas by October 14, 1983 and two additional meters for backup by December 1, 1983. (Responsibility: [redacted])

2. Additional training should be administered to all Radwaste Senior Handlers regarding proper survey methods including use of the Micro "R" meter for releasing material from the Restricted Areas. The training should include discussions of instrument response time, the care that must be exercised to detect low level contamination, and stress the importance of this compliance function.

ACTION ITEM

Per the request of the Health Physics Manager, a brief training course to satisfy recommendation number 2, above, will be developed and presented to all Radwaste Senior Handlers by November 15, 1983. (Responsibility: [redacted]

E83-248

[redacted]
Health Physics Engineer

[redacted]0652K:[redacted]

cc: [redacted]
CDM files

July 28, 1983

MESSRS: [redacted]

SUBJECT: Contaminated Material at Mesa GRIP Facility

On July 20, 1983, while tools were being surveyed at the [redacted] tool crib for release from the Restricted Area at Unit 1, a gang box was brought to the area to transport tools to the Mesa. The Radwaste technician surveying the tools chose to survey the box prior to use and found it contaminated to 4 mrad/hr Beta and 0.1 mR/hr gamma in one small spot (see attached survey form.) The box was then removed to the Red Building Area for storage and sampling (results of sample attached).

Upon investigation, it was determined that the box had just been brought over from the Mesa GRIP Facility for use. Since we confiscated the box, it was immediately obvious there was some radiological problem. A short while later, a call was received from [redacted] at the Mesa Facility. Concern was expressed over the uncontrolled presence of radioactive material at the Mesa. [redacted] and myself arrived on the Mesa at noon and questioned [redacted] about the history of the box. The following information was determined:

1) it had been on the Mesa for "over two years",

2) it had last contained pipe caps,

3) it had been stored in at least three different locations,

4) other items in the area may have come over from the jobsite at the same time.

No radioactive material was found on this day (July 20, 1983); however, in the following two days, Mesa personnel continued to identify material that they suspected had arrived a year or more ago and may not have been surveyed since. As a result of their calls and surveys by Radwaste technicians, two additional items were retrieved. The contamination levels found were 13,000 dpm/100 cm^2 fixed on a cable choker and 200 cpm above background in a small area of a core drill. (See survey.)

These incidents, in conjunction with a heliarc welding stand found on July 14, would seem to indicate the possibility of the presence of contaminated items at the Mesa Facility which were released from the site prior to instituting the present release controls. In the quantities found to date, the radiation hazard is believed to be minimal, however, additional controls are needed to prevent release of any like items from the Mesa facilities.

MESSRS: D. DURAN
R. POSIK

July 28, 1983

On Monday July 25, 1983, a tour of all Mesa laydown facilities (GRIP Area, Fab Shop, [redacted]) was made. It was determined that there is no accountability of material at the facility that may have been in the protected area over the past 5-7 years. In addition, only minimal records are available for surveys of items removed from the protected areas. Based on this, contact was made with [redacted] (GRIP Yard Supervisor) and an agreement made that Radwaste Health Physics would be notified in advance of any material leaving the GRIP Yard or Fab Shop areas.

A material laydown area at [redacted] was observed on the tour and was determined not to have had material controls in place or have been surveyed by Health Physics. A survey of this area was performed on July 27, 1983 and found no radiation levels above background. A comprehensive survey of all items in this area is being performed and should be completed by August 5, 1983.

[redacted]

[redacted]0490K/[redacted]
Attachment

cc: [redacted]
CDM files

SONGS HP INDIVIDUAL TASK ASSIGNMENT (ITA)

A. ORIGINATOR: Comp[redacted]ividual assigning ITA is to complete Section B.

1) Name (Print) [redacted] 2) Enter your next ITA number E84-295

3) Describe Task Prepare MESA radiological impact report.

4) Describe what constitutes completion As above.

5) List appropriate references NRC Inspection

6) Sign and Date [redacted] July 83

B. ASSIGNOR(S): Compliance with this Section is indicated by your signature or initials below.

1) All necessary documents are to be referenced and/or readily available and/or attached.

2) Prime assignor and assignee discuss this ITA and agree on Prime Due Date, assignor enters:
PRIME DUE DATE* of _____ Assigned to [redacted] By _____ On _____

3) Subsequent assignor and assignee discuss and agree on Sub Due Date, assignor enters:
SUB DUE DATE* of _____ Assigned to _____ By _____ On _____

4) Assignor(s) gives original ITA to assignee and forwards a copy to TAC Coordinator.

*Prime Due Dates should be at least 5 calendar days beyond the date when task first assigned and Sub Due Dates must not be later than Prime Due Dates.

C. DUE DATE EXTENTION REQUEST: This Section is not a substitute for the Prime Due Date in Section B which must be agreed to between assignor/assignee prior to establishment. Required extensions, initiated by assignee, are to be requested as far in advance of the pending due date(s) as possible whenever completion date problems are identified.

1) New SUB DUE DATE of _____ Requested By _____ On _____

2) New PRIME DUE DATE of _____ Requested By _____ On _____

3) Reason why due date cannot be met _____

4) New SUB DUE DATE of _____ Approved By _____ On _____

5) New PRIME DUTE DATE of _____ Approved By _____ On _____

6) Copy of ITA forwarded to TAC Coordinator By _____

D. TASK COMPLETION: To be completed by assignee and forwarded to originator.

1) Statement of completed action PREPARED MEMOS DESCRIBING THE INVESTIGATION OF THE RELEASED MATERIALS & THE RADIOLOGICAL IMPACT EVALUATION

2) Date completed JANUARY '84

3) Is a copy of completion document attached ✓ BOTH MEMOS Yes (ACTION IS NOT COMPLETE WITHOUT THIS)

4) Signature of Assignee [redacted]

5) Originator is to forward original ITA and supporting documentation to TAC Coordinator.

To TACC on _____ date, By _____

Distribution: White - Originator Canary & Pink - Assignee Goldenrod - TAC Coordinator

SCE SO(123) 197 REV. 0 11/24/82

MEMORANDUM FOR FILE

December 21, 1983

SUBJECT: Evaluation of "Most Significant" Potential Radiological Conditions from Inadvertently Released Contaminated Material

This memorandum, written in response to the Notice of Violation which resulted from the NRC inspection conducted September 26-30, 1983, by Mr. [redacted] contains a summary of the requested radiological impact evaluation. Also included are:

1. The detailed calculations on which the summary is based;
2. A tabulation of all contaminated items found by December 31, 1983 outside of the Restricted Area;
3. Estimated release dates and radioactive decay corrections;
4. A description of follow-up efforts to locate and control potentially contaminated items; and
5. The status and estimated completion date of the radiological surveys.

INTRODUCTION

Since 1976, San Onofre Nuclear Generating Station, Unit 1 has undergone several major construction and repair projects. Those activities necessarily involved moving tools and materials in and out of Restricted Areas.

Although Station procedures regarding the proper release of materials were in effect at that time, controls and methods were not as rigorous as those now in place.

In October 1981, some items contaminated with licensed material were discovered outside the Unit 1 Restricted Area. That situation indicated the need for strengthening the contamination control program. As a result, the Health Physics Division began taking steps to increase both procedural and administrative controls over such releases.

Corrective steps which were taken included the following:

1. Routine weekly radiation surveys were expanded in October 1981 to include a portion of the Mesa.

2. Health Physics procedures regarding the release of potentially contaminated material were revised in November 1981, to incorporate NRC recommendations contained in NRC IE Circular 81-07.

3. Health Physics Technician coverage at potential release points was increased to 24-hours-a-day in November 1981. The points were locked when no technician was present.

4. The Health Physics Division began providing continuous, 24-hours-a-day coverage in the holddown area, the final release point from Unit 1 in September 1982.

5. Micro-R meters have been made available to Radwaste personnel permitting more sensitive release surveys.

6. Vehicle monitors were installed and are currently undergoing final testing in the two most heavily used Unit holddown areas as a supplemental measure to help prevent the release of radioactive material.

Control was substantially increased in May 1983, by assigning responsibility to the Radwaste Supervisor for releasing material from SONGS Restricted Areas for unrestricted use. Control of release is considered a primary function of the Radwaste Group and additional personnel have been committed to meet this goal. The group is currently expending approximately 1000 person-hours per month to perform radiological surveys of material released from Unit 1.

As a result of the increased surveillance by the Health Physics Division and cooperation by other groups at SONGS, several items with detectable fixed contamination were discovered at the Mesa in July 1983.

Following the realization that additional radioactively contaminated material might be present at the Mesa, the Health Physics Division established a program which included:

1. Initiation of comprehensive radiation and contamination surveys of all Mesa Facilities which could have received materials from the Unit 1 Restricted Area.

2. Imposition of material accountability controls at the affected Mesa Facilities such that no materials could be removed without a Health Physics release.

3. Initiation of an investigation to determine the source of the contaminated material at the Mesa and whether or not similar potentially contaminated items could have been released from the facilities in the past.

STATUS OF FOLLOW-UP EFFORT

Approximately 90 person-months have been expended through December 31, 1983, to locate potentially contaminated material ouside the SONGS Restricted Area. Radiological survey efforts are presently concentrated at the Mesa. There are approximately 90 person-months of survey work remaining with an estimated completion date of February 12, 1984.

Appendix 1 to this memorandum is a listing of all contaminated material which has been found through December 31, 1983. The tabulation includes a description of each item, the location of its discovery, the measured fixed and removable activities, the approximate release date, and the radioactive decay corrected activities estimated to have been present at the time of release.

Appendix 2 describes the rationale for establishing the release dates and characterizes the method for determining the activities present when the items were released. Also included is a discussion of a technique for dating several of the items by Cs-137/Cs-134 ratios.

It is important to note that all of the items described in Appendix 1 were released from SONGS Unit 1 before the rigorous controls, enumerated above, were established to prevent such releases. Since their institution, those corrective steps have prevented the inadvertent release of radioactively contaminated materials from SONGS Restricted Areas.

RADIOLOGICAL IMPACT EVALUATION

The remainder of this memorandum is a summary of an evaluation of the maximum possible radiological impact to members of the general public resulting from the possible use or possession of any item described in Appendix 1. The evaluation was performed by carefully reviewing the data and then selecting those items from Appendix 1 which were deemed able to present the greatest potential for direct whole body and extremity exposure, for skin contamination, for inhalation, and for ingestion, and then establishing and analyzing a "most significant" scenario for maximum possible exposure in each of the categories. It is intended that these scenarios represent the most significant possible radiological conditions posed by any contaminated item found.

The following sections provide a brief description of the analysis performed for each exposure category mentioned above and cite the appendix which contains the detailed dose calculations. Table 1 summarizes the calculated potential exposures to members of the general public and compares these to the applicable regulatory limits.

TABLE 1

SUMMARY OF UPPER LIMITS ON MOST SIGNIFICANT POTENTIAL EXPOSURE TO MEMBERS OF THE GENERAL PUBLIC

CONDITION	MOST SIGNIFICANT SCENARIO DOSE	10 CFR 20.105 LIMIT	VALUE ASSUMED EQUIVALENT TO REGULATORY LIMIT
I. Direct Radiation Whole Body	0.3 mrem/hour 7.8 mrem (Lifetime)	2.0 mrem/hour 100 mrem/week 500 mrem/year	- -
Extremity	20 mrem/hour 120 mrem (Lifetime)	NONE	[1]30 mrem/hour 1500 mrem/week 7500 mrem/year
II. Skin Contamination	8.5 mRem/hour 100 mRem (Lifetime)	NONE	[2]12 mrem/hour 600 mrem/week 3000 mrem/year
II. Inhalation	69 mrem (Lifetime)	500 mrem/year	- -
IV. Ingestion	21 mrem (Lifetime)	NONE	[3]1500 mrem/year

[1] Obtained by multiplying the limits specified in 10 CFR 20.105 by the ratio of maximum permissible whole body and extremity doses contained 10 CFR 20.101(a). (See Appendix 3.)

[2] Obtained by multiplying the limits specified in 10 CFR 20.105 by the ratio of maximum permissible whole body and skin of whole body doses contained in 10 CFR 20.101(a). (See Appendix 4.)

[3] Health Physics: Vol 3; "Report of ICRP Committee II on Permissible Dose for Internal Radiation (1959), With Bibliography for Biological, Mathematical and Physical Data", Section II, Paragraph 4(a); 1960.

I. DIRECT RADIATION

The 1 inch drive air-powered impact wrench, retrieved from the Bechtel warehouse in [redacted] (item number VI, 9 of Appendix 1), was judged to be the item which presented the greatest potential for whole body and extremity exposure to a member of the general public. Appendix 3 describes the scenario used to evaluate the most significant potential exposure and details the dose calculations.

I. DIRECT RADIATION (Continued)

Very briefly, the most significant scenario selected for evaluating potential whole body and extremity exposure to a member of the general public involved an individual repairing the impact wrench. As shown in Table 1, the resultant maximum potential doses are far below those allowed.

II. SKIN CONTAMINATION

The most significant scenario selected for evaluating potential skin contamination involved the deposition of contaminated grease, on the thigh of the supposed individual repairing the wrench described in the preceding section.

The scenario and the dose calculations are detailed in Appendix 4. As shown in Table 1, the maximum potential dose to the skin is far below the assumed limit to members of the general public.

III. INHALATION

Since few of the recovered items had removable surface contamination, there was an insignificant potential for the dispersal or inhalation of radioactive materials. However, for the purposes of evaluation, Appendix 5 describes a scenario in which the non-removable contaminants in a vacuum hose, retrieved from the Bechtel warehouse in [redacted] (item number VI, 3), are exhausted into a small room continuously occupied by a member of the general public.

As shown in Table 1, and detailed in Apendix 5, the resultant whole body dose is a small fraction of the limit established for members of the general public. The potential whole body dose was more significant than the potential organ dose.

IV. INGESTION

Again, because of the absence of removable contamination, few of the inadventently released items presented a potential for ingestion of radioactive material.

Appendix 6 describes a scenario and contains dose calculations for an individual who consumes contaminated grease from the impact wrench described in Section I.

As shown in Table 1, the resultant dose is again an insignificant fraction of the ICRP II recommendation.

CONCLUSION

The evaluation described in this memorandum consisted of establishing and analyzing the most extreme credible scenarios involving the potential for exposure to members of the general public from contaminated items inadvertently released from SONGS. In each case, the maximum potential dose was far below regulatory and related limits.

[redacted]
Health Physics Engineer

[redacted]0929K/[redacted]

cc: [redacted]
CDM files

APPENDIX 1
SUMMARY OF CONTAMINATED ITEMS

LOCATION/ITEM DESCRIPTION	ESTIMATED RELEASE DATE	ACTIVITY DETECTED: FIXED PLUS REMOVABLE (cpm)	ACTIVITY DETECTED: REMOVABLE (cpm)	ACTIVITY WHEN RELEASED: FIXED PLUS REMOVABLE (cpm)	ACTIVITY WHEN RELEASED: REMOVABLE (cpm)	COMMENTS
I. AWS WAREHOUSE						These tools and materials were discovered in the AWS Warehouse during October 1981. Since documentation of radiological surveys at that time was less rigorous than now, the information is incomplete in most cases. A dash indicates incomplete data.
PERSONNEL LOCKERS:						
1. Strapping Tool	5-1-81	300	- -	390	- -	
2. Wrench (7/16")	5-1-81	400	- -	520	- -	
3. Wrench (1-15/16")	5-1-81	500	- -	650	- -	
4. Snap Ring Pliers	5-1-81	200	- -	260	- -	
5. Channel Locks	5-1-81	1,400	- -	1,820	- -	
6. Channel Locks	5-1-81	300	- -	390	- -	
7. Wrench (7/8")	5-1-81	600	- -	780	- -	
8. Wrench (3/4")	5-1-81	300	- -	390	- -	
9. Screwdriver	5-1-81	200	- -	260	- -	
10. Screwdriver	5-1-81	400	- -	520	- -	
11. Crescent Wrench (10")	5-1-81	- -	1,500	- -	1,950	Removable contamination was evaluated by obtaining a gross smear on masslin and determining the count rate with a frisker.
12. Crescent Wrench (12")	5-1-81	- -	10,000	- -	13,000	
13. Crescent Wrench (6")	5-1-81	- -	3,000	- -	3,900	
14. Nylon Slings	5-1-81	200	- -	260	- -	
15. Scaffold Wrench	5-1-81	- -	600	- -	780	
16. Steel Wedge	5-1-81	200	- -	260	- -	
17. Pipe Wrench (14")	5-1-81	700	- -	910	- -	
18. Magnetic Base	5-1-81	300	- -	390	- -	
19. Crescent Wrench	5-1-81	1,500	- -	1,950	- -	
Tool Crib:						
20. Special Tool	5-1-81	200	- -	260	- -	
21. Air Driven Grinder	5-1-81	800	- -	1,040	- -	
22. Crescent Wrench	5-1-81	5,000	- -	6,500	- -	
23. Wrench	5-1-81	500	- -	650	- -	
24. Wrench	5-1-81	500	- -	650	- -	Items 32 through 36 were placed in the Maintenance Shop crypt in January 1981. The material remained isolated until the crypt was opened for radiological survey in October 1981. The items were returned to the Restricted Area after survey and were never accessible to a member of the general public.
25. Slug Wrench	5-1-81	- -	800	- -	1,040	
26. I Bolt	5-1-81	1,000	- -	1,300	- -	
27. Misc. Parts	5-1-81	500	- -	650	- -	
28. Grinder Parts	5-1-81	500	- -	650	- -	
29. Crescent Wrench (10")	5-1-81	1,500	- -	1,950	- -	
30. Chicago Fitting	5-1-81	2,000	- -	2,600	- -	
31. Tin Snips	5-1-81	- -	1,200	- -	1,560	
Machine Shop Crypt:						
32. Stud Tension Tester	1-1-81		- -	3,900	- -	Beta corrected measurements of 20 mrad/hr at 1/2" and 0.1 mRad/hr at 12" were reported on item No. 35. Dose rates when released are calculated to have been 25% higher.
33. RCS Seal Dummy	1-1-81		- -	1,300	- -	
34. I Beam	1-1-81		- -	650,000	- -	
35. Steel O-Ring	1-1-81		- -	See Comment	- -	
36. RCS Seal Dummy	1-1-81		- -	650	- -	

APPENDIX 1
SUMMARY OF CONTAMINATED ITEMS

LOCATION/ITEM DESCRIPTION	ESTIMATED RELEASE DATE	ACTIVITY DETECTED		ACTIVITY WHEN RELEASED		COMMENTS
		FIXED PLUS REMOVABLE (cpm)	REMOVABLE (dpm/100cm^2)	FIXED PLUS REMOVABLE (cpm)	REMOVABLE (dpm/100cm^2)	
II. MESA GRIP FACILITY						
1. Pipe Elbow (1")	5-1-81	>50,000 (on one small spot)	LLD	66,000	LLD	Item No. 1 was found in October 1981. The reported maximum reading was 10 mRad/hr (Beta corrected).
2. Wood Plank	5-1-81	600	LLD	1,000	LLD	Item No. 2 was discovered in March 1982.
3. Gang Box	5-1-81	300(general) >50,000 (on one small spot inside box)	<1,000	400 >50,000	<1,000	Item No. 3 was found in July, 1983. No radiation above background on exterior of box.
1. Forklift Battery	5-1-81	See Comment	4,000	See Comment	5,200	These items were found in October and December, 1981. Reported dose rates, in excess of natural background were: Item No. 1, 25 uR/hr; Item No. 2, 40 uR/hr; and Item No. 3, 2 uR/hr. Dose rates when released are estimated to have been 25% higher.
2. Pre-Filters	5-1-81		3,000		3,900	
3. Lead Blankets (6 Pallets)	5-1-81		- -		- -	
1. Heliarc Welding Stand	5-1-81	200	LLD	340	LLD	These items, released a minimum of 2 to 3 years ago, were surveyed in July 1983.
2. Roto Hammer	5-1-81	1,000	<1,000	1,700	1,100	
3. Cable Choker	5-1-81	200	LLD	340	LLD	
4. Core Drill	5-1-81	200	LLD	340	LLD	
5. Tap	5-1-81	100	LLD	170	LLD	
6. Wrench	5-1-81	100	LLD	170	LLD	
7. Dynameter	5-1-81	400	LLD	680	LLD	
III. AMERON LAYDOWN AREA						
1. 1.5 Meter Dia. Metal Rings	3-1-77	800 (max.)	LLD	9,100	LLD	These items, released from Unit 1 before 1980, were surveyed in August and September 1983.
2. Metal Support Rack	3-1-77	3,000	LLD	34,000	LLD	
3. Steel Shaft (4"x50")	3-1-77	10,000	LLD	114,000	LLD	
4. Split Pressure Flask	3-1-77	300	LLD	3,400	LLD	
5. Cylindrical Metal Puck	3-1-77	3,000	LLD	34,000	LLD	

LLD - Below Lower Limit of Detection

APPENDIX 1
SUMMARY OF CONTAMINATED ITEMS

LOCATION/ITEM DESCRIPTION	ESTIMATED RELEASE DATE	ACTIVITY DETECTED		ACTIVITY WHEN RELEASED		COMMENTS
		FIXED PLUS REMOVABLE (cpm)	REMOVABLE 2 (dpm/100cm)	FIXED PLUS REMOVABLE (cpm)	REMOVABLE 2 (dpm/100cm	
6.-11. Pressure Desurgers (6)	3-1-77	600 (max.)	LLD	6,800	LLD	
12. Pump Case	3-1-77	75	LLD	850	LLD	
13. 10 cm Shackle	3-1-77	300	LLD	3,400	LLD	
14. 7.5 cm Shackle	3-1-77	75	LLD	850	LLD	
15. Clamp	3-1-77	75	LLD	850	LLD	
16. Drain Cap	3-1-77	2,000	LLD	23,000	LLD	
17. Hand Lift	3-1-77	150	LLD	1,700	LLD	
18.&19. Clamps (2)	3-1-77	350 (max.)	LLD	4,000	LLD	
20. Cruciform Pipe	3-1-77	5,000	LLD	57,000	LLD	
21. 30 cm. Dia. Handwheel	3-1-77	1,000	LLD	11,400	LLD	
22. Valve Stem	3-1-77	2,000	LLD	23,000	LLD	
23. 3-inch Gate Valve	3-1-77	600	LLD	6,800	LLD	
24.&25. Shackles (2)	3-1-77	100	LLD	1,100	LLD	
26.-28. Aluminium Pipes (3)	3-1-77	2,000	<1,000 (External) 1,100 (Internal)	23,000	5,700 (External) 12,500 (Internal)	
29. Lead Blanket	3-1-77	1,000	LLD	11,400	LLD	
30. Metal Brace	3-1-77	700	LLD	8,000	LLD	
31. 3" Thick Metal Plate	3-1-77	2,600	LLD	30,000	LLD	
32. 22-inch Pipe	3-1-77	500	LLD	5,700	LLD	
33. Tube	3-1-77	1,200	LLD	14,000	LLD	
IV. EDISON SALVAGE YARD - [redacted] NO ITEMS FOUND						
V. DIVISION MAINTENANCE FACILITY AT [redacted] NO ITEMS FOUND						
VI. BECHTEL WAREHOUSE IN [redacted]						These items were surveyed in September 1983
1. Drill Press	5-1-81	2,000	LLD	5,600	LLD	Items 1 through 4 were released from Mesa Fabrication Shop during August 1983
2. 50', 1/2-inch Dia. Hose	5-1-81	75	<1,000	210		
3. 24', 2-inch Dia. Vacuum Hose	5-1-81	1,500 (External) 10,000 (Internal)	LLD (External) 1,120 (Internal)	4,200 (External) 28,000 (Internal)	LLD (External) 3,100 (Internal)	Removable contamination on item 3 was confined to a 3 inch long metal fitting on one end of the hose.

LLD-Below Lower Limit of Detection

APPENDIX 1
SUMMARY OF CONTAMINATED ITEMS

LOCATION/ITEM DESCRIPTION	ESTIMATED RELEASE DATE	ACTIVITY DETECTED		ACTIVITY WHEN RELEASED		COMMENTS
		FIXED PLUS REMOVABLE (cpm)	REMOVABLE (dpm/100cm^2)	FIXED PLUS REMOVABLE (cpm)	REMOVABLE (dpm/100cm^2)	
4. 100', 1 inch Dia. Hose	5-1-81	100	<1,000	280	1,300	
5. Air Powered Grinder	5-1-81	4,000	LLD	11,200	LLD	Items 5 through 9 were released from Unit 1 a minimum of 2-3 years ago.
6. 6', 1 inch Dia. Hose	5-1-81	4,000 (External) 16,000 (Internal)	LLD (External) <1,000 (Internal)	11,200 (External) 44,800 (Internal)	LLD (External) 1,100 (Internal)	
7. 6', 1 inch Dia. Hose	5-1-81	1,000	LLD	2,800	LLD	
8. Impact Wrench	5-1-81	1,200	<1,000	3,400	<1,000	
9. Impact Wrench	5-1-81	45,000 (one hot spot) 15mR/hr by TLD	2,200 (External) 35,100 βγ, 40α (Internal)	61,200 20mR/hr	3,000 47,800 βγ	An isotopic analysis of Item No. 9 revealed essentially only Cobalt-60.
10. Welding Connector	3-1-77	75	LLD	880	LLD	Items 10 through 24 released from Unit 1 a minimum of 5-6 years ago.
11.-16. Welding Connectors (5)	3-1-77	100	LLD	1,170	LLD	
17. Welding Connector	3-1-77	100	<1,000	1,170	2,800	
18. Welding Connector	3-1-77	800	LLD	9,400	LLD	
19. Welding Connector	3-1-77	800	<1,000	9,400	3,500	
20. Welding Connector	3-1-77	800	1,500	9,400	17,500	
21. Welding Connector	3-1-77	2,000	<1,000	23,400	3,300	
22. Welding Connector	3-1-77	2,200	<1,000	25,800	10,700	
23. Gate Valve	3-1-77	700 (External) 800 (Internal)	<1,000 (Internal and External)	8,200 (External) 9,400 (Internal)	LLD (External) 7,500 (Internal)	
24. Gate Valve	3-1-77	1,000 (External) 6,000 (Internal)	LLD (External) <1,000 (Internal)	11,700 (External) 70,000 (Internal)	LLD (External) 7,400 (Internal)	
VII. MESA FENCED AREA WEST OF AMERON						
1.&2. Head Set	5-1-81	1,800	<1,000	5,400	<3,000	The material found, November '83, in this area had been received from the GRIP Facility before the Radwaste Group established control over the movement of materials between areas at the Mesa.
3. Ratchet Wrench	5-1-81	90	<1,000	270	<3,000	
4. Staple Gun	5-1-81	100	<1,000	300	<3,000	
5. Ratchet Head	5-1-81	100	<1,000	300	<3,000	
6. Slug Wrench	5-1-81	90	<1,000	270	<3,000	
7. Air Powered Nail Gun	5-1-81	75	<1,000	225	<3,000	
8. C Clamp	5-1-81	240	<1,000	720	<3,000	
9. Pipe Stand	5-1-81	270	<1,000	800	<3,000	
10. Pipe Stand	5-1-81	390	<1,000	1,170	<3,000	

LLD - Below Lower Limit of Detection

APPENDIX 1
SUMMARY OF CONTAMINATED ITEMS

LOCATION/ITEM DESCRIPTION	ESTIMATED RELEASE DATE	ACTIVITY DETECTED		ACTIVITY WHEN RELEASED		COMMENTS
		FIXED PLUS REMOVABLE (cpm)	REMOVABLE [2] (dpm/100cm)	FIXED PLUS REMOVABLE (cpm)	REMOVABLE [2] (dpm/100cm	
11. C Clamp	5-1-81	300	<1,000	900	<3,000	
12. Pipe Stand	5-1-81	125	<1,000	375	<3,000	
13. Strap	5-1-81	200	<1,000	600	<3,000	
14. Vise Grips	5-1-81	3,000	1,650	9,000	5,000	
15. Vise Grips	5-1-81	90	<1,000	270	<3,000	
16. Vise Grips	5-1-81	6,500	5,800	19,500	17,400	
17. Vise Grips	5-1-81	3,200	3,880	9,600	11,600	
18. Vise Grips	5-1-81	75	<1,000	225	<3,000	
19. and 20. Fitting	5-1-81	125	<1,000	375	<3,000	
21. Fitting	5-1-81	150	<1,000	450	<3,000	The vicegrips, item 16, were
22. and 23. Fitting	5-1-81	100	<1,000	300	<3,000	modified for remote operation.
24. Fitting	5-1-81	1,590	<1,000	4,800	<3,000	Use as a standard hand tool was
25. Fitting	5-1-81	1,000	1,190	3,000	3,600	not possible.
26. Valve	5-1-81	1,000	<1,000	3,000	<3,000	
27. Box	5-1-81	200	1,070	600	3,200	
28. Vacuum Tool	5-1-81	250	<1,000	750	<3,000	
29. Regulator	5-1-81	100	<1,000	300	<3,000	
30. Socket Drive	5-1-81	250	<1,000	750	<3,000	
31. Winch	5-1-81	200	<1,000	600	<3,000	
32. Bucket	5-1-81	75	<1,000	225	<3,000	
33. T. V. Camera	5-1-81	300	<1,000	900	<3,000	
34. Head Set	5-1-81	200	<1,000	600	<3,000	
35. Head Set	5-1-81	250	<1,000	750	<3,000	
36. Metal Disk	5-1-81	400	<1,000	1,200	<3,000	
37. Allen Wrench	5-1-81	250	<1,000	750	<3,000	
38. Pipe Bender	5-1-81	500	<1,000	1,500	<3,000	
39. Pump and Valves	5-1-81	100	<1,000	300	<3,000	
40. Socket Breaker Bar	5-1-81	100	<1,000	300	<3,000	
41. Pipe	5-1-81	300	<1,000	900	<3,000	
42. Gas Bottle	5-1-81	400	<1,000	1,200	<3,000	
43. Scaffolding Knuckle	5-1-81	2,500	<1,000	7,500	<3,000	
44. Scaffolding Knuckle	5-1-81	18,000	4,200	54,000	12,600	
45. Casters	5-1-81	1,000	<1,000	3,000	<3,000	
46. Barrel	5-1-81	200	<1,000	600	<3,000	
47. Glove	5-1-81	200	LLD	600	LLD	
VIII. MESA 2/3 LAYDOWN AREA						These items were surveyed in November and December 1983.
1. Tube Lock	3-1-77	1,000	<1,000	12,000	<12,000	Item 1 was removed from Unit 1
2.-7. Knuckle	5-1-81	100	<1,000	300	<3,000	before 1980.
8.-9. Knuckle	5-1-81	200	<1,000	600	<3,000	
10.-11. Knuckle	5-1-81	400	<1,000	1,200	<3.000	
12.-15. Knuckle	5-1-81	150	<1.000	450	<3,000	
16.-26. Knuckle	5-1-81	75	<1.000	225	<3,000	

APPENDIX 1
SUMMARY OF CONTAMINATED ITEMS

LOCATION/ITEM DESCRIPTION	ESTIMATED RELEASE DATE	ACTIVITY DETECTED: FIXED PLUS REMOVABLE (cpm)	ACTIVITY DETECTED: REMOVABLE 2 (dpm/100cm)	ACTIVITY WHEN RELEASED: FIXED PLUS REMOVABLE (cpm)	ACTIVITY WHEN RELEASED: REMOVABLE 2 (dpm/100cm)	COMMENTS
27. Knuckle	5-1-81	350	[1,000	1,050	[3,000	
28. Knuckle	5-1-81	80	[1,000	240	[3,000	
29. Knuckle	5-1-81	500	[1,000	1,500	[3,000	
30. Knuckle	5-1-81	250	[1,000	750	[3,000	
31. Knuckle	5-1-81	160	[1,000	480	[3,000	
32. Knuckle	5-1-81	10,000	[1,000	30,000	[3,000	
33. Knuckle	5-1-81	350	[1,000	10,500	[3,000	
34. Engineers Box	5-1-81	200	[1,000	600	[3,000	
35. Tape	5-1-81	300	[1,000	900	[3,000	
36. File	5-1-81	600	[1,000	1,800	[3,000	
37. Box Wrench	5-1-81	80	[1,000	240	[3,000	
38. Brass Fittings	5-1-81	800	[1,000	2,400	[3,000	
39. Hydrolazer	5-1-81	2,000	3,700	6,000	11,100	
IX. Mesa Training Center						
1. Survey Instrument	5-27-82	20,000	LLD	25,000	LLD	This item, found in December 1983, was released from the Unit 1 Restricted Area in May, 1982. It was then transferred from the Protected Area in May, 1983, to the Training Center for use as a training aid.
X. San Diego State University						
No items found						
XI. [redacted]						
1.-3. Three level detectors.	5-2-82	300	1150 (max.)	350	1,300	These items were inadvertently shipped to the manufacturer for repair. The combined fixed plus removable activity (primarily Co-60 and Cs-137) was estimated at 0.1 uCi. The items were surveyed and decontaminated by a licensed contractor before repairs were made.

LLD - Below lower limit of detection

0929K

APPENDIX 2

RELEASE DATE ANALYSIS AND DECAY CORRECTIONS

A review of outages and the types of work performed during those outages suggested that October 1976 - March 1977 and March 1980 - June 1981 were the most likely times during which radioactive materials may have inadvertently been released. Major work during the 1976-1977 period included structural steel additions in containment, and construction of the diesel generator and biological shield structures. The 1980 - 1981 outage included the steam generator repair by sleeving and extensive TMI related backfit work. Much material was repeatedly transferred between SONGS 1 and the Mesa facilities during that outage. Large quantities of equipment and materials were removed from containment in March 1977 and May 1981 as the unit was being prepared for return to service. Some of those items were ultimately transferred to various Mesa facilities for storage or salvage.

The decay of gross fission products may be described by following equation which was taken from, Introduction to Health Physics, by H. Cember (p. 368):

$$A = 1.46\ P[(\tau-t)^{-0.2}-\tau^{-0.2}]\ Ci \qquad \text{(EQN. 2.1)}$$

where A = fission product activity, curies
P = power, watts
t = reactor operating time, days
τ = t + time after shutdown, days

Figure 2.1 provides a graph of A versus time after shutdown for a reactor which has operated for 500 days. That operating time is a reasonable approximation of one fuel cycle for SONGS 1.

Some indication of the age of contaminated material may be obtained by performing an analysis for radionuclides present. The presence of only the longer-lived fission and corrosion products (Co-60, Cs-134, Cs-137) is good evidence that the radionuclides exited the primary system months to years ago. A knowledge of typical Cs-137/Cs-134 ratios during operation, as they applied to primary system and liquid waste streams, combined with a measurement of those radionuclides on recently found contaminated items, permits an estimate of the number of years since the contamination was released from the reactor coolant system. Before 1981, the Cs-137/Cs-134 ratio was about 1.8 for SONGS Unit 1 reactor coolant. The ratio had increased to 2.5-3.0 by late 1983 as a result of differential decay rates combined with only a few months of operation since early 1980. Items analyzed for radionuclides are shown in Table 2-1 together with the "estimated age" based on Cs-137/Cs-134 ratios. The "estimated ages" are considered supportive of the estimated release dates shown in Appendix 1.

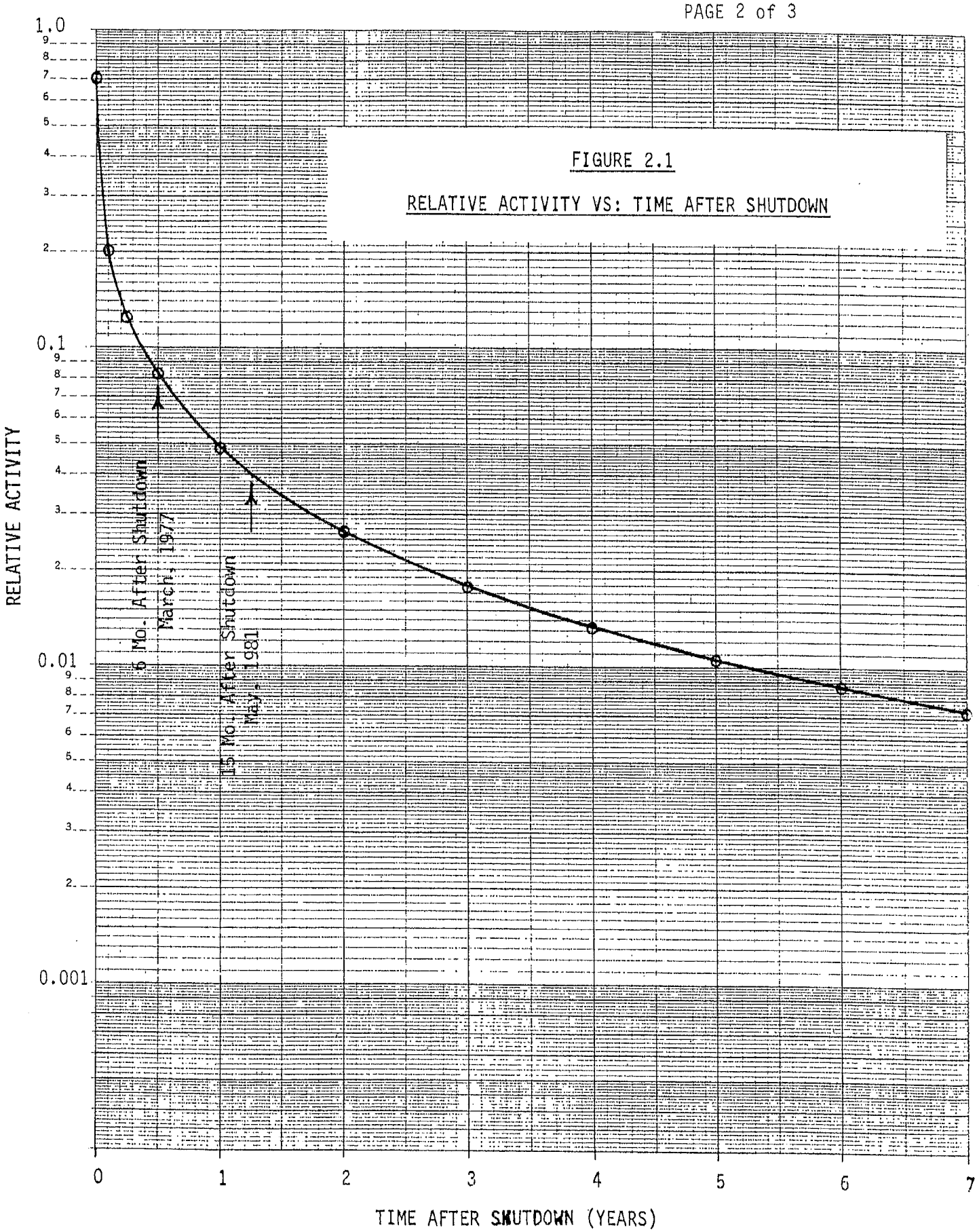


FIGURE 2.1
RELATIVE ACTIVITY VS: TIME AFTER SHUTDOWN
RELATIVE ACTIVITY
1.0
0.1
0.01
0.001
6 Mo. After Shutdown
March, 1977
15 Mo. After Shutdown
May, 1981
0
1
2
3
4
5
6
7
TIME AFTER SHUTDOWN (YEARS)

TABLE 2-1
CESIUM DATING

[1]ITEM	MAJOR RADIONUCLIDES IDENTIFIED	Cs-137/Cs-134 AGE	ESTIMATED RELEASE DATE
Scaffolding Knuckle (VII, 44)	Co-60, Cs-134, Cs-137	8 years	5-1-81
Vice Grips, Fitting Headset (VII, 1, 16,21)	Co-60, Cs-134, Cs-137	7 years	5-1-81
Tube Lock (VIII, 1)	Co-60, Cs-137	[2] 3 years	3-1-77
Vacuum Hose (VI, 3)	Co-60, Cs-134, Cs-137	2 years	5-1-81
Impact Hammer (VI, 9)	Co-60, Cs-134, Cs-137	10 years	5-1-81

[1] The notation in parenthesis refers to the item's location in Appendix 1.

[2] Since Cs-134 was not identifed, the minimum detectable activity was used to calculate the ratio. The actual ratio, and thus the age, could be much greater than the listed value.

For purposes of the radiological impact assessment, the amount of radioactive material detected on an item was decay corrected, using Figure 2.1, from the time of measurement back to either March 1977 or May 1981, whichever date was more consistent with the probable release date. Because of the special circumstances associated with the material found in the Maintenance Shop crypt, those items were corrected back to January 1, 1981. It should be noted that the reactor was shut down for 6 months before March 1977, and for 15 months before May 1981. The only exception to this method was a normal decay correction for items which showed essentially only cobalt to be present. Release dates were estimated from (1) a knowledge of the history of an area (i.e., GRIP established in 1979; material moved to [redacted] 5 years ago ...), (2) personnel recollections, (3) release tag records, and (4) dating by Cs-137/Cs-134 ratios.

0929K

APPENDIX 3

EVALUATION OF THE MOST SIGNIFICANT DIRECT RADIATION CONDITION

The steel O-ring which was found in the AWS Maintenance Shop crypt presented the highest exposure rate of all the items listed in Appendix 1. However, because the O-ring was never released from the site and was totally isolated from personnel in its storage location, the exposure potential was insignificant. Instead, the 1-inch drive air-powered impact wrench, retrieved from the Bechtel Warehouse in [redacted] (item number VI, 9 in Appendix 1), was judged to be the item which presented the greatest potential for whole body and extremity exposure to a member of the general public.

Initial radiological surveys of the wrench revealed only a minimal amount of removable contamination on the external surface, that the direct radiation due to cobalt-60, was emanating from a localized spot inside the handle, and that exposure rates were essentially the same on either side of the handle. No beta radiation was detected.

A piece of X-ray film was exposed to the wrench to determine the location and the effective size of the radiation source inside the handle. The image on the film indicated that the source was on the air inlet side toward the lower end of the handle and that the source measured approximately 3/4 inch in diameter. A number of thermoluminescent dosimeters (TLDs) were then exposed along the length of the handle to further characterize the radiation field. The radiation survey and TLD evaluation results are summarized in Table 3-1.

TABLE 3-1

IMPACT WRENCH SURVEY RESULTS

Measurement Method	Exposure Rate (mR/hr)	
	[1] Contact	12"
Eberline RO-2	5.0	0.2
Eberline E520 with HP270 Probe	13.0	0.2
Panasonic TLD	15.0	-

[1] The surface to center-of-detector was 1 1/2" and 1/2" for the Eberline RO-2 and HP270 probe, respectively. The center of the TLD phosphor was 1/8" from the wrench surface.

The "contact" exposure rates measured with the two survey instruments were not corrected for source size or distance effects which result in an under response at short distances. The TLD results are representative of the actual dose rate at the exterior surface of the wrench handle and are used in the dose calculations below. No correction to the TLD measured surface exposure rate (actually 1/8 inch from the surface) was warranted since the actual radioactive source was about 1/4 inch below the surface of the wrench handle and is shielded by greater than 1/8 inch of steel.

The TLD measurements ranged from 5.5 mR/hr to a high of 19.0 mR/hr. Because the 19 mR/hr was measured near the bottom of the handle, even a large hand positioned on the handle would not have extended that low and would have been exposed to a maximum of only about 15 mR/hr.

The exposure rate measured by survey instrument at 12 inches from the wrench surface requires no corrections for geometry or energy. This conclusion is based on a study performed by [redacted], "External Dose Evaluation Manual," BNWL-MA-62, [redacted] August 5, 1969, which concluded that source size and distance corrections are not required when using an instrument similar to the Eberline RO-2 at source to window distances greater than 6 inches.

The contaminated wrench was originally sent to the [redacted] for repairs. According to warehouse personnel, after being repaired, the wrench was stored at the warehouse until it was found during a radiation survey and subsequently returned to SONGS. When found, the repair tag was still loosly attached to the wrench which is further evidence that the wrench was never operated after being repaired. In its storage location at the warehouse, the wrench presented an insignificant potential for personnel exposure as verified by radiation measurements made at the storage location.

A private firm which performs maintenance and repairs on air powered tools was contacted regarding typical repairs on impact wrenches. It was learned that a complete rebuild of a wrench of that type would involve no more than 1 to 2 hours of work. However, if weld repairs were needed, the total repair time could increase to 6 hours. It was further mentioned that if required replacement parts were not locally available, delivery would extend the repair time to 2 weeks.

The "most significant" scenario selected for evaluating potential whole body and extremity exposure involved an individual repairing the impact wrench. The following assumptions were made:

1. Total repair time was 6 hours.

2. The repairman held the wrench by the handle at a distance of 12 inches from his body during the entire 6 hours.

3. The wrench remained at the work station at a distance of 2 feet from the repairman during a 2 week wait for replacement parts.

4. The exposure rate at a distance of 2 feet was 0.075 mR/hr.

5. 20 mR/hr extremity exposure rate (TLD results decay corrected using cobalt-60 half-life since essentially only cobalt-60 was identified in the isotopic analysis).

6. 0.3 mR/hr whole body exposure (12" detector-to-surface measurement, Eberline RO-2 also decay corrected).

POTENTIAL WHOLE BODY EXPOSURE

$$6 \text{ hours} \times \frac{0.3 \text{mR}}{\text{hour}} + \frac{40 \text{ hours}}{\text{week}} \times 2 \text{ weeks} \times \frac{0.075 \text{ mR}}{\text{hour}} = 7.8 \text{ mR}$$

POTENTIAL EXTREMITY EXPOSURE

$$6 \text{ hours} \times \frac{20 \text{ mR}}{\text{hour}} = 120 \text{ mR}$$

The whole body exposures calculated above are well below the 2mR/hour, 100mR/week, and 500mR/year allowed in section 20.105 of 10 CFR. The code does not include limits for extremity exposure for members of the general public, however, the code does limit general public annual whole body exposure to 10% of the occupational exposure limits. If the limits specified in section 20.105 are multiplied by the ratio computed of maximum permissible whole body and extremity doses contained in section 20.101(a) [occupational] of 10 CFR as follows:

$$\text{General Public Whole Body Dose Limit (10 CFR 20.105)} \times \frac{\text{Occupational Extremity Dose Limit (10 CFR 20.101(a))}}{\text{Occupational Whole Body Dose Limit (10 CFR 20.101(a))}} = \text{Allowed Extremity Dose to a Member of the General Public}$$

The results are:

$$2 \text{ mrem (whole body)/hr} \times \frac{18.75 \text{ rem (extremity dose)}}{1.25 \text{ rem (whole body dose)}} = 30 \text{ mrem/hr (extremity)}$$

$$100 \text{ mrem (whole body)/7 days} \times \frac{18.75 \text{ rem (extremity dose)}}{1.25 \text{ rem (whole body dose)}} = 1500 \text{ mrem/7days (extremity)}$$

$$500 \text{ mrem (whole body)/year} \times \frac{18.75 \text{ rem (extremity dose)}}{1.25 \text{ rem (whole body dose)}} = 7500 \text{ mrem/year (extremity)}$$

The calculated potential extremity dose to a member of the general public is far below values obtained by the above ratioing of occupational and general public whole body exposure limits.

APPENDIX 4

EVALUATION OF MOST SIGNIFICANT SKIN CONTAMINATION CONDITION

Initially, it was thought that operation of the air-driven impact wrench, described in Appendix 3 would generate an airborne radioactive material condition. To evaluate this possibility, the wrench was secured in a vice and operated continuously for 20 minutes in an 8' x 10' x 8' room with no ventilation. Several air samples were obtained at various distances from the wrench both before and during the 20-minute run time. No difference was observed in the two sets of air sample results. However, a total of approximately 0.5 cm^3 of grease was discharged downward from the wrench exhaust port. It should be mentioned that this was not typical operation for this type of wrench. Under normal loaded operation, the wrench turns much slower and, therefore, the rate of contaminated grease discharge would also be much less than observed in the test. The wrench was subsequently disassembled and a sample of grease was obtained from the exhaust port. The sample was analyzed on a gamma ray spectrometer (GeLi detector) and revealed 3.88 E-4 µCi/mg cobalt-60, and 4.44 E-6 µCi/mg cesium-137. The total volume of contaminated grease in the wrench was estimated at 5 cm^3.

The "most significant" scenario selected for evaluating maximum potential skin contamination involved the deposition of the contaminated grease on the thigh of the repairman while testing the wrench. The following assumptions were made:

1) The total volume of contaminated grease, estimated at 5 cm^3, was discharged from the wrench.

2) The contaminated grease was deposited on the repairman's pants covering a 10 cm x 10 cm area, 100 cm^2.

3) The pants were worn for 12 hours before being removed.

4) The epidermis of the thigh is 7 mg/cm^2. The pants provided an additional 25 mg/cm^2 for a conservative total density thickness (x) of 30 mg/cm^2 between the contaminant and the basal layer of the skin.

5) The grease provided no additional beta particle absorption through self-absorption.

6) All activity in the grease was due to cobalt-60 (99% actually).

7) The total activity in the grease (A) was 5.34 E-4 µCi/mg, decay corrected to the time the wrench was released using the half-life for cobalt-60.

8) The density of the grease (ρ_g) was conservatively estimated to be 1 g/cm^3.

9) The maximum beta energy ($E_{\beta max}$) for cobalt-60 is 0.318 (99+%), (from Radiological Health Handbook).

10) The average beta energy ($\bar{E}_\beta$) is 0.095 MeV, (from Radiological Health Handbook).

11) The density of soft tissue (ρ_t) is 1 g/cm³.

The beta dose rate to the basal layer of the skin is calculated by the following semi-emperical equation described by Brownell and Hine in Radiation Dosimetry, pg. 720:

$$R = 8.0\ E\text{-}9\ \rho_t{}^2 \bar{E}_\beta\ \alpha\sigma \left\{ c\ [1+\ln(c/\nu x) - \exp\ (1-\nu x/c)] + \exp\ (1-\nu x) \right\} \text{ Rad/hr} \qquad \text{(EQN.4.1)}$$

$$[\ ] \equiv 0 \text{ for: } x \geq c/\nu$$

where c and α are empirical constants (2 and 0.260, respectively); the 8.0 E-9 value is a dose conversion factor; ν is the apparent beta absorption coefficient of soft tissue; σ is the source strength in disintegrations/hour per cm²; and ρ_t, $\bar{E}_\beta$, and x are used as defined above.

The absorption coefficient, ν, was calculated by:

$$\nu = \frac{18.6}{(E_{\beta max} - 0.036)^{1.37}} \left(2 - \frac{\bar{E}_\beta}{E_\beta{}^*} \right) \text{ cm}^2/\text{g} \qquad \text{(EQN 4.2)}$$

where $\bar{E}_\beta{}^*$ is a hypothetical average beta ray energy per disintegration for a hypothetical allowed spectrum with the same value of $E_{\beta max}$.

For allowed spectra, the ratio $\bar{E}_\beta/\bar{E}_\beta{}^*$ is unity, and the parentheses containing this term is unity. Substituting the value for $E_{\beta max}$, yields:

$$\nu = \frac{18.6}{(0.318 - 0.036)^{1.37}}$$

$$\nu = 105.4 \text{ cm}^2/\text{g}$$

The source strength, σ, is calculated by:

$$\sigma = \frac{AfV\rho_g}{a} \text{ disintegrations/hour per cm}^2 \qquad \text{(EQN 4.3)}$$

where A is the activity present in the grease in µCi/mg, f is a conversion factor with units of distintegrations/hour per µCi, V is the volume of the grease in cm³, ρ_g is the density of the grease in mg/cm³, and a is the area of skin exposed in cm².

Substituting the values into EQN 4.3, yields:

$$\sigma = \frac{(5.34\ E\text{-}4)(1.33E8)(5)(1000)}{100}$$
$$= 3.55\ E6 \text{ disintegrations/hour per cm}^2$$

Since:

$$x \geq c/\nu$$

$$0.030\ g/cm^2 \geq 2/105.4\ cm^2/g$$
$$\geq 0.019\ g/cm^2$$

The term within the brackets [ ] of EQN 4.1 is identically zero and equation 4.1 reduces to:

$$R = 8.0\ E\text{-}9\ \rho^2\nu\ \bar{E}_\beta\alpha\sigma \exp(1-\nu x)\ \text{Rad/hr} \qquad \text{(EQN 4.2)}$$

Substituting the values into equation 4.2 yields:

$$R = 8.0\ E\text{-}9(1)^2(105.4)(0.095)(0.260)(3.55E6)\exp[1-(105.4)(0.030)]$$
$$= 8.51\ E\text{-}3\ \text{Rad/hr}$$

Assuming a 12 hour exposure period, the total dose to the basal layer of the repairman's skin (D) is given by:

$$D = (8.51\ E\text{-}3\ \text{Rad/hr})(12\ \text{hr})$$
$$= 1.02\ E\text{-}1\ \text{Rad or } 100\ \text{mRad}$$

The Code of Federal Regulations does not include limits for skin exposure for members of the general public, however, the Code does limit general public annual whole body exposure to 10% of the occupational exposure limits. If the limits specified in Section 20.105 are multiplied by the ratio computed of maximum permissible whole body and skin of whole body doses contained in Section 20.101(a) [occupational] of 10 CFR as follows:

$$\begin{array}{c}\text{General Public} \\ \text{Whole Body Dose} \\ \text{Limit (10 CFR 20.105)}\end{array} \times \frac{\begin{array}{c}\text{Occupational} \\ \text{Skin Dose} \\ \text{Limit (10 CFR 20.101(a))}\end{array}}{\begin{array}{c}\text{Occupational} \\ \text{Whole Body Dose} \\ \text{Limit (10 CFR 20.101(a))}\end{array}} = \begin{array}{c}\text{Allowed Skin} \\ \text{Dose to a Member} \\ \text{of the General} \\ \text{Public}\end{array}$$

The results are:

$$2\ \text{mrem (whole body)/hr} \times \frac{7.5\ \text{rem (skin dose)}}{1.25\ \text{rem (whole body dose)}} = 12\ \text{mrem/hr (skin)}$$

$$100\ \text{mrem (whole body)/7 days} \times \frac{7.5\ \text{rem (skin dose)}}{1.25\ \text{rem (whole body dose)}} = 600\ \text{mrem/7 days (skin)}$$

$$500\ \text{mrem (whole body)/year} \times \frac{7.5\ \text{rem (skin dose)}}{1.25\ \text{rem (whole body dose)}} = 3000\ \text{mrem/year (skin)}$$

The calculated maximum potential skin dose to a member of the general public is far below values obtained by the above ratioing of occupational and general public whole body exposure limits.

APPENDIX 5

EVALUATION OF THE MOST SIGNIFICANT INHALATION CONDITION

Very few of the items uncovered during the investigation had removable surface contamination in excess of the SONGS release limits. Several of the items with fixed contamination could have presented an inhalation condition had cutting or grinding been attempted on them. However, the potential uptake was so slight for those items, that analyses were not performed. Instead, a 24-foot section of vacuum hose, retrieved from the [redacted] (item number VI, 3 in Appendix 1), was selected as the most significant item for this scenario. It was assumed that, though the contaminants were fixed and not removable, the entire amount of radioactivity in the hose would be exhausted if air were blown through it. The scenario assumes that the entire contents of the hose exhausted into a small room (10' x 10' x 8') occupied by an individual. Those dimensions equate to a room volume of 2.3 E7 cm^3.

The observed deposition of activity was nonuniform along the length of the hose. A detailed radiation survey demonstrated a substantial decrease in activity after the first 8 feet of the hose. Isotopic analyses of several segments of the hose revealed the following nuclides and decay corrected activities:

TABLE 5-1

VACUUM HOSE ISOTOPIC ANALYSIS RESULTS AND INITIAL ROOM CONCENTRATION

	DECAY CORRECTED ACTIVITY (µCi)			
NUCLIDE	FIRST 8' SECTION	REMAINING 16' SECTION	TOTAL	ROOM CONCENTRATION (C_o) @ t = 0 (µCi/cm^3)
Mn-54	0.77	- -	0.77	3.3 E-08
Co-60	2.99	2.08 E-2	3.01	1.3 E-07
Cs-134	19.2	1.76 E-3	19.20	8.3 E-07
Cs-137	31.1	1.99 E-2	31.12	1.4 E-06
		TOTAL:	54.10	2.39 E-06

In a study performed by [redacted] et al, published in the July-August 1972 issue of "Nuclear Safety," the number of complete air changes per hour were measured for several single family dwellings in New England. Air exchange rates of 2 to 3 per hour were observed on the first floor of these dwellings.

Considering the effect of ventilation on activity removal, the effective half-life for removal of the radioactive material from the room is calculated by the equation:

$$T_{1/2}(\text{effective}) = \frac{T_{1/2}\ (\text{physical}) \cdot T_{1/2}\ (\text{vent})}{T_{1/2}\ (\text{physical}) + T_{1/2}\ (\text{vent})} \qquad \text{(EQN 5.1)}$$

where $T_{1/2}$ (vent) = 0.693 • T (air change), and T (air change) is the room volume divided by the air volume exhausted per unit time.

However, since $T_{1/2}$ (vent) << $T_{1/2}$ (physical), Equation 5.1 reduces to:

$$T_{1/2}\ (\text{effective}) \equiv T_{1/2}\ (\text{vent}) \qquad \text{(EQN 5.2)}$$

If a conservative 2 air volume changes per hour is substituted into equation 5.2:

$$T_{1/2}\ (\text{effective}) \equiv T_{1/2}\ (\text{vent}) = 0.693 \cdot T\ (\text{air change})$$

$$\equiv 0.693\ \frac{\text{Room Volume}}{\text{2-Room volumes exhausted/hour}}$$

$$\equiv \frac{0.693}{2}\ \text{hours}$$

Assuming a feed and bleed situation, the concentration of radioactivity present after any time interval is given by the following equation:

$$C = C_o e^{-\lambda_{eff} t} \qquad \text{(EQN 5.3)}$$

where C_o is the initial concentration, C is the concentration present after time t, λ_{eff} is the effective activity removal constant, and e is the base of the system of natural logarithms.

The effective activity removal constant is the fraction of activity removed per unit time, and is related to the effective half-life $T_{1/2}$ (effective), by:

$$\lambda_{eff} = \frac{0.693}{T_{1/2}\ (\text{effective})} \qquad \text{(EQN 5.4)}$$

Substituting the value obtained for $T_{1/2}$ (effective) into equation 5.4, yields:

$$\lambda_{eff} = \frac{0.693}{\frac{0.693}{2}\ \text{hours}}$$

$$= 2\ \text{hours}^{-1}$$

A plot (Figure 5.1) of airborne radioactive material present in the room vs time shows that the airborne concentration decreases very rapidly.

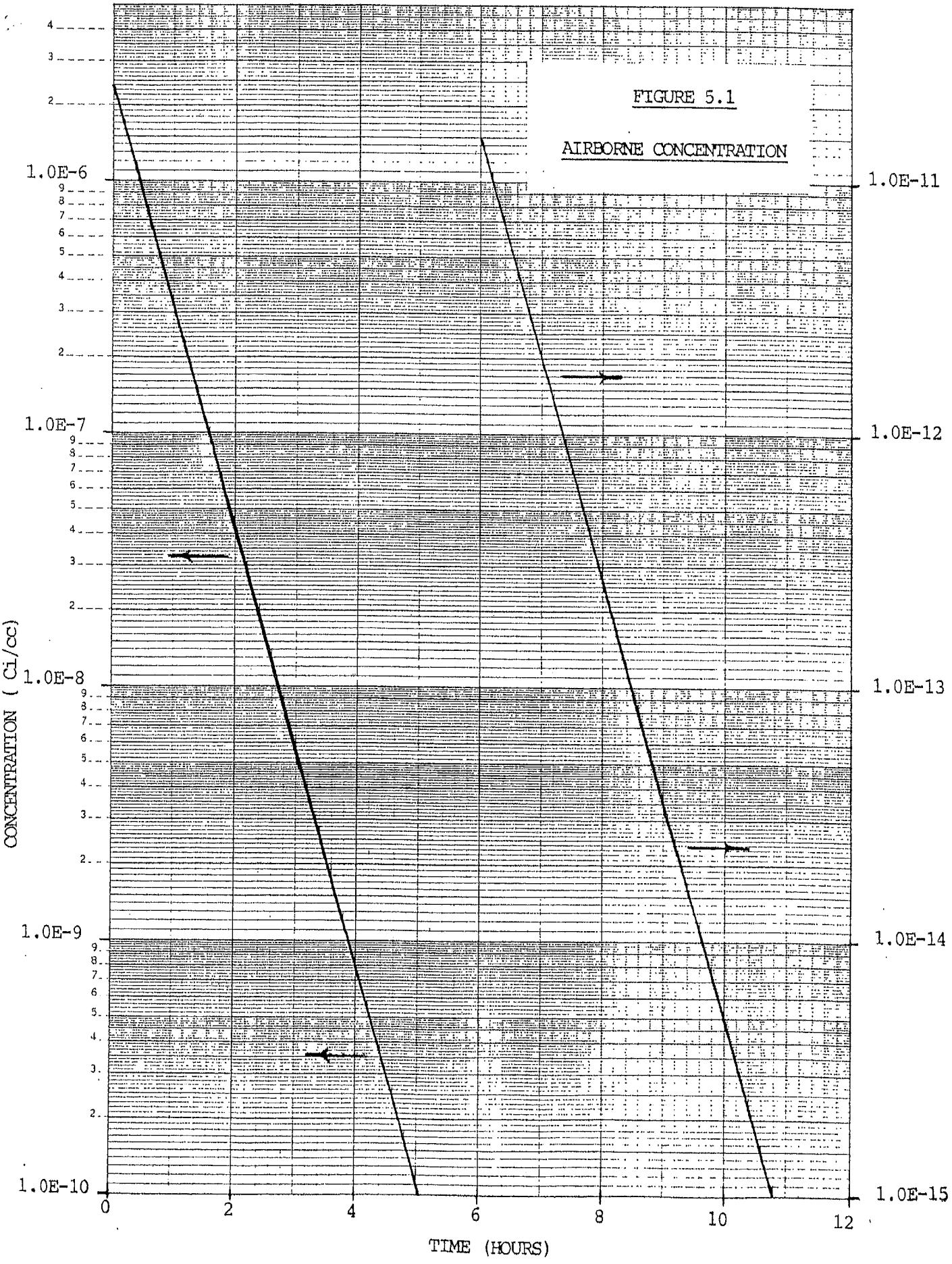


FIGURE 5.1
AIRBORNE CONCENTRATION
CONCENTRATION (Ci/cc)
1.0E-6
1.0E-7
1.0E-8
1.0E-9
1.0E-10
1.0E-11
1.0E-12
1.0E-13
1.0E-14
1.0E-15
0
2
4
6
8
10
12
TIME (HOURS)

The total activity inhaled (A_I) by the individual in the room is the product of: Concentration (C), Breathing Rate (B), and Time (t) of exposure. A resting breathing rate of 2.5E5 cm^3/hour was obtained from ICRP 23 for the most significant individual engaged in light activity. Since the concentration is constantly decreasing, the time integral must be obtained:

$$A_I = \int CBdt \qquad \text{(EQN 5.5)}$$

Substituting the expression for concentration (from equation 5.3), the value of λ_{eff}, and then solving, yields:

$$A_I = BC_o \int_{t=o}^{t=\infty} e^{-\lambda_{eff} t} dt$$

$$= \frac{C_o B}{2} \quad \mu Ci$$

Since virtually all of the radioactive material was removed from the air in the room after the first 8 hours, Equation 5.5 yields the same inhaled activity for all values of $t \geq 8$ hours.

The following dose evaluation was performed using ICRP II methods. The evaluation assumes a single uptake of the contaminants present in the room and calculates the resultant whole body dose using the equation:

$$DOSE = 2.13 \frac{\varepsilon f_r A_I f_a}{m \lambda_b} \quad Rem \qquad \text{(EQN 5.6)}$$

Where ε is the energy absorption term expressed in MeV (ICRP II), A_I is the inhaled activity, f_r is the fraction of inhaled activity retained (ICRP II), f_a is the fraction reaching the "critical organ" (ICRP II), m is the body mass in grams (ICRP 23), and λ_b is the biological decay constant with units of inverse hours (ICRP II). The 2.13 value is a factor for converting from energy deposited to dose.

An A_I value was calculated for each nuclide from Table 5-1 information and equation 5.5. Values used in the dose calculation are contained in Table 5-2. Notice that the values used for the energy absorption term (ε) relate to "total body" dose. Those values were conservatively used since the calculated resultant whole body dose was greater than that to just the lungs.

TABLE 5-2

INHALATION DOSE CALCULATION VARIABLES

NUCLIDE	A_I (μCi)	ε (MeV)	f_r	f_a	λ_b (hr^{-1})
Mn-54	4.13 E-3	0.51(TB)	0.75	0.3	5.2 E-3
Co-60	1.63 E-2	1.5 (TB)	0.75	1.0	3.0 E-3
Cs-134	1.04 E-1	1.1 (TB)	0.75	0.75	4.1 E-4
Cs-137	1.75 E-1	0.59(TB)	0.75	0.75	4.1 E-4

The dose contribution from each nuclide was calculated separately using Equation 5.6:

$$\text{Mn-54} = 2.13 \frac{(0.51)(0.75)(4.13\text{ E-3})(0.3)}{(9{,}500)(5.2\text{ E-3})} = 2.0\text{ E-5 Rem}$$

$$\text{Co-60} = 2.13 \frac{(1.5)(0.75)(1.63\text{ E-2})(1.0)}{(9{,}500)(3.0\text{ E-3})} = 1.4\text{ E-3 Rem}$$

$$\text{Cs-134} = 2.13 \frac{(1.1)(0.75)(1.04\text{ E-1})(0.75)}{(9{,}500)(4.1\text{ E-4})} = 3.5\text{ E-2 Rem}$$

$$\text{Cs-137} = 2.13 \frac{(0.59)(0.75)(1.75\text{ E-1})(0.75)}{(9{,}500)(4.1\text{ E-4})} = 3.2\text{ E-2 Rem}$$

Total whole body dose due to inhalation of the contaminants is the sum of the dose from each nuclide:

$$\text{Total dose} = \Sigma\,(D_{\text{Mn-54}},\ D_{\text{Co-60}},\ D_{\text{Cs-134}},\ D_{\text{Cs-134}})$$

$$= 6.9\text{ E-2 Rem or 69 mrem}$$

The whole body dose calculated above is less than 14% of the 500 mR/year allowed in Section 20.105 of 10 CFR.

APPENDIX 6

EVALUATION OF THE MOST SIGNIFICANT INGESTION CONDITION

Again, because of the lack of significant removable radioactive contamination on most of the inadvertently released items, the potential for ingestion of radioactivity was present for very few of the discovered items.

The scenario for the most significant ingestion of radioactivity involves the possible consumption of contaminated grease by an individual operating or repairing the impact wrench described in Appendices 3 and 4. It's difficult to imagine anyone ingesting more than trace amounts of the grease, however, for the purposes of calculation, it was assumed that the subject of the internal dose evaluation ingested 1 cm^3 of the contaminated grease.

It was assumed that all activity in the grease was due to cobalt-60 and that the activity was consumed in a single uptake. The total activity ingested (A) is given by:

$$A = VA_I\rho_g \quad \mu Ci \qquad \text{(EQN 6.1)}$$

where V is the volume of grease ingested in cm^3, A_I is the activity present in the grease in $\mu Ci/mg$, and ρ_g is the conservatively assumed density of the grease in mg/cm^3.

Substituting the values into EQN 6.1, yields:

$$A = (1)(5.34\ E\text{-}4)(1000)$$

$$= 0.53\ \mu Ci$$

Cobalt-60 encountered at nuclear generating stations is found primarily in the oxide form. ANSI N343-1978, "Internal Dosimetry for Mixed Fission and Activation Products," classifies oxides of cobalt as being highly insoluble. Following the guidance of the Standard, the cobalt was assumed to be nontransportable.

The following dose evaluation was performed using ICRP II methods. The dose from both beta and gamma exposure to the contents of the digestive segments are calculated and the dose to the wall of the digestive tract is assumed to be one-half the sum of these values.

TABLE 6-1

INGESTION DOSE CALCULATION VARIABLES

SEGMENT	M, Mass of Contents (g)	τ, Residence Time (hrs)	Effective Energy Terms	
			ε_β(MeV)	ε_γ(MeV)
Stomach, (S)	250	1	0.1	0.62
Small Intestine (SI)	1100	4	0.1	1.4
Upper Large Intestine (ULI)	135	8	0.1	0.34
Lower Large Intestine (LLI)	150	18	0.1	0.34

The radioactive decay constant (λ_r) for cobalt-60 is 1.5 E-5 hr^{-1}; the biological removal rate constant (λ_b) is 3.0 E-3 hr^{-1}; and the fraction of activity transported from the small intestine to the blood (f_1) is 0.3.

The dose in rem to the stomach due to the beta component ($DOSE_{S\beta}$) is calculated from the equation:

$$DOSE_{S\beta} = \frac{2.13\varepsilon_\beta A(1-e^{-\lambda_r \tau_S})}{2M_S\lambda_r} \text{ Rem} \qquad \text{(EQN 6.2)}$$

where the 2.13 value is used to convert from energy deposited to dose and the factor of 2 is used as explained above.

Substituting the values into EQN 6.2, yields:

$$DOSE_{S\beta} = \frac{2.13\ (0.1)(0.39)(1-e^{-(1.5\ E-5)(1)})}{2(250)(1.5\ E-5)}$$

$$= 2.26\ E-4\ \text{Rem}$$

The dose to the stomach from the gamma radiation ($DOSE_{S\gamma}$) is equal to $DOSE_{S\beta}$ multiplied by the ratio of the gamma and beta effective energy terms:

$$DOSE_{S\gamma} = \frac{DOSE_{S\beta}\varepsilon_\gamma}{\varepsilon_\beta} \qquad \text{(EQN 6.3)}$$

$$= \frac{(2.26\ E-4)(0.62)}{0.1}$$

$$= 1.40\ E-3\ \text{Rem}$$

Total dose to the stomach ($DOSE_S$) is the sum of the gamma and beta components:

$$DOSE_S = DOSE_{S\beta} + DOSE_{S\gamma} \qquad \text{(EQN 6.4)}$$

$$= 2.26\ E\text{-}4 + 1.40\ E\text{-}3$$

$$DOSE_S = 1.63\ E\text{-}3\ rem$$

After one hour, the material is passed to the small intestine (SI). The average beta dose to the small intestine is calculated by:

$$DOSE_{SI\beta} = \frac{2.13\ \varepsilon_\beta A e^{-\lambda_r \tau_S}\left(1-e^{-(\lambda_b + \lambda r)\tau_{SI}}\right)}{2M_{SI}\ (\lambda_b + \lambda_r)}\ Rem \qquad \text{(EQN 6.5)}$$

$$= \frac{2.13\ (0.1)(0.53)e^{-(1.5\ E\text{-}5)(1)}\left(1-e^{-(3.0\ E\text{-}3\ +\ 1.5\ E\text{-}5)(4)}\right)}{2\ (1100)(3.0\ E\text{-}3\ +\ 1.5\ E\text{-}5)}$$

$$DOSE_{SI\beta} = 2.04\ E\text{-}4\ Rem$$

The gamma dose to the small intestine is obtained by multiplying $DOSE_{SI\beta}$ by the ratio of the gamma and beta effective energy terms:

$$DOSE_{SI\gamma} = \frac{DOSE_{SI\beta}\varepsilon_\gamma}{\varepsilon_\beta} \qquad \text{(EQN 6.6)}$$

$$= \frac{(2.04\ E\text{-}4)(1.4)}{0.1}$$

$$DOSE_{SI\gamma} = 2.85\ E\text{-}3\ Rem$$

Total dose to the small intestine ($DOSE_{SI}$) is the sum of the beta and gamma components:

$$DOSE_{SI} = DOSE_{SI\beta} + DOSE_{SI\gamma} \qquad \text{(EQN 6.7)}$$

$$= 2.04\ E\text{-}4 + 2.85\ E\text{-}3$$

$$DOSE_{SI} = 3.06\ E\text{-}3\ Rem$$

After five hours, the radioactive material enters the upper large intestine (ULI). The beta dose to the upper large intestine is calculated by:

$$DOSE_{ULI\beta} = \frac{2.13\ \varepsilon_\beta A(1-f_1)e^{-\lambda_r T}\left(1-e^{-\lambda_r \tau ULI}\right)}{2\ M_{ULI}\lambda_r}\ Rem \qquad \text{(EQN 6.8)}$$

where T is the total time the material is present in the digestive tract and all other factors are used as described above.

Substituting the values into EQN 6.8, yields:

$$= \frac{2.13(0.1)(0.53)(1-0.3)e^{-(1.5\ E-4)(31)}(1-e^{-(1.5\ E-5)(8)})}{2\ (135)(1.5\ E-5)}$$

$$DOSE_{ULI\beta} = 2.34\ E-3\ Rem$$

The gamma dose to the upper large intestine is obtained by multiplying $DOSE_{ULI\beta}$ by the ratio of the gamma and beta effective energy terms:

$$DOSE_{ULI\gamma} = \frac{DOSE_{ULI\beta}\varepsilon_{\gamma}}{\varepsilon_{\beta}}\ Rem \qquad \text{(EQN 6.9)}$$

$$= \frac{(2.34\ E-3)(0.34)}{0.1}$$

$$= 7.95\ E-3\ Rem$$

Total dose to the upper large intestine ($DOSE_{ULI}$) is the sum of the gamma and beta components:

$$DOSE_{ULI} = DOSE_{ULI\beta} + DOSE_{ULI\gamma} \qquad \text{(EQN 6.10)}$$

$$= 2.34\ E-3 + 7.95\ E-3$$

$$DOSE_{ULI} = 1.03\ E-2\ Rem$$

After thirteen hours from ingestion, the radioactive material enters the lower large intestine (LLI). The average beta dose to the wall of the lower large intestine is calculated by:

$$DOSE_{LLI\beta} = \frac{2.13\ \varepsilon_{\beta}A(1-f_1)e^{-\lambda_r T}(1-e^{-\lambda_r \tau_{LLI}})}{2\ M_{LLI}\lambda_r}\ Rem \qquad \text{(EQN 6.11)}$$

$$= \frac{2.13\ (0.1)(0.53)(1-0.3)e^{-(1.5\ E-5)(31)}\ (1-e^{-(1.5\ E-5)(18)})}{2\ (150)(1.5\ E-5)}$$

$$= 4.74\ E-3\ Rem$$

The gamma dose to the lower large intestine is obtained by multiplying $DOSE_{LLI\beta}$ by the ratio of the gamma and beta effective energy terms:

$$DOSE_{LLI\gamma} = \frac{DOSE_{LLI\beta}\,\varepsilon_{\gamma}}{\varepsilon_{\beta}} \qquad \text{(EQN 6.12)}$$

$$= \frac{(4.74\ E\text{-}3)(0.34)}{(0.1)}$$

$$= 1.62\ E\text{-}2\ Rem$$

Again, total dose to the lower large intestine ($DOSE_{LLI}$) is the sum of the gamma and beta components:

$$DOSE_{LLI} = DOSE_{LLI\beta} + DOSE_{LLI\gamma} \qquad \text{(EQN 6.13)}$$

$$= 4.74\ E\text{-}3 + 1.62\ E\text{-}2$$

$$DOSE_{LLI} = 2.09\ E\text{-}2\ Rem$$

Since the potential dose to the lower large intestine was calculated to be greater than that to any of the other segments of the digestine tract, the lower large intestine was the "critical organ."

A calculation performed using methods outlined in MIRD Phamphlet No. 11 demonstrated an insignificant dose contribution (1 mrem) to the lower large intestine from the radioactive material while it was in the other segments of the digestive tract.

The maximum potential dose to an internal organ, then, is:

$$DOSE_{LLI} = 2.09\ E\text{-}2\ Rem \text{ or } 21\ mrem$$

ICRP II recommends that the internal dose to members of the general public be limited to 1.5 Rem/year. The 21 mrem received by the subject of the scenario represents less than 2% of this annual limit.

SONGS HP INDIVIDUAL TASK ASSIGNMENT (ITA)

A. ORIGINATOR: Complete this Section, individual assigning ITA is to complete Section B.

1) Name (Print) [redacted] 2) Enter your next ITA number E84-311

3) Describe Task Confirm conclusions reached in referenced memo, inspect site.

4) Describe what constitutes completion Memo documenting above.

5) List appropriate references Memo from [redacted] (Incl sample results + radiation surveys).

6) Sign and Date [redacted] 1-25-84

B. ASSIGNOR(S): Compliance with this Section is indicated by your signature or initials below.

1) All necessary documents are to be referenced and/or readily available and/or attached.

2) Prime assignor and assignee discuss this ITA and agree on Prime Due Date, assignor enters:
PRIME DUE DATE* of 2-24-84 Assigned to [redacted] By [redacted] On 1-25-84

3) Subsequent assignor and assignee discuss and agree on Sub Due Date, assignor enters:
SUB DUE DATE* of _____ Assigned to _____ By _____ On _____

4) Assignor(s) gives original ITA to assignee and forwards a copy to TAC Coordinator.

*Prime Due Dates should be at least 5 calendar days beyond the date when task first assigned and Sub Due Dates must not be later than Prime Due Dates.

C. DUE DATE EXTENTION REQUEST: This Section is not a substitute for the Prime Due Date in Section B which must be agreed to between assignor/assignee prior to establishment. Required extensions, initiated by assignee, are to be requested as far in advance of the pending due date(s) as possible whenever completion date problems are identified.

1) New SUB DUE DATE of _____ Requested By _____ On _____

2) New PRIME DUE DATE of _____ Requested By _____ On _____

3) Reason why due date cannot be met _____

4) New SUB DUE DATE of _____ Approved By _____ On _____

5) New PRIME DUTE DATE of _____ Approved By _____ On _____

6) Copy of ITA forwarded to TAC Coordinator By _____

D. TASK COMPLETION: To be completed by assignee and forwarded to originator.

1) Statement of completed action COMPLETED THE REQUESTED MEMO

2) Date completed 2-21-84

3) Is a copy of completion document attached ✓ Yes (ACTION IS NOT COMPLETE WITHOUT THIS)

4) Signature of Assignee [redacted]

5) Originator is to forward original ITA and supporting documentation to TAC Coordinator.

To TACC on _____ date, By _____

Distribution: White - Originator Canary & Pink - Assignee Goldenrod - TAC Coordinator

CE 50(111) 187 REV. 8 11/21/83

MEMORANDUM FOR FILE

February 17, 1984

SUBJECT: "Old Highway 101 Land Fill"

REFERENCES:
1) Radiation Survey Report, [redacted] to [redacted] dated April 17, 1981
2) Letter, [redacted] to [redacted] (SONGS Chemistry), dated April 3, 1981; Subject: "Soil Sample Results"

On January 12, 1984, a telephone conversation occurred between [redacted] SONGS Environmental Monitoring, and [redacted] USNRC-Region V. [redacted] inquired about the results of a Station investigation regarding the possible presence of plant-generated radioactivity in the "Old Highway 101 Land Fill." He recommended that Station review the results of radiation surveys and isotopic analyses of soil samples obtained at the land fill to determine the need for a 10 CFR 20.302 submittal.

The purpose of this Memorandum is to document Station's evaluation of all available radiological data relating to the land fill site and to close the issue.

BACKGROUND:

During the March 1980 - June 1981 Unit 1 outage, TMI retrofit projects required the removal of soil from radiologically controlled areas. Isotopic analyses of samples of the excavated material revealed the presence of low level radioactive contamination.

As a result of those findings, Station investigated disposal methods for previous excavations at SONGS Unit 1 to determine whether or not contaminated soil had been inadvertently released.

It was determined that the only significant excavation which had previously been experienced at Unit 1 was performed during the October 1976 - March 1977 outage when a significant amount of substrate was removed to allow construction of the Diesel Generator and Biological Shield structures. Through interviews with individuals who worked on those projects, the location of the disposal site for the excavated material was also determined.

SURVEYS AND ANALYSES:

Reference 1 describes an extensive radiation survey conducted of the "land fill" area in March 1981. Exposure rates between 5 µR/hr and 15 µR/hr were measured by Ludlum Model 19 Micro-R-Meters. Those readings were well within the normal range for natural background radiation. The surveyor concluded that there was no evidence of radioactive contamination. That conclusion is substantiated by the results of isotopic analyses performed by EAL Corporation, a contract laboratory, on three soil samples obtained from the land fill. Reference 2 reports those results, and indicates only naturally occurring radon and thoron daughter products. No radioactive activation or fission products were identified.

DISCUSSION:

Though all exposure rate measurements were within the range of natural background radiation, the radiation survey map, contained in Reference 1, seemed to indicate a localized area with slightly elevated readings (14-15 µR/hr). To evaluate that anomaly, the land fill site was visited.

The "old land fill" is located approximately 1 1/2 miles south of the new Edison Training and Education Center. The land fill is accessible by the frontage road that parallels Interstate 5 on its east side. The site consists of two ravines which run from the frontage road, join near Interstate 5, and terminate in a culvert which continues under the Interstate. The area is heavily overgrown with foilage, although dirt mounds and broken concrete are visible.

Exposure rates of 5 µR/hr to 10 µR/hr were observed in and around the ravine using an Eberline PRM-7 Micro-R-Meter. The readings were not increased by placing the meter in contact with the material that had obviously been off-loaded there. Special attention was paid to the area which showed the highest readings during the referenced survey. The points which showed elevated readings during the 1981 survey were located and exposure rate measurements were made. The exposure rate observed on the shoulder of the road was 8 µR/hr to 10 µR/hr. The exposure rate measured on the surface of the concrete road was 14 µR/hr to 16 µR/hr. Similar measurements were obtained along the road in the vicinity of the ravine with identical results. An analogous set of measurements made at a location approximately 1/4 mile north of the land fill demonstrated comparable results.

It is obvious that the elevated exposure rates are the result of natural radioactivity in the concrete of the road.

CONCLUSION:

Based on the results of GeLi analyses performed by the contract environmental laboratory, the extensive radiation survey performed in 1981, and the recent verification of the results of that survey, the soil disposed of in the "Old Highway 101 Land Fill" did not contain licensed material. A 10 CFR 20.302 submittal is not required.

[redacted]
Health Physics Engineer

[redacted]2027I:[redacted]

cc: [redacted]
CDM files

January 12, 1984

[redacted]

SUBJECT: Radiological Environmental Survey
of Old Hwy 101 Landfill

Attached for your information and review are:

1) Telephone note from Jan. 12, 1984 conversation between [redacted] (SCE-SONGS) and [redacted] (NRC).

2) [redacted] results of laboratory analyses of soil samples collected from the subject landfill.

3) Report from [redacted] to [redacted] concerning Environmental Survey of subject landfill.

Please let me know if you need additional help or information.

[redacted]

[redacted]
Attachments

cc: [redacted]
Chemistry File
CDM

TELEPHONE NOTES

BY [redacted] OF SCE-SONGS ENV.

WITH [redacted] OF USNRC-REG I

DATE JANUARY 12, 1984, 0745

SUBJECT RADIOLOGICAL SURVEY OF "OLD HWY 101 LANDFILL"

DISTRIBUTION

[redacted]

ACTION REQUIRED

REVIEW RESULTS OF RADIOLOGICAL FIELD SURVEYS AND LABORATORY RESULTS OF SAMPLES COLLECTED FROM THE "OLD HWY 101 LANDFILL" TO DETERMINE NEED FOR 10 CFR 20.302 SUBMITTAL.

DISCUSSION HIGHLIGHTS AND AGREEMENTS REACHED

[redacted] WAS INTERESTED TO KNOW THE FINAL DETERMINATION REGARDING THE PRESENCE OF STATION GENERATED RADIOACTIVITY IN THE OLD HWY 101 LANDFILL. [redacted] STATED THAT IF THE FINDINGS WERE POSITIVE, (ACTIVITY LEVELS ABOVE BACKGROUND OR ISTOPES OF FISSION ORIGIN), THEN SCE WOULD BE WELL ADVISED TO ADDRESS THIS SITUATION BY MEANS OF A 10 CFR 20.302 SUBMITTAL.

EAL CORPORATION
2030 Wright Avenue
Richmond, California 94804
(415) 235-2633
(TWX) 910-382-8132

3 April 1981

Ref: EAL 2301

[redacted]
San Onofre Nuclear
Generating Station
P.O. Box 128
San Clemente, CA 92672

Dear [redacted]

The results of the soil samples we received on March 2, 1981, have been completed and are shown on Attachment 1.

We appreciate this opportunity to be of service.

Very truly yours,

[redacted]
Senior Environmental Chemist

[redacted]
Manager
Nuclear Science Department

[redacted]

Attachment 1

cc: [redacted]

ATTACHMENT 1 SOIL RESULTS

Collection Site and Date	Ge(Li) Scan nCi/kg ± 2 σ (dry wt. basis)	Isotope	Radiochemical nCi/kg ± 2 σ (dry wt. basis)
Jap Mesa Dumpsite 1/21/81	0.51 ± 0.03	^{60}Co	---
	0.63 ± 0.03	^{137}Cs	---
	0.70 ± 0.04	^{226}Ra decay chain (1)	---
	0.36 ± 0.07	^{232}Th decay chain (2)	---
		^{90}Sr	0.09 ± 0.02
SONGS I Security Bldg. 1/21/81	0.07 ± 0.01	^{60}Co	---
	0.04 ± 0.01	^{137}Cs	---
	0.47 ± 0.02	^{226}Ra decay chain (1)	---
	0.28 ± 0.04	^{232}Th decay chain (2)	---
		^{90}Sr	0.02 ± 0.01
E. side of Sphere Near Door 16 2/19/81	0.05 ± 0.02	^{60}Co	---
	0.12 ± 0.02	^{137}Cs	---
	1.05 ± 0.05	^{226}Ra decay chain (1)	---
	0.33 ± 0.06	^{232}Th decay chain (2)	---
		^{90}Sr	0 ± 0.01
Location No. 33 Old Hwy. 101 2/19/81	0 ± 0.01	^{60}Co	---
	0 ± 0.01	^{137}Cs	---
	0.33 ± 0.03	^{226}Ra decay chain (1)	---
	0.29 ± 0.05	^{232}Th decay chain (2)	---
		^{90}Sr	0 ± 0.01
Location No. 28 Old Hwy. 101 2/19/81	0 ± 0.01	^{60}Co	---
	0 ± 0.01	^{137}Cs	---
	0.29 ± 0.03	^{226}Ra decay chain (1)	---
	0.26 ± 0.05	^{232}Th decay chain (2)	---
		^{90}Sr	0.04 ± 0.01
Location No. 24 Old Hwy 101 2/19/81	0 ± 0.01	^{60}Co	---
	0 ± 0.01	^{137}Cs	---
	0.42 ± 0.03	^{226}Ra decay chain (1)	---
	0.35 ± 0.06	^{232}Th decay chain (2)	---
		^{90}Sr	0.02 ± 0.01

(1) The naturally occurring ^{226}Ra decay chain reported is calculated on the ^{214}Bi photopeak at 0.609 MeV. Other photopeaks detected in this chain are ^{226}Ra, ^{214}Pb, ^{210}Bi and ^{210}Tl.

(2) The naturally occurring ^{232}Th decay chain reported is calculated on the ^{228}Ac photopeak at 0.910 MeV. Other photopeaks detected in this chain are ^{228}Th, ^{212}Pb, ^{212}Bi and ^{208}Tl.

SAN ONOFRE NUCLEAR GENERATING STATION

MEMORANDA FOR FILE

APRIL 17, 1981

TO: [redacted]

FROM: [redacted]

SUBJECT: Environmental Survey of 1976-1977 Land Fill Site approximately 2.5 miles South East East of Jap Mesa

PURPOSE: During the construction of Unit One Sphere Containment in 1976 and 1977 a large amount of soil was removed and disposed of at a site approximately 2.5 miles South East East of Jap Mesa.

During the disposal operation there was evidentially no reason to be concerned with the possibility of this resultant land fill being contaminated with radioactive materials resultant from the past operation of Unit One. With in the recent past a careful study has been made of the events surrounding the exavation and subsequent disposal of soil associated with Unit One Sphere. The results of this study pointed for a need to survey the land fill site to asertain once and for all the degree of radioactive contamination, if any, present at the site.

On February 4, 1981 through February 7, 1981 a radiation survey was conducted by [redacted]. Although this represented an extensive survey of the area a number of questions were raised during the analysis of the survey results. These questions were mostly based on two criteria. First, there was extreme difficulty in matching the data gleened from the two different Ludlum Model 19 Micro-Roentegen Meters used for the survey and the low range calibration of these instruments were also in question. Secondly, data showed a wide variance in reading obtained in adjacent locations. For example data from a survey of the drainage tunnel under Interstate 5 showed a variance from 10 to 150 micro-roentegen/hour. It was also noted that the survey did not include information from areas of the ravines were the angle of incline approached and many times exceeded 30 degrees.

Because of the foregoing reasons on March 12, 1981 the decision was made to conduct an exhaustive and hopefully reproduceable survey again to asertain once and for all whether or not the activities associated with the 1976-1977 Unit One Sphere construction had led to any radioactive contamination of the land fill.

DISCUSSION: During initial planning for the survey every attempt was made to devise procedures that would standardize each survey measurement and make it possible to locate at a later date each survey point for later resurvey or soil sampling. After careful research it was decided that all survey measurements would be taken at a distance of one meter from the surface of the soil. This hopefully would allow a comparison of results with other environmental surveys performed recently throughout the Health Physics profession.

DISCUSSION (Continued): To eliminate any unexplainable data varience two other techniques were devised to both enhance reproducability and detect source position and/or any interference caused by buildup of naturally occuring airborne radioactivity resultant from atmospheric inversion at the survey points.

First, careful study of the manufacturers literature yielded a detailed understanding of the Ludlum Model 19 Micro-Roentegen Meter. This instrument has a one inch by one inch Sodium Iodine (Thallium activated) crystal located at the front and bottom of the instrument. Hence all survey measurements were taken with the face of the instrument dial and thusly the centerline of the crystal parrellel to the soil surface being measured. This technique was relatively easy to perform on gentle inclines and somewhat more difficult when dealing with inclines which in some cases exceed 30 degrees. Further study of the manufacturers literature gave helpful information about the response characteristics of the Ludlum Model 19 Micro-Roentegen Meter. As all measurements were theorized to be readable on the lowest scale, 0 to 25 Micro-Roentegen/Hour, all data was taken with the instrument in the Slow Response or Slow Reaction mode. This technique resulted in a period of response as per above mentioned manufacturers literature of approximately 11 seconds for each measurement. Actual field experience indicated reproduceable response time of approximately 5 seconds to as long as 30 seconds. For this reason, at each survey point the instrument was held in the above discussed geometry for a period of 15 to 30 seconds to insure that the instrument had indeed given a stable and reproducable measurement.

Second, extensive past field experience with the measurement of low level radiation levels had indicated as much as a 30 percent variation in readings observed when the individual holding the instrument positioned the instrument so as his body was between the source of radiation and the detector as opposed to having an unobstructed field of measurement in relation to the known source.

Detailed study of professional papers submitted throughout the Health Physics profession indicated that the potential for interference in data resultant from the accumulation of naturally occuring airborne radioactivity during atmospheric inversions. In worst cases measurements could be caused to vary as much as 85%. It was noted that these accumulations of airborne radioactivity when encountered during atmospheric inversion almost exclusively represented cloud-like concentrations in which a given reading with in the cloud varied at least 15% with a change in air movement, survey instrument position, and time. This characteristic of natural airborne radioactivity appeared reproduceable in all instances except those dealing with a partially enclosed areas such as the drainage tunnel under Interstate Highway 5 where measurements were much more uniform due to lack of air movement within center portions of the tunnel.

Due to the foregoing considerations at each survey point four seperate measurements were taken. Using a relatively inexpensive compass with no magnetic corrections applied measurements were taken at each point with the instrument and the individual holding the instrument facing in the North, then East, South, and West compass directions in that order.

DISCUSSION (Continued): Comparison of the four measurements at each point made it possible to distinguish as to whether the data for each particular point was indeed valid and reproduceable. Measurements when later compared with other measurenents at the same point would be expected to vary one from another by less than 15% unless some other influence such as close proximety to a point source or build up of naturally occuring airborne radioactivity during atmospheric inversions. Actual field experience showed that only 10 survey locations out of the over 130 locations surveyed showed a variance of greater than 15%. Variance was calculated by selecting the highest and lowest of the four readings taken at a given point. The difference between these two values was then divided by the lowest reading giving a decimal that could be converted to percent variance. Later resurvey of these 10 locations showed that earlier reading were definitely being effected by the build up of naturally occuring airborne radioactivity during atmospheric inversion. For example one survey location when first measured showed readings between 11.5 and 15 micro-Roentegen per hour. Initital examination of this data showed a varience of over 30% between the four readings taken at that location. After comparison with other surrounding survey points it appeared evident that this varience was not being caused by a point source. As field experience grew it became readilly clear when the survey point was under the influence of an atmospheric inversion. For example on one Sunday morning a general background of 19 micro-Roentegen per hour was observed where earler data showed readings of 8 to 10 micro-Roentegen per hour and when the locations in which variences of greater than 15% were observed were resurveyed the highest reading observed was greater than 15% lower than that initially observed and agreement between points was well within $\pm$ 15%.

As the desired goal was to obtain enough information from survey of both landfill areas and the nearby areas to distinguish any possible differences between the two several techniques were developed to this end. Due to the large area to be surveyed in was deemed that the initial survey points would be approximately 10 meters apart. Later examination of the data would show whether a more detailed area survey was required, but hopefully, and as field experience proved this degree of detail was both expediate and substitive enough to reach the desired goal. It should be noted that out of the approximately 3000 square meters surveyed only approximately 900 square meters showed distinct evidence as being of landfill origin.

In order that the data presented would be an accurate reproduction of the trends in radiation levels observed in one area versus another the sequence and techniques used in taking the measurements became most important. Due to the ruggedness of the terrain line of site approximations of perpendicual or parallel angles became impossible. To solve this problem a compasss was purchased which, although not corrected for magnetic error, made it possible for adjacent survey points to be layed out in a NORTH-SOUTH, EAST-WEST GRID somewhat like that observed on a road map where the upper left corner is North-West and has the designation A-1.

DISCUSSION (Continued): The sequence in which the survey data was taken was designed to most effectively place survey locations approximately 10 meters apart without the time consuming use of surveyors equipment. Starting in the North-West Corner of the survey area a sequence of survey points was taken in an arc starting at 90 degrees and proceeding to 180 degrees at which time a return to 90 degrees was affected. This process was repeated until the area of interest was surveyed at the prescribed 10 meter intervals.

It should be noted that at each survey point topographical data was gathered for purposes of both survey map making and later analysis of survey results. The map obtained can only be considered an accurate depiction of the area if it is realized the measured 10 meter increments cause the illustration to reflect the area as if all the depressions eg. ravines and gullies, were raised to the same level as the upper most elevations of the area.

Figure 1A and 1B show the measurement data recorded for each survey point. As stated all readings are in micro-Roentegen/Hour reading the 0-25 micro-Roentegen/hour Scale of Ludlum Model 19 Micro-Roentegen Meter Serial Number 12906. Readings recorded are the highest observed at that point from the four readings taken. From previous discussion it should be noted again final survey results reflected at least ± 15% agreement between measurements.

Figure 2 shows the soil classification given to each survey point. From reasearching recent studies made in the field of Environmental Health Physics it was learned that retention of radioactive materials in soil was inversly proportional to soil particle size. This data was also helpful in defininining the areas which showed evidence of being actual land fill. Landfill soil was known to be almost entirely beach sand with a relatively low soil particle size and thusly in most cases a characteristically higher natural background reading potential.

Finally, Figure 3 depicts the area as to the incline of the soil surface incline encountered at each survey point. Initially this dat was collected to yield a possible understanding of the potential transport mechanism of any radioactive material found at the survey site. This information was also most helpful in making the contours shown as accurate as possible in light of the obviously rude direction and measurement techniques used to select the survey points.

It should be noted in the summation of this discussion that no soil classification or elevation data is shown for the survey data collected in the drainage tunnel under Interstate Highway 5 as this was a concrete tunnel with a slope of less than 15%.

CONCLUSION AND RECOMMENDATIONS: After carefully examining the results presented on the attached Figures 1 through 3 it ~~should be~~ evident that no conclusive evidence what so ever was obtained that would show any of the landfill area was contaminated by radioactive materials originating from the construction of the Unit One Containment Sphere.

As expected the survey data indicated the desired varience between data collected at widely varing soil classification areas, confirming earlier studies that showed the highest background readings in areas were the soil has a relately small particle size eg. less than .2 mm.

The readings obtained in the drainage tunnel under Interstate Highway 5 can be explained as the reading are significantly higher in the center than at either end. This leads one to believe the readings obtained in the center of the tunnel are influenced by the the buildup of naturally occurring airborne radioactivity due to lack of venelation in the center of the tunnel and a consistant source represented by the concrete.

In summation it should be stated that the purpose of this survey simply was to compare two adjacent areas for radiation levels knowing one area was suspect and the other was not. The instrumentation and techniques used are considered adequate to accomplish this effort. It should be noted that the Ludlum Model 19 Micro-Roentegen meter is calibrated on the 0-25 Micro-Roentegen Scale by pulse signal only because of presumed background radiation interference negating the possibility of source calibration. The records of the current calibration on the subject scale was unavailable from the Instrument and Calibration department but linearity checks to known ranges confirmed a roughly accurate calibration. Each survey point was marked with a white tape marked with the grid location and sequence number for later reference or resurvey. Resurvey, if attempted, would hopefully use an instrument with much larger crystal size and be shielded from atmospheric interference using significantly longer data aquisition times at each survey point. From the results of this initial extensive survey there appears very little need to attempt such a resurvey.

[redacted]

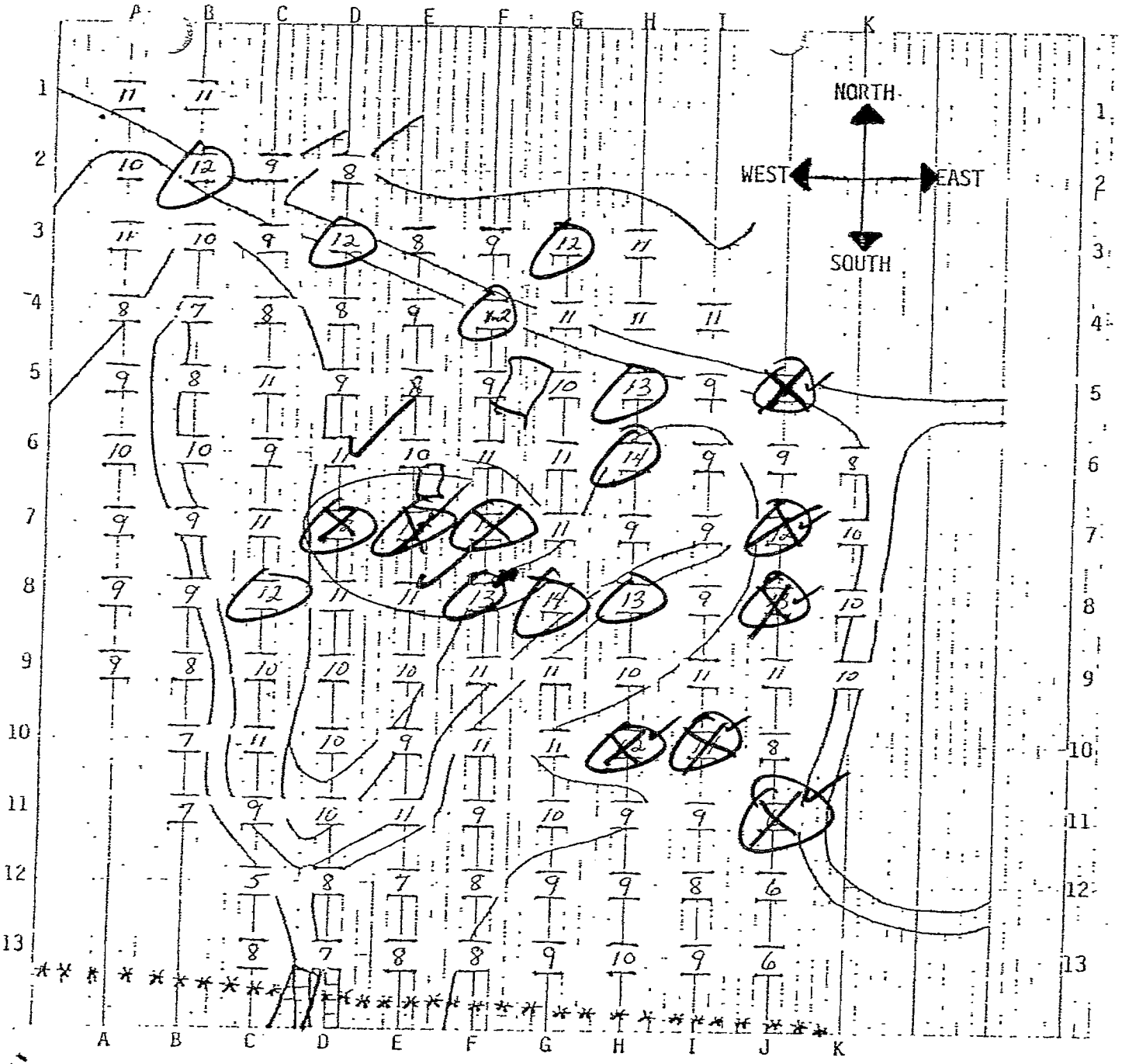


Figure 14

All Readings in uR/hr

Ludlum Model 19 uR meter

Serial No: 12906

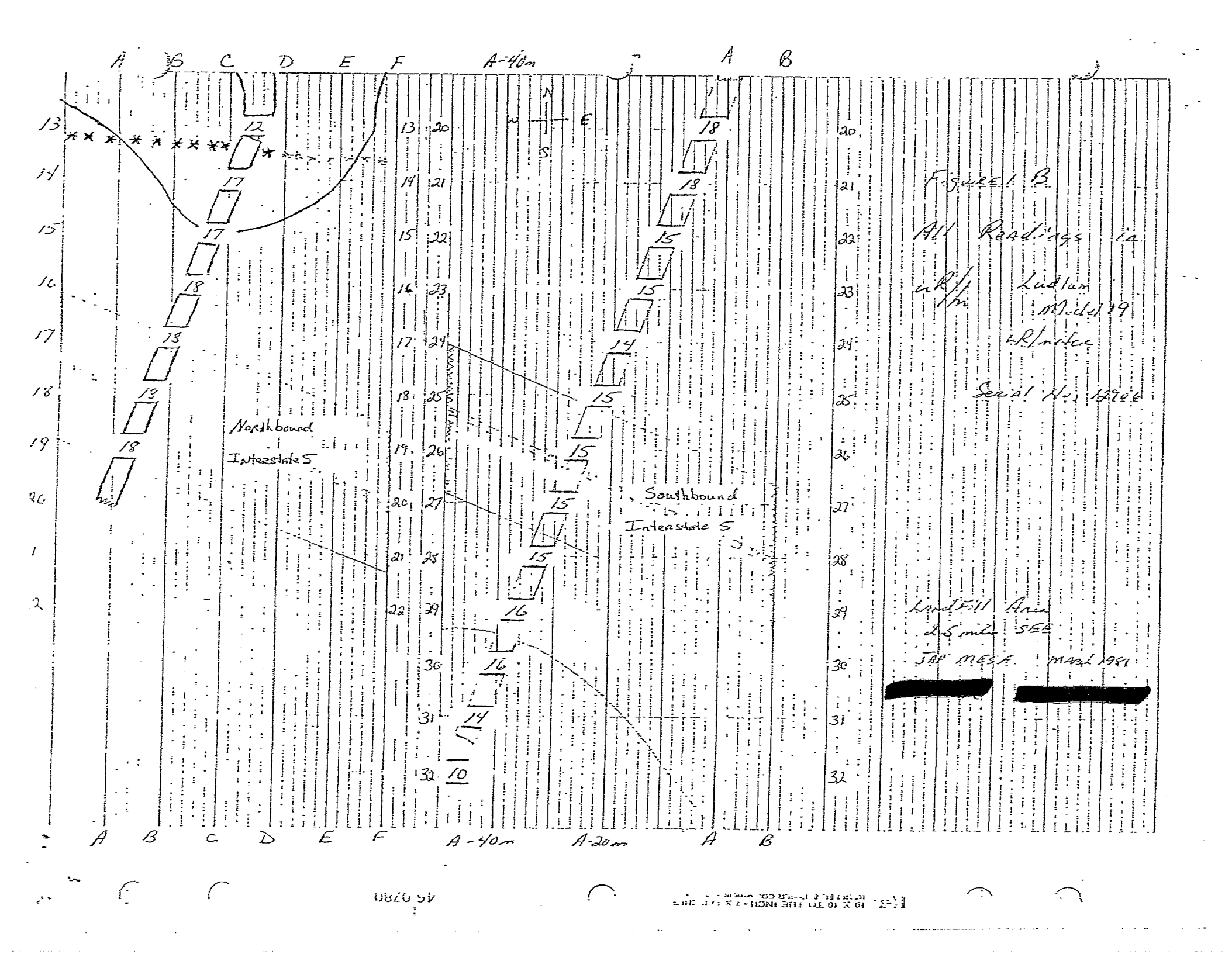
Landfill Area 2. See Sheet 4

JAP MESA

MARCH 1981

[redacted]

[redacted]


A
B
C
D
E
F
A-40m
A-20m
Northbound
Interstate 5
Southbound
Interstate 5
N
S
E
Figure 1
All
Readings
in
Ludlum
Model 19
Serial No. 16706
Landfill Area
2.5 miles SE
SAP MESA
March 1981

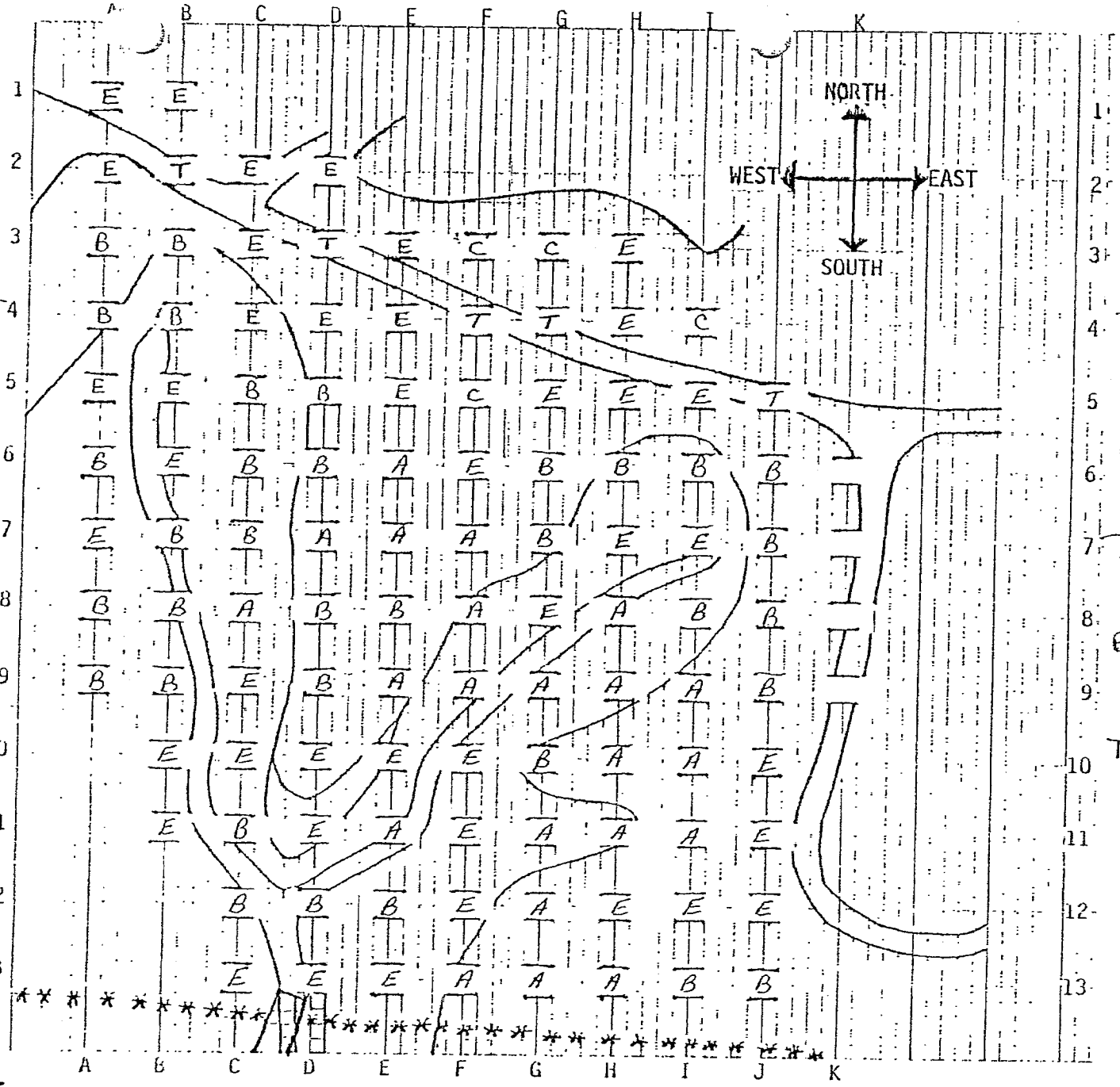


Figure 2

Soil Classification

A - Beach Sand (Landfill) Small Soil Particle Size

B - Vegitation Covered Soil - Soil Particle Size not accurately determined.

C - Mud Soil - Intermediate to Small Soil Particle Size

D - Clay like Soil - Small Soil Particle Size.

E - Rocky - Large Soil Particle Size predominant.

T - Asphalt Tar Surface

Land Fill Area
2.5 miles SEE
Tap Mesa March 81

[redacted] [redacted]

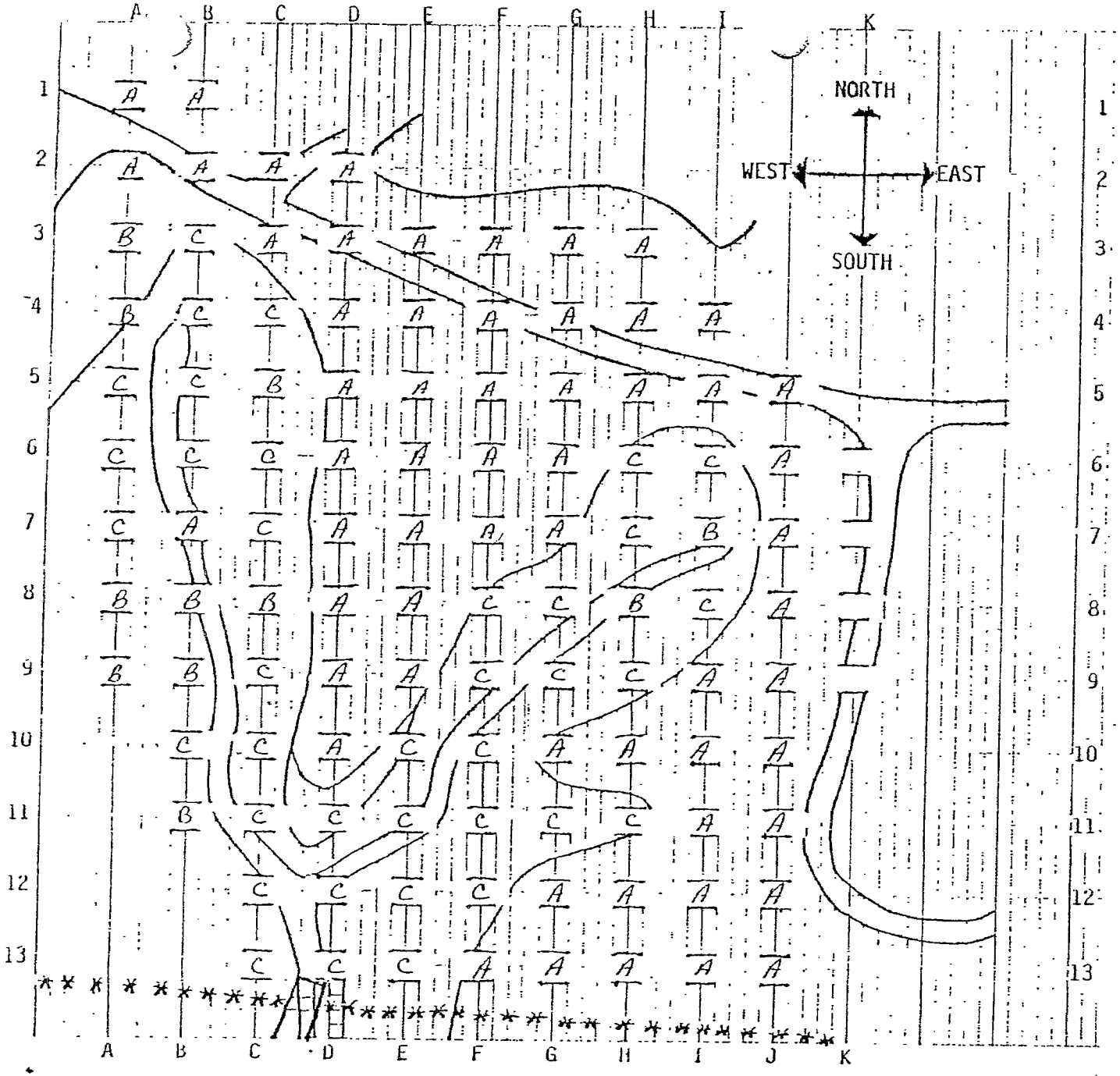


Figure 3

Angle of Incidence

A - 0-20°

B - 20-30°

C - > 30°

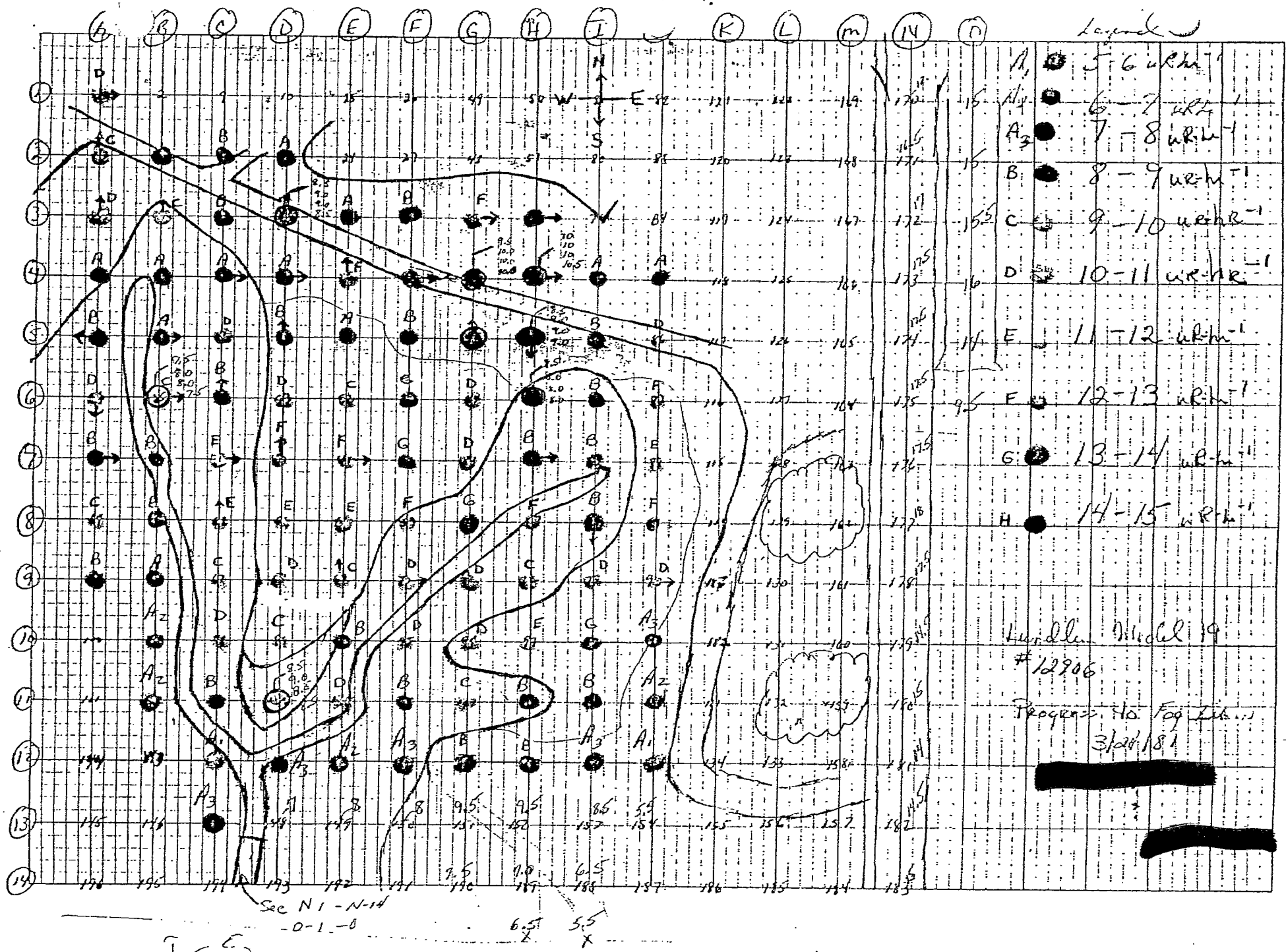
Landfill Area

2.5 Miles SEE

Tap Mesa March 81

[redacted]

[redacted]



46 0780

K-E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

#12906

Point - From Sequence List
from Sequence List and/or Map
"Rho" Reading @ 1 meter Technique Reveal by Reading Procedure
% Difference [Highest Reading - Lowest Reading] / (Lowest Reading - 1)
Soil Data Pick best one, pick two if rigid - Note Presence of Asphalt by "T"
A - Beach Sand Like (Small Particle Size, Loose, Light Color)
B - Vegitation Covered Soil (Position over Overgrowth)
C - Mud Soil (Dense, Packed Mixture, Devoid of Large Soil Particles
D - Clay Like Soil
E - Rocky (Large Soil Particles)

Angle Legend
A 0-20°
B 20-30°
C 730°

Survey Point #	GRID #	"Rho" Reading @ 1m N	W	S	E	% Difference	Soil Data	Angle
1	A-1	10	10.5	10.5	11.0		E	A
2	B-1							
3	B-2	14	14	14	14		T	A
4	A-2	9.5	9	8.5	8.5		E	A
5	A-3	10.5	10	10	10		B	B
6	B-3	10	9	9	9		B	C
7	C-3	9	9	9	8.5		E	A
8	C-2	9	9	8.5	8.5		E	A
9	C-1							
10	D-1							
11	D-2	7.5	8	7.5	7.5		E	A
12	D-3	14	13	12	12		T	T
13	D-4	7	7	7.5	80		E	A
14	C-4	7	7	7	7.5		E	C
15	B-4	7	7	7	7		E	C

- From Sequence List
in Sequence list and/or Map
1st Reading @ 1 meter Technique Review by Reading Procedure
% Difference [(Highest Reading - Lowest Reading) / (Lowest Reading - 1)]
Soils Pick best one, pick two if rigid - Note Presence of Asphalt by 'T'
A - Beach Sand Like (Small Particle Size, Loose, Light Color)
B - Vegitation Covered Soil (Position over Overgrowth)
C - Mud Soil (Dark, Packed Mixture, Devoid of Large Soil Particles
D - Clay Like Soil
E - Rocky (Large Soil Particle Size)

Angle L of Inclin
A 0-20°
B 20-30°
C 730°

Survey Point #	GRID #	1st Reading @ 1m N	W	S	E	% Difference	Soil Code	Angle
16	A-4	7.5	7.5	7.5	7.0		B	B
17	A-5	8	9	8	8		E	C
18	B-5	7	7	7	7.5		E	C
19	C-5	10.5	10	10	10.5		B	B
20	D-5	8.5	8	7.5	7.5		B	A
21	E-5	7.5	7.5	7.5	7.5		E	A
22	E-4	12.5	12	11	11		T	A
23	E-3	8	8	8	8		E	A
24	E-2							
25	E-1							
26	F-1							
27	F-2							
28	F-3	9	9	8	8.5		C	A
29	F-4	13	12.5	13	13.5		T	A
30	F-5	8.5	8.5	8.5	8.5		C	A

- From Sequence List
= Sequence List and/or Map
Reading @ 1 meter Technique Review by Reading Procedure
Difference [Highest Reading - Lowest Reading] / (Lowest Reading - 1)
Soils Pick best one, pick two if rigid - Note Presence of Asphalt by "T"
A - Beach Sand Like (Small Particle Size, Loose, Light Color)
B - Vegitation Covered Soil (Resists entry, Overgrowth)
C - Mud Soil (Moist, Packed Mixture, Devoid of Large Soil Particles
D - Clay Like Soil
E - Rocky (Large Soil Particle Size)

Angle Legend
A 0-20°
B 20-30°
C >30°

Survey Point #	GRID #	"R" Reading @ 1m N	W	S	E	% Difference	Soil Data	Angle
31	F-6	13.5	12.5	12.5	13.5		E	A
32	E-6	9.5	9.5	10	10		A	A
33	D-6	10.5	10.5	10.5			B	A
34	C-6	8.5	9	8.5	8.5		B	A
35	B-6	9	8	8.5	10		E	C
36	A-6	9.5	10	10.5	9.5		B	C
37	A-7	8.5	8.5	8.5	9.0		E	C
38	B-7	8.5	9.0	9.0	8.5		B	A
39	C-7	10.5	11	11	11.5		B	C
40	D-7	12.5	12	12	12		A	A
41	E-7	11.5	12	13	12.5		A	A
42	F-7	14.0	13.5	13.5	14.0		A	A
43	G-7	10.5	10	10.5	10		B	A
	G-6	10.5	10.5	10	9.5		B	A
45	G-5	14	13.5	13	11		E	A

ant - From Sequence List
from Sequence List and/or Map
Lbs' Reading @ 1 meter Technique: Review by Reading Procedures
% Difference [(Highest Reading - Lowest Reading) / (Lowest Reading - 1)]
Soil Data Pick best one, pick two if rigid - Note Presence of Asphalt by 'T'
A - Beach Sand Like (Small Particle Size, Loose, Light Color)
B - Vegitation Covered Soil (Position over Overgrowth)
C - Mud Soil (Moist, Packed Mixture, Devoid of Large Soil Particles
D - Clay Like Soil
E - Rocky (Large Soil Particle Size)

Angle L of Incidence
A 0-20°
B 20-30°
C 730°

Survey Point #	GRID #	Lbs' Reading @ 1m N	W	S	E	% Difference	Soil Data	Angle
46	G-4	15	15	11.5	11.5		T	A
47	G-3	12	12.5	12	11.5		C	A
48	G-2	[illegible]					[illegible]	[illegible]
49	G-1							
50	H-1							
51	H-2							
52	H-3	16.5	11.5	11	13.5		E	A
53	H-4	135	12	13	14.5		E	A
54	H-5	13.5	13.5	14.5	13.5		E	A
55	H-6	14	14	15	15		B	C
56	H-7	8	8.5	8.5	9		E	C
57	H-8							
58	G-8							
59	F-8							
60	E-8							

SONGS HP INDIVIDUAL TASK ASSIGNMENT (ITA)

A. ORIGINATOR: Complete this Section, individual assigning ITA is to complete Section B.

1) Name (Print) [redacted] 2) Enter your next ITA number E84-317

3) Describe Task Investigate source of Cr-51, Mn-54, Co-58 found in seaweed taken from U-3 intake structure.

4) Describe what constitutes completion Name possible mechanism by which radionuclides enter U-3 (possibly also U-2) intake and how to eliminate or reduce for future.

5) List appropriate references [redacted] has lab analyses and will have survey results.

6) Sign and Date [redacted] 2-13-84

B. ASSIGNOR(S): Compliance with this Section is indicated by your signature or initials below.

1) All necessary documents are to be referenced and/or readily available and/or attached.

2) Prime assignor and assignee discuss this ITA and agree on Prime Due Date, assignor enters:
PRIME DUE DATE* of 2-27-84 Assigned to [redacted] By [redacted] On 2-13-84

3) Subsequent assignor and assignee discuss and agree on Sub Due Date, assignor enters:
SUB DUE DATE* of ______ Assigned to ______ By ______ On ______

4) Assignor(s) gives original ITA to assignee and forwards a copy to TAC Coordinator.

*Prime Due Dates should be at least 5 calendar days beyond the date when task first assigned and Sub Due Dates must not be later than Prime Due Dates.

C. DUE DATE EXTENTION REQUEST: This Section is not a substitute for the Prime Due Date in Section B which must be agreed to between assignor/assignee prior to establishment. Required extensions, initiated by assignee, are to be requested as far in advance of the pending due date(s) as possible whenever completion date problems are identified.

1) New SUB DUE DATE of ______ Requested By ______ On ______

2) New PRIME DUE DATE of ______ Requested By ______ On ______

3) Reason why due date cannot be met ______

4) New SUB DUE DATE of ______ Approved By ______ On ______

5) New PRIME DUTE DATE of ______ Approved By ______ On ______

6) Copy of ITA forwarded to TAC Coordinator By ______

D. TASK COMPLETION: To be completed by assignee and forwarded to originator.

1) Statement of completed action MEMO TO [redacted] DATE Feb. 22, 1984

2) Date completed 2/28/84

3) Is a copy of completion document attached ✓ Yes (ACTION IS NOT COMPLETE WITHOUT THIS)

4) Signature of Assignee [redacted]

5) Originator is to forward original ITA and supporting documentation to TAC Coordinator.
To TACC on ______ date, By ______

Distribution: White - Originator Canary & Pink - Assignee Goldenrod - TAC Coordinator

SCE SO(123) 197 REV. 0 11/24/82

February 22, 1984

[redacted]

SUBJECT: Contaminated Material Discovered on
Circulating Water Stop Gate #4,
San Onofre Nuclear Generating Station Unit 3

REFERENCE: ITA E84-319

On February 12, 1984, the Number 4 stop gate on Unit 3 was removed from service and lifted from its support structure for inspection. The purpose of the inspection was to determine if the concrete gate was damaged. Because of the close proximity of Gate 4, when in service, to the liquid radwaste discharge point into the circulating water system, a radiological survey was performed. A small amount of sludge on the discharge side of the gate was found to be contaminated. The activity was detected when a Frisker Survey of the surface of the gate measured 200 to 400 counts above background. A sample of sludge (approximately 100 grams) was analyzed on the GeLi System which identified Cr-51, Mn-54, Co-58, Zr-95 and Nb-95. The gate was decontaminated and released for repairs. Approximately five gallons of waste sludge was removed from the gate.

On February 16th, with repairs complete, the Number 4 gate was lifted in preparation for reinstallation into the support structure. A survey of the intake side of the gate was performed at that time. No activity was detected.

Origin of Contamination

The source of the contaminated material found on the stop gate was determined to be liquid radwaste discharging to the circulating water system. Radioisotopes identified in the sludge were compared to those in reactor coolant from Unit 2 and Unit 3. Results indicate that the primary source of the contamination was probably Unit 2 and was released from the miscellaneous radwaste system.

Radiological Significance

While in service, no radiological hazard exists by the deposition of radioactive sludge on the stop gate. The only precaution required is to survey the Number 4 stop gate on either unit when lifted out of its normal position for inspection or service. Additionally, should contaminated sludge be recovered in the future, special radwaste packaging may be required, particularly if the sludge contains bio-mass.

Recommendation

Post the Number 4 stop gates on both units to require Health Physics notification when those gates are removed from their normal position.

The Project should be requested to expedite, and the Station to support, the completion of DCP 768.5N. This DCP provides for the relocation of the radwaste discharge line to a more desirable location. Additionally, even though there is no evidence that liquid radwaste discharged into the outfall is passing under or around Gate #4 into the intake, sludge and debris from the intake should be surveyed until DCP 768.5N is completed.

[redacted]

[redacted]1041K[redacted]

cc: [redacted]
CDM files

SONGS HP INDIVIDUAL TASK ASSIGNMENT (ITA)

A. ORIGINATOR: Complete this Section, individual assigning ITA is to complete Section B.

1) Name (Print) [redacted] 2) Enter your next ITA number 84-031

3) Describe Task Update Appendix A to MESA Isolation Report and Draft a Letter Transmitting to NRC

4) Describe what constitutes completion As above

5) List appropriate references E83-295

6) Sign and Date [redacted] 3-5-84

B. ASSIGNOR(S): Compliance with this Section is indicated by your signature or initials below.

1) All necessary documents are to be referenced and/or readily available and/or attached.

2) Prime assignor and assignee discuss this ITA and agree on Prime Due Date, assignor enters:
PRIME DUE DATE* of 3-16-84 Assigned to [redacted] By [redacted] On 3-5-84

3) Subsequent assignor and assignee discuss and agree on Sub Due Date, assignor enters:
SUB DUE DATE* of _____ Assigned to _____ By _____ On _____

4) Assignor(s) gives original ITA to assignee and forwards a copy to TAC Coordinator.

*Prime Due Dates should be at least 5 calendar days beyond the date when task first assigned and Sub Due Dates must not be later than Prime Due Dates.

C. DUE DATE EXTENTION REQUEST: This Section is not a substitute for the Prime Due Date in Section B which must be agreed to between assignor/assignee prior to establishment. Required extensions, initiated by assignee, are to be requested as far in advance of the pending due date(s) as possible whenever completion date problems are identified.

1) New SUB DUE DATE of _____ Requested By _____ On _____

2) New PRIME DUE DATE of _____ Requested By _____ On _____

3) Reason why due date cannot be met _____

4) New SUB DUE DATE of _____ Approved By _____ On _____

5) New PRIME DUTE DATE of _____ Approved By _____ On _____

6) Copy of ITA forwarded to TAC Coordinator By _____

D. TASK COMPLETION: To be completed by assignee and forwarded to originator.

1) Statement of completed action UPDATED APPENDIX 1 & PREPARED REQUESTED MEMOS

2) Date completed 3-16-84

3) Is a copy of completion document attached ✓ Yes (ACTION IS NOT COMPLETE WITHOUT THIS)

4) Signature of Assignee [redacted]

5) Originator is to forward original ITA and supporting documentation to TAC Coordinator.

To TACC on _____ date, By _____

Distribution: White - Originator Canary & Pink - Assignee Goldenrod - TAC Coordinator

SCE SO(123) 197 REV. 0 11/24/82

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION V
1450 MARIA LANE, SUITE 210
WALNUT CREEK, CALIFORNIA 94596

FEB 7 1984

[redacted]

Docket Nos. 50-206, 50-361 and 50-362

[redacted] 3/2/84
If this effort is now complete [redacted] Says (EIS) Have [redacted] Prepare the referenced letter [redacted]

Southern California Edison Company
P. O. Box 800
2244 Walnut Grove Avenue
Rosemead, California 91770

Attention: [redacted] Vice President
Advanced Engineering

Gentlemen:

Thank you for your report dated January 16, 1984 describing the status of your efforts to locate items contaminated with low levels of radioactive material. Based on our review of your radiological evaluation and the replacement page (Appendix 1, page 1) provided to our inspector on January 27, 1984 we find your conclusions to be reasonable.

We understand that you will submit a letter informing us of the results of your survey efforts when they are complete.

Your cooperation with us is appreciated.

Sincerely,

[redacted]
Chief
Radiological Safety Branch

March 21, 1984

[redacted]

SUBJECT: Final Results of Survey Efforts at the Mesa

Attached for your use is the final summary of contaminated items found at the MESA and a draft letter for transmission of this information to [redacted] of the US NRC Region V.

Should you have any questions or require further assistance, please contact me.

[redacted]
Health Physics Manager

[redacted]
Attachment

cc: [redacted]
CDM Files

ATTACHMENT

U. S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
Region V
1450 Maria Lane, Suite 210
Walnut Creek, California 94596-5368

Attention: [redacted] Chief
Radiological Safety Branch

Dear Sir:

Subject: Notification of Completion and Final Results of Survey Efforts to Locate Contaminated Material at the Mesa

Reference: Letter, [redacted] (SCE) to [redacted] (NRC), dated January 16, 1984, Response to request for follow-up information

[redacted] letter of February 7, 1984, acknowledged receipt of the referenced letter which transmitted information regarding our follow-up efforts to locate contaminated material at the Mesa. [redacted] letter also requested that SCE forward the final results of survey efforts when they were completed.

Radiological survey of the Mesa was completed on February 8, 1984. Forty-three (43) additional items with measurable radioactive contamination were found and transferred to the Unit 1 restricted area after December 31, 1983. The enclosure is an updated Appendix 1 to the referenced letter.

We have compared the radiological conditions presented by each of the forty-three items to those presented by the "most significant" items evaluated in the referenced report. It was determined that none of the recently recovered items posed a condition that was not already bounded by our radiological impact evaluation.

If you require any additional information, please so advise.

APPENDIX 1
SUMMARY OF CONTAMINATED ITEMS

LOCATION/ITEM DESCRIPTION	ESTIMATED RELEASE DATE	ACTIVITY DETECTED		ACTIVITY WHEN RELEASED		COMMENTS
		FIXED PLUS REMOVABLE (cpm)	REMOVABLE (cpm)	FIXED PLUS REMOVABLE (cpm)	REMOVABLE (cpm)	
I. AWS WAREHOUSE						These tools and materials were discovered in the AWS Warehouse during October 1981. Since documentation of radiological surveys at that time was less rigorous than now, the information is incomplete in most cases. A dash indicates incomplete data.
PERSONNEL LOCKERS:						
1. Strapping Tool	5-1-81	300	- -	390	- -	
2. Wrench (7/16")	5-1-81	400	- -	520	- -	
3. Wrench (1-15/16")	5-1-81	500	- -	650	- -	
4. Snap Ring Pliers	5-1-81	200	- -	260	- -	
5. Channel Locks	5-1-81	1,400	- -	1,820	- -	
6. Channel Locks	5-1-81	300	- -	390	- -	
7. Wrench (7/8")	5-1-81	600	- -	780	- -	
8. Wrench (3/4")	5-1-81	300	- -	390	- -	
9. Screwdriver	5-1-81	200	- -	260	- -	
10. Screwdriver	5-1-81	400	- -	520	- -	
11. Crescent Wrench (10")	5-1-81	- -	1,500	- -	1,950	Removable contamination was evaluated by obtaining a gross smear on masslin and determining the count rate with a frisker.
12. Crescent Wrench (12")	5-1-81	- -	10,000	- -	13,000	
13. Crescent Wrench (6")	5-1-81	- -	3,000	- -	3,900	
14. Nylon Slings	5-1-81	200	- -	260	- -	
15. Scaffold Wrench	5-1-81	- -	600	- -	780	
16. Steel Wedge	5-1-81	200	- -	260	- -	
17. Pipe Wrench (14")	5-1-81	700	- -	910	- -	
18. Magnetic Base	5-1-81	300	- -	390	- -	
19. Crescent Wrench	5-1-81	1,500	- -	1,950	- -	
Tool Crib:						
20. Special Tool	5-1-81	200	- -	260	- -	
21. Air Driven Grinder	5-1-81	800	- -	1,040	- -	
22. Crescent Wrench	5-1-81	5,000	- -	6,500	- -	
23. Wrench	5-1-81	500	- -	650	- -	
24. Wrench	5-1-81	500	- -	650	- -	Items 32 through 36 were placed in the Maintenance Shop crypt in January 1981. The material remained isolated until the crypt was opened for radiological survey in October 1981. The items were returned to the Restricted Area after survey and were never accessible to a member of the general public.
25. Slug Wrench	5-1-81	- -	800	- -	1,040	
26. I Bolt	5-1-81	1,000	- -	1,300	- -	
27. Misc. Parts	5-1-81	500	- -	650	- -	
28. Grinder Parts	5-1-81	500	- -	650	- -	
29. Crescent Wrench (10")	5-1-81	1,500	- -	1,950	- -	
30. Chicago Fitting	5-1-81	2,000	- -	2,600	- -	
31. Tin Snips	5-1-81	- -	1,200	- -	1,560	
Machine Shop Crypt:						
32. Stud Tension Tester	1-1-81		- -	3,900	- -	Beta corrected measurements of 20 mrad/hr at 1/2" and 0.1 mRad/hr at 12" were reported on item No. 35. Dose rates when released are calculated to have been 25% higher.
33. RCS Seal Dummy	1-1-81		- -	1,300	- -	
34. I Beam	1-1-81		- -	650,000	- -	
35. Steel O-Ring	1-1-81		- -	See Comment	- -	
36. RCS Seal Dummy	1-1-81		- -	650	- -	

*The "Fixed Plus Removable" activities contained in Appendix 1 were recorded in units of counts per minute (cpm). The typical instrument used to make those measurements was the Eberline RM-14 count rate meter with an HP-260 GM Probe. Nominal efficiency for these instruments is 10%.

APPENDIX 1
SUMMARY OF CONTAMINATED ITEMS

LOCATION/ITEM DESCRIPTION	ESTIMATED RELEASE DATE	ACTIVITY DETECTED		ACTIVITY WHEN RELEASED		COMMENTS
		FIXED PLUS REMOVABLE (cpm)	REMOVABLE ^{2} (dpm/100cm)	FIXED PLUS REMOVABLE (cpm)	REMOVABLE ^{2} (dpm/100cm	
II. MESA GRIP FACILITY						
1. Pipe Elbow (1")	5-1-81	>50,000 (on one small spot)	LLD	66,000	LLD	Item No. 1 was found in October 1981. The reported maximum reading was 10 mRad/hr (Beta corrected).
2. Wood Plank	5-1-81	600	LLD	1,000	LLD	Item No. 2 was discovered in March 1982.
3. Gang Box	5-1-81	300(general) >50,000 (on one small spot inside box)	<1,000	400 >50,000	<1,000	Item No. 3 was found in July, 1983. No radiation above background on exterior of box.
1. Forklift Battery	5-1-81	See Comment	4,000	See Comment	5,200	These items were found in October and December, 1981. Reported dose rates, in excess of natural background were: Item No. 1, 25 uR/hr; Item No. 2, 40 uR/hr; and Item No. 3, 2 uR/hr. Dose rates when released are estimated to have been 25% higher.
2. Pre-Filters	5-1-81		3,000		3,900	
3. Lead Blankets (6 Pallets)	5-1-81		- -		- -	
1. Heliarc Welding Stand	5-1-81	200	LLD	340	LLD	These items, released a minimum of 2 to 3 years ago, were surveyed in July 1983.
2. Roto Hammer	5-1-81	1,000	<1,000	1,700	1,100	
3. Cable Choker	5-1-81	200	LLD	340	LLD	
4. Core Drill	5-1-81	200	LLD	340	LLD	
5. Tap	5-1-81	100	LLD	170	LLD	
6. Wrench	5-1-81	100	LLD	170	LLD	
7. Dynameter	5-1-81	400	LLD	680	LLD	
III. AMERON LAYDOWN AREA						
1. 1.5 Meter Dia. Metal Rings	3-1-77	800 (max.)	LLD	9,100	LLD	These items, released from Unit 1 before 1980, were surveyed in August and September 1983.
2. Metal Support Rack	3-1-77	3,000	LLD	34,000	LLD	
3. Steel Shaft (4"x50")	3-1-77	10,000	LLD	114,000	LLD	
4. Split Pressure Flask	3-1-77	300	LLD	3,400	LLD	
5. Cylindrical Metal Puck	3-1-77	3,000	LLD	34,000	LLD	

LLD - Below Lower Limit of Detection

APPENDIX 1
SUMMARY OF CONTAMINATED ITEMS

LOCATION/ITEM DESCRIPTION	ESTIMATED RELEASE DATE	ACTIVITY DETECTED		ACTIVITY WHEN RELEASED		COMMENTS
		FIXED PLUS REMOVABLE (cpm)	REMOVABLE [2] (dpm/100cm)	FIXED PLUS REMOVABLE (cpm)	REMOVABLE [2] (dpm/100cm	
6.-11. Pressure Desurgers (6)	3-1-77	600 (max.)	LLD	6,800	LLD	
12. Pump Case	3-1-77	75	LLD	850	LLD	
13. 10 cm Shackle	3-1-77	300	LLD	3,400	LLD	
14. 7.5 cm Shackle	3-1-77	75	LLD	850	LLD	
15. Clamp	3-1-77	75	LLD	850	LLD	
16. Drain Cap	3-1-77	2,000	LLD	23,000	LLD	
17. Hand Lift	3-1-77	150	LLD	1,700	LLD	
18.&19. Clamps (2)	3-1-77	350 (max.)	LLD	4,000	LLD	
20. Cruciform Pipe	3-1-77	5,000	LLD	57,000	LLD	
21. 30 cm. Dia. Handwheel	3-1-77	1,000	LLD	11,400	LLD	
22. Valve Stem	3-1-77	2,000	LLD	23,000	LLD	
23. 3-inch Gate Valve	3-1-77	600	LLD	6,800	LLD	
24.&25. Shackles (2)	3-1-77	100	LLD	1,100	LLD	
26.-28. Aluminium Pipes (3)	3-1-77	2,000	<1,000 (External) 1,100 (Internal)	23,000	5,700 (External) 12,500 (Internal)	
29. Lead Blanket	3-1-77	1,000	LLD	11,400	LLD	
30. Metal Brace	3-1-77	700	LLD	8,000	LLD	
31. 3" Thick Metal Plate	3-1-77	2,600	LLD	30,000	LLD	
32. 22-inch Pipe	3-1-77	500	LLD	5,700	LLD	
33. Tube	3-1-77	1,200	LLD	14,000	LLD	
IV. EDISON SALVAGE YARD - ALHAMBRA NO ITEMS FOUND						
V. DIVISION MAINTENANCE FACILITY AT ALAMITOS STATION NO ITEMS FOUND						
VI. BECHTEL WAREHOUSE IN LA MIRADA						These items were surveyed in September 1983
1. Drill Press	5-1-81	2,000	LLD	5,600	LLD	Items 1 through 4 were released from Mesa Fabrication Shop during August 1983
2. 50', 1/2-inch Dia. Hose	5-1-81	75	<1,000	210		
3. 24', 2-inch Dia. Vacuum Hose	5-1-81	1,500 (External) 10,000 (Internal)	LLD (External) 1,120 (Internal)	4,200 (External) 28,000 (Internal)	LLD (External) 3,100 (Internal)	Removable contamination on item 3 was confined to a 3 inch long metal fitting on one end of the hose.

LLD-Below Lower Limit of Detection

APPENDIX 1
SUMMARY OF CONTAMINATED ITEMS

LOCATION/ITEM DESCRIPTION	ESTIMATED RELEASE DATE	ACTIVITY DETECTED		ACTIVITY WHEN RELEASED		COMMENTS
		FIXED PLUS REMOVABLE (cpm)	REMOVABLE (dpm/100cm^2)	FIXED PLUS REMOVABLE (cpm)	REMOVABLE (dpm/100cm^2)	
4. 100', 1 inch Dia. Hose	5-1-81	100	<1,000	280	1,300	
5. Air Powered Grinder	5-1-81	4,000	LLD	11,200	LLD	Items 5 through 9 were released from Unit 1 a minimum of 2-3 years ago.
6. 6', 1 inch Dia. Hose	5-1-81	4,000 (External) 16,000 (Internal)	LLD (External) <1,000 (Internal)	11,200 (External) 44,800 (Internal)	LLD (External) 1,100 (Internal)	
7. 6', 1 inch Dia. Hose	5-1-81	1,000	LLD	2,800	LLD	
8. Impact Wrench	5-1-81	1,200	<1,000	3,400	<1,000	
9. Impact Wrench	5-1-81	45,000 (one hot spot) 15mR/hr by TLD	2,200 (External) 35,100 ,40 (Internal)	61,200 20mR/hr	3,000 47,800	An isotopic analysis of Item No. 9 revealed essentially only Cobalt-60.
10. Welding Connector	3-1-77	75	LLD	880	LLD	Items 10 through 24 released from Unit 1 a minimum of 5-6 years ago.
11.-16. Welding Connectors (5)	3-1-77	100	LLD	1,170	LLD	
17. Welding Connector	3-1-77	100	<1,000	1,170	2,800	
18. Welding Connector	3-1-77	800	LLD	9,400	LLD	
19. Welding Connector	3-1-77	800	<1,000	9,400	3,500	
20. Welding Connector	3-1-77	800	1,500	9,400	17,500	
21. Welding Connector	3-1-77	2,000	<1,000	23,400	3,300	
22. Welding Connector	3-1-77	2,200	<1,000	25,800	10,700	
23. Gate Valve	3-1-77	700 (External) 800 (Internal)	<1,000 (Internal and External)	8,200 (External) 9,400 (Internal)	LLD (External) 7,500 (Internal)	
24. Gate Valve	3-1-77	1,000 (External) 6,000 (Internal)	LLD (External) <1,000 (Internal)	11,700 (External) 70,000 (Internal)	LLD (External) 7,400 (Internal)	
VII. MESA FENCED AREA WEST OF AMERON						
1.-2. Head Set	5-1-81	1,800	<1,000	5,400	<3,000	The material found, November '83, in this area had been received from the GRIP Facility before the Radwaste Group established control over the movement of materials between areas at the Mesa.
3. Ratchet Wrench	5-1-81	90	<1,000	270	<3,000	
4. Staple Gun	5-1-81	100	<1,000	300	<3,000	
5. Ratchet Head	5-1-81	100	<1,000	300	<3,000	
6. Slug Wrench	5-1-81	90	<1,000	270	<3,000	
7. Air Powered Nail Gun	5-1-81	75	<1,000	225	<3,000	
8. C Clamp	5-1-81	240	<1,000	720	<3,000	
9. Pipe Stand	5-1-81	270	<1,000	800	<3,000	
10. Pipe Stand	5-1-81	390	<1,000	1,170	<3,000	

LLD - Below Lower Limit of Detection

APPENDIX 1
SUMMARY OF CONTAMINATED ITEMS

LOCATION/ITEM DESCRIPTION	ESTIMATED RELEASE DATE	ACTIVITY DETECTED		ACTIVITY WHEN RELEASED		COMMENTS
		FIXED PLUS REMOVABLE (cpm)	REMOVABLE (dpm/100cm^2)	FIXED PLUS REMOVABLE (cpm)	REMOVABLE (dpm/100cm^2)	
11. C Clamp	5-1-81	300	<1,000	900	<3,000	
12. Pipe Stand	5-1-81	125	<1,000	375	<3,000	
13. Strap	5-1-81	200	<1,000	600	<3,000	
14. Vise Grips	5-1-81	3,000	1,650	9,000	5,000	
15. Vise Grips	5-1-81	90	<1,000	270	<3,000	
16. Vise Grips	5-1-81	6,500	5,800	19,500	17,400	
17. Vise Grips	5-1-81	3,200	3,880	9,600	11,600	
18. Vise Grips	5-1-81	75	<1,000	225	<3,000	
19. and 20. Fitting	5-1-81	125	<1,000	375	<3,000	
21. Fitting	5-1-81	150	<1,000	450	<3,000	The vicegrips, item 16, were
22. and 23. Fitting	5-1-81	100	<1,000	300	<3,000	modified for remote operation.
24. Fitting	5-1-81	1,590	<1,000	4,800	<3,000	Use as a standard hand tool was
25. Fitting	5-1-81	1,000	1,190	3,000	3,600	not possible.
26. Valve	5-1-81	1,000	<1,000	3,000	<3,000	
27. Box	5-1-81	200	1,070	600	3,200	
28. Vacuum Tool	5-1-81	250	<1,000	750	<3,000	
29. Regulator	5-1-81	100	<1,000	300	<3,000	
30. Socket Drive	5-1-81	250	<1,000	750	<3,000	
31. Winch	5-1-81	200	<1,000	600	<3,000	
32. Bucket	5-1-81	75	<1,000	225	<3,000	
33. T. V. Camera	5-1-81	300	<1,000	900	<3,000	
34. Head Set	5-1-81	200	<1,000	600	<3,000	
35. Head Set	5-1-81	250	<1,000	750	<3,000	
36. Metal Disk	5-1-81	400	<1,000	1,200	<3,000	
37. Allen Wrench	5-1-81	250	<1,000	750	<3,000	
38. Pipe Bender	5-1-81	500	<1,000	1,500	<3,000	
39. Pump and Valves	5-1-81	100	<1,000	300	<3,000	
40. Socket Breaker Bar	5-1-81	100	<1,000	300	<3,000	
41. Pipe	5-1-81	300	<1,000	900	<3,000	
42. Gas Bottle	5-1-81	400	<1,000	1,200	<3,000	
43. Scaffolding Knuckle	5-1-81	2,500	<1,000	7,500	<3,000	
44. Scaffolding Knuckle	5-1-81	18,000	4,200	54,000	12,600	
45. Casters	5-1-81	1,000	<1,000	3,000	<3,000	
46. Barrel	5-1-81	200	<1,000	600	<3,000	
47. Glove	5-1-81	200	LLD	600	LLD	
VIII. Mesa Training Center						
1. Survey Instrument	5-27-82	20,000	LLD	25,000	LLD	This item, found in December 1983, was released from the Unit 1 Restricted Area in May, 1982. It was then transferred from the Protected Area in May, 1983, to the Training Center for use as a training aid.
IX. San Diego State University						
No items found						

LLD - Below lower limit of detection

APPENDIX 1
SUMMARY OF CONTAMINATED ITEMS

LOCATION/ITEM DESCRIPTION	ESTIMATED RELEASE DATE	ACTIVITY DETECTED		ACTIVITY WHEN RELEASED		COMMENTS
		FIXED PLUS REMOVABLE (cpm)	REMOVABLE (dpm/100cm²)	FIXED PLUS REMOVABLE (cpm)	REMOVABLE (dpm/100cm²)	
X. Trans America/ Deleval Corporation - Connecticut						These items were inadvertently shipped to the manufacturer for repair. The combined fixed plus removable activity (primarily Co-60 and Cs-137) was estimated at 0.1 uCi. The items were surveyed and decontaminated by a licensed contractor before repairs were made.
1.-3. Three level detectors.	5-2-82	300	1150 (max.)	350	1,300	
XI. MESA 2/3 LAYDOWN AREA						Items 1-39 were surveyed in November and December 1983.
1. Tube Lock	3-1-77	1,000	<1,000	12,000	<12,000	Item 1 was removed from Unit 1 before 1980.
2.-7. Scaffold Knuckle	5-1-81	100	<1,000	300	<3,000	
8.-9. Scaffold Knuckle	5-1-81	200	<1,000	600	<3,000	
10.-11. Scaffold Knuckle	5-1-81	400	<1,000	1,200	<3.000	
12.-15. Scaffold Knuckle	5-1-81	150	<1.000	450	<3,000	
16.-26. Scaffold Knuckle	5-1-81	75	<1.000	225	<3,000	
27. Scaffold Knuckle	5-1-81	350	<1,000	1,050	<3,000	
28. Scaffold Knuckle	5-1-81	80	<1,000	240	<3,000	
29. Scaffold Knuckle	5-1-81	500	<1,000	1,500	<3.000	
30. Scaffold Knuckle	5-1-81	250	<1.000	750	<3,000	
31. Scaffold Knuckle	5-1-81	160	<1.000	480	<3,000	
32. Scaffold Knuckle	5-1-81	10,000	<1.000	30,000	<3,000	
33. Scaffold Knuckle	5-1-81	350	<1.000	10,500	<3,000	
34. Engineers Box	5-1-81	200	<1,000	600	<3,000	
35. Tape	5-1-81	300	<1,000	900	<3,000	
36. Tile	5-1-81	600	<1,000	1,800	<3.000	
37. Box Wrench	5-1-81	80	<1.000	240	<3,000	
38. Brass Fittings	5-1-81	800	<1.000	2,400	<3,000	
39. Hydrolazer	5-1-81	2,000	3,700	6,000	11,000	
40. Wrench (1 13/16")	5-1-81	650	<1,000	1,950	<3,000	All remaining items were discovered after December 31, 1983.
41. Wrench (1 3/8")	5-1-81	300	<1,000	900	<3,000	
42. Wrench (1")	5-1-81	400	<1,000	1,200	<3,000	
43. Pump Unit	5-1-81	500	<1,000	1,500	<3.000	
44. Tripod	5-1-81	160	<1.000	480	<3,000	
45. Ratchet Wrench	5-1-81	350	<1.000	1,050	<3,000	
46. Hand Press	5-1-81	200	<1,000	600	<3,000	
47. Steel Rule	5-1-81	4,000	<1,000	12,000	<3,000	
48. C-Clamp (8")	5-1-81	300	<1,000	900	<3.000	
49. C-Clamp (11")	5-1-81	120	<1.000	360	<3,000	
50. C-Clamp (6")	5-1-81	210	<1.000	630	<3,000	
51. Pipe Die	5-1-81	200	<1.000	600	<3,000	
52. Pipe Bender	5-1-81	900	<1.000	2,700	<3,000	
53. Breaker Bar (18")	5-1-81	2,200	<1,000	6,600	<3,000	
54. Pipe Threader	5-1-81	1,000	<1,000	3,000	<3,000	
55. Tripod	5-1-81	300	<1,000	900	<3,000	
56. Gas Regulator	5-1-81	500	<1,000	1,500	<3,000	
57. Grinder Catch Pot	5-1-81	200	1,500	600	4,500	
58. Pipe Vise	5-1-81	120	<1,000	360	11,000	
59. Shaft	5-1-81	90	<1,000	180	11,000	

APPENDIX 1
SUMMARY OF CONTAMINATED ITEMS

LOCATION/ITEM DESCRIPTION	ESTIMATED RELEASE DATE	ACTIVITY DETECTED		ACTIVITY WHEN RELEASED		COMMENTS
		FIXED PLUS REMOVABLE (cpm)	REMOVABLE 2 (dpm/100cm)	FIXED PLUS REMOVABLE (cpm)	REMOVABLE 2 (dpm/100cm)	
60. Pipe Vise	5-1-81	350	<1,000	1,050	<3,000	
61. Wood (2" x 4" x 18")	5-1-81	300	<1,000	900	<3,000	
62. Tool Box	5-1-81	(Internal) 10,000	<1,000	30,000	<3,000	External radiation at contact < 0.1 mR/hr when found.
		(External) 200	<1,000	600	<3,000	
63. Grinder Wheel	5-1-81	140	<1,000	420	<3,000	
64. Bucket Lid	5-1-81	200	1,500	600	4,500	
65. Table	5-1-81	200	<1,000	600	11,000	
66. Resistor	5-1-81	150	<1,000	450	11,000	
67. Resistor	5-1-81	120	<1,000	360	11,000	
Ameron, Lot 12						
1. Eye Bolt	5-1-81	14,000	<1,000	42,000	<3,000	Items 1, 2 and 3 contaminated
2. Eye Bolt	5-1-81	500	<1,000	1,500	<3,000	on threads.
3. Eye Bolt	5-1-81	10,000	<1,000	30,000	<3,000	Potential whole body and skin doses
4. Air Conditioner	5-1-81	1,200	<1,000	3,600	<3,000	posed by Item 1 are bounded by the evaluations contained in Appendices 3 and 4.
Warehouse B						
1. Fan	5-1-81	1,500	<1,000	4,500	<3,000	
Paint/Sandblast Yard						
1. Nylon Sling (8')	5-1-81	200	<1,000	600	<3,000	
2. Gate Valve	5-1-81	180	<1,000	540	<3,000	
3. Gate Valve (1")	5-1-81	600	<1,000	1,800	<3,000	
Edison Warehouse						
1. Tripod Jack	5-1-81	1,800	(Internal) 3,000	5,400	9,000	The contamination on Item 3 flaked off, leaving the tool clean.
			(External) <1,000		<3,000	Appendices 5 and 6 bound the
2. Pipe Bender	5-1-81	4,000	<1,000	12,000	<3,000	potential dose from either inhaling
3. Hilti Roto Hammer	5-1-81	1,500	15,000	4,500	45,000	or ingesting the entire amount of
4. Electrical Plug	5-1-81	6,000	<1,000	18,000	<3,000	contamination.
5. Fire Extinguisher	5-1-81	1,400	<1,000	4,200	<3,000	Contamination on Item 5 was
6. Fire Extinguisher	5-1-81	200	<1,000	600	<3,000	confined to base of the cylinder.
7. Welding Box	5-1-81	300	<1,000	900	<3,000	

SONGS HP INDIVIDUAL TASK ASSIGNMENT (ITA)

A. ORIGINATOR: Complete this Section, individual assigning ITA is to complete Section B.

1) Name (Print) [redacted] 2) Enter your next ITA number E84-386

3) Describe Task Guide investigation of contaminated materials found on SONGS 2/3 Offshore Pad (3-22-84)

4) Describe what constitutes completion Memo describing disposition of materials, causes for materials being outside Rest. Area, radiological impact, corrective action.

5) List appropriate references ________

6) Sign and Date [redacted] 6-5-84

B. ASSIGNOR(S): Compliance with this Section is indicated by your signature or initials below.

1) All necessary documents are to be referenced and/or readily available and/or attached.

2) Prime assignor and assignee discuss this ITA and agree on Prime Due Date, assignor enters:
PRIME DUE DATE* of 6-20-84 Assigned to [redacted] By [redacted] On 3-22-84

3) Subsequent assignor and assignee discuss and agree on Sub Due Date, assignor enters:
SUB DUE DATE* of ________ Assigned to ________ By ________ On ________

4) Assignor(s) gives original ITA to assignee and forwards a copy to TAC Coordinator.

*Prime Due Dates should be at least 5 calendar days beyond the date when task first assigned and Sub Due Dates must not be later than Prime Due Dates.

C. DUE DATE EXTENTION REQUEST: This Section is not a substitute for the Prime Due Date in Section B which must be agreed to between assignor/assignee prior to establishment. Required extensions, initiated by assignee, are to be requested as far in advance of the pending due date(s) as possible whenever completion date problems are identified.

1) New SUB DUE DATE of ________ Requested By ________ On ________

2) New PRIME DUE DATE of ________ Requested By ________ On ________

3) Reason why due date cannot be met ________

4) New SUB DUE DATE of ________ Approved By ________ On ________

5) New PRIME DUTE DATE of ________ Approved By ________ On ________

6) Copy of ITA forwarded to TAC Coordinator By ________

D. TASK COMPLETION: To be completed by assignee and forwarded to originator.

1) Statement of completed action THE MEMORANDUM REQUESTED IN A4, ABOVE, HAS BEEN PREPARED

2) Date completed 6-20-84

3) Is a copy of completion document attached ✓ Yes (ACTION IS NOT COMPLETE WITHOUT THIS)

4) Signature of Assignee [redacted]

5) Originator is to forward original ITA and supporting documentation to TAC Coordinator.
To TACC on ________ date, By ________

Distribution: White - Originator Canary & Pink - Assignee Goldenrod - TAC Coordinator

SCE 50(123) 197 REV. 0 11/24/82

MEMORANDUM FOR FILE

June 20, 1984

SUBJECT: Discovery of Additional Contaminated Material Outside SONGS Restricted Areas

REFERENCE: Memorandum For File, [redacted] "Evaluation of 'Most Significant' Potential Radiological conditions from Inadvertently Released Contaminated Material," dated December 21, 1983

On the afternoon of March 27, 1984, [redacted] Senior Radwaste Handler stationed in the North Holddown Area for Units 2/3, detected radioactive contamination on several items being transferred to the Unit 1 Restricted Area. Since the material exceeded Station release limits, [redacted] confiscated the items and the pallet which contained them and removed the material to radwaste storage. Using a hand-held GM probe and a count rate meter, 700 cpm was measured on a short length of hose, 250 cpm on two (2) nylon slings, and 150 cpm on a third slign. All four items were free of removable contamination.

Upon questioning the teamster who was accompaning the contaminated material, [redacted] learned that the material transfer had originated from the Offshore Pad. From there, the material entered through the South Holddown Area for Units 2/3, was transported across the Restricted Area to the North Holddown Area where it was identified as contaminated material. [redacted] was told that during the move across the Restricted Area, several hand tools were removed from the pallet by Maintenance Shop Personnel. [redacted] then went to the Maintenance Shop, determined which tools had been removed from the pallet, and evaluated each item for residual contamination. All of the items were found to be free of contamination.

On the following day, March 28, two Radwaste handlers were sent to the Offshore Pad to meet [redacted] SCE Maintenance. [redacted] is the individual who loaded the contaminated items on the pallet which was eventually stopped in the North Holddown Area. The handlers were directed to the storage container from which the contaminated items were removed. That container was one of seven which had been on the Offshore Pad for several years. Then handlers performed an item-by-item survey of all remaining material in the suspect container and four of the other containers. All material in those five containers was found to be free of residual contamination. The remaining two containers were not readily accessible and were not surveyed at that time.

[redacted] stated that, to the best of his knowledge, the items were never used after being placed in storage and were now being distributed where they could be used. He also stated that other similar material had been moved to the Special Tools and Rigging (STAR) Yard, (previously known as the GRIP Area) at the Mesa.

The two Radwaste handlers were then sent to the STAR Yard to evaluate material which had been received from the Offshore Pad. The handlers examined the material and found no evidence of radioactive contamination. However, during the course of their survey, four metal boxes (4' x 6' x 3') containing rigging for turbine overhaul work were located. Though the handlers were assured by personnel at the STAR Yard that the four boxes did not come from the Offshore Pad, because of the nature of the contents they chose to survey the itmes. Two of those four boxes were found to contain material with detectable contamination: One (1) choker with 2,000 cpm fixed and 2,000 dpm/100 cm^2 removable $\beta\gamma$, one (1) other piece of rigging with 100 cpm fixed $\beta\gamma$ and no removable contamination. The two boxes which contained the contaminated items were labeled as radioactive material and the area around them was barricaded.

Immediate Action

1. The two boxes found at the STAR Yard which contained the contaminatec material were removed to the Unit 1 Restricted Area.

2. Controls were established at the access road for Units 2/3 to ensure that material leaving the Offshore Pad and the [redacted] Tool Room would first be evaluated for residual contamination.

3. An investigation was initiated to determine the source of the contaminated material and the areas which would require radiological survey to locate other potentially contaminated items.

[redacted] was contacted and questioned regarding his group's efforts on the Offshore Pad. He described large amounts of tools and equipment that have been in storage on the Offshore Pad for several years. [redacted] was assigned the task of salvaging any items that may be useful during the Unit 1 return-to-service outage. Salvaged items, primarily rigging equipment, were transferred either to Unit 1 or to the STAR Yard at the Mesa. Material was not transferred to any other locations.

Before hiring on with Edison, [redacted] was employed by Bechtel as a millwright at Units 2 and 3. He explained that during his years as a millwright it was common practice to obtain from Unit 1 any items needed for work at Units 2 and 3. He believed that other crafts followed the same practice. When asked if he were certain that the items which were identified as contaminated came from the container on the Offshore Pad, he said it was possible that they were added to the pallet during its transit through the Units 2/3 Restricted Area. However, he recalled loading material of the type that was found to be contaminated. [redacted] felt confident that at least some of the items he had removed from that storage container labeled "Millwrights" had originated at Unit 1.

It appears that there is little doubt that the contaminated items discovered in the North Holddown for Units 2/3 came from the Offshore Pad. From [redacted] statements, it appears that the items must have been removed from Unit 1 and transferred to Units 2/3 several years ago.

[redacted] an Edison Supervisor at the STAR Yard, was interviewed regarding the movement of material into and out of his facility. The STAR Facility, formerly the GRIP Yard, was established in mid-September 1983. The yard is accumulating special tools and rigging equipment to support unit outages. In addition, load testing of rigging equipment is perfomed there. [redacted] explained that they have essentially only been receiving material at the yard. The only material removed from the facility were items which had been load tested and were being returned to the units.

[redacted] stated that the four boxes, two of which contained the contaminated items, had been among the first materials they received. The boxes had come from an area near Ameron, where several of the items were sandblasted and repainted. He estimated that the material had been present in the STAR Yard for approximately 6 months. One member of his crew who previously worked for Unit 1 Maintenance, identified the boxes and their contents as having been stored at the Reservoir, north of Unit 1.

To understand how this material could have been present at the STAR Facility after the extensive radiological survey that was performed at the Mesa and the controls established on material movement between the various facilities located at the Mesa, requires a review of some significant events and dates:

1. A substantial amount of old Unit 1 equipment, of which the four boxes found in the STAR Yard were a part, was previously stored at the Reservoir. During the second calendar quarter of 1982, that material was removed to the Ameron area to allow the installation of office trailers around the Reservoir.

2. Some time before material in the [redacted] area was identified as contaminated, July 28, 1983, and before placing a guard to control material movement into and out of the area on August 1, 1983, the four boxes were moved to the sandblast area.

3. Survey efforts at the GRIP (now STAR) Yard were completed on September 15, 1983. Control of material movement into and out of that facility was terminated at that time.

4. On September 27, 1983, contaminated material was found in an area to the east of the Ameron area. The following day the guard was relocated to permit material accountability control of the entire south end of the Mesa.

It appears, then, that some time between September 15, 1983, when the GRIP Facility was declared "clean" and September 28, 1983, when full accountability control was established, that the four boxes were moved from the sandblast area to the STAR Yard.

Since the survey efforts at the Fab Shop, the area south of the GRIP Yard, were also completed in mid-September 1983, there was concern that contaminated material may also have been transferred there.

Like the GRIP Facility, the Fab Shop has also been redesignated. The structure and surrounding yard are now used for mock-up training. Only new training aids and new material for fabrication of training aids have been moved into that area.

There is one additional area which lies between the STAR Yard and the Mock-up Facility. That small area is being used by Edison Field Forces for laydown of construction material.

[redacted] Field Forces Supervisor, was questioned regarding the origin of materials present in the yard. He explained that there were no salvaged items in the yard. All material was either new or had been obtained from the Edison Alhambra Facility. The only shipments out of the yard went to the units and the structural materials from those shipments have already been installed.

[redacted] Civil Superintendent, is responsible for material transfer from the Offshore Pad. During an interview, [redacted] recounted that a substantial amount of material had been removed from the Pad within the last three months of 1983. In January, the number of material shipments decreased because of reductions in the work force. Between February and April, 1984, only a few transfers were made consisting essentially of office furniture. Transfers from the Offshore Pad have again increased since mid-April 1984.

According to [redacted] all material removed from the Offshore Pad was sent either to the GRIP Facility or to Warehouse B at the Mesa. He also mentioned that there was a constant movement of tools and equipment between the Offshore Pad and the [redacted] Tool Room. That Tool Room was located south of the Unit 3 and West of OB 1 and 2. The structure which housed the tool room is being replaced by the new South Security Processing Facility. All of the tools and equipment which were stored there were loaded into cargo-containers and moved inside the Restricted Area.

[redacted] Edison Supervisor of Warehouse Operations, was also questioned regarding material transfers from the Offshore Pad to the Mesa. [redacted] confirmed [redacted] narrative.

It was determined that further investigation of the Mesa Warehouse area was not indicated since:

1. Health Physics personnel were present at the Mesa Warehouse area through February 8, 1984, performing radiological surveys of all materials;

2. All transfers of potentially contaminated material from the Offshore Pad after March 30, 1984, were surveyed; and,

3. No transfers of potentially contaminated material from the Offshore Pad to the Mesa Warehouse area occurred between February 8 and March 30, 1984.

It was then desired to establish a scope of Radiological surveys required to locate any radioactively contaminated material which may exist outside of SONGS Restricted Areas. Following, is a list of locations that were included in the intensive, item-by-item survey effort:

1. Offshore Pad
2. Mesa STAR Yard and Fab Shop areas
3. Batch Plant (south of site)
4. AWS Machine shop
5. AWS B&C Mechanic Shop
6. AWS Paint Shop
7. AWS Maintenance Supervision Offices
8. AWS Tool Room
9. AWS Calibrated Tool Room

Radiological surveys of those locations were initiated on April 9, 1984, and completed on May 31, 1984. Approximately 20,000 man-hours were expended during the survey effort. Attachment 1 is a description of each recovered item and the measured activity. Also included is the "Calculated Activity When Released" which was determined by the methods discribed in the referenced report.

DISCUSSION

A few of the recovered items deserve special mention.

Two hammers, Items A2 and A3 on Attachment 1, were found on a shelf in a portion of the AWS Building Paint Shop previously used by the carpenter. When found, both hammers were covered with dust indicating they had been in that location for some time. It was determined that the hammers which belonged to [redacted] had not been used since the Unit 1 Sleeving Outage, 1981.

Two wrenches, Items A9 and A10 on Attachment 1, were also located in the Paint Shop. Those wrenches were found in a tool box of a worker who had left the site in 1978. There was no evidence that any of the tools in that box had been used since that individual left in 1978.

Items A30 through A35 on Attachment 1 were found in the Maintenance Shop Crypt. Two of those items were identified in a previous survey, October 1981, and were described in the referenced memorandum. Apparently, after their identification as contaminated material, the items were not removed from the Crypt.

As explained in the referenced memorandum, material stored in the Crypt is isolated from personnel. [redacted] Maintenance Supervisor, recalled only one instance during the past few years when the Crypt was opened. On that occassion, the Crypt was inspected without personnel entry.

On May 5, 1984, a contaminated rawhide hammer, Item A67 on Attachment 1, was received at the AWS Building Tool Room. The worker delivering the tool was questioned about its origin. The Health Physics Technician was told by the worker that he had obtained the hammer from the Unit 2 Elevation 70' Tool Room and, assuming the tool had already been checked by Health Physics, he removed it from the Restricted Area through the portal monitor. Although located within the Restricted Area, that Unit 2 Tool Room is outside of the Red Badge Zone and the presence of contaminated material was not expected there.

A Health Physics Technician was sent to the Unit 2 Tool Room to evaluate other material stored there. Eight other contaminated items were recovered with fixed residual contamination ranging from 100 cpm to 600 cpm βγ.

Several steps have taken to prevent the removal of tools and equipment from SONGS Restricted Areas through the portal monitors:

1. Signs have been posted within the Restricted Area directing personnel to remove tools and equipment only through the Holddown Areas.

2. Changes to Health Physics Procedure SO123-VII-7.3.2, "Release of Potentially Contaminated Items From the Restricted Area," have been submitted which will clarify the requirement that tools and equipment be removed only through the Holddown Areas.

3. [redacted] Manager of Health Physics, has been in contact with [redacted] Manager of Security, to obtain Security Officer involvement to help prevent tool and equipment removal through the portal monitors.

4. A letter was issued from Mr. [redacted] to Mr. [redacted] Nuclear Training Manager, which requested that the Basic Radiation Training/Retraining courses include instruction for the proper release of material from the Restricted Area.

CONCLUSIONS

With the accomplishment of the four corrective steps mentioned above it appears that the Health Physics Division has now established control over all avenues for the inadvertent release of contaminated material from the SONGS Restricted Area.

Again, as was reported in the referenced memorandum, and with the exception of the rawhide hammer described above, the recently recovered items appear to have been released from the SONGS Restricted Area several years ago.

The radiological conditions presented by each of the items was compared to those presented by the "Most Significant" items evaluated in the referenced report. It was determined that none of the recently recovered items posed a condition that was not already bounded by our radiological impact evaluation.

[redacted]
Health Physics Engineer

[redacted]1197K/2007x[redacted]

cc: [redacted] COM Files

[redacted]s

ATTACHMENT 1

SUMMARY OF CONTAMINATED ITEMS

LOCATION/ITEM DESCRIPTION	ESTIMATED RELEASE DATE	ACTIVITY DETECTED FIXED PLUS REMOVABLE (cpm)	ACTIVITY DETECTED REMOVABLE (dpm/100cm²)	ACTIVITY WHEN RELEASED FIXED PLUS REMOVABLE (cpm)	ACTIVITY WHEN RELEASED REMOVABLE (dpm/100cm²)	COMMENTS
A. AWS WAREHOUSE						
Paint Shop:						
1. T-Handle	5-1-81	250	<1,000	750	<3,000	Items 1 through 6 were found on a shelf in a corner of the Paint Shop. The items had not been used since 1981.
2.,3. Hammer	5-1-81	7,000	1,000	21,000	3,000	
4.,5. Wrench	5-1-81	100	<1,000	300	<3,000	
6. Wrench	5-1-81	150	<1,000	450	<3,000	
7. Wrench	5-1-81	500	<1,000	1,500	<3,000	
8. Drill Motor	5-1-81	1,500	<1,000	4,500	<3,000	
9. Wrench	3-1-77	3,400	3,000	44,200	39,000	Items 9 and 10 were found in a tool box left behind by a worker who left site in 1978.
10. Wrench	3-1-77	1,900	3,500	24,700	45,500	
11. Electric Adapter	5-1-81	600	<1,000	1,800	<3,000	
12. Hammer	5-1-81	100	<1,000	300	<3,000	
13. Grinder	5-1-81	200	<1,000	600	<3,000	
14. Needle Gun	5-1-81	250	<1,000	750	<3,000	
15.-18. Air Hoses	5-1-81	300	<1,000	900	<3,000	
19. Air Drill	5-1-81	300	<1,000	900	<3,000	
Machine Shop:						
20.-22. Wrench	5-1-81	150	<1,000	450	<3,000	
23.-24. Snubber	5-1-81	150	<1,000	450	<3,000	
25. Pipe Roller	5-1-81	1,200	<1,000	3,600	<3,000	
26. Pipe Roller	5-1-81	400	<1,000	1,200	<3,000	
27. Welding Hose	5-1-81	600	<1,000	1,800	<3,000	
28 Pipe Wrench	5-1-81	100	<1,000	300	<3,000	
29. Snubber Parts	5-1-81	400	<1,000	1,200	<3,000	
Machine Shop Crypt:						
30. Airlock Parts	1-1-81	500	<1,000	2,200	<4,400	Material stored in the Crypt was isolated from personnel.
31. Eye Bolt	1-1-81	900	<1,000	3,950	<4,400	
32. Paint Sprayer	1-1-81	3,000	<1,000	13,150	<4,400	
33. Stud Tensioner	1-1-81	250	<1,000	1,100	<4,400	
34. RCP Seal Mock-up	1-1-81	900	<1,000	3,950	<4,400	

SUMMARY OF CONTAMINATED ITEMS

LOCATION/ITEM DESCRIPTION	ESTIMATED RELEASE DATE	ACTIVITY DETECTED: FIXED PLUS REMOVABLE (cpm)	ACTIVITY DETECTED: REMOVABLE [2] (dpm/100cm)	ACTIVITY WHEN RELEASED: FIXED PLUS REMOVABLE (cpm)	ACTIVITY WHEN RELEASED: REMOVABLE [2] (dpm/100cm)	COMMENTS
Tool Boxes:						
35. Socket	5-1-81	1,000	<1,000	3,000	<3,000	
36. Hammer	5-1-81	200	<1,000	600	<3,000	
37. Hammer	5-1-81	350	<1,000	1,050	<3,000	
38. Wrench	5-1-81	500	<1,000	1,500	<3,000	
39. Wrench	5-1-81	100	<1,000	300	<3,000	
40. Wrench	5-1-81	200	<1,000	600	<3,000	
41. Wire Hooks	5-1-81	200	<1,000	600	<3,000	
42. Channelocks	5-1-81	100	<1,000	300	<3,000	
43. Socket	5-1-81	1,000	<1,000	3,000	<3,000	
44. Wrench	5-1-81	100	<1,000	300	<3,000	
45. Alignment Bar	5-1-81	150	<1,000	450	<3,000	
46. Dial Guage	5-1-81	1,200	<1,000	3,600	<3,000	
47. Gauge Box	5-1-81	250	<1,000	750	<3,000	
48. Pipe Wrench	5-1-81	100	<1,000	300	<3,000	
49. Pliers	5-1-81	500	<1,000	1,500	<3,000	
50.,51. Wrench	5-1-81	100	<1,000	300	<3,000	
52. Socket	5-1-81	200	<1,000	600	<3,000	
53.-55. Socket	5-1-81	150	<1,000	450	<3,000	
56.-58. Socket	5-1-81	100	<1,000	300	<3,000	
Calibrated Tool Room:						
59. Special Tool	5-1-81	250	<1,000	750	<3,000	
60. Load Cell	5-1-81	300	<1,000	900	<3,000	
61. Load Cell	5-1-81	2,400	<1,000	7,200	<3,000	
62. Torque Wrench	5-1-81	200	<1,000	600	<3,000	
63. Micro Meter	5-1-81	150	<1,000	450	<3,000	
64. Meter Parts	5-1-81	200	<1,000	600	<3,000	
65. DC Voltmeter	5-1-81	250	<1,000	750	<3,000	
66. Meter Leads	5-1-81	100	<1,000	300	<3,000	
Tool Room:						
67. Rawhide Hammer	5-5-84	3,000	<1,000	3,000	<1,000	Item Number 67 was transfered from the Restricted Area to the AWS Building Tool Room on May 5, 1984.
68. C-Clamp	5-1-84	500	<1,000	1,500	<3,000	
69. Slugging Wrench	5-1-84	350	<1,000	1,050	<3,000	
70. Wrench	5-1-84	150	<1,000	450	<3,000	
71. Level	5-1-84	150	<1,000	450	<3,000	
72. 1 3/4" Combination Wrench	5-1-84	1,000	<1,000	3,000	<3,000	
73. 1 1/4"-15/16" Wrench	5-1-84	150	<1,000	450	<3,000	
74. 1 5/8" Open end Wrench	5-1-84	100	<1,000	300	<3,000	
75. Hex Head Wrench	5-1-84	150	<1,000	450	<3,000	
76. Breaker Bar	5-1-84	1,000	<1,000	3,000	<3,000	

SUMMARY OF CONTAMINATED ITEMS

LOCATION/ITEM DESCRIPTION	ESTIMATED RELEASE DATE	ACTIVITY DETECTED: FIXED PLUS REMOVABLE (cpm)	ACTIVITY DETECTED: REMOVABLE 2/ (dpm/100cm²)	ACTIVITY WHEN RELEASED: FIXED PLUS REMOVABLE (cpm)	ACTIVITY WHEN RELEASED: REMOVABLE 2/ (dpm/100cm²)	COMMENTS
Tool Room (Continued):						
77. Breaker Bar	5-1-84	200	<1,000	600	<3,000	
78. 2 1/4" Socket	5-1-84	300	<1,000	900	<3,000	
79. 1 5/8" Socket	5-1-84	100	<1,000	300	<3,000	
80. 1/2" - 5/8" Rubber Collar	5-1-84	100	<1,000	300	<1,000	
81. 1" Impact Wrench	5-1-84	100	<1,000	300	<3,000	
82. 4" Impact Extension	5-1-84	400	<1,000	1,200	<3,000	
83. Hex Head Socket	5-1-84	200	<1,000	600	<3,000	
84. 1" Socket	5-1-84	7,000	<1,000	21,000	<3,000	
85. 1" 7/8" Socket	5-1-84	150	<1,000	450	<3,000	
86. 2 7/16" Impact Socket	5-1-84	100	<1,000	300	<3,000	
87. 2 13/16" Impact Socket	5-1-84	150	<1,000	450	<3,000	
88. 2 1/2" Impact Socket	5-1-84	300	<1,000	900	<3,000	
89. 36" Pipe Wrench	5-1-84	150	<1,000	450	<3,000	
90. 24" Pipe Wrench	5-1-84	300	<1,000	900	<3,000	
91. Magnetic Base	5-1-84	600	<1,000	1,800	<3,000	
92. Flashlight	5-1-84	200	<1,000	600	<3,000	
93. 6" Pipe Wrench	5-1-84	300	<1,000	900	<3,000	
94. #5 Strap Wrench	5-1-84	200	<1,000	600	<3,000	
95. 32 Oz. Hammer	5-1-84	150	<1,000	450	<3,000	
96. Sledge Hammer	5-1-84	200	<1,000	600	<3,000	
97. Grinding Disk	5-1-84	150	<1,000	450	<3,000	
98. Air Motor	5-1-84	200	<1,000	600	<3,000	
99. 3/4" Air Drill	5-1-84	200	<1,000	600	<3,000	
100. 1 1/2" Air Impact	5-1-84	1,350	<1,000	4,050	<3,000	
101. Kero Test Rig	5-1-84	150	<1,000	450	<3,000	
102. Hilti Elect. Cord	5-1-84	200	<1,000	600	<3,000	
103. Hilti Bit	5-1-84	200	<1,000	600	<3,000	
104. 1 1/4" Eye Bolt	5-1-84	200	<1,000	600	<3,000	
105.,106. C-Clamp	5-1-84	100	<1,000	300	<3,000	
107. Clipping Hammer	5-1-84	100	<1,000	300	<3,000	
108. Clipping Hammer	5-1-84	200	<1,000	600	<3,000	
109. Welding Hose	5-1-84	100	<1,000	300	<3,000	
110. Light Cord	5-1-84	250	<1,000	750	<3,000	
111. Hydraulic App.	5-1-84	200	<1,000	600	<3,000	
112. Cable Clamp	5-1-84	200	<1,000	600	<3,000	
113. Cable Clamp	5-1-84	350	<1,000	1,050	<3,000	
114. 4" Pipe Nipple	5-1-84	100	<1,000	300	<3,000	
115. 1/4" Right Drill	5-1-84	300	<1,000	900	<3,000	
116. 3/4" x 12" Ext.	5-1-84	150	<1,000	450	<3,000	
Supervisor Office Area:						
No items found						

SUMMARY OF CONTAMINATED ITEMS

LOCATION/ITEM DESCRIPTION	ESTIMATED RELEASE DATE	ACTIVITY DETECTED		ACTIVITY WHEN RELEASED		COMMENTS
		FIXED PLUS REMOVABLE (cpm)	REMOVABLE (dpm/100cm)[2]	FIXED PLUS REMOVABLE (cpm)	REMOVABLE (dpm/100cm)[2]	
B. OFFSHORE PAD						
1. Hose	5-1-84	700	<1,000	21,000	<3,000	Items 1 through 4 were the initial items found in the Unit 2/3 holdown area.
2.,3. Nylon Sling	5-1-84	250	<1,000	750	<3,000	
4. Nylon Sling	5-1-84	150	<1,000	450	<3,000	
5. Welding Lead	5-1-84	300	<1,000	900	<3,000	
6. Oxygen Bottle	5-1-84	200	<1,000	600	<3,000	
7. Piping w/Valves	5-1-84	200	<1,000	600	<3,000	
8. Electric Shop	5-1-84	100	<1,000	300	<3,000	
9. Oxygen Bottle	5-1-84	350	<1,000	1,050	<3,000	
10. Drain Shroud	5-1-84	120	<1,000	360	<3,000	
11. Paint Scraper	5-1-84	3,200	<1,000	9,600	<3,000	
C. BATCH PLANT						
1. Hoist Trolly	5-1-84	600	<1,000	1,800	<3,000	This item was transferred to the Batch Plant from the Bechtel Tool Room in February 1984.
D. MESA						
STAR/GRIP Yard:						
1. Oxygen Bottle	3-1-77	300	<1,000	3,900	<13,000	
2 Shackle	3-1-77	600	<1,000	7,800	<13,000	
3. Cable Choker	3-1-77	2,000	1,000	25,800	13,000	
4. Lift Strap	3-1-77	2,000	2,000	25,800	25,800	
5. Tube Bender	3-1-77	100	<1,000	<1,300	<13,000	
6. Wrench	3-1-77	100	<1,000	1,300	<13,000	
7. Lift Rig	3-1-77	100	<1,000	1,300	<13,000	
Fab Shop/Mock-up Area: No Items found						

1197K/2007x

SONGS HP INDIVIDUAL TASK ASSIGNMENT (ITA)

A. ORIGINATOR: Comple[redacted]on, individual assigning ITA is to complete Section B.

1) Name (Print) [redacted] 2) Enter your next ITA number E84-485

3) Describe Task Determine what should be done with "contaminated sand/sludge in U2 intake."

4) Describe what constitutes completion Verbal recommendation on 11-5-84 + memo to follow documenting recommendation.

5) List appropriate references July 6, 1983 memo by [redacted] + [redacted]; Contact [redacted] for current analyses

6) Sign and Date [redacted] 11-5-84

B. ASSIGNOR(S): Compliance with this Section is indicated by your signature or initials below.

1) All necessary documents are to be referenced and/or readily available and/or attached.

2) Prime assignor and assignee discuss this ITA and agree on Prime Due Date, assignor enters:
PRIME DUE DATE* of _____ Assigned to [redacted] By [redacted] On 11-5-84

3) Subsequent assignor and assignee discuss and agree on Sub Due Date, assignor enters:
SUB DUE DATE* of _____ Assigned to _____ By _____ On _____

4) Assignor(s) gives original ITA to assignee and forwards a copy to TAC Coordinator.

*Prime Due Dates should be at least 5 calendar days beyond the date when task first assigned and Sub Due Dates must not be later than Prime Due Dates.

C. DUE DATE EXTENTION REQUEST: This Section is not a substitute for the Prime Due Date in Section B which must be agreed to between assignor/assignee prior to establishment. Required extensions, initiated by assignee, are to be requested as far in advance of the pending due date(s) as possible whenever completion date problems are identified.

1) New SUB DUE DATE of _____ Requested By _____ On _____

2) New PRIME DUE DATE of _____ Requested By _____ On _____

3) Reason why due date cannot be met _____

4) New SUB DUE DATE of _____ Approved By _____ On _____

5) New PRIME DUTE DATE of _____ Approved By _____ On _____

6) Copy of ITA forwarded to TAC Coordinator By _____

D. TASK COMPLETION: To be completed by assignee and forwarded to originator.

1) Statement of completed action _____

2) Date completed _____

3) Is a copy of completion document attached _____ Yes (ACTION IS NOT COMPLETE WITHOUT THIS)

4) Signature of Assignee _____

5) Originator is to forward original ITA and supporting documentation to TAC Coordinator.

To TACC on _____ date, By _____

Distribution: White - Originator Canary & Pink - Assignee Goldenrod - TAC Coordinator

SCE SO(123) 197 REV. 0 11/24/82

E84-185

MEMORANDUM FOR FILE

November 6, 1984

SUBJECT: Disposal of Contaminated Intake Sludge
San Onofre Nuclear Generating Station
Units 2 and 3

REFERENCE: Memo to [redacted] and [redacted] from [redacted] and [redacted], dated July 6, 1983; Subject: SONGS Unit 3 Intake Sludge

The referenced memo documents the deposition of contaminated sediments in the Unit 3 intake structure in 1983. Presently, contaminated sediments containing small concentrations of Co-60 are also being observed in the Unit 2 intake structure. The source of the contaminated sludge is postulated to be ocean bottom sediment containing very small concentrations of radioactivity from Unit 1 operation.

At the request of [redacted] of the Maintenance Department, Health Physics evaluated what the most cost-effective option was available to dispose of approximately 6,000 ft^3 of Unit 2 intake sludge. The recommended option is to pump the intake sludge into the Unit 3 discharge and handle the sludge as an effluent release. Both Station Engineering and Effluent Engineering have concurred with this suggested disposal method.

The recommended disposal sequence for potentially contaminated intake sludge is as follows:

1. The cognizant work group planning to remove sludge from either the Unit 2 or Unit 3 intake structure should contact the Health Physics Radwaste Group at PAX [redacted]

2. The Radwaste Group will collect sludge samples and coordinate with Chemistry to have an analysis performed.

3. If the analysis results indicate that no contamination is present then the Radwaste Group will complete form SO(123) 212, "Release of Liquid, Sludge or Slurry." The cognizant work group will then be notified that the sludge may be free released from SONGS.

4. If the analysis results indicate that contamination is present then the Radwaste Group will notify the cognizant work group and Effluent Engineering that the sludge should be pumped to the discharge structure and treated as an effluent release.

5. The Radwaste Group will provide sample analysis results to the Effluent Engineering Group.

6. The cognizant work group will provide to Effluent Engineering an estimate of the volume of sludge required to be removed from the intake.

7. Effluent Engineering will generate a release permit for the intake sludge.

8. The cognizant work group will obtain approval from Station Engineering and Operations to pump the sludge to the discharge prior to commencing sludge removal.

It is recommended that the disposal sequence be formalized in a Station procedure. Since the disposal method is an effluent release coming under the responsibility of Effluent Engineering, it is recommended that this disposal method be contained in a Chemistry procedure.

[redacted]

DDD:mjk

cc: [redacted]
Engineering Files
CDM Files

SONGS HP INDIVIDUAL TASK ASSIGNMENT (ITA)

A. ORIGINATOR: Complete this Section, individual assigning ITA is to complete Section B.

1) Name (Print) [redacted] 2) Enter your next ITA number E88-020

3) Describe Task Determine time to decay for U-1 Fish basket waste

4) Describe what constitutes completion Memo to file

5) List appropriate references Attached Germ reports

6) Sign and Date [redacted] 2/22/88

B. ASSIGNOR(S): Compliance wi[redacted]d by your signature or initials below.

1) All necessary documents are to be referenced and/or readily available and/or attached.

2) Prime assignor and assignee discuss this ITA and agree on Prime Due Date, assignor enters:
PRIME DUE DATE* of 3/15/88 Assigned to [redacted] By [redacted] On 2/22/88

3) Subsequent assignor and assignee discuss and agree on Sub Due Date, assignor enters:
SUB DUE DATE* of _____ Assigned to _____ By _____ On _____

4) Assignor(s) gives original ITA to assignee and forwards a copy to TAC Coordinator.

*Prime Due Dates should be at least 5 calendar days beyond the date when task first assigned and Sub Due Dates must not be later than Prime Due Dates.

C. DUE DATE EXTENTION REQUEST: This Section is not a substitute for the Prime Due Date in Section B which must be agreed to between assignor/assignee prior to establishment. Required extensions, initiated by assignee, are to be requested as far in advance of the pending due date(s) as possible whenever completion date problems are identified.

1) New SUB DUE DATE of _____ Requested By _____ On _____

2) New PRIME DUE DATE of _____ Requested By _____ On _____

3) Reason why due date cannot be met _____

4) New SUB DUE DATE of _____ Approved By _____ On _____

5) New PRIME DUTE DATE of _____ Approved By _____ On _____

6) Copy of ITA forwarded to TAC Coordinator By _____

D. TASK COMPLETION: To be completed by assignee and forwarded to originator.

1) Statement of completed action Attached memo & data

2) Date completed _____

3) Is a copy of completion document attached Yes (ACTION IS NOT COMPLETE WITHOUT THIS)

4) Signature of Assignee [redacted]

5) Originator is to forward original ITA and supporting documentation to TAC Coordinator.

To TACC on 3/10/88 date, By [redacted]

Distribution: White - Originator Canary & Pink - Assignee Goldenrod - TAC Coordinator

SCE SO(123) 197 REV. 0 11/24/82

MEMORANDUM FOR FILE

March 10, 1988

SUBJECT: Radioiodine in Fish Basket Waste

REFERENCES: 1. [redacted] to [redacted] dated May 16, 1986; Subject: Disposal of Waste Materials Accumulated at SONGS

2. ITA E88-020

Radioiodine was detected in fish basket waste from all three San Onofre Units in mid-February. The source of the iodine was steam generator secondary water, contaminated by primary to secondary leakage, which was overboarded to the outfall to resolve abnormal chemistry. The benthic waste drawn back into the intakes of each Unit had very low, but detectable, levels of I-131. The purpose of this memorandum is to document the calculations used to determine holding times for each volume of waste, and to demonstrate that the final released product had no detectable activity.

Given: A 1 liter Marinelli sample counted for the required 300 seconds (Reference) has an LLD for I-131 of 5E-8 uCi/cc. Assume I-131 half life is 8 days.

Unit 1 Fish Basket collected 2/17/88

Act_1 = 1.1 E-6 uCi/cc
Act_2 = 5.0 E-7 uCi/cc
Act_3 = 0.0 uCi/cc

For the highest concentration:

$\frac{1\ E\text{-}6}{5\ E\text{-}8}$ = 20 times 2^x = 20 times
x = 5 half-lifes

5 half-lifes = 5 x 8 = 40 days

Recommend: Hold material for 40 days, resample; if not detectable activity, release.

Units 2 and 3 Fish Baskets collected 2/22/88

Act - $U3_1$ = 2.0 E-7 uCi/cc
Act - $U3_2$ = 2.4 E-7 uCi/cc
Act - $U2_1$ = 3.0 E-7 uCi/cc
Act - $U2_2$ = 0.0 uCi/cc

For the highest concentration:

$\frac{3\ E\text{-}7}{5\ E\text{-}8}$ = 6 times 2^x = 6 times

x = 3 half-lifes

3 half-lifes x 8 days = 24 days

Recommend: Hold material for 24 days, resample, if no detectable activity, release.

Unit 1 Fish Basket collected 2/25/88

Act = 1.4 E-7 uCi/cc

Added to previous Unit 1 material

Unit 3 Fish Basket collected 3/3/88

Act_1 = 2.3 E-8 Error = 55%

Recommend: Hold for 1 half-life (till 3/11/88), resample, if not detectable, release.

Resample (release) data printouts will be attached as they are completed.

[redacted]
HP Engineer

[redacted]
0388-17

cc: [redacted]
CDM Files

[1] From: [redacted] at WEST 2/21/98 10:20AM (589 bytes: 15 ln)
To: [redacted] at AWS, [redacted]
Subject: Fish LLDs

[redacted]

The results are in. What follows are the LLDs for a 1 liter marinelli counted for 300 seconds (in uCi/cc):

I -131	----	5 E-8
Xe-133	----	2 E-7
Cs-137	----	7 E-8
Cs-134	----	8 E-8
Co- 60	----	2 E-7
Co- 58	----	7 E-8

Most all the LLDs were in the E-8 to E-7 range.

[redacted]

****
********** 18-FEB-88 09:59:23 **********
****

U-1 FISH 02 17 AH 05

SAMPLE COLLECTION START DATE: 17-FEB-88 00:00:00
SAMPLE COLLECTION END DATE : 17-FEB-88 14:30:00
SAMPLE IDENTIFICATION: 3924
TYPE OF SAMPLE : U2/3 H. P.
SAMPLE QUANTITY: 1000.000 UNITS: ML
PER CENT YIELD : 100.00000 REACTOR #: 0
SAMPLE GEOMETRY: 1L LIQ MARINELLI OPERATORS INITIALS: [redacted]
EFFICIENCY FILE NAME: EFFE .MARILE

****

ACQUIRE DATE: 18-FEB-88 09:46:52
PRESET TIME(LIVE): 300. SEC
ELAPSED REAL TIME: 300. SEC
ELAPSED LIVE TIME: 300. SEC

FWHM(1332) : 1.951
SENSITIVITY: 5.000
SHAPE PARAMETER: 10.0 %
NBR ITERATIONS: 10.

****

DETECTOR: GERME
CALIB DATE: 18-FEB-88 08:01:21
KEV/CHNL: 0.4999411
OFFSET: -0.0461368 KEV

LIBRARY: NUCL .RXLIB
ENERGY TOLERANCE: 1.500KV
HALF LIFE RATIO: 8.00
ABUNDANCE LIMIT: 75.00%

****

ENERGY WINDOW 24.95 TO 2047.71

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	63.56 KX Ru-4	12.	11.	0.61	127.22	124	7	4.05E-02	47.4	
2	0	92.37 Pb 212	17.	20.	1.30	184.85	182	9	5.69E-02	44.4	
3	0	351.59	7.	5.	0.90	703.36	699	10	2.33E-02	58.9	
4	0	364.43 I 131	108.	10.	1.31	729.05	723	20	3.60E-01	10.5	

PEAK SEARCH COMPLETED (REV 12)

NUCLIDE IDENTIFICATION SYSTEM (SONGS VER 3.0, 8/87)
SUMMARY OF NUCLIDE ACTIVITY

TOTAL LINES IN SPECTRUM	4	
LINES NOT LISTED IN LIBRARY	2	
IDENTIFIED IN SUMMARY REPORT	1	25.00%

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1-SIGMA ERROR	%ERR	%MIX
I-131	FP	8.04D	1.072	1.079E -6	1.130E -7	10.47	100.00

ACTIVITY FROM ISOTOPE GROUP= 1.079E-06 UCI /UNIT

TOTAL ACTIVITY = 1.079E-06 UCI /UNIT

TOTAL FISSION PRODUCTS / TOTAL ACTIVATION PRODUCTS "UNDIFINED"

****
********** 19-FEB-88 08:23:14 **********
****

U1 FISH 0217AH05 RAD WASTE

Reconstituted

SAMPLE COLLECTION START DATE: 17-FEB-88 14:30:00
SAMPLE COLLECTION END DATE : 17-FEB-88 14:30:00
SAMPLE IDENTIFICATION: 3892
TYPE OF SAMPLE : UZ/3 H. P.
SAMPLE QUANTITY: 1000.000 UNITS: ML
PER CENT YIELD : 100.00000 REACTOR #: 1
SAMPLE GEOMETRY: 1L LIQ MARINELLI OPERATORS INITIALS: [redacted]
EFFICIENCY FILE NAME: EFFE .MARILE

****

ACQUIRE DATE: 17-FEB-88 15:25:17		FWHM(1332) :	1.685
PRESET TIME(LIVE):	300. SEC	SENSITIVITY:	5.000
ELAPSED REAL TIME:	300. SEC	SHAPE PARAMETER:	10.0 %
ELAPSED LIVE TIME:	300. SEC	NBR ITERATIONS:	10.

****

DETECTOR: GERME		LIBRARY: NUCL .RXLIQ	
CALIB DATE:	17-FEB-88 09:24:24	ENERGY TOLERANCE:	1.500KV
KEV/CHNL:	0.4999462	HALF LIFE RATIO:	8.00
OFFSET:	0.0043561 KEV	ABUNDANCE LIMIT:	75.00%

****

ENERGY WINDOW 25.00 TO 2047.78

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	364.52	54.	0.	1.88	729.11	721	20	1.80E-01	13.6	

PEAK SEARCH COMPLETED (REV 12)

NUCLIDE IDENTIFICATION SYSTEM (SONGS VER 3.0, 8/87)
SUMMARY OF NUCLIDE ACTIVITY

TOTAL LINES IN SPECTRUM 1
LINES NOT LISTED IN LIBRARY 0
ID'F IFIED IN SUMMARY REPORT 1 100.00%

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1-SIGMA ERROR	%ERR	%MIX
I-131	FP	8.040	1.003	5.047E -7	6.867E -8	13.61	100.00

ACTIVITY FROM ISOTOPE GROUP= 5.047E-07 UCI /UNIT

TOTAL ACTIVITY = 5.047E-07 UCI /UNIT

TOTAL FISSION PRODUCTS / TOTAL ACTIVATION PRODUCTS "UNDIFINED"

R155 2-88 [redacted]

****
********** 18-FEB-88 16:23:37 **********
****

U1 FISH 3RD SAMPLE FROM BATCH 0218JB01 10 MIN COUNT

FEB 18 1988

SAMPLE COLLECTION START DATE: 18-FEB-88 16:00:00
SAMPLE COLLECTION END DATE : 18-FEB-88 16:00:00
SAMPLE IDENTIFICATION: 3949
TYPE OF SAMPLE : U2/3 H. P.
SAMPLE QUANTITY: 1000.000 UNITS: ML
PER CENT YIELD : 100.00000 REACTOR #: 1
SAMPLE GEOMETRY: 1L LIQ MARINELLI OPERATORS INITIALS [redacted]
EFFICIENCY FILE NAME: EFFE .MAR1LE

****

ACQUIRE DATE:	18-FEB-88 16:12:58	FWHM(1332) :	1.951
PRESET TIME(LIVE):	600. SEC	SENSITIVITY:	5.000
ELAPSED REAL TIME:	600. SEC	SHAPE PARAMETER:	10.0 %
ELAPSED LIVE TIME:	600. SEC	NBR ITERATIONS:	10.

****

DETECTOR:	GERME	LIBRARY:	NUCL .RXLIQ
CALIB DATE:	18-FEB-88 08:01:21	ENERGY TOLERANCE:	1.500KV
KEV/CHNL:	0.4999411	HALF LIFE RATIO:	8.00
OFFSET:	-0.0461368 KEV	ABUNDANCE LIMIT:	75.00%

****

ENERGY WINDOW 24.95 TO 2047.71

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	1460.17 K-40	14.	0.	1.37	2920.79	2912	16	2.33E-02	26.7	

PEAK SEARCH COMPLETED (REV 12)

Long count time [redacted]

NUCLIDE IDENTIFICATION SYSTEM (SONGS VER 3.0, 8/87)
SUMMARY OF NUCLIDE ACTIVITY

PAGE 1 FEB 18 1988

TOTAL LINES IN SPECTRUM	1	
LINES NOT LISTED IN LIBRARY	1	
IDENTIFIED IN SUMMARY REPORT	0	0.00%

ACTIVITY FROM ISOTOPE GROUP= 0.000E-01 UCI /UNIT

TOTAL ACTIVITY = 0.000E-01 UCI /UNIT

TOTAL FISSION PRODUCTS / TOTAL ACTIVATION PRODUCTS "UNDIFINED"

****
********** 22-FEB-88 13:08:55 **********
****

U3 FISH INTAKE 0222RH01

SAMPLE COLLECTION START DATE: 22-FEB-88 12:45:00
SAMPLE COLLECTION END DATE : 22-FEB-88 12:45:00
SAMPLE IDENTIFICATION: 0061
TYPE OF SAMPLE : U2/3 H. P.
SAMPLE QUANTITY: 1000.000 UNITS: ML
PER CENT YIELD : 100.00000 REACTOR #: 3
SAMPLE GEOMETRY: 1L LIQ MARINELLI OPERATORS INITIALS: [redacted]
EFFICIENCY FILE NAME: EFFE .MARILE

****

ACQUIRE DATE:	22-FEB-88 13:02:21	FWHM(1332) :	2.087
PRESET TIME(LIVE):	300. SEC	SENSITIVITY:	5.000
ELAPSED REAL TIME:	300. SEC	SHAPE PARAMETER:	10.0 %
ELAPSED LIVE TIME:	300. SEC	NBR ITERATIONS:	10.

****

DETECTOR:	GERME	LIBRARY:	NUCL .RXLIQ
CALIB DATE:	22-FEB-88 08:12:20	ENERGY TOLERANCE:	1.500KV
KEV/CHNL:	0.4998684	HALF LIFE RATIO:	8.00
OFFSET:	-0.0297147 KEV	ABUNDANCE LIMIT:	75.00%

****

ENERGY WINDOW 24.96 TO 2047.43

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	364.64	21.	0.	0.86	729.52	723	14	7.00E-02	21.8	

PEAK SEARCH COMPLETED (REV 12)

[redacted]
2-22-88

NUCLIDE IDENTIFICATION SYSTEM (SONGS VER 3.0, 8/87)
SUMMARY OF NUCLIDE ACTIVITY

TOTAL LINES IN SPECTRUM 1
LINES NOT LISTED IN LIBRARY 0
I' NTIFIED IN SUMMARY REPORT 1 100.00%

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1-SIGMA ERROR	%ERR	%MIX
I-131	FP	8.04D	1.001	1.959E -7	4.274E -8	21.82	100.00

ACTIVITY FROM ISOTOPE GROUP= 1.959E-07 UCI /UNIT

TOTAL ACTIVITY = 1.959E-07 UCI /UNIT

TOTAL FISSION PRODUCTS / TOTAL ACTIVATION PRODUCTS "UNDIFINED'

****
********** 22-FEB-88 10:38:20 **********
****

U-3 FISH

SAMPLE COLLECTION START DATE: 22-FEB-88 07:30:00
SAMPLE COLLECTION END DATE : 22-FEB-88 07:30:00
SAMPLE IDENTIFICATION: 56
TYPE OF SAMPLE : U2/3 H. P.
SAMPLE QUANTITY: 1000.000 UNITS: ML
PER CENT YIELD : 100.00000 REACTOR #: 3
SAMPLE GEOMETRY: 1L LIQ MARINELLI OPERATORS INITIALS: [redacted]
EFFICIENCY FILE NAME: EFFE .MARILE

****

ACQUIRE DATE: 22-FEB-88 10:11:26		FWHM(1332) :	2.037
PRESET TIME(LIVE):	300. SEC	SENSITIVITY:	5.000
ELAPSED REAL TIME:	300. SEC	SHAPE PARAMETER:	10.0 %
ELAPSED LIVE TIME:	300. SEC	NBR ITERATIONS:	10.

****

DETECTOR: GERME		LIBRARY: NUCL .RXLIB	
CALIB DATE: 22-FEB-88 08:12:20		ENERGY TOLERANCE:	1.500KV
KEV/CHNL:	0.4996684	HALF LIFE RATIO:	8.00
OFFSET:	-0.0297147 KEV	ABUNDANCE LIMIT:	75.00%

****

ENERGY WINDOW 24.96 TO 2047.43

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	364.51	26.	5.	1.12	729.27	725	9	8.50E-02	23.0	

PEAK SEARCH COMPLETED (REV 12)

NUCLIDE IDENTIFICATION SYSTEM (SONGS VER 3.0, 8/87)
SUMMARY OF NUCLIDE ACTIVITY

TOTAL LINES IN SPECTRUM 1
LINES NOT LISTED IN LIBRARY 0
IDENTIFIED IN SUMMARY REPORT 1 100.00%

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1-SIGMA ERROR	%ERR	%MIX
I-131	FP	8.04D	1.010	2.398E -7	5.524E -8	23.03	100.00

ACTIVITY FROM ISOTOPE GROUP= 2.398E-07 UCI /UNIT

TOTAL ACTIVITY = 2.398E-07 UCI /UNIT

TOTAL FISSION PRODUCTS / TOTAL ACTIVATION PRODUCTS "UNDIFINED"

```
**********************************************************************
**********          22-FEB-88 10:25:35          **********
**********************************************************************

'    2-22 JB 07:45

SAMPLE COLLECTION START DATE:   22-FEB-88 07:45:00
SAMPLE COLLECTION END DATE  :   22-FEB-88 07:45:00
SAMPLE IDENTIFICATION:   0055
TYPE OF SAMPLE :   U2/3 H. P.
SAMPLE QUANTITY:    1000.000          UNITS:   ML
PER CENT YIELD :  100.00000           REACTOR #:    2
SAMPLE GEOMETRY:   1L LIQ MARINELLI   OPERATORS INITIALS: [redacted]
EFFICIENCY FILE NAME:   EFFD   .MARILD
**********************************************************************
                                      *
ACQUIRE DATE: 22-FEB-88 10:11:12      * FWHM(1332) :          2.038
PRESET TIME(LIVE):        300.  SEC   * SENSITIVITY:          5.000
ELAPSED REAL TIME:        300.  SEC   * SHAPE PARAMETER:     10.0 %
ELAPSED LIVE TIME:        300.  SEC   * NBR ITERATIONS:      10.
                                      *
**********************************************************************
                                      *
DETECTOR: GERMD                       * LIBRARY:NUCL   .RXLIQ
CALIB DATE:   22-FEB-88 08:00:00      * ENERGY TOLERANCE:    1.500KV
KEV/CHNL:        0.4999749            * HALF LIFE RATIO:     8.00
OFFSET:          0.2243660 KEV        * ABUNDANCE LIMIT:    75.00%
                                      *
**********************************************************************

                    ENERGY WINDOW     25.22 TO  2048.12

 PK  IT   ENERGY     AREA     BKGND     FWHM CHANNEL  LEFT  PW  CTS/SEC  %ERR     FIT

  1   0    92.26      33.       14.     1.64  184.08   179  11 1.10E-01  23.6
  2   0   238.68      12.       20.     1.45  476.93   471  13 3.83E-02  61.8
  3   0   364.51      33.       10.     0.89  728.62   722  13 1.10E-01  22.0

                    PEAK SEARCH COMPLETED (REV 12)
```

NUCLIDE IDENTIFICATION SYSTEM (SONGS VER 3.0, 8/87)
SUMMARY OF NUCLIDE ACTIVITY PAGE 1

TOTAL LINES IN SPECTRUM 3
'S NOT LISTED IN LIBRARY 2
ENTIFIED IN SUMMARY REPORT 1 33.33%

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1-SIGMA ERROR	%ERR	%MIX
I-131	FP	8.04D	1.009	2.970E -7	6.531E -8	21.99	100.00

ACTIVITY FROM ISOTOPE GROUP= 2.970E-07 UCI /UNIT

TOTAL ACTIVITY = 2.970E-07 UCI /UNIT

TOTAL FISSION PRODUCTS / TOTAL ACTIVATION PRODUCTS "UNDIFINED"

****
********** 22-FEB-88 13:07:04 **********
****

'' 'ISH INTAKE 0222RH02

SAMPLE COLLECTION START DATE: 02-FEB-88 12:45:00
SAMPLE COLLECTION END DATE : 02-FEB-88 12:45:00
SAMPLE IDENTIFICATION: 0060
TYPE OF SAMPLE : U2/3 H. P.
SAMPLE QUANTITY: 1000.000 UNITS: ML
PER CENT YIELD : 100.00000 REACTOR #: 2
SAMPLE GEOMETRY: 1L LIQ MARINELLI OPERATORS INITIALS: [redacted]
EFFICIENCY FILE NAME: EFFD .MARILD

****

ACQUIRE DATE: 22-FEB-88 13:01:38		FWHM(1332) :	2.038
PRESET TIME(LIVE):	300. SEC	SENSITIVITY:	5.000
ELAPSED REAL TIME:	300. SEC	SHAPE PARAMETER:	10.0 %
ELAPSED LIVE TIME:	300. SEC	NBR ITERATIONS:	10.

****

DETECTOR: GERMD		LIBRARY: NUCL .RXLIQ	
CALIB DATE:	22-FEB-88 08:00:00	ENERGY TOLERANCE:	1.500KV
KEV/CHNL:	0.4999749	HALF LIFE RATIO:	8.00
OFFSET:	0.2243660 KEV	ABUNDANCE LIMIT:	75.00%

****

ENERGY WINDOW 25.22 TO 2048.12

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	FW	CTS/SEC	%ERR	FIT

PEAK SEARCH COMPLETED (REV 12)

[redacted]
2-22-88

NUCLIDE IDENTIFICATION SYSTEM (SONGS VER 3.0, 8/87)
SUMMARY OF NUCLIDE ACTIVITY

TOTAL LINES IN SPECTRUM	0	
.S NOT LISTED IN LIBRARY	0	
..ENTIFIED IN SUMMARY REPORT	0	0.00%

ACTIVITY FROM ISOTOPE GROUP= 0.000E-01 UCI /UNIT

TOTAL ACTIVITY = 0.000E-01 UCI /UNIT

TOTAL FISSION PRODUCTS / TOTAL ACTIVATION PRODUCTS "UNDIFINED"

****
********** 25-FEB-88 14:33:45 **********
****

[redacted]

RLSS 2/88

' ISH 0225AH17

SAMPLE COLLECTION START DATE: 25-FEB-88 14:00:00
SAMPLE COLLECTION END DATE : 25-FEB-88 14:00:00
SAMPLE IDENTIFICATION: 0241
TYPE OF SAMPLE : U2/3 H. P.
SAMPLE QUANTITY: 1000.000 UNITS: ML
PER CENT YIELD : 100.00000 REACTOR #: 1
SAMPLE GEOMETRY: 1L LIQ MARINELLI OPERATORS INITIALS: [redacted]
EFFICIENCY FILE NAME: EFFD .MAR1LD

ACQUIRE DATE:	25-FEB-88 14:26:58	FWHM(1332) :	1.929
PRESET TIME(LIVE):	300. SEC	SENSITIVITY:	5.000
ELAPSED REAL TIME:	300. SEC	SHAPE PARAMETER:	10.0 %
ELAPSED LIVE TIME:	300. SEC	NBR ITERATIONS:	10.

DETECTOR:	GERMD	LIBRARY:	NUCL .RXLIQ
CALIB DATE:	25-FEB-88 08:23:41	ENERGY TOLERANCE:	1.500KV
KEV/CHNL:	0.5001084	HALF LIFE RATIO:	8.00
OFFSET:	0.0628753 KEV	ABUNDANCE LIMIT:	75.00%

ENERGY WINDOW 25.07 TO 2048.51

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	364.79	15.	5.	1.14	729.29	723	18	5.07E-02	32.3	

I-131

PEAK SEARCH COMPLETED (REV 12)

2-26-88
FISH sample
Basket added to
U-1 Fish in LOT 1
FORWARD TO [redacted]

NUCLIDE IDENTIFICATION SYSTEM (SONGS VER 3.0, 8/87)
SUMMARY OF NUCLIDE ACTIVITY

RLSS 2/88

TOTAL LINES IN SPECTRUM 1
.S NOT LISTED IN LIBRARY 0
. ENTIFIED IN SUMMARY REPORT 1 100.00%

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1-SIGMA ERROR	%ERR	%MIX
I-131	FP	8.04D	1.002	1.364E -7	4.411E -8	32.33	100.00

ACTIVITY FROM ISOTOPE GROUP= 1.364E-07 UCI /UNIT

TOTAL ACTIVITY = 1.364E-07 UCI /UNIT

TOTAL FISSION PRODUCTS / TOTAL ACTIVATION PRODUCTS "UNDIFINED"

MINIMUM DETECTABLE ACTIVITY REPORT (SONGS REV 2 12/86)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

NUCLIDE	BKG	ENERGY	MINIMUM UCI /UNIT
NA-24	0.	1368.55	0.0000E-01
AR-41	0.	1293.64	0.0000E-01
CR-51	3.	320.08	5.3287E-07
MN-54	2.	834.83	1.2505E-07
MN-56	0.	1810.72	0.0000E-01
CO-57	6.	122.06	4.7523E-08
CO-58	1.	810.75	7.0678E-08
FE-59	0.	1291.56	0.0000E-01
CO-60	1.	1332.46	1.1109E-07
CU-64	1.	1345.93	2.3505E-05
ZN-65	1.	1115.52	1.8583E-07
BR-84	2.	881.50	4.8108E-07
KR-85	5.	513.99	2.4040E-05
KR-85M	3.	151.18	4.3006E-08
KR-87	1.	402.58	9.7643E-08
KR-88	2.	196.32	1.2385E-07
RB-88	1.	898.03	1.6876E-06
RB-89	2.	1031.88	7.9224E-07
SR-91	1.	1024.30	2.7721E-07
Y-91M	0.	557.57	0.0000E-01
SR-92	0.	1383.95	0.0000E-01
Y-92	1.	934.50	6.3351E-07
Y- 3	1.	267.05	4.1592E-07
95	0.	765.79	0.0000E-01
-95M	3.	235.69	1.6112E-07
ZR-95	1.	756.72	1.1926E-07
NB-97	2.	657.92	1.1066E-07
ZR-97	0.	743.40	0.0000E-01
MO-99	1.	739.47	4.9922E-07
TC-99M	2.	140.51	2.8376E-08
RU-103	3.	497.08	8.9894E-08
RU-106	2.	621.84	7.9048E-07
AG-110M	2.	657.75	8.6540E-08
SB-124	1.	602.71	5.4669E-08
XE-131M	2.	163.93	1.2975E-06
I-132	1.	667.70	6.9048E-08
I-133	1.	529.89	5.5351E-08
XE-133	5.	81.00	1.2980E-07
XE-133M	2.	233.18	3.1722E-07
CS-134	1.	795.80	8.0854E-08
I-134	1.	884.08	1.7002E-07
I-135	0.	1260.41	0.0000E-01
XE-135	5.	249.79	6.2717E-08
CS-136	1.	1048.10	1.1072E-07
CS-137	4.	661.64	1.3698E-07
XE-138	3.	258.31	5.8416E-07
CS-138	0.	1435.87	0.0000E-01
BA-139	3.	165.85	2.1401E-07
P .40	0.	537.25	0.0000E-01
L 140	0.	1596.40	0.0000E-01

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

_IDE	BKG	ENERGY	MINIMUM UCI /UNIT
CE-141	3.	145.44	6.1243E-08
LA-142	2.	641.17	1.8883E-07
CE-143	2.	293.26	9.4055E-08
CE-144	2.	133.53	2.1908E-07
W-187	2.	479.53	2.6587E-07
NP-239	3.	106.13	1.3124E-07

****

********** 03-MAR-88 10:02:11 **********

****

UP "ISH 0303AH03

[redacted]

RLSS 3/88

SAMPLE COLLECTION START DATE: 03-MAR-88 08:50:00
SAMPLE COLLECTION END DATE : 03-MAR-88 08:50:00
SAMPLE IDENTIFICATION: 0476
TYPE OF SAMPLE : U2/3 H. P.
SAMPLE QUANTITY: 1000.000 UNITS: ML
PER CENT YIELD : 100.00000 REACTOR #: 3
SAMPLE GEOMETRY: 1L LIQ MARINELLI OPERATORS INITIALS: [redacted]
EFFICIENCY FILE NAME: EFFD .MAR1LD

SUB-STANDARD QUALITY
BEST AVAILABLE COPY

MAR 0 3 1988

****

ACQUIRE DATE: 03-MAR-88 09:45:03	FWHM(1332) : 2.111
PRESET TIME(LIVE): 1000. SEC	SENSITIVITY: 5.000
ELAPSED REAL TIME: 1000. SEC	SHAPE PARAMETER: 10.0 %
ELAPSED LIVE TIME: 1000. SEC	NBR ITERATIONS: 10.

****

DETECTOR: GERMD	LIBRARY: NUCL .RXLIQ
CALIB DATE: 03-MAR-88 08:38:30	ENERGY TOLERANCE: 1.500KV
KEV/CHNL: 0.5000224	HALF LIFE RATIO: 0.00
OFFSET: 0.1075773 KEV	ABUNDANCE LIMIT: 75.00%

****

ENERGY WINDOW 25.11 TO 2048.20

PK	IT	ENERGY		AREA	BKGND	FWHM	CHANNEL	LEFT	FW	CTS/SEC	%ERR	FIT
1	0	92.11	TH234	18.	52.	0.77	184.00	176	16	1.88E-02	60.4	
2	0	186.39	TH234	21.	7.	3.12	372.56	368	14	2.13E-02	27.9	
3	0	364.49	I131	9.	7.	0.66	728.73	719	14	8.57E-03	55.4	
4	0	1461.22	K40	45.	0.	2.79	2922.09	2913	17	4.50E-02	14.9	

PEAK SEARCH COMPLETED (REV 12)

22-MAR-88 11:59:12

2/3

U/2 FISH THAT HAS BEEN STORED IN LOT 1 0322AH06

RLSS 3/88 [redacted]

SA .E COLLECTION START DATE: 22-MAR-88 10:50:00
SAMPLE COLLECTION END DATE : 22-MAR-88 10:50:00
SAMPLE IDENTIFICATION: 1304
TYPE OF SAMPLE : U2/3 H. P.
SAMPLE QUANTITY: 1000.000 UNITS: ML
PER CENT YIELD : 100.00000 REACTOR #: 1
SAMPLE GEOMETRY: 1L LIQ MARINELLI OPERATORS INITIALS: [redacted]
EFFICIENCY FILE NAME: EFFE .MARILE

ACQUIRE DATE:	22-MAR-88 11:48:01	FWHM(1332) :	2.042
PRESET TIME(LIVE):	300. SEC	SENSITIVITY:	5.000
ELAPSED REAL TIME:	300. SEC	SHAPE PARAMETER:	10.0 %
ELAPSED LIVE TIME:	300. SEC	NBR ITERATIONS:	10.

DETECTOR: GERME		LIBRARY: NUCL .RXLIB	
CALIB DATE:	22-MAR-88 08:23:08	ENERGY TOLERANCE:	1.500KV
KEV/CHNL:	0.4999461	HALF LIFE RATIO:	8.00
OFFSET:	-0.0575419 KEV	ABUNDANCE LIMIT:	75.00%

ENERGY WINDOW 24.94 TO 2047.72

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT

PEAK SEARCH COMPLETED (REV 12)

[redacted]

[redacted]

3-22-88

This is todays sample
Result from (U-2/3 Fish)
Basket in Parking lot
one, Could you please send
[redacted] (RMC SUP 5) Your [redacted]
E-mail Thax — [redacted]

NUCLIDE IDENTIFICATION SYSTEM (SONGS VER 3.0, 8/87)
SUMMARY OF NUCLIDE ACTIVITY

RLSS 3/88 [redacted]

TOTAL LINES IN SPECTRUM	4	
ES NOT LISTED IN LIBRARY	3	
NTIFIED IN SUMMARY REPORT	1	25.00%

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1-SIGMA ERROR	%ERR	%MIX
I-131	FP	8.04D	1.004	2.308E -8	1.279E -8	55.43	100.00

ACTIVITY FROM ISOTOPE GROUP= 2.308E-08 UCI /UNIT

TOTAL ACTIVITY = 2.308E-08 UCI /UNIT

TOTAL FISSION PRODUCTS / TOTAL ACTIVATION PRODUCTS "UNDIFINED"

10-MAR-88 15:12.19

L3 FISH 0310AH05

S. LE COLLECTION START DATE: 10-MAR-88 14:30:00
SAMPLE COLLECTION END DATE 10-MAR-88 14:30:00
SAMPLE IDENTIFICATION: 0799
TYPE OF SAMPLE : U2/3 H. P.
SAMPLE QUANTITY: 1000.000 UNITS: ML
PER CENT YIELD : 100.00000 REACTOR #: 3
SAMPLE GEOMETRY: 1L LIQ MARINELLI OPERATORS INITIALS: [redacted]
EFFICIENCY FILE NAME: EFFD .MARILD

ACQUIRE DATE: 10-MAR-88 15:06:19
PRESET TIME(LIVE): 300. SEC
ELAPSED REAL TIME: 300. SEC
ELAPSED LIVE TIME: 300. SEC

* FWHM(1332) : 2.095
* SENSITIVITY: 5.000
* SHAPE PARAMETER: 10.0 %
* NBR ITERATIONS: 10.

DETECTOR: GERMD
CALIB DATE: 10-MAR-88 08:50:04
KEV/CHNL: 0.5000705
OFFSET: 0.0863518 KEV

* LIBRARY: NUCL .RXLIQ
* ENERGY TOLERANCE: 1.500KV
* HALF LIFE RATIO: 8.00
* ABUNDANCE LIMIT: 75.00%

ENERGY WINDOW 25.09 TO 2048.38

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	FW	CTS/SEC	%ERR	FIT
1	0	92.50 Bi214	31.	46.	1.26	184.80	178	37	1.05E-01	35.5	
2	0	351.86 Pb214	9.	0.	1.19	703.44	698	28	3.00E-02	33.3	
3	0	1461.38 K-40	11.	0.	1.50	2922.18	2918	10	3.67E-02	30.2	

PEAK SEARCH COMPLETED (REV 12)

Release sample

NUCLIDE IDENTIFICATION SYSTEM (SONGS VER 3.0, 8/87)
SUMMARY OF NUCLIDE ACTIVITY

TOTAL LINES IN SPECTRUM	3	
LINES NOT LISTED IN LIBRARY	2	
ITIFIED IN SUMMARY REPORT	0	0.00%

ACTIVITY FROM ISOTOPE GROUP= 0.000E-01 UCI /UNIT

TOTAL ACTIVITY = 0.000E-01 UCI /UNIT

TOTAL FISSION PRODUCTS / TOTAL ACTIVATION PRODUCTS "UNDIFINED"

NUCLIDE IDENTIFICATION SYSTEM (SONGS VER 3.0, 8/87)
UNKNOWN LINE REPORT

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	FW	CTS/SEC	%ERR	EFF
	0	92.50	31.	46.	1.24	184.80	178	37	1.05E-01	35.5	2.25E-02
J	0	1461.38	11.	0.	1.50	2922.18	2918	10	3.67E-02	30.2	3.47E-03

LINES NOT MEETING SUMMARY CRITERIA

NONE

[redacted] at WEST3 3/14/08 11:39AM (698 bytes; 13 ln)
To: [redacted] at WEST
Subject: More Fish

Message Contents

[redacted]

Tried to contact you before RMC staff meeting at 1200 but was unable. Apparently, Sat 3/12 Unit 3 Fish showed Xe-133 at 1.20IE-7 uCi/cc (5.20 T1/2). This basket is now full and requires removal. What is the disposition of this material? How long till resampling?

Please contact [redacted] (sampling technician) so she can make appropriate arrangements. Sorry for the inconvenience.

[redacted]

********** 12-MAR-88 14:53:23 **********

03-12-AH-04, U-2 FISH

Prelim [redacted]
3/88
RLSS

SAMPLE COLLECTION START DATE: 12-MAR-88 14:10:00
SAMPLE COLLECTION END DATE 12-MAR-88 14:10:00
SAMPLE IDENTIFICATION: 0800
TYPE OF SAMPLE . U2/3 H. P.
SAMPLE QUANTITY: 1000.000 UNITS: ML
PER CENT YIELD 100.00000 REACTOR # 0
SAMPLE GEOMETRY: ISOTOPIC OPERATORS INITIALS: [redacted]
EFFICIENCY FILE NAME: EFFE .MARILE

****

ACQUIRE DATE:	12-MAR-88 14:47:58	FWHM(1332)	1.902
PRESET TIME(LIVE):	300. SEC	SENSITIVITY:	5.000
ELAPSED REAL TIME:	300. SEC	SHAPE PARAMETER.	10.0 %
ELAPSED LIVE TIME:	300. SEC	NBR ITERATIONS:	10.

****

DETECTOR:	GERME	LIBRARY NUCL	.RXL10
CALIB DATE:	12-MAR-88 08:22:35	ENERGY TOLERANCE:	1.500KV
KEV/CHNL:	0.5000556	HALF LIFE RATIO	8.00
OFFSET:	-0.0205877 KEV	ABUNDANCE LIMIT:	75.00%

****

ENERGY WINDOW 24.98 TO 2048.21

PK	IT	ENERGY		AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	80.99		6.	0.	0.75	162.00	159	8	2.00E-02	40.8	
2	0	1460.38	K40	17.	0.	1.94	2920.47	2915	11	5.67E-02	24.3	

PEAK SEARCH COMPLETED (REV 12)

Saturday 3/12 sample

NUCLIDE IDENTIFICATION SYSTEM (SONGS VER 3.0. 8/87)
SUMMARY OF NUCLIDE ACTIVITY

TOTAL LINES IN SPECTRUM	2	
LINES NOT LISTED IN LIBRARY	1	
IDENTIFIED IN SUMMARY REPORT	1	50.00%

RLSS 3/88

MAR 1 4 1988

FISSION GAS

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1-SIGMA ERROR	%ERR	%MIX
XE-133	FG	5.25D	1.004	1.001E-7	4.086E-8	40.82	100.00

ACTIVITY FROM ISOTOPE GROUP= 1.001E-07 UCI /UNIT

TOTAL ACTIVITY = 1.001E-07 UCI /UNIT

TOTAL FISSION PRODUCTS / TOTAL ACTIVATION PRODUCTS UNDEFINED

********** 14-MAR-88 09:41:03 **********

M

RLSS 3/88 [redacted]

MAR 14 1988

SUB-STANDARD QUALITY
BEST AVAILABLE COPY

FISH 0314AH01

SAMPLE COLLECTION START DATE: 14-MAR-88 08:55.00
SAMPLE COLLECTION END DATE 14-MAR-88 08:55:00
SAMPLE IDENTIFICATION: 0695
TYPE OF SAMPLE : U2/3 H. P.
SAMPLE QUANTITY: 1000.000 UNITS: ML
PER CENT YIELD : 100.00000 REACTOR #: 2
SAMPLE GEOMETRY: 1L LIQ MARINELLI OPERATORS INITIALS: [redacted]
EFFICIENCY FILE NAME: EFFD .MARILD

ACQUIRE DATE. 14-MAR-88 09:35:37	* FWHM(1332) : 2.082
PRESET TIME(LIVE): 300. SEC	* SENSITIVITY: 5.000
ELAPSED REAL TIME: 300. SEC	* SHAPE PARAMETER: 10.0 %
ELAPSED LIVE TIME: 300. SEC	* NBR ITERATIONS: 10.
DETECTOR: GERMD	* LIBRARY: NUCL .RXLIQ
CALIB DATE: 14-MAR-88 08:52:15	* ENERGY TOLERANCE: 1.500KV
KEV/CHNL: 0.4997939	* HALF LIFE RATIO: 8.00
OFFSET: 0.1732877 KEV	* ABUNDANCE LIMIT: 75.00%

ENERGY WINDOW 25.16 TO 2047.33

PK	IT	ENERGY		AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	295.12	Bi-214	14.	3.	1.39	590.14	582	13	4.67E-02	32.3	
2	0	352.00	Pb-214	18.	3.	1.55	703.94	698	11	6.04E-02	26.8	
3	0	1460.88	K-40	21.	0.	0.73	2922.62	2916	12	7.00E-02	21.8	

PEAK SEARCH COMPLETED (REV 12)

Monday 3/14 Sample

NUCLIDE IDENTIFICATION SYSTEM (SONGS VER 3.0, 6/87)
SUMMARY OF NUCLIDE ACTIVITY

TOTAL LINES IN SPECTRUM	3	
LINES NOT LISTED IN LIBRARY	3	
IDENTIFIED IN SUMMARY REPORT	0	0.00%

RLSS 3/88 [redacted]

MAR 14 1988

ACTIVITY FROM ISOTOPE GROUP= 0.000E-01 uCi /UNIT

TOTAL ACTIVITY = 0.000E-01 UCI /UNIT

TOTAL FISSION PRODUCTS / TOTAL ACTIVATION PRODUCTS "UNDIFINED"

[5] From: [redacted] at WEST 3/23/88 5:08PM (525 bytes: 6 ln)
To: RMC SUP 5 at AWS
cc: [redacted]
Subject: Unit 2/3 Fish Basket Waste - 2/22/88
---------- Message Contents ----------

The Unit 2/3 fish basket waste that was collected 2/22/88 has now decayed to levels below LLD. This is based on the sample dated 3/22/88, sample id 1304. The waste may now be released to a landfill, based on radiological characterization.

[redacted]

NUCLIDE IDENTIFICATION SYSTEM (SONGS VER 3.0, 8/87)
SUMMARY OF NUCLIDE ACTIVITY

RLSS 3/88 [redacted]

TOTAL LINES IN SPECTRUM	0	
LINES NOT LISTED IN LIBRARY	0	
IDENTIFIED IN SUMMARY REPORT	0	0.00%

ACTIVITY FROM ISOTOPE GROUP= 0.000E-01 UCI /UNIT

TOTAL ACTIVITY = 0.000E-01 UCI /UNIT

TOTAL FISSION PRODUCTS / TOTAL ACTIVATION PRODUCTS "UNDIFINED"

********** 31-MAR-88 13:27:36 **********

03-31-AH-03, LOT 1 FISH from U-1

SAMPLE COLLECTION START DATE: 31-MAR-88 12.00.00
SAMPLE COLLECTION END DATE : 31-MAR-88 12:00:00
SAMPLE IDENTIFICATION. 1914
TYPE OF SAMPLE : U2/3 H. P.
SAMPLE QUANTITY: 1000.000 UNITS ML.
PER CENT YIELD : 100.00000 REACTOR #: 0
SAMPLE GEOMETRY: ISOTOPIC OPERATORS INITIALS: [redacted]
EFFICIENCY FILE NAME: EFFE .MARILE

ACQUIRE DATE:	31-MAR-88 13:22.12	FWHM(1332)	1.971
PRESET TIME(LIVE):	300. SEC	SENSITIVITY:	5.000
ELAPSED REAL TIME:	300. SEC	SHAPE PARAMETER	10.0 %
ELAPSED LIVE TIME:	300. SEC	NBR ITERATIONS:	10.

DETECTOR:	GERME	LIBRARY NUCL	.RXLIB
CALIB DATE:	31-MAR-88 08:43:34	ENERGY TOLERANCE:	1.500KV
KEV/CHNL:	0.4999501	HALF LIFE RATIO	8.00
OFFSET:	-0.0148477 KEV	ABUNDANCE LIMIT:	75.00%

ENERGY WINDOW 24.98 TO 2047.78

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	FW	CTS/SEC	%ERR	FIT

PEAK SEARCH COMPLETED (REV 12)

U1 Fish waste collected 2/17/88

Released 3/31/88

NUCLIDE IDENTIFICATION SYSTEM (SONGS VER 3.0. 8/87)
SUMMARY OF NUCLIDE ACTIVITY

TOTAL LINES IN SPECTRUM	0	
LINES NOT LISTED IN LIBRARY	0	
IDENTIFIED IN SUMMARY REPORT	0	0.00%

ACTIVITY FROM ISOTOPE GROUP= 0.000E-01 UCI /UNIT

TOTAL ACTIVITY = 0.000E-01 UCI /UNIT

TOTAL FISSION PRODUCTS / TOTAL ACTIVATION PRODUCTS "UNDEFINED"

[6] From: [redacted] at WEST 3/23/88 5:11PM (472 bytes: 5 ln)
To: RMC SUP 5 at AWS, [redacted] at AWS
cc: [redacted]
Subject: Unit 3 fish basket waste - 3/18/88
---------- Message Contents ----------

The Unit 3 fish basket waste collected 3/18/88 with low levels of I-131, samples 1221, 1061, 1294, will need to be held for about two half lives, or 16 days.

Written memo to follow.

[redacted]

****
********** 21-MAR-88 10:01:55 **********
****

U3 FISH 0321AH02

SAMPLE COLLECTION START DATE: 21-MAR-88 08:50:00
SAMPLE COLLECTION END DATE : 21-MAR-88 08:50:00
SAMPLE IDENTIFICATION: 1221
TYPE OF SAMPLE : U2/3 H. P.
SAMPLE QUANTITY: 1000.000 UNITS: ML
PER CENT YIELD : 100.00000 REACTOR #: 0
SAMPLE GEOMETRY: 1L LIQ MARINELLI OPERATORS INITIALS: [redacted]
EFFICIENCY FILE NAME: EFFE .MAR1LE

****

ACQUIRE DATE:	21-MAR-88 09:55:29	* FWHM(1332) :	1.963
PRESET TIME(LIVE):	300. SEC	* SENSITIVITY:	5.000
ELAPSED REAL TIME:	300. SEC	* SHAPE PARAMETER:	10.0 %
ELAPSED LIVE TIME:	300. SEC	* NBR ITERATIONS:	10.

****

DETECTOR:	GERME	* LIBRARY.NUCL	.RXLIQ
CALIB DATE:	21-MAR-88 08:11:49	* ENERGY TOLERANCE:	1.500KV
KEV/CHNL:	0.4999615	* HALF LIFE RATIO:	8.00
OFFSET:	-0.0866108 KEV	* ABUNDANCE LIMIT:	75.00%

****

ENERGY WINDOW 24.96 TO 2047.81

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	9	92.01	14.	4.	0.88	184.10	181	9	4.65E-02	33.4	2.99E 00
2	9	93.41	8.	4.	0.88	186.90	181	9	2.72E-02	48.0	
3	0	364.48	22.	8.	0.74	729.09	723	11	7.20E-02	28.6	

PEAK SEARCH COMPLETED (REV 12)

These samples were taken out of U. 3 dumpsters only

NUCLIDE IDENTIFICATION SYSTEM (GUNGS VER 3.0) 6/83/7
SUMMARY OF NUCLIDE ACTIVITY

TOTAL LINES IN SPECTRUM 3
LINES NOT LISTED IN LIBRARY 2
IDENTIFIED IN SUMMARY REPORT 1 33.33%

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1-SIGMA ERROR	%ERR	%MIX
-131	FP	8.04D	1.004	2.021E -7	5.772E -8	28.56	100.00

ACTIVITY FROM ISOTOPE GROUP= 2.021E-07 UCI /UNIT

TOTAL ACTIVITY = 2.021E-07 UCI /UNIT

TOTAL FISSION PRODUCTS / TOTAL ACTIVATION PRODUCTS "UNDIFINED"

NUCLIDE IDENTIFICATION SYSTEM (SONGS VER 3.0, 8/87)
UNKNOWN LINE REPORT

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	EFF
	?	92.01 Pb 214	14.	4.	0.88	184.10	181	9	4.65E-02	33.4	1.77E-02
*	?	93.41 Bi 214	8.	4.	0.88	186.90	181	9	2.72E-02	48.0	1.81E-02

LINES NOT MEETING SUMMARY CRITERIA

NONE

********** 18-MAR-88 08:41:48 **********

[redacted]

U3 FISH 0318AH02

Prelim

SAMPLE COLLECTION START DATE: 18-MAR-88 07:30:00
SAMPLE COLLECTION END DATE : 18-MAR-88 07:30:00
SAMPLE IDENTIFICATION: 1061
TYPE OF SAMPLE : U2/3 H. P.
SAMPLE QUANTITY: 1000.000 UNITS: ML
PER CENT YIELD : 100.00000 REACTOR #: 3
SAMPLE GEOMETRY: 1L LIQ MARINELLI OPERATORS INITIALS [redacted]
EFFICIENCY FILE NAME: EFFE .MARILE

ACQUIRE DATE: 18-MAR-88 08:36:18	FWHM(1332) : 1.869
PRESET TIME(LIVE): 300. SEC	SENSITIVITY: 5.000
ELAPSED REAL TIME: 300. SEC	SHAPE PARAMETER 10.0 %
ELAPSED LIVE TIME: 300. SEC	NBR ITERATIONS: 10.

DETECTOR: GERME	LIBRARY: NUCL .RXLIQ
CALIB DATE: 18-MAR-88 08:10:50	ENERGY TOLERANCE: 1.500KV
KEV/CHNL: 0.4999856	HALF LIFE RATIO. 8.00
OFFSET: -0.0374468 KEV	ABUNDANCE LIMIT: 75.00%

ENERGY WINDOW 24.96 TO 2047.90

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	92.28	7.	5.	0.96	184.64	177	20	2.47E-02	56.4	
2	0	364.48	18.	0.	1.03	729.06	724	11	6.00E-02	23.6	

PEAK SEARCH COMPLETED (REV 12)

TOTAL LINES IN SPECTRUM	2	
LINES NOT LISTED IN LIBRARY	1	
IDENTIFIED IN SUMMARY REPORT	1	50.00%

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1-SIGMA ERROR	%ERR	%MIX
I-131	FP	8.04D	1.004	1.683E -7	3.967E -8	23.57	100.00

ACTIVITY FROM ISOTOPE GROUP= 1.683E-07 UCI /UNIT

TOTAL ACTIVITY = 1.683E-07 UCI /UNIT

TOTAL FISSION PRODUCTS / TOTAL ACTIVATION PRODUCTS "UNDIFINED"

********** 22-MAR-88 09:47:51 **********

[redacted]

JNIT 3 FISH SAMPLE/0322AH05

SA : COLLECTION START DATE: 22-MAR-88 09:30:00
SAMPLE COLLECTION END DATE : 22-MAR-88 09:30:00
SAMPLE IDENTIFICATION: 1294
TYPE OF SAMPLE : U2/3 H. P.
SAMPLE QUANTITY: 1000.000 UNITS: ML
ER CENT YIELD : 100.00000 REACTOR #: 3
SAMPLE GEOMETRY: 1L LIQ MARINELLI OPERATORS INITIALS: [redacted]
IFFICIENCY FILE NAME: EFFD .MAR1LD

CQUIRE DATE: 22-MAR-88 09:42:27	* FWHM(1332) : 1.925
RESET TIME(LIVE): 300. SEC	* SENSITIVITY: 5.000
LAPSED REAL TIME: 300. SEC	* SHAPE PARAMETER: 10.0 %
LAPSED LIVE TIME: 300. SEC	* NBR ITERATIONS: 10.
ETECTOR: GERMD	* LIBRARY: NUCL .RXLIQ
ALIB DATE: 22-MAR-88 08:34:17	* ENERGY TOLERANCE: 1.500KV
EV/CHNL: 0.4998750	* HALF LIFE RATIO: 8.00
FFSET: 0.2049477 KEV	* ABUNDANCE LIMIT: 75.00%

[redacted]

PK	IT	ENERGY	%ERR	FIT
1	0	364.36	35.4	

This sample was taken this morning Right out of the basket that is dumped into the Fish dumpster

)TAL LINES IN SPECTRUM 1
:NES NOT LISTED IN LIBRARY 0
)E"'"FIED IN SUMMARY REPORT 1 100.00%

SSION PRODUCT

ICLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1-SIGMA ERROR	%ERR	%MIX
·131	FP	8.04D	1.001	7.156E -8	2.530E -8	35.36	100.00

)CTIVITY FROM ISOTOPE GROUP= 7.157E-08 UCI /UNIT

TOTAL ACTIVITY = 7.157E-08 UCI /UNIT

TOTAL FISSION PRODUCTS / TOTAL ACTIVATION PRODUCTS "UNDIFINED"

MEMORANDUM FOR FILE

April 5, 1988

SUBJECT: Radioiodine in Fish Basket Waste, Part 2

REFERENCES: 1. [redacted] to [redacted] dated May 16, 1986; Subject: Disposal of Waste Materials Accumulated at SONGS

2. ITA E88-020

Radioiodine was detected in fish basket waste from San Onofre Unit 3 in mid-March. The source of the iodine was Unit 2 steam generator secondary water, contaminated by primary to secondary leakage, which was overboarded to the outfall to resolve abnormal chemistry. The benthic waste drawn back into the intakes of each Unit had very low, but detectable, levels of I-131. The purpose of this memorandum is to document the calculations used to determine holding times for the waste, and to demonstrate that the final released product had no detectable activity.

Given: A 1 liter Marinelli sample counted for the required 300 seconds (Reference) has an LLD for I-131 of 5E-8 uCi/cc. Assume I-131 half life is 8 days.

Unit 3 Fish Basket collected 3/18/88

Act_1 = 2.0 E-6 uCi/cc
Act_2 = 1.7 E-7 uCi/cc
Act_3 = 7.2 E-8 uCi/cc

For the highest concentration:

$\frac{2\text{ E-7}}{5\text{ E-8}} = 4$ times $2^x = 4$ times
$x = 2$ half-lifes

2 half-lifes = 2 x 8 = 16 days

Recommend: Hold material for 16 days, resample; if not detectable activity, release.

Resample (release) data printouts will be attached as they are completed.

[redacted]
(Acting) HP Engineering Supervisor

[redacted]
0388-29

cc: [redacted]
CDM Files

06-APR-88 10:43:05

APR 0 6 1988

[redacted]
RLSS 4/88

SUB-STANDARD QUALITY
BEST AVAILABLE COPY

I.D.: FISH 0406AH01
from U-3

SAMPLE COLLECTION START DATE: 06-APR-88 08:00:00
SAMPLE COLLECTION END DATE : 06-APR-88 09:00:00
SAMPLE IDENTIFICATION: 2124
TYPE OF SAMPLE : U2/3 H. P.
SAMPLE QUANTITY: 1000.000 UNITS: [redacted]
PER CENT YIELD : 100.00000 REACTOR #: 3
SAMPLE GEOMETRY: 1L LIQ MARINELLI OPERATORS INITIALS [redacted]
EFFICIENCY FILE NAME: EFFE .MARILE

ACQUIRE DATE: 06-APR-88 10:37:39
PRESET TIME(LIVE): 300. SEC
ELAPSED REAL TIME: 300. SEC
ELAPSED LIVE TIME: 300. SEC

FWHM(1332) : 1.865
SENSITIVITY: 5.000
SHAPE PARAMETER: 10.0 %
NBR ITERATIONS: 10.

DETECTOR: GERME
CALIB DATE: 06-APR-88 08:22:45
KEV/CHNL: 0.4999458
OFFSET: -0.1408322 KEV

LIBRARY: NUCL .RXL1Q
ENERGY TOLERANCE: 1.500KV
HALF LIFE RATIO 8.00
ABUNDANCE LIMIT: 75.00%

ENERGY WINDOW 24.86 TO 2047.64

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	351.83 Pb-214	11.	6.	0.92	704.02	699	11	3.50E-02	44.2	
2	0	1460.16 K-40	12.	0.	1.56	2920.92	2916	11	4.00E-02	28.9	

PEAK SEARCH COMPLETED (REV 12)

NUCLIDE IDENTIFICATION SYSTEM (SONGS VER 3.0, 8/87)
SUMMARY OF NUCLIDE ACTIVITY

TOTAL LINES IN SPECTRUM	2	
LINES NOT LISTED IN LIBRARY	1	
TIFIED IN SUMMARY REPORT	0	0.00%

ACTIVITY FROM ISOTOPE GROUP= 0.000E-01 UCI /UNIT

TOTAL ACTIVITY = 0.000E-01 UCI /UNIT

TOTAL FISSION PRODUCTS / TOTAL ACTIVATION PRODUCTS "UNDIFINED"

April 5, 1988

[redacted]

SUBJECT: Contaminated Intake Structure Waste

During the past two months, several hundred cubic feet of radioactively contaminated marine debris have been collected at all three SONGS Units. The source of the contamination is apparently steam generator secondary water which was contaminated by primary to secondary leakage, and then overboarded to allow refilling the generators in order to achieve proper chemistry. The radioiodine is taken up by marine life offshore and subsequently deposited in fish baskets. The presence of the radioiodine means that we cannot release the material to a landfill, but must hold it until the radioiodine decays to levels below the lower limit of detection.

The purpose of this memorandum is to request the Operations add a note in the appropriate procedures (steam generator draining perhaps) to clean the rakes and screens, and change the fish baskets and dumpsters in advance of overboarding steam generator secondary water after tube leakage. This should minimize the level of contamination and may provide enough time for decay before the material is sampled for release. We understand there is no practical means to process the water, nor sufficient tank capacity to hold it for decay. The benefits to be realized are:

1) reduction (or elimination) of dumpsters being held with marine debris; these dumpsters held in Parking Lot 1 are a health hazard as the material biologically decays, and

2) minimization of the expense to Housekeeping for holding multiple dumpsters which are awaiting radioactive decay.

Please contact me if I can provide any further information of if you have an alternative approach to the problem.

[redacted]
(Acting) H.P. Engineering Supervisor

[redacted]
0388-30

cc: [redacted]

ITA E88-020

#280

SONGS HP INDIVIDUAL TASK ASSIGNMENT (ITA)

A. ORIGINATOR: Complete this Section, individual assigning ITA is to complete Section B.

1) Name (Print) [redacted] 2) Enter your next ITA number EBB-45

3) Describe Task INVESTIGATE & PERFORM ROOT CAUSE ANALYSIS, DETERMINE CORRECTIVE ACTION FOR CONTAMINATED MATERIALS FOUND OFF-SITE AS NOTED ON 3/14/89

4) Describe what constitutes completion "EVALUATION / ROOT CAUSE ANALYSIS AS PER SO123-VII-1.6 FOLLOWED UPON WITH [redacted]

5) List appropriate references [redacted] EBB-99 TAC, [redacted] 5411 MATERIAL RECALL PROGRAM

6) Sign and Date [redacted] 3/17/89

B. ASSIGNOR(S): Compliance with this Section is indicated by your signature or initials below.

1) All necessary documents are to be referenced and/or readily available and/or attached.

2) Prime assignor and assignee discuss this ITA and agree on Prime Due Date, assignor enters:
PRIME DUE DATE* of _____ Assigned to [redacted] By [redacted] On 3/17/89

3) Subsequent assignor and assignee discuss and agree on Sub Due Date, assignor enters:
SUB DUE DATE* of _____ Assigned to _____ By _____ On _____

4) Assignor(s) gives original ITA to assignee and forwards a copy to TAC Coordinator.

*Prime Due Dates should be at least 5 calendar days beyond the date when task first assigned and Sub Due Dates must not be later than Prime Due Dates.

C. DUE DATE EXTENTION REQUEST: This Section is not a substitute for the Prime Due Date in Section B which must be agreed to between assignor/assignee prior to establishment. Required extensions, initiated by assignee, are to be requested as far in advance of the pending due date(s) as possible whenever completion date problems are identified.

1) New SUB DUE DATE of _____ Requested By _____ On _____

2) New PRIME DUE DATE of _____ Requested By _____ On _____

3) Reason why due date cannot be met _____

4) New SUB DUE DATE of _____ Approved By _____ On _____

5) New PRIME DUTE DATE of _____ Approved By _____ On _____

6) Copy of ITA forwarded to TAC Coordinator By _____

D. TASK COMPLETION: To be completed by assignee and forwarded to originator.

1) Statement of completed action _____

2) Date completed _____

3) Is a copy of completion document attached _____ Yes (ACTION IS NOT COMPLETE WITHOUT THIS)

4) Signature of Assignee _____

5) Originator is to forward original ITA and supporting documentation to TAC Coordinator.

To TACC on _____ date, By _____

Distribution: White - Originator Canary & Pink - Assignee Goldenrod - TAC Coordinator

SCE SO(123) 197 REV. 0 11/24/82

were quarantined and a 100% release survey policy was established there as well as creating an unofficial ad hoc committee within the health physics organization to deal with long term corrective actions. Additionally, detailed surveys were started in selected areas outside the PA in an effort to identify any other radioactive materials that may have been released.

CHRONOLOGICAL DESCRIPTION

While the releases can be associated with two distinct mechanisms, they can also be grouped into three distinct incidents. The first two incidents share a single root cause; the third incident had a seperate root cause. This report will discuss the description of the first two incidents, present their root cause and then discuss the third incident and its root cause.

THE FIRST INCIDENT

On March 15, 1989, while conducting a routine quarterly radiation survey, a health physics (HP) technician discovered radioactive material in several areas of the special tooling and rigging (STAR) yard. Attachment 1 to this report chronologically documents each item found. One of the items found on March 15 was located directly in front of the Unit 1 R/F cargo container and led the technicians performing the survey to suspect the contents of the cargo container. Subsequent surveys in the cargo container located a total of 15 items contaminated with levels equal to or greater than 100 ccpm/scan. These items averaged approximately 500 ccpm /scan with the highest recorded reading being 4,000 ccpm/scan as found on a scotch brite cleaning pad in the container. By March 19, the container and it's contents had been 100% surveyed.

SEQUENCE OF EVENT OF THE FIRST INCIDENT

On or about February 5, Mr. [redacted] Fluor refueling worker, asked [redacted] to release the container from the backyard. [redacted] looked in the container and found approximately 5 magenta colored items and told [redacted] he did not have the resources to survey the container at that time. Those 5 magenta items were removed from the container at that time. [redacted] continued requesting release surveys for the next two days.

On or about on February 7, [redacted] of PSESI was loaned to the release crew by [redacted] for the express purpose of releasing the cargo container. [redacted] took his direction from [redacted] the release crew foreman.

[redacted] began surveying the contents of the cargo container while it was located in the backyard RBZ. High background levels (200 to 300 cpm) in the backyard prevented [redacted] from surveying in about two thirds of the container. After consulting with [redacted] who consulted with [redacted] the container was moved outside the RBZ for continued release surveys in a low background area within the PA. It should be noted here that the background issue will not be considered as a contributing cause. This is based on the fact that the container was moved to a low background area within the PA prior to it's release specifically to perform the release surveys.

The container was again moved, to get it out of the fire lane, to an area near the north PA gate. [redacted] continued surveying for about 20 minutes and then left the PA for his lunch break. Mr. [redacted] the Fluor R/F worker assigned to move the container out of the PA, stated to me in an interview (attachment 6) that he asked [redacted] (just prior to [redacted] lunch break) if he had found anything to be contaminated in the container. When [redacted] told him he had not found anything contaminated [redacted] assumed at that point that the container was cleared. However, as can be evidenced by attachments 2 and 4, the HP's involved did not consider the container cleared at this time. In fact, [redacted] contends (attachment 4) that he knew the container would be moved to the staryard and that he knew he would be going there to survey it after lunch. However, [redacted] indicates in attachment 2 that he did not know the container would be moved to the staryard prior to completion of the release surveys.

It was this miscommunication, between [redacted] and [redacted] that alllowed the container to be sent to the staryard prior to completion of the release surveys. However, as will be discussed later, the relese program did not clearly require a 100% survey of the contents of the container. When [redacted] asked [redacted] (during or near lunch) where to continue surveying the container, [redacted] instructed [redacted] to survey the container where is was currently located or to have it moved to the west road and survey it there. When [redacted] returned from lunch to continue his surveys, the container had been transferred to the Mesa.

Once it had been confirmed that the container had been moved to the staryard (before the release surveys were complete), [redacted] drove [redacted] to the staryard and instructed him to continue surveying for a couple of hours. When [redacted] returned, [redacted] told him he had found a pair of contaminated binoculars. [redacted] then locked the container and drove [redacted] and the binoculars back to the PA.

In retrospect, and after the first two contaminated items were discovered in the container, [redacted] states in

attachment 5, "One problem I can identify is that I didn't directly supervise [redacted] as one familiar with our Release Program Policies. He was assigned only to supplement our crew for this one task. Once I drove him up to the Staryard, I immediately returned to the Plant. Apparently, he passed over these two items and I should have spot checked his work and supervised his techniques. My hit." It should also be noted (attachment 4) that [redacted] understood that he was to "spot check" items in the container, not perform a 100% comprehensive survey.

End of incident.

THE SECOND INCIDENT

On March 29, 1989, HP technicians performing surveys in the staryard to detect radioactive materials potentially released from the PA discovered 4 contaminated items located on a pallet that had been delivered as part of a truckload of "released" materials from the PA on March 27. Two of the items were marked as potentially radioactive with magenta paint. Additional surveys the next day located a contaminated hydraulic motor lift that had been delivered on the same truck.

SEQUENCE OF EVENTS OF THE SECOND INCIDENT

A housekeeping flatbed trailer was staged just west of the Unit 3 turbine buildiing to recieve material cleared from the Unit 2/3 RBZ on or about March 24. The station was implementing a housekeeping campaign in preparation for an upcoming INPO inspection. HP's released materials from the Radwaste building roll up door area throughout the day Friday and through the weekend. These materials were loaded onto pallets and then transferred around the building and placed on the flatbed trailer. There was a word of mouth policy that nothing was to be placed on the truck unless it had been cleared by the HP's. However, during backshift, and in fact, even during much of the dayshifts for Friday, Saturday and Sunday, the trailer was unattended. Opportunity existed for materials to be placed on the trailer without the benefit of HP surveys.

Monday morning, the trailer was pulled into the hold down area for release. [redacted] released the trailer without further surveys. He stated that (attachment 9) he recognized what he thought to be the materials the HP's had been releasing for the previous three days. He documented the release with his release stamp in the release log book (attachment 10).

The trailer was driven to the staryard and offloaded Monday. The staryard HP technicians noticed a magenta colored tube light on top of one of the pallets Wednesday morning and

began surveying the load. After finding a total of 4 items in the load the HP's at the staryard were advised by [redacted] staryard supervisor, that a hydraulic motor lift that had also arrived on the same truck should be checked. It too was found to be contaminated. By the end of the week, the rest of the load had been 100% surveyed and no additional radioactive materials were found. It should be noted that this investigation was unable to determine the origin of the hydraulic motor lift and that the discussions associated with this incident do not address that item.

End of incident.

ROOT CAUSE OF THE FIRST AND SECOND INCIDENT

The root cause of the first and second incident was programatic deficiencies in the release program. Programatic deficiencies in the release procedure coupled with the excessive ammounts of materials requiring release at the conclusion of the outage compromised the efficiency of the release program.

DISCUSSION OF THE ROOT CAUSE

SO123-VII-7.3.2, "Release of Potentially Contaminated Items From the Restricted Area", is subject to interpretation and did not require many of the items released to be surveyed. The note to section 6.1.8.2.12 states, "It is not intended that every item released from the Restricted Area be surveyed. Operational Health Physics has the responsibility to evaluate each item to determine where it has been and what its potential may be for contamination." In accordance with this, the release crew attempted to identify "suspect" items located in the material being released. Those items were surveyed.

Additionally, section 6.5.5 states, "Evaluate all items which may potentially be contaminated, radioactive, or contain radioactive material. However, every reasonable effort should be made to minimize the impact on the flow of materials through the Hold Down Area." By "evaluate", it is assumed by the release personnel that they are to look for "suspect" items such as those marked with magenta paint or items believed to be contaminated for some other reason. In fact, given hindsite into this situation, all materials are suspect that have entered the PA. Yet, the procedure directs personnel to "evaluate" and base surveys on judgement.

When these procedural deficiencies are coupled with the high volume of release surveys required at the end of major maintenance evolutions and/or clean up campaigns, the efficiency of the release surveys is challenged. In fact, this situation makes a zero release goal unachievable.

CONTRIBUTING CAUSES FOR THE FIRST AND SECOND INDIDENT

The following contributing causes increased the liklihood that radioactive material would have been released from the PA. It should be recognized, however, that the solutions to the root causes are independent of these contributing causes.

1. (First and Second incident) SO123-VII-7.3.2 states in part, (section 4.1) "Measures should be employed when practicable to minimize tools, material, vehicles, and equipment taken into the Restricted Area, and to prevent their contamination." Contrary to this requirement, the station has no formal policy to define the "margin of safety" required for the work groups inventories and implement such compliance.

2. (First incident) Miscommunication between the release crew foreman, the HP technician on loan to the release crew and the work group allowed the container to exit the PA without completing the release surveys.

   Once [redacted] assumed the container had been cleared, he proceeded to have it transferred to the Mesa. [redacted] contacted [redacted] to ask further direction as to continuing the release surveys. Based on [redacted] statement in attachment 4, he considered the staryard an acceptable location to continue the surveys. It was not until [redacted] told him to survey it in place or at the west road that [redacted] had clear instruction as to where to survey the container. By the time [redacted] returned to the area he had last seen the container, it had been transferred to the staryard. This fact placed an additional time restraint on the release surveys and is considered a contributing cause to the incident.

3. (First and Second incident) There is no general attitude of segregating radioactive materials within the PA amongst the work groups.

   This is evidenced by the fact that magenta materials were found in the cargo container in the first incident and the fact that, in all liklihood, the pallet containing the magenta tube light and other radioactive materials was probably loaded onto the trailer in the secon incident without being surveyed.

END OF DISCUSSION OF THE FIRST AND SECOND INCIDENT

CHRONOLOGICAL DESCRIPTION

THE THIRD INCIDENT

On April 4, 5 and 10, 1989, HP technicians performing surveys at the staryard to detect potentially released radioactive materials discovered 6 contaminated items associated with the refueling maintenance group. In addition to the fact that these items were found to be contaminated, it is also noteworthy to mention the fact that two of the items were contaminated with "hot particles". One, a reactor head stud rack, was found to have a FLEA reading 300 ccpm/scan on it, and the other, the transshipment impact limiter, was found to have a cobalt particle reading 1500 ccpm/scan on it. Attachment 1 contains additional radiological information on these items. Of the 6 items located, 5 were in or adjacent to the R/F warehouse. The sixth item was found on a pallet load of underwater camera equipment stored temporarily in the main staryard warehouse awaiting transfer to the R/F warehouse.

SEQUENCE OF EVENTS OF THE THIRD INCIDENT

During the time frame of the end of February and the beginning of March, 1989, transshipment completed and the refueling group completed refueling evolutions in the Unit 1 containment. In the traditional manner, a massive offload of containment and associated transshipment and refueling areas commenced. This investigation has not been able to determine the exact dates and times of the transfers associated with the array of contaminated refueling/transshipment items found in the staryard. It can be concluded however, that these items were released during the offload, and probably very near the third or fourth week of February. This conclusion can be drawn from the fact that the individual items identified are normally in use during refueling and transshipment activities. Additionally, attachment 12 indicates that the transfer of the impact limiter probably was released and documented on 2/27/89. No details in any of the release logs identify who released the other refueling equipment.

These materials sat at the staryard for about a month until they were surveyed by the staryard HP technicians. The reason the staryard HP technicians surveyed these items is because they were directed to survey suspicious items by their supervision. As of April 12, 1989, about 75% of the refueling groups materials have been surveyed and no additional items have been found to be contaminated.

End of incident.

The root cause of the third incident, the release of contaminated refueling equipment, is the failure to adequately survey the materials.

THE CONTRIBUTING CAUSES INCLUDE THE FOLLOWING:

1. Inadequate attention to detail in performing release surveys resulted in the release of small, undetected areas of contamination on large components.

   The impact limiter, for example, has approximately 3.1 E5 cm2 of surface area. One area approximately 4 in2 was found to have 500 ccpm/scan fixed contamination. Also, a 1500 ccpm/scan cobalt particle was found on one area less than 1 cm2.

2. Excessive materials are brought into the PA to support work evolutions.

   Photographs in attachment 3 show a box containing over 100 cam-lock fittings, most of which are new and remain unused. However, a 100% survey of each cam-lock revealed one to have 300 ccpm/scan fixed contamination. As stated previously in the contributing cause section of the first two incidents in this report, no active program exists to define acceptable "margins of safety" associated with work group inventories brought in the PA to support work evolutions. And, as mentioned earlier, that is in violation of section 4.1 of SO123-VII-7.3.2.

END OF DISCUSSION OF THE THIRD INCIDENT

CONCLUSIONS

While the failure to perform an adequate release survey was noted as the root cause of the third incident, it is recognized that the third incident represents a single, correctable incident. However, the root cause of the first two incidents are programatic and compromise the entire release program. It is assumed that the problem of inadequate surveys will also be minimized, if not corrected by resolving the programatic deficiencies associated with the program. The two components of the programatic deficiencies are:

1. Health Physics procedure SO123-VII-7.3.2 allows materials to be released from the protected area without being surveyed.

AND

2. The ammount of material requiring release surveys to exit the PA are excessive.

Additionally, there are several contributing causes that are incident specific. These do not necessarily indicate programatic deficiencies. However, the correction of the incident specific deficiencies without the correction of the aforementioned programatic deficiencies is viewed inadequate to attain a zero-release status of radioactive material from the PA. The incident specific contributing causes are:

1. Miscommunication between work groups (in the second incident).

2. Failure of the station to comply with procedures requiring the minimization of materials brought into the PA (in the first and second incident).

3. Inadequate attention to detail when performing surveys (in the third incident).

4. The lack of a general feeling of resposibility on the part of the station work groups to segregate radioactive materials (the first and second incident).

In conclusion, certain programatic station wide problems as well as programatic release program deficiencies resulted in the inadvertent release of radioactive materials from the PA. Additionally, inadequate surveys and the aforementioned contributing causes escalated the potential of inadvertent releases from the PA. The corrective actions discussed later is this report attempt to address the programatic problems.

CORRECTIVE ACTIONS

IMMEDIATE CORRECTIVE ACTIONS

As mentioned earlier in this report, the station took several immediate corrective actions upon the identification of the inadvertant releases of radioactive materials from the PA. Initial corrective actions were as follows:

Upon the initial discovery of the materials associated with the staryard general areas and the Unit 1 R/F cargo container:

1. HP assigned technicians to complete a 100% survey in the cargo container.

2. HP Supervision made a walk down of the staryard area and directed HP technicians to survey identified "suspect" items in the staryard.

Upon the discovery of the contaminated items from the PA shipment of March 27, corporate QA issued a "stop work" order to the station manager regarding the release of materials from the PA and the staryard. In response to that order the station implemented the following corrective actions:

1. Implementation of a QA/HP exemption list including a 100% survey policy for materials being released from the PA via that list.

2. Implementation of a 100% survey policy for materials being released from the staryard area.

3. Continued the "suspect" item search for radioactive materials in the staryard.

4. HP formed an ad hoc committee to begin resolving the long term implications of this problem.

Upon the discovery (by a QA inspector) of additional radioactive materials in the Material and Equipment Sales yard on the Mesa, The station implemented the following corrective actions:

1. Established a policy, including a management sponsor [redacted] to have HP survey all materials released from the entire Mesa.

2. HP staffed an office at the Mesa, established supervisory contacts and began offering the service of release surveys for all the work groups associated with the mesa.

3. HP continued the "suspect" item search for radioactive materials within the staryard.

This concludes the discussion on immediate corrective actions.

LONG TERM CORRECTIVE ACTIONS

The long term corrective actions require action the part of the station as a whole. No single division can solve the programatic problems identified within this report. It is with that assumption that the following recommendations are made:

1. Revise HP release procedures to ensure that radioactive materials are surveyed prior to being released from the PA. Given the current state of affairs, it is assumed that this would require 100% surveys of all materials exiting the PA until such time as it can be proven that contaminated material does not exist outside the RBZ yet inside the PA.

2. Decrease the ammount of material requiring release surveys from the protected area.

   As directed by SO123-VII-7.3.2, section 4.1, "Measures should be employed when practicable to minimize...". This would require a commitment from station management to formalize a system that identifies inventories required to perform planned work in the PA. This system should include performance monitoring to ensure compliance. Additionally, provisions should be made (such as procedurally required) such that in the event the work process makes it impractical to survey materials, HP maintains positive control over such materials until such time as a survey is practical.

3. Include an upgraded lesson into training programs that would educate all workers in the PA as to the requirements of the release program. This should be reinforced by providing performance monitoring for compliance.

   In short, if zero tolerance is expected from the release program, all contaminated materials must be surveyed prior to their release from the PA. This investigation has proven that "evaluations" do not work. One cannot tell if something is contaminated by looking at it. The only thing that will result in zero release is (a) survey everthing that is released, or (b) maintain control (ie don't release everything).

Att 1

This report contains a list of contaminated items found outside the Protected Area as well as the radiological information associated with each item. The area contaminated is based on information from the individuals surveying the material, personal observation or estimated where noted. The frisker readings are as reported through various E-mail communications, personal observation and interviews with personnel performing the surveys. The total microcuries is calculated based on a 10% efficiency and a 15 cm2 surface area for a frisker probe. The dose rate is calculated at a depth of 1000 mg/cm2. The isotopic distribution is based on a single GeLI report that is assumed to be representative for all of the materials. The reportability is based on the requirements specified in 10CFR20 paragraph 20.405, subparagraph (v).

ITEM DATE	DESCRIPTION (AREA)	FRISKER READING (SMEARABLE)	TOTAL MICROCURIES	DOSE RATE	REPORTABLE/ LOCATION CODE*
1. 3/15	Metal sling. (8 in2)	400-500 ccpm	7.1 E-3	<0.1 mr/hr	NO/*1
2. 3/15	Greasy nylon sling. (10 cm2)	800 ccpm	3.6 E-3	" "	NO/*2
3. 3/15	Roll of tape. (10 in2)	200-300 ccpm	4.8 E-3	" "	NO/*2
4. 3/16	Roll of tape. (8 in2)	300 ccpm	4.1 E-3	" "	NO/*3
5. /16	Wire drill attchmnt (10 in2)	200 ccpm	3.9 E-3	" "	NO/*3
6. 3/17	Tool box. (40 cm2)	200 ccpm	2.4 E-3	" "	NO/*3
7. 3/17	2(ea) 25 ft. 2"hoses. (150 cm2)	300 ccpm	1.4 E-2	" "	NO/*3
8. 3/17	One bull horn. (10 cm2)	100 ccpm	4.5 E-4	" "	NO/*3
9. 3/17	Several Scotch Brite Pads. (10 cm2) @ 4000 ccpm (max) (338 cm2) @ 1000 ccpm (1500 cm2) @ 200 ccpm	4000 ccpm	2.1 E-1	" "	NO/*3
10. 3/17	Bag of 20 nuts/bolts. (65 cm2)	300 ccpm	5.8 E-3	" "	NO/*3
11. 3/17	Bag of 12 nuts/bolts. (65 cm2, estimated)	600 ccpm	1.2 E-2	" "	NO/*3
12. 3/17	One pair channel locks. (13 cm2)	100 ccpm	4.5 E-4	" "	NO/*3
13. 3/17	One FME notebook. (2 cm2)	400 ccpm	1.8 E-3	" "	NO/*3
14. 3/17	One pulley wheel assy. (10 cm2)	1000 ccpm	4.5 E-2	" "	NO/*4

15. 3/18	Roll of tape. (10 in2 estimated)	100 ccpm	1.9 E-3	" "	NO/*4
16. 3/18	Bag of bolts. (13 cm2)	300 ccpm (2,000 dpm/masslin)	1.4 E-3	" "	NO/*3
17. 3/18	Bag of bolts. (26 cm2)	100 ccpm	7.7 E-4	" "	NO/*3
18. 3/18	Bag of bolts. (26 cm2)	500 ccpm (2,000 dpm/masslin)	3.8 E-3	" "	NO/*3
19. 3/19	Punch. (2 cm2)	150 ccpm	6.8 E-4	" "	NO/*3
20. 3/19	Three bolts (decon masslin 16 in2)	Not Avail (4,000 dpm smearable)	1.3 E-2	" "	NO/*3
21. 3/20	Battery Charger (four in2)	200 ccpm	1.8 E-3	" "	NO/*4
22. 3/21	Synflex hose (13 cm2)	400 ccpm	1.8 E-3	" "	NO/*4
23. 3/22	Nylon sling. (33 cm2)	150 ccpm	1.5 E-3	" "	NO/*1
24. /23	Nylon sling. (45 cm2)	100 ccpm	1.4 E-3	" "	NO/*1
25. 3/27	Vacuum cleaner (See note 1)	200 ccpm	9.8 E-1	" "	NO/*2
26. 3/28	Gland seal gasket. (100 cm2)	100 ccpm	3.0 E-3	" "	NO/*5
27. 3/28	Old REMS box. (25 cm2)	200 ccpm	1.5 E-3	" "	NO/*2
28. 3/28	Gland seal gasket. (100 cm2)	150 ccpm	4.5 E-3	" "	NO/*5
29. 3/28	Gland seal gasket. (100 cm2)	300 ccpm	9.0 E-3	" "	NO/*5
30. 3/29	Tube light. (26 cm2) @ 1200 ccpm (936 cm2) @ 200 ccpm (26 cm2) @ 500 ccpm...removable on masslin	1200 ccpm (max)	6.9 E-2	" "	NO/*6
31. 3/29	Welding whip. (30 cm2)	200 ccpm	1.8 E-3	" "	NO/*6
32. /29	Work glove. (15 cm2)	100 ccpm	4.5 E-4	" "	NO/*6
33. 3/29	Work glove. (100 cm2)	100 ccpm	4.5 E-4	" "	NO/*6

SONGS HP INDIVIDUAL TASK ASSIGNMENT (ITA)

A. ORIGINATOR: Complete this Section, individual assigning ITA is to complete Section B.

1) Name (Print) [redacted] 2) Enter your next ITA number E89-161

3) Describe Task PERFORM HP BUILDING AWARD TO REMOVE MISC SALVAGE MATERIALS

4) Describe what constitutes completion MEMO TO [redacted] ON ABOVE (SEE ATTACHED)

5) List appropriate references [redacted] FOR MISC ASSIGNMENT / [redacted] FOR ALTERNATIVE SURVEY TECHNIQUE [redacted] FOR HP & IM

6) Sign and Date [redacted] 4/7/89

B. ASSIGNOR(S): Compliance with this Section is indicated by your signature or initials below.

1) All necessary documents are to be referenced and/or readily available and/or attached.

2) Prime assignor and assignee discuss this ITA and agree on Prime Due Date, assignor enters:
PRIME DUE DATE* of 4/11/89 Assigned to [redacted] By [redacted] On 4/7/89

3) Subsequent assignor and assignee discuss and agree on Sub Due Date, assignor enters:
SUB DUE DATE* of _____ Assigned to _____ By _____ On _____

4) Assignor(s) gives original ITA to assignee and forwards a copy to TAC Coordinator.

*Prime Due Dates should be at least 5 calendar days beyond the date when task first assigned and Sub Due Dates must not be later than Prime Due Dates.

C. DUE DATE EXTENTION REQUEST: This Section is not a substitute for the Prime Due Date in Section B which must be agreed to between assignor/assignee prior to establishment. Required extensions, initiated by assignee, are to be requested as far in advance of the pending due date(s) as possible whenever completion date problems are identified.

1) New SUB DUE DATE of _____ Requested By _____ On _____

2) New PRIME DUE DATE of _____ Requested By _____ On _____

3) Reason why due date cannot be met _____

4) New SUB DUE DATE of _____ Approved By _____ On _____

5) New PRIME DUTE DATE of _____ Approved By _____ On _____

6) Copy of ITA forwarded to TAC Coordinator By _____

D. TASK COMPLETION: To be completed by assignee and forwarded to originator.

1) Statement of completed action _____

2) Date completed _____

3) Is a copy of completion document attached _____ Yes (ACTION IS NOT COMPLETE WITHOUT THIS)

4) Signature of Assignee _____

5) Originator is to forward original ITA and supporting documentation to TAC Coordinator.

To TACC on _____ date, By _____

Distribution: White - Originator Canary & Pink - Assignee Goldenrod - TAC Coordinator

SCE 80(123) 197 REV. 0 11/24/82

QUALITY ICE SERVICE

- HP BUSTOUD ANALYSES TO DETERMINE MEDIA SALVAGE MATERIALS

- DETERMINE QUANTITIES (~SURFACE AREA) REQUIRED TO BE SURVEYED / RECORDED

- DETERMINE METHOD TO SURVEY MATERIALS
  - CONSIDER FRENCH SURVEY
  - " ALTERNATIVE SURVEY TECHNIQUE (SEE [redacted])

- DETERMINE HP COST & TIME TO SURVEY MATERIALS
  - BREAK-UP COST & TIME INTO GEOGRAPHIC AREAS WHERE PRACTICAL

- TAKE CLOSE AREA PHOTOS OF MATERIALS TO BE SALVAGED & INCLUDE IN REPORT

- NOTE SUGGESTIONS THAT WOULD SIGNIFICANTLY REDUCE HP'S DOLLAR ~~DAMAGE~~ WORKLOAD OF TYPICAL SALVAGE MATERIALS

[146] From: [redacted] at WEST4 4/10/89 9:07AM (5876 bytes: 98 ln)
To: [redacted] at ROOF
cc: [redacted]
Subject: Manhour Estimate to Release Salvage Material at the Mesa

---------- Message Contents ----------

I met with [redacted] Warehouse Supervisor, and [redacted] Sales Agent, on Monday to evaluate the resources which would be required to release the salvage material which is presently under the control of the Warehouse. Three specific areas were defined in order of release priority: 1) Warehouse Salvage Area, 2) M & E Sales Area, and 3) the Scrap Steel Salvage Area. Each of the areas are discussed below:

1. Warehouse Salvage Area:
   This material is located inside the Warehouse and consists primarily of material which was issued by the Warehouse to the Site then was returned either unused, partially used, or to a lesser degree as used material. No accountability exists as to whether this material actually entered the Protected Area or was co-mingled with material which had entered the Protected Area. This salvage area has the highest prioriy for release since it has already been sold and because it is occuping space inside the Warehouse which has been allegated for additional material coming to the Warehouse.

   This material consists of approximately 105 pallets of various types of filters and three rows of miscellaneous electrical parts, insulation, plastic PC's, valve fittings, motors, instrumention, etc. It is estimated that approximately 90 pallets of material are contained in these three rows.

   Eighty to ninety percent of the filters appear unopened. Possibly 30 percent of the remaining material has not been opened. This unopened material should be releasable after externally frisking their containers. The remaining material will require individual hand frisking.

2. M & E Sales Salvage Area:
   This material consists primarily of Project related surplus material. The quantity of material in this outside storage area is similar to that at the Staryard. This material contains large amounts of cabling, valves, pump parts, steel ,etc. Since no accountability exists on this material, 100 percent of it will need to be surveyed. This area has the second highest priority since bids have already been solicited for this material.

   The cabling material survey can be expediated by pulling the cabling past a fixed bank of stationary friskers. The remaining material will need to be individually frisked. Labor support is essential in this area due to the size and weight of many of these items.

3. Scrap Steel Salvage Area:

This area contains 300 tons of material. The quantity of material is probably over four times that which is in the M & E Sales Area. This material consists of radwaste drums, the old makeup demineralizer, large numbers of surplus furniture, old radwaste liners and storage casks, old security shacks and entry point buildings, and large amounts of scrap steel. Much of this material is very bulky and heavy. Whether any accoutability of this material exists is unknown at this time. Ideally, the release of the demineralizer was documented. If not, then 100 percent survey of this material is required. At times very extensive labor support for this area will be required because of the size of some of this material. This labor support will require crane support at various times.

The estimated manhours for release of these three areas are estimated below based on conversations with [redacted] and examination of manpower required in the 1983 Mesa Survey:

Area	Estimated Manhours	
	Health Physics	Laborers
1. Warehouse Salvage	250	100
2. E & C Sales Salvage	1200	600
3. Scrap Steel Salvage	4000	2000
Total:	5450	2700

Using a labor cost of $1200/week for a HP Technician and $26.02 for a Bechtel Laborer results in a total cost for releasing the salvage material of $233,754. This was based on no overtime and no additional cost for forklift or crane support. The cost for each area is summarized below:

Area	Estimated Cost ($)		
	HP	Laborers	Total
1. Warehouse Salvage	7,500	2,602	10,102
2. E & C Salvage	36,000	15,612	51,612
3. Scrap Steel	120,000	52,040	172,040

[redacted]

SONGS HP INDIVIDUAL TASK ASSIGNMENT (ITA) 240

A. ORIGINATOR: Complete this Section, individual assigning ITA is to complete Section B.

1) Name (Print) [redacted] 2) Enter your next ITA number E90-34

3) Describe Task Document method for holding & releasing Unit 2 Fish basket maf'l contam. w. Iodine.

4) Describe what constitutes completion Memo for file with Germ prints attached

5) List appropriate references E88-020

6) Sign and Date [redacted] 5/21/90

B. ASSIGNOR(S): Compliance with this Section is indicated by your signature or initials below.

1) All necessary documents are to be referenced and/or readily available and/or attached.

2) Prime assignor and assignee discuss this ITA and agree on Prime Due Date, assignor enters:
PRIME DUE DATE* of 6/30/90 Assigned to [redacted] By [redacted] On 5/21/90

3) Subsequent assignor and assignee discuss and agree on Sub Due Date, assignor enters:
SUB DUE DATE* of _____ Assigned to _____ By _____ On _____

4) Assignor(s) gives original ITA to assignee and forwards a copy to TAC Coordinator.

*Prime Due Dates should be at least 5 calendar days beyond the date when task first assigned and Sub Due Dates must not be later than Prime Due Dates.

C. DUE DATE EXTENTION REQUEST: This Section is not a substitute for the Prime Due Date in Section B which must be agreed to between assignor/assignee prior to establishment. Required extensions, initiated by assignee, are to be requested as far in advance of the pending due date(s) as possible whenever completion date problems are identified.

1) New SUB DUE DATE of _____ Requested By _____ On _____

2) New PRIME DUE DATE of _____ Requested By _____ On _____

3) Reason why due date cannot be met _____

4) New SUB DUE DATE of _____ Approved By _____ On _____

5) New PRIME DUTE DATE of _____ Approved By _____ On _____

6) Copy of ITA forwarded to TAC Coordinator By _____

D. TASK COMPLETION: To be completed by assignee and forwarded to originator.

1) Statement of completed action See Attached Memo / Procedure

2) Date completed 5/24/90

3) Is a copy of completion do[redacted] (ACTION IS NOT COMPLETE WITHOUT THIS)

4) Signature of Assignee [redacted]

5) Originator is to forward original ITA and supporting documentation to TAC Coordinator.
To TACC on 5/25/90 date, By [redacted]

Distribution: White - Originator Canary & Pink - Assignee Goldenrod - TAC Coordinator

SCE SO(123)197 REV. 0 11/24/82

MEMORANDUM FOR FILE

May 23, 1990

SUBJECT: Radioiodine in Fish Basket Waste

REFERENCE: Memorandum for File, Radioiodine in Fish Basket Waste, dated 3/10/88

Radioiodine was detected in the Unit 1 and 2 fish basket waste in May 1990. The source of the iodine was most likely steam generator secondary water, contaminated by primary to secondary leakage which was discharged to the outfall. The benthic waste drawn into the Unit intakes had very low, but detectable, levels of Iodine-131. This memorandum documents the calculations used to determine the holding times for this waste and to demonstrate the released waste had no detectable activity.

Given a 1 liter marinelli sample counted for 300 seconds has a critical level of 2.5E-8 μCi/cc (Reference) and the fish basket waste has an activity of 1.3E-7 μCi/cc, 1.6E-7 μCi/cc and 3.9E-7 μCi/cc (attached), the calculated decay times are:

1) Unit 2

$$2.5E\text{-}8\ \mu Ci/cc = 1.3E\text{-}7\ \mu Ci/cc\ e^{-\frac{.693}{8\ days}(t)}$$

$t = 19$ days

2) Unit 2

$$2.5E\text{-}8\ \mu Ci/cc = 1.6E\text{-}7\ \mu Ci/cc\ e^{-\frac{.693}{8\ days}(t)}$$

$t = 22$ days

3) Unit 1

$$2.5E\text{-}8\ \mu Ci/cc = 3.9E\text{-}7\ \mu Ci/cc\ e^{-\frac{.693}{8\ days}(t)}$$

$t = 32$ days

Therefore, the recommended times to hold the fish basket waste on site to allow for decay to non-detectable activity levels is 19, 22 and 32 days. After these time periods, the fish basket waste should be re-sampled and counted on the Ge detector. The results should be forwarded to HP Engineering for final review before shipment off site.

[redacted]
HP Engineering

[redacted]iodine:[redacted]

cc: [redacted]
CDM Files

Hot 5-90

17-MAY-90 14:34:26

90 05 17 TW 04 U2 FISH

MAY 17 1990 QUALITY CONTROL COPY

Iodine Not Clean

SAMPLE COLLECTION START DATE: 17-MAY-90 14:00:00
SAMPLE COLLECTION END DATE : 17-MAY-90 14:00:00
SAMPLE IDENTIFICATION: 2316
TYPE OF SAMPLE : U2/3 H. P.
SAMPLE QUANTITY: 1000.000 UNITS: ML
PER CENT YIELD : 100.00000 REACTOR #: 0
SAMPLE GEOMETRY: 1L LIQ MARINELLI OPERATORS INITIALS: [redacted]
EFFICIENCY FILE NAME: EFFD .MARILD

ACQUIRE DATE: 17-MAY-90 14:27:35
PRESET TIME(LIVE): 300. SEC
ELAPSED REAL TIME: 300. SEC
ELAPSED LIVE TIME: 300. SEC

* FWHM(1332) : 1.973
* SENSITIVITY: 3.500
* SHAPE PARAMETER: 10.0 %
* NBR ITERATIONS: 10.

DETECTOR: GELID
CALIB DATE: 17-MAY-90 07:36:10
KEV/CHNL: 0.4999276
OFFSET: -0.1114134 KEV

* LIBRARY: NUCL .LIQUID
* ENERGY TOLERANCE: 1.500KV
* HALF LIFE RATIO: 8.00
* ABUNDANCE LIMIT: 50.00%

ENERGY WINDOW 24.88 TO 2047.59

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	62.70	48.	120.	1.51	125.64	119	30	1.60E-01	35.3	
2	0	92.34	71.	35.	1.25	184.94	178	14	2.36E-01	16.7	
3	0	183.91	10.	0.	1.75	368.10	365	28	3.33E-02	31.6	
4	0	238.01	14.	9.	0.73	476.31	471	12	4.67E-02	40.4	
5	0	364.07	15.	0.	1.05	728.47	724	9	5.00E-02	25.8	

PEAK SEARCH COMPLETED (V2.0 [SONGS 1/89])

175 Fe

NU E IDENTIFICATION SYSTEM (SONGS VER 3.0, 8/87)
SU Y OF NUCLIDE ACTIVITY

Hot 5-96

TOTAL LINES IN SPECTRUM 5
LINES NOT LISTED IN LIBRARY 4
IDENTIFIED IN SUMMARY REPORT 1 20.00%

CORRECTION FOR NUCLIDE INTERFERENCE ANALYSIS PERFORMED

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1-SIGMA ERROR	%ERR	%MIX
I-131	FP	8.04D	1.002	1.294E -7	3.340E -8	25.82	100.00

ACTIVITY FROM ISOTOPE GROUP= 1.294E-07 UCI /UNIT

TOTAL ACTIVITY = 1.294E-07 UCI /UNIT

TOTAL FISSION PRODUCTS / TOTAL ACTIVATION PRODUCTS "UNDIFINED"

$$\frac{1.29 \times 10^{-7}\ \mu Ci/cc}{2.5 \times 10^{-8}\ \mu Ci/cc} = 5.16$$

C.L
I-131

$2^x = 5.16$ $\quad x = 2.4$ 1/2 LIVES

2.4
x8 DAYS
19.2

Hot 5-90

23-MAY-90 10 48.06

SQ 05 23 TW 05 U2 FISH Resampled from Monday 4-28 5-21-90

SAMPLE COLLECTION START DATE: 23-MAY-90 10:00:00
SAMPLE COLLECTION END DATE : 23-MAY-90 10 00.00
SAMPLE IDENTIFICATION: 2743
TYPE OF SAMPLE : U2/3 H. F.
SAMPLE QUANTITY: 1000.000 UNITS: ML
PER CENT YIELD : 100.00000 REACTOR # 0
SAMPLE GEOMETRY: 1L LIQ MARINELLI OPERATORS INITIALS [redacted]
EFFICIENCY FILE NAME: EFFE .MARILE

ACQUIRE DATE: 23-MAY-90 10:42:41
PRESET TIME(LIVE): 300. SEC
ELAPSED REAL TIME. 300. SEC
ELAPSED LIVE TIME: 300. SEC

FWHM(1332) 1.988
SENSITIVITY: 3.500
SHAPE PARAMETER 10.0 %
NBR ITERATIONS: 10.

DETECTOR. GELIE
CALIB DATE: 23-MAY-90 08:51:56
KEV/CHNL: 0.4999966
OFFSET: -0.0598533 KEV

LIBRARY.NUCL .LIBUTIL
ENERGY TOLERANCE: 1.500KV
HALF LIFE RATIO 8.00
ABUNDANCE LIMIT: 50.00%

ENERGY WINDOW 24.94 TO 2047.93

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	FW	CTS/SEC	%ERR	FIT
1	0	63.45 XRAY	13.	16.	1.33	127.02	124	8	4.27E-02	52.2	
2	5	90.49 Bi214	13.	6.	1.21	181.09	178	15	4.39E-02	37.5	1.66E 00
3	5	92.63	49.	6.	1.47	185.39	178	15	1.63E-01	16.0	
4	0	185.78 Ra226	13.	3.	0.94	371.69	366	11	4.37E-02	32.9	
5	0	364.57 I131	19.	15.	1.12	729.27	722	29	6.17E-02	37.3	
6	0	1460.06 K-40	19.	0.	1.04	2920.26	2914	13	6.33E-02	32.9	

PEAK SEARCH COMPLETED (V2.0 [SONGS 1/89])

Hot 5-90

NUCLIDE IDENTIFICATION SYSTEM (GCNGS VER 3.0, 6/87)
SUMMARY OF NUCLIDE ACTIVITY

TOTAL LINES IN SPECTRUM	6
LINES NOT LISTED IN LIBRARY	5
IDENTIFIED IN SUMMARY REPORT	1 16.67%

CORRECTION FOR NUCLIDE INTERFERENCE ANALYSIS PERFORMED

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1-SIGMA ERROR	%ERR	MIX
I-131	FP	8.040	1.003	1.644E -7	6.125E -8	37.25	100.00

ACTIVITY FROM ISOTOPE GROUP= 1.644E-07 UCI /UNIT

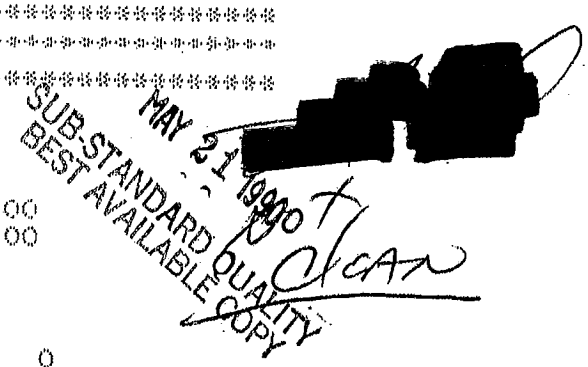
TOTAL ACTIVITY = 1.644E-07 UCI /UNIT

TOTAL FISSION PRODUCTS / TOTAL ACTIVATION PRODUCTS UNDIFINED

Hot 5-20

21-MAY-90 13:06:05

05 21 TW 12 UI FISH



SAMPLE COLLECTION START DATE: 21-MAY-90 12:00:00
SAMPLE COLLECTION END DATE : 21-MAY-90 12:00:00
SAMPLE IDENTIFICATION: 2581
TYPE OF SAMPLE : U2/3 H. P.
SAMPLE QUANTITY: 1000.000 UNITS: ML
PER CENT YIELD : 100.00000 REACTOR # 0
SAMPLE GEOMETRY: 1L LIQ MARINELLI OPERATORS INITIALS: [redacted]
EFFICIENCY FILE NAME: EFFE .MARILE

ACQUIRE DATE: 21-MAY-90 13:00:35
PRESET TIME(LIVE): 300. SEC
ELAPSED REAL TIME: 300. SEC
ELAPSED LIVE TIME: 300. SEC

FWHM(1332) . 1.964
SENSITIVITY: 3.500
SHAPE PARAMETER 10.0 %
NBR ITERATIONS: 10.

DETECTOR: GELIE
CALIB DATE: 21-MAY-90 07:33:38
KEV/CHNL: 0.5000664
OFFSET: -0.0320709 KEV

LIBRARY NUCL .LIQUID
ENERGY TOLERANCE: 1.500KV
HALF LIFE RATIO 8.00
ABUNDANCE LIMIT: 50.00%

ENERGY WINDOW 24.97 TO 2048.24

PK	IT	ENERGY	AREA	BCGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	ZERR	FIT
1	0	68.99	9.	7.	6.59	138.03	136	7	2.86E-02	55.4	
2	0	92.59	25.	21.	1.16	185.21	178	12	8.44E-02	32.4	
3	0	240.10	10.	11.	3.33	480.20	475	14	3.27E-02	56.5	
4	0	364.94	44.	8.	1.92	729.85	724	16	1.47E-01	17.6	

PEAK SEARCH COMPLETED (V2.0 DSONGS 1/89)

Hot 5-90

NUCLIDE IDENTIFICATION SYSTEM (SONGS VER 3.0. 6/87)
SUMMARY OF NUCLIDE ACTIVITY

TOTAL LINES IN SPECTRUM	4	
LINES NOT LISTED IN LIBRARY	2	
IDENTIFIED IN SUMMARY REPORT	1	25.00%

CORRECTION FOR NUCLIDE INTERFERENCE ANALYSIS PERFORMED

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1-SIGMA ERROR	%ERR	%MIX
I-131	FP	8.04D	1.004	3.915E -7	6.896E -8	17.61	100.00

ACTIVITY FROM ISOTOPE GROUP= 3.915E-07 UCI /UNIT

TOTAL ACTIVITY = 3.915E-07 UCI /UNIT

TOTAL FISSION PRODUCTS / TOTAL ACTIVATION PRODUCTS UNDEFINED

SONGS HP INDIVIDUAL TASK ASSIGNMENT (ITA)

A. ORIGINATOR: Complete this Section/Individual assigning ITA is to complete Section B.

1) Name (Print) [redacted] 2) Enter your next ITA number 92115

3) Describe Task Mesa Salvage Yard COG Engineer

4) Describe what constitutes completion [illegible]

5) List appropriate references

6) Sign and Date

B. ASSIGNOR(S): Compliance with this section is indicated by your signature or initials below.

1) All necessary documents are to be referenced and/or readily available and/or attached.

2) Prime assignor and assignee discuss this ITA and agree on Prime Due Date, assignor enters PRIME DUE DATE* of [illegible] Assigned to [redacted] By [redacted] 7/1/92

3) Subsequent assignor and assignee discuss and agree on Sub Due Date, assignor enters SUB DUE DATE* of ______ Assigned to ______ By ______ On ______

4) Assignor(s) gives original ITA to assignee and forwards a copy to TAC Coordinator.

*Prime Due Dates should be at least 5 calendar days beyond the date when task is assigned and Sub Due Dates must not be later than Prime Due Dates.

C. DUE DATE EXTENTION REQUEST: This section is not a substitute for the Prime Due Date in Section B which must be agreed to between assignor/assignee prior to establishment. Required extensions, initiated by assignee, are to be requested as far in advance of the pending due date(s) as possible whenever completion date problems are identified.

1) New SUB DUE DATE of ______ Requested By ______ On ______

2) New PRIME DUE DATE of ______ Requested By ______ On ______

3) Reason why due date cannot be met

4) New SUB DUE DATE of ______ Approved By ______ On ______

5) New PRIME DUE DATE of ______ Approved By ______ On ______

6) Copy of ITA forwarded to TAC Coordinator By ______

D. TASK COMPLETION: To be completed by assignee and forwarded to originator.

1) Statement of completed action closed per [redacted] this is a functional (ongoing) responsibility of COG Engineer ([redacted] [illegible]/16/92)

2) Date completed 12-16-92

3) Is a copy of completion document attached ______ Yes (ACTION IS NOT COMPLETE WITHOUT THIS)

4) Signature of Assignee

5) Originator is to forward original ITA and supporting [redacted] TAC Coordinator.

To TACCion 12-16-92 date, By [redacted]

Distribution: White - Originator Canary & Pink - Assignee Goldenrod - TAC Coordinator

SCE 90(123) 197 REV. 0 11/24/82

MEMORANDUM FOR FILE

June 24, 1992

SUBJECT: Radioactive Materials Found at the Mesa Salvage Yard

The Salvage Yard located at the Mesa is used as a storage facility for scrap materials. (see attached map). It is a large rectangular lot, fenced on all sides. The fence is 6 foot high chain link with no breaks or gaps and stretches to the ground in all areas. There are two access points to the lot: The north gate remains locked at all times except on rare occasions when a vehicle must pass through the lot. The south gate remains locked when Health Physics personnel are not present and is preceded by an additional gate which also remains locked in the absence of HP personnel. Health Physics and Facilities Management are the only possessors of keys to the salvage yard. No one enters the Salvage Yard lot without HP personnel present.

It has been the practice of the Health Physics Division to perform precautionary surveys of items in non-restricted areas since early 1990. In early 1990, a wide spread survey effort was conducted at the Mesa to verify the absence of radioactive contamination. Virtually the entire Mesa Facility was evaluated, including the STAR Yard areas, Mesa Warehouse, building G-50, and building G-48. Areas which were not surveyed at that time were fenced and maintained under positive HP control until such a time when surveying the area was practical. One such area was the Mesa Salvage Yard. The scrap material in the yard dates back to this time period.

The scrap material stored in the Salvage Yard is currently being assessed for salvage. It is anticipated that the materials stored at the Salvage Yard are non-radioactive however, as a precautionary effort to ensure that no licensed Radioactive Material is released from Edison's control, this scrap material is being surveyed before uncontrolled release from SONGS. During these surveys, a small number of items have been identified with low levels of residual contamination present. A list of the items found and associated physical and radiological data of the current survey effort is presented in the attached spreadsheet.

There are various regulations which are applicable to the identification of contaminated items at the salvage yard (i.e. 10CFR20.105; 20.203; 20.405(v); 20.207; and 49CFR173.403). 10CFR20.105 specifies dose limits for persons in non-restricted areas. No person shall receive a dose equal to or greater than 2 millirem if that person were to occupy the area for one hour continuously or 100 millirem for a continuous 7 day period. 10CFR20.203 specifies posting requirements for Radiological Materials and Radiation Areas. If the activity present in a given area is greater than ten times the

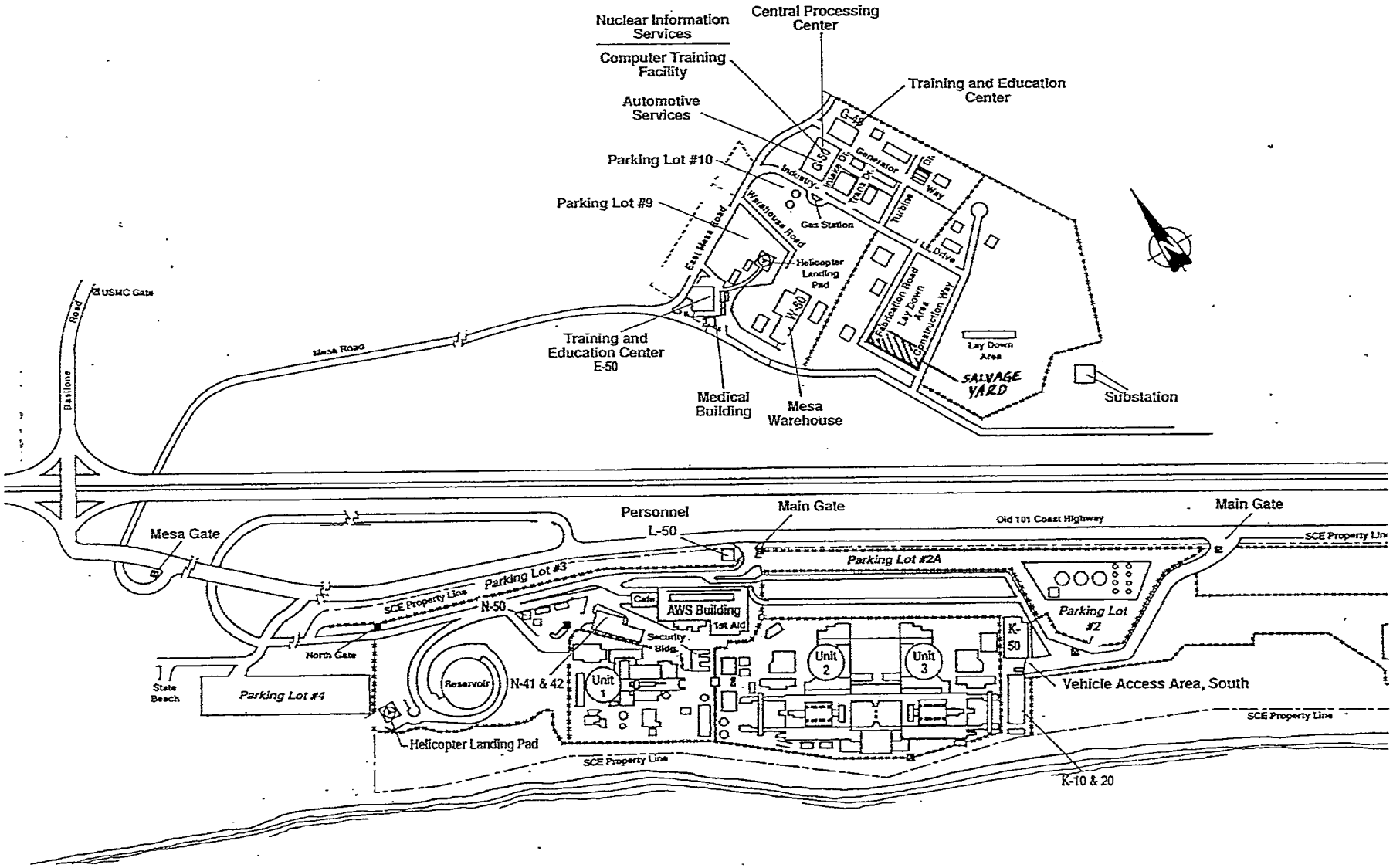
Appendix C limits the area must be posted as a "Radioactive Materials Area" and if a person is capable of receiving 5 millirem wholebody dose over a one hour continuous period the area must be posted as a "Radiation Area". 10CFR20.405, subparagraph (v), lists the reportability requirements for personnel exposures in non-restricted areas. If the radiation levels or nuclide concentrations in an unrestricted area are in excess of 10 times any applicable limit then a "Reportable" situation exists. 10CFR20.207 lists the storage and control requirements for Radioactive Materials in non-restricted areas. Radioactive Materials stored in an unrestricted area must be secured from unauthorized removal. The description of the salvage yard lot and Health Physics control over that lot demonstrates compliance with 10CFR20.207. 49CFR173.403, subparagraph (y), states the definition of "Radioactive Materials" as being any material with a specific activity greater than 2 nanoCuries per gram of that material. Materials with activity greater than this value are subject to specific transportation and documentation requirements by the Department of Transportation. Compliance with all of the above regulations is demonstrated in the attached spreadsheet.

This memorandum and the attached spreadsheet will be updated and distributed periodically to provide information regarding the progress of work at the mesa salvage yard.

[redacted]
HP Engineer

cc: [redacted]
ITA File #92115
CDM

SAN ONOFRE NUCLEAR GENERATION SITE



SALVAGE YARD CLEANUP

Date Found	Item Description	Total Contam. (ccpm)	Smearable Contam. (dpm/100 cm ^ 2)	Nuclide I.D.	Activity (nCi)	WB Dose Rate (mR/hr)	D.O.T. (173.403)	10CFR20 Appendix C	10CFR20.405 Reportable	Comments
21-May-92	4" Pipe section	360	<1k	Pb-214	1.6E+00	< 0.01	**<2nCi/g**	n/a	NO	GeLi, survey, non-uniform
21-May-92	4" Pipe section	360	<1k	Pb-214	1.6E+00	< 0.01	**<2nCi/g**	n/a	NO	GeLi, survey, non-uniform
26-May-92	Flex-atalic Gasket	4500	<1k	Cs-134;137;Co-60	2.0E+01	< 0.01	**<2nCi/g**	<app. C	NO	GeLi, survey, uniform
05-Jun-92	Wheel	1800	<1k	Cs-137	8.1E+00	7.00E-02	**<2nCi/g**	<app. C	NO	Survey, uniform, Geli
05-Jun-92	Wheel	1600	<1k	Cs-137	7.2E+00	5.00E-02	**<2nCi/g**	<app. C	NO	Survey, uniform, Geli

- Wholebody dose rate determined using survey and GeLi data (1000 mg/cm ^ 2) and the MicroShield computer code when necessary

EXPLANATION OF COMMENTS

- GeLi: Gamma spectroscopy analysis was performed on item
- Survey: item was surveyed
- Uniform/Non-Uniform distribution of contamination

SONGS HP INDIVIDUAL TASK ASSIGNMENT (ITA) [redacted]

A. ORIGINATOR: Complete this Section, individual assigning ITA is to complete Section B 92123

1) Name (Print) [redacted] 2) Enter your next ITA number [redacted]

3) Describe Task EXEMPT BENTHIC WASTE SHIPMENT TO OTAY MESA LANDFILL

4) Describe what constitutes completion

5) List appropriate references

6) Sign and Date [redacted]

B. ASSIGNOR(S): Compliance with this Section is indicated by your signature or initials below.

1) All necessary documents are to be referenced and/or readily available and/or attached.

2) Prime assignor and assignee discuss this ITA and agree on Prime Due Date, assignor enters:
PRIME DUE DATE* of 8-21-92 Assigned to [redacted] By [redacted] On 8-10-92

3) Subsequent assignor and assignee discuss and agree on Sub Due Date, assignor enters:
SUB DUE DATE* of _____ Assigned to _____ By _____ On _____

4) Assignor(s) gives original ITA to assignee and forwards a copy to TAC Coordinator.

*Prime Due Dates should be at least 5 calendar days beyond the date when task first assigned and Sub Due Dates must not be later than Prime Due Dates.

C. DUE DATE EXTENTION REQUEST: This Section is not a substitute for the Prime Due Date in Section B which must be agreed to between assignor/assignee prior to establishment. Required extensions, initiated by assignee, are to be requested as far in advance of the pending due date(s) as possible whenever completion date problems are identified.

1) New SUB DUE DATE of _____ Requested By _____ On _____

2) New PRIME DUE DATE of _____ Requested By _____ On _____

3) Reason why due date cannot be met

4) New SUB DUE DATE of _____ Approved By _____ On _____

5) New PRIME DUTE DATE of _____ Approved By _____ On _____

6) Copy of ITA forwarded to TAC Coordinator By _____

D. TASK COMPLETION: To be completed by assignee and forwarded to originator.

1) Statement of completed action 8-21-92 Memo for files attached

2) Date completed 8-21-92

3) Is a copy of completion document attached X Yes (ACTION IS NOT COMPLETE WITHOUT THIS)

4) Signature of Assignee [redacted] Date [redacted]

5) Originator is to forward original ITA and supporting documentation to TAC Coordinator.

To TACC on _____ date, By _____

Distribution: White - Originator Canary & Pink - Assignee Goldenrod - TAC Coordinator

SCE SO(123) 197 REV. 0 11/24/82

MEMORANDUM FOR FILE

August 21, 1992

Subject: Exempt Benthic Waste Shipment to Otay Mesa Landfill

In accordance with a State of California exemption, obtained for the landfill disposal of the contents from a San Onofre Unit 1 fish basket containing small amounts of radioactivity, I have escorted and observed the proper disposal of said contents.

On August 21, 1992, I observed the transport of 50 cubic feet of marine debris to the Otay Mesa Landfill. At the landfill, the waste was dumped from the truck in a designated area. Within minutes of dumping, landfill operators spread and covered the material with several feet of dirt and trash, as required by the exemption. Samples taken from the container on August 12, prior to transport, indicated activity levels of 6.82E-7 μCi/ml, 1.45E-7 μCi/ml, and 7.56E-7 μCi/ml of Cobalt-60, Cesium-134, and Cesium-137 respectively.

This shipment brings the total volume of all exempt benthic waste disposed of to date to 580 cubic feet, which effectively constitutes fulfillment of the state exemption allowing for a total of 600 cubic feet to be disposed.

[redacted]
HP Engineer

[redacted] fish2: [redacted]

cc: [redacted]
CDM
[redacted]
ITA#92123

REFERENCE: SO123-VII-8.2.11

ENCODE: CN04CJ-389-NM04-PP

SO 1 (When Form Filled C

RELEASE OF LIQUID, SLUDGE OR SLURRY

No liquid, sludge or slurry will be released from the Protected Area unless Sections I and III of this form are completed and Section III signed.

I. Container/Vehicle Data (Completed by Radwaste)

A. From what system or component was the liquid, sludge or slurry removed? UI FISH

B. Estimated total volume (or container dimensions and approximate % full) 50 ft^3

C. Container or vehicle identification 920810MC01

D. Container or vehicle destination OTAY MESA

E. Where is the container or vehicle located now? MPHF @ LOT 1

F. Proposed shipment date/time 8-20-92 / 1400

II. Chemistry or Counting Room Analysis

A. Sample volume (ml) 1000

B. Total volume (ml) of liquid, sludge or slurry in the container or vehicle (from I. above) 1.416 E6

C. Method of Analysis GELI C

D. Isotopic Identification

Nuclide	Concentration (µCi/ml)	Total Activity (µCi)
Co-60	6.822E-7	9.660E-1
Cs-134	1.451E-7	2.055E-1
Cs-137	7.561E-7	1.071E0

[redacted] Technician Name [redacted] Signature 8-20-92/1115 Date/Time

III. Radwaste Review

A. Would release of this liquid, sludge or slurry represent a radiological hazard?

B. Would release of this liquid, sludge or slurry violate the requirements of 10CFR or 49CFR for radioactive materials?

C. Was contamination and radiation clearance tag SO(123) 79 issued? N/A

D. Remarks C TO BE ESCORTED TO OTAY MESA BY [redacted]

E. This liquid, sludge, or slurry is cleared for release.

[redacted] Radwaste Foreman or Designee Name [redacted] Signature 8/20/92 1120 Date/Time

SCE SO(123) 212 REV. 1 12/03/85

Not CLEAN 8-12-92

****
********** 12-AUG-92 08:04:13 **********
****

MPHF BENTHIC WASTE 920810mc01

SAMPLE COLLECTION START DATE: 10-AUG-92 08:00:00
SAMPLE COLLECTION END DATE : 10-AUG-92 08:00:00
SAMPLE IDENTIFICATION: 0641
TYPE OF SAMPLE : U 2/3 CHEMISTRY
SAMPLE QUANTITY: 1000.000 UNITS: ML
PER CENT YIELD : 100.00000 REACTOR #: 0
SAMPLE GEOMETRY: 1000ML MARINELLI OPERATORS INITIALS: [redacted]
EFFICIENCY FILE NAME: EFFC .MAR1LC

ACQUIRE DATE: 12-AUG-92 07:58:47	FWHM(1332) : 2.419
PRESET TIME(LIVE): 300. SEC	SENSITIVITY: 3.500
ELAPSED REAL TIME: 300. SEC	SHAPE PARAMETER: 20.0 %
ELAPSED LIVE TIME: 300. SEC	NBR ITERATIONS: 5.

DETECTOR: GELIC	LIBRARY:NUCL .LIQUID
CALIB DATE: 12-AUG-92 02:59:22	ENERGY TOLERANCE: 1.250KV
KEV/CHNL: 0.4997688	HALF LIFE RATIO: 8.00
OFFSET: 0.4317302 KEV	ABUNDANCE LIMIT: 50.00%
Q. COEFF. : -4.725E-09 KEV/C**2	

ENERGY WINDOW 50.41 TO 2047.41

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	XERR	FIT	
1	0	163.33 U-235	10.	11.	1.45	325.94	322	9	3.17E-02	59.5		
2	0	207.45 U-235	13.	24.	2.26	414.24	406	19	4.39E-02	59.1		
3	0	239.40 Pb-212	24.	51.	1.26	478.17	472	17	8.00E-02	46.8		
4	0	310.87 Pa-233	10.	6.	2.79	621.16	617	11	3.17E-02	47.7		
5	0	351.76 Pb-214	31.	12.	1.14	702.99	696	16	1.05E-01	23.7		
6	4	604.53 Cs-134	15.	4.	1.48	1208.76	1201	31	5.07E-02	31.4	1.52E 0	
7	4	609.62 Bi-214	25.	2.	1.47	1218.96	1201	31	8.48E-02	21.5		
8	0	661.63 Cs-137	58.	9.	1.79	1322.82	1318	12	1.93E-01	15.0		
9	0	795.30 Cs-134	9.	3.	1.28	1590.50	1584	13	3.15E-02	42.2		
10	0	1172.99 Co-60	27.	0.	1.02	2346.26	2339	13	9.00E-02	19.2		
11	0	1332.12 Co-60	33.	0.	2.53	2664.67	2659	13	1.10E-01	17.4		
12	0	1459.89 K-40	26.	0.	2.84	2920.35	2910	19	8.67E-02	19.6		

PEAK SEARCH COMPLETED (V2.0 [SONGS 1/89])

NUCLIDE IDENTIFICATION SYSTEM (SONGS REV 3.0, 8/88)
SUMMARY OF NUCLIDE ACTIVITY PAGE 1

TOTAL LINES IN SPECTRUM 12
LINES NOT LISTED IN LIBRARY 6
IDENTIFIED IN SUMMARY REPORT 5 41.67%

CORRECTION FOR NUCLIDE INTERFERENCE ANALYSIS PERFORMED
CORRECTION FOR DEPOSITION DECAY PERFORMED

FISSION GAS

NUCLIDE	SBHR	HLIFE	END DATE DECAY	DEPOSIT DECAY	UCI /UNIT	1-SIGMA ERROR	%ERR
XE-131M	FG	11.90D	1.124	1.000	2.083E -6	1.240E -6	59.55

ACTIVATION PRODUCT

NUCLIDE	SBHR	HLIFE	END DATE DECAY	DEPOSIT DECAY	UCI /UNIT	1-SIGMA ERROR	%ERR
CO-60	AP	5.27Y	1.001	1.000	6.822E -7	1.188E -7	17.41

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	END DATE DECAY	DEPOSIT DECAY	UCI /UNIT	1-SIGMA ERROR	%ERR
CS-134	FP	2.06Y	1.002	1.000	1.451E -7	6.127E -8	42.23
CS-137	FP	30.02Y	1.000	1.000	7.561E -7	1.138E -7	15.05

TOTAL ACTIVITY = 3.667E-06 UCI /UNIT

TOTAL GASEOUS ACTIVITY = 2.083E-06 UCI /UNIT

TOTAL ACTIVITY LESS GASEOUS ACTIVITY = 1.583E-06 UCI /UNIT

SONGS HP INDIVIDUAL TASK ASSIGNMENT (ITA)

A. ORIGINATOR: Complete this Section, individual assigning ITA is to complete Section B.

1) Name (Print) [redacted] 2) Enter your next ITA number 94267

3) Describe Task EVALUATE RELEASE OF FISH FOR USE AS TEACHING AIDS

4) Describe what constitutes completion ~~Letter~~

5) List appropriate references Letter, [redacted] 10-18-94 Letter [redacted] dated 11-18-94 ATTACHED

6) Sign and Date [redacted]

B. ASSIGNOR(S): Compliance with this Section is indicated by your signature or initials below.

1) All necessary documents are to be referenced and/or readily available and/or attached.

2) Prime assignor and assignee discuss this ITA and agree on Prime Due Date, assignor enters:
PRIME DUE DATE* of 12-2-94 Assigned to [redacted] By [redacted] On 11-8-94

3) Subsequent assignor and assignee discuss and agree on Sub Due Date, assignor enters:
SUB DUE DATE* of _____ Assigned to _____ By _____ On _____

4) Assignor(s) gives original ITA to assignee and forwards a copy to TAC Coordinator.

*Prime Due Dates should be at least 5 calendar days beyond the date when task first assigned and Sub Due Dates must not be later than Prime Due Dates.

C. DUE DATE EXTENTION REQUEST: This Section is not a substitute for the Prime Due Date in Section B which must be agreed to between assignor/assignee prior to establishment. Required extensions, initiated by assignee, are to be requested as far in advance of the pending due date(s) as possible whenever completion date problems are identified.

1) New SUB DUE DATE of _____ Requested By _____ On _____

2) New PRIME DUE DATE of _____ Requested By _____ On _____

3) Reason why due date cannot be met _____

4) New SUB DUE DATE of _____ Approved By _____ On _____

5) New PRIME DUTE DATE of _____ Approved By _____ On _____

6) Copy of ITA forwarded to TAC Coordinator By _____

D. TASK COMPLETION: To be completed by assignee and forwarded to originator.

1) Statement of completed action Letter, [redacted] to [redacted] dated 12-2-94

See also ITA 94297 & 94268

2) Date completed 12-2-94

3) Is a copy of completion document attached X Yes (ACTION IS NOT COMPLETE WITHOUT THIS)

4) Signature of Assignee [redacted]

5) Originator is to forward original ITA and supporting documentation to TAC Coordinator.
To TACC on 12-5-94 date, By [redacted]

Distribution: White - Originator Canary & Pink - Assignee Goldenrod - TAC Coordinator

December 2, 1994

[redacted]

SUBJECT: Release of Fish for Use as Teaching Aids

REFERENCES:
1. Letter, [redacted], "Evaluation of Fish," dated October 18, 1994
2. Letter, [redacted], "Disposal of Benthic Material," dated November 18, 1994

In Reference 1, the Environmental Protection Group requested the Health Physics Division to determine whether fish collected during operation of the plants at San Onofre could be released for use as teaching aids. The short answer is yes, as explained below.

Since receiving your request, the Health Physics and Environmental Group (HP&E) completed their evaluation (Reference 2) of the necessity for radiometric analysis before releasing benthic material from the Restricted Area. Effluent from Unit 1 was explained as the source of the low level radioactivity found in benthic material at Units 2 and 3. The evaluation concluded: "Now that Unit 1 is no longer operating, this means of contaminating seaweed has been eliminated. ...The only plausible plant conditions that could coincide with low levels of contamination are: (1) operation of either unit with a secondary activity of 3E-05 μCi/ml; or (2) liquid radioactive waste releases of specific activity greater than 2E-04 μCi/ml. ... Apart from these conditions . . . HP&E recommends discontinuing routine sampling of benthic material for isotopic analysis as a prerequisite for disposing of the material in a local landfill."

As recommended, Station is amending practices to discontinue routine sampling and analysis before releasing benthic material unless the plant operating conditions described above make it necessary.

Although fish is not specifically mentioned in Reference 2, the term "benthic material" applies to the waste seaweed and entrained marine life collected in the fish baskets. So, the evaluation extends to fish. Landfill disposition is specified because that is the preferred method for disposal. However, since the material is free of radioactive contamination, there is no health physics concern to prevent the desired release of fish for use as teaching aids.

Operating Instruction SO23-2-6, "Fish Handling System and Entrainment of Marine Mammals and Reptiles," prohibits removing any marine life from the fish baskets for personal consumption or use. It is recommended that EPG verify that this proposed use of collected fish does not violate the California Fish and Game Code.

Before any fish is released for use as teaching aids, appropriate EPG procedures must be modified to require EPG personnel to verify that plant operating and effluent release parameters do not exceed the criteria described above from Reference 2.

Please direct any additional questions to [redacted] at PAX [redacted]

[redacted]
Health Physics Manager

cc: [redacted]

November 18, 1994

TO: [redacted]

SUBJECT: **DISPOSAL OF BENTHIC MATERIAL**

REFERENCES:

(1) "Benthic Waste Release Practices", 5/6/94 email from [redacted]
(2) "Disposal of Waste Materials Accumulated at SONGS" 5/16/86. [redacted]
(3) "Status of Benthic Material Release Program" 5/24/93. [redacted]
(4) "SONGS 2 & 3: Correlation of SG Activity to CWS Outfall MPC Values". Calculation N-4097-14
(5) "Standard Radiological Effluent Technical Specifications for Pressurized Water Reactors", Draft 7, Revision 3. 1982
(6) "Environmental Radioactivity", M. Eisenbud. 2nd edition. 1973 Academic Press

In Reference 1, Station Health Physics requested the Health Physics and Environmental Group review the practice of analyzing benthic material for gamma-emitting isotopes as a routine part of the disposal process. Given that Unit 1 is shutdown and permanently defueled, the potential for marine flora and fauna offshore from San Onofre to become contaminated is greatly reduced. This material is only likely to exhibit detectable activity if there is a significant primary-to-secondary leak with RCS activity, resulting in steam generator blowdown activity above 3E-5 μCi/ml or if liquid radwaste discharges are greater than 2E-4 μCi/ml. Sampling and analysis frequencies may be modified accordingly.

BACKGROUND

Radioactive liquids are discharged into the Pacific Ocean as part of the normal operation of SONGS. The Radioactive Effluent Program ensures those discharges are performed in accordance with 10 CFR 20.1301 (previously 20.106) and 10 CFR 50 Appendix I as embodied in the Offsite Dose Calculation Manual and site procedures. All releases are diluted in the circulating water system and then, to a much greater extent, by the ocean itself. Samples of seawater, sand, plants, and animals taken as part of the Radiological Environmental Monitoring Program do not routinely show detectable levels of activity. At least theoretically, the potential exists for organisms to occasionally contain trace amounts of radioactive material due to their proximity to San Onofre, primarily as a function of the ability for some species to selectively concentrate different elements with respect to ambient levels. Marine debris collected on the rakes and screens of the circulating water system intake is known as benthic material.

In 1986, a prudent radiological protection practice was established of analyzing benthic material for gamma-emitting isotopes prior to disposal (Reference 2). SCE has always maintained that this material is collected from the environment and therefore outside the provisions of 10 CFR 20 regarding "licensed material". In 1988 after low-levels of activity had been detected with some frequency in the benthic material, an exemption was obtained from the State to dispose of the waste in a municipal facility. A concise review of documents on this issue can be found in Reference 3, along with the recommendation to continue the program as it existed at that time.

DISCUSSION

There are several mechanisms that, as part of routine plant operation, result in releasing radioactivity to the marine environment, thereby making it available to biota for uptake:

(1) Feed and bleed of the RCS to coolant radwaste for chemical control
(2) Processing of wastewater through the miscellaneous liquid radwaste system
(3) Regeneration of purification ion exchangers:
    (a) Blowdown Processing System (BPS)
    (b) Full Flow Condensate Polishing Demineralizer System (FFCPD)
(4) Primary to secondary leakage with
    (a) Blowdown to the outfall for chemical control
    (b) Overboarding condensers for chemical control
    (c) Turbine lab drains to the control building sump

System fluids from the RCS, SFP, and RWST (Item 1) are processed through ion exchangers to ensure control of chemical and radiochemical contaminants. Partial drainage of those systems and wastewater collected in the plant sump and drain systems (Item 2) are also processed before being released to reduce the specific activity. These liquid radioactive waste discharges are considered an intermittent source to the environment. SO123-III-5.1.23 establishes an administrative goal of 2E-5 μCi/ml particulates and iodine before the wastewater is discharged. If there are extenuating circumstances, Effluent Engineering can authorize releases above the administrative limit on a case-by-case basis. As demonstrated in Attachment 1, sampling of benthic material below radwaste concentrations of 1E-4 μCi/ml for all Co isotopes, 1E-5 μCi/ml for all Cs isotopes and 1E-4 μCi/ml for I isotopes would not likely detect any activity. Not included in the calculation, is the large dilution that occurs once releases from the plant leave the discharge pipe and enter the ocean. Rapid mixing in the immediate vicinity of the discharge pipe and subsequent dispersion should further reduce activity by three or more orders of magnitude.

Empirical data from liquid release permits have shown that regenerant wastewater (Items 3a and 3b) does not contain significant levels of activity even after use during primary to secondary leakage conditions. Furthermore, short-lived isotopes like I-131 would be expected to decay away between retention on the resin and subsequent regeneration, particularly if the leakage occurred at the beginning of ion exchanger bed life. Releases from the BPS and FFCPD sumps which would contain concentrations greater than the administrative goal of 2E-5 μCi/ml are not considered likely.

During startup and shutdown of the plant, steam generators blowdown may be diverted directly to the outfall, bypassing the BPS, for chemical control (Item 4a). This mechanism is considered the most potentially significant in terms of activity being discharged to the environment from the SG or BPS. Calculation N-4097-14 discusses the partitioning of isotopes between the steam generator liquid and the condensate in detail. The result is that no meaningful fraction of isotopes is carried into the secondary side by the steam and, further, given that overboarding of the condensers to the outfall for chemical control is infrequent, Item 4b does not constitute a major mechanism for introducing radioactivity to the marine environment. Similarly, the sample drains from the turbine lab to the control building sump (Item 4c) do not represent a significant pathway. The mechanism which could result in the highest activity being released is therefore Item 4a. Attachment 1 provides the calculated activity for Cs, Co, and I isotopes in steam generator blowdown above which there is the potential for activity to be detectable in benthic material entering the plant's intake structure(s).

There are obviously other accidental/catastrophic events (tank or pipe failures, inadvertent introduction of high specific activity wastewater to yard drains) which could result in releases of radioactive water to the environment. Given that site programs and procedures have been established to minimize the likelihood of uncontrolled releases, it is not deemed appropriate to implement a sampling frequency of the benthic material based on these occurrences.

Finally, in consideration that there might be a very low potential for this environmental material to be disposed of with very low levels of detectable activity, a dose assessment was performed using the software program IMPACTS and assuming disposal of 300 ft^3/month with E-6 μCi/g each of Co-60 and Cs-137. The solid waste is assumed to be buried in a municipal landfill where the site is administratively controlled by the city for 1 year before being released to public use. For the mixture of isotopes considered, the transportation worker theoretically obtains a higher dose than the construction and agriculture intruders, exposed waste impact, and leaching into groundwater impacts. Conservatively, the truck driver could obtain 0.2 mrem/yr - well below the public dose limits for licensed material in 10 CFR 20.1006.

Conclusion

Steam generator blowdown from Unit 1 was released to the ocean without processing since phosphates were used for chemical control. As such, whenever there was primary to secondary leakage at Unit 1, there was a strong potential for benthic material to have detectable levels of activity. The impact could be discerned at Units 2 and 3, just downcoast of Unit 1. Now that Unit 1 is no longer operating, this means of contaminating seaweed has been eliminated.

The philosophy of analyzing the benthic material prior to disposal as a careful radiological protection practice still holds true today. What has changed is that the likelihood of there being detectable activity in this environmental material has been reduced even farther. The only plausible plant conditions which could coincide with low levels of contamination are (1) operation of either unit with a secondary activity of 3E-5 μCi/ml or liquid radioactive waste releases of specific activity greater than 2E-4 μCi/ml. Chemistry personnel sample both streams routinely and should modify their procedures to notify the Health Physics Division whenever these levels are exceeded. Subsequent to notification, benthic material should continue to be analyzed for gamma emitters per existing HP practices.

Apart from these conditions, analysis of seaweed and/or entrained marine life for gamma isotopes will not provide additional assurances of either public health or protection of the environment. HP&E recommends that routine sampling of benthic material for isotopic analysis be discontinued as a prerequisite to disposal of the material in a local landfill. Only under those specific plant conditions discussed in the previous paragraph is analysis of the material likely to show detectable levels of activity.

If there are any questions concerning the information herein, please contact [redacted] of my staff [redacted] or myself, [redacted]

[redacted]

[redacted]

cc: [redacted]

CDM/HPE Files

ATTACHMENT 1

ITEMS 1 & 2 - DISCHARGES OF COOLANT OR MISCELLANEOUS LIQUID RADWASTE

(1) Feed and bleed of the RCS to coolant radwaste for chemical control
(2) Processing of wastewater through the miscellaneous liquid radwaste system

$$A_b = A_{rw} * \frac{RR}{DR} * BF * \frac{1}{DD}$$

where A_b is activity in the benthic material
A_{rw} is activity of radwaste discharges, μCi/ml
RR is release rate from radwaste, 100 gal/min
DR is dilution rate from 3 circulating pumps, 555000 gal/min
BF is bioconcentration factor
DD is dilution from the diffuser ports in circulating discharge pipe, 10

Determine when A_b should be less than environmental MDAs

Limiting $$MDA = A_{rw} * \frac{RR}{DR} * BF * \frac{1}{DD}$$

where MDA is the minimum detectable activity in environmental samples

$$A_{rw} = MDA * \frac{DR}{RR} * \frac{1}{BF} * DD$$

$$\mu Ci/ml = \frac{pCi}{kg} * \frac{\mu Ci}{1E6\ pCi} * \frac{kg}{1E3\ g}$$

ISOTOPE	MDA[a] (pCi/kg)	BF[b]	A_{rw} (μCi/ml)
Co-58	130	51	1.4E-4
Co-60	130	51	1.4E-4
Cs-134	130	553	1.3E-5
Cs-137	150	553	1.5E-5
I-131	3000[c]	1065	1.6E-4

[a] Minimum detection levels taken from Table 4.12-1, NUREG-0472 (Reference 5)
[b] Bioconcentration factor from Table 6-4 "Environmental Radioactivity", Eisenbud, M.; 2nd edition, 1973 Academic Press (Reference 6)
[c] No environmental MDA for fish (wet weight) given. Non-drinking water MDA used (Reference 5)

ITEM 4a - BLOWDOWN OF SG DIRECTLY TO OUTFALL

Maximum blowdown rate = 250 gpm/steam generator
Assume two generators blown down simultaneously, 500 gpm = RR

Substituting A_{sg} for A_{rw} in the previous equation:

$$A_{sg} = \frac{pCi}{kg} * \frac{\mu Ci}{1E6\ pCi} * \frac{kg}{1E3\ g} * \frac{DR}{RR} * \frac{1}{BF} * DD$$

ISOTOPE	MDA[a] (pCi/kg)	BF[b]	A_{sg} (μCi/ml)
Co-58	130	51	2.8E-5
Co-60	130	51	2.8E-5
Cs-134	130	553	2.6E-6
Cs-137	150	553	3.0E-6
I-131	3000[c]	1065	3.1E-5

[a] Minimum detection levels taken from Table 4.12-1, NUREG-0472 (Reference 5)

[b] Bioconcentration factor from Table 6-4 "Environmental Radioactivity", Eisenbud, M.; 2nd edition, 1973 Academic Press (Reference 6)

[c] No environmental MDA for fish (wet weight) given. Non-drinking water MDA used (Reference 5)

HEALTH PHYSICS DIVISION PROJECT/SERVICE REQUEST FORM

REQUESTOR'S NAME: [redacted] CODE:* _____ PAX: _____

PROJECT SCOPE: (Describe what is to be accomplished; list references if an

Evaluate whether fish from plant can be released for scientific work by students.

COMPLETION: (Describe the factors to be used when determining if the project has been completed satisfactorily.)

APPROVED BY SUPERINTENDENT: [redacted] DATE: 11-8-94

HEALTH PHYSICS DIVISION PROJECT ASSIGNMENT FORM

ID #: _____ CODE:* _____

ASSIGNED TO: _____
Name Group PAX

TITLE: _____

PRIORITY: _____

START DATE: _____

DUE DATE: ~~11-8-94~~

BUDGETED HOURS: _____

COMMENT: _____

ASSIGNED BY SUPERINTENDENT: _____ DATE: _____

* Codes:

HPD = HPD Manager (Knapp)
SUP = Superint. HPE/Dosim. (Warnock)
HPE = Superv. HP Engineering
ALA = Lead, ALARA
RAD = Lead, Radwaste
HPI = Lead, HP Instruments
DOS = Superv. Dosimetry
OPS = Superint. OPS HP/RMC (Fee)
U1 = Superv. Unit 1
U2&3 = Superv. Unit 2&3
RMC = Superv. RMC
NHP = Non-HP Requestor

Generic Tracking System (GENTS), 10/27/94

Seq. No. 94-00066 Document date 10/18/94
To [redacted] Units
From [redacted]
Subject EVALUATION OF FISH

Type ACTION File code Status O

Received 10/27/94 Due date 11/08/94 Forecast / / Scheduled / /

Closed / / Assignee [redacted]

Key 1 2 3

Seq. No. Cross Ref. 1: 2: 3: 4: 5:

Assignment No. and Description:
> HP TO EVALUATE IF FISH COLLECTED DURING HEAT TREATS CAN BE FREE RELEASED
> VIA COUNTING TO PART-TIME SCE EMPLOYEES FOR EDUCATION RESEARCH & TO SERVE
> AS TEACH AIDS.
>
>
>
>
>
>
>
>
>
>
>
>
>
>
>
>
>
>
>
>
>
>

[Activity Journal]

(none)

[redacted]

Please develop a response for my signature

[redacted]

RECEIVED

[redacted]

OCT 24 1994

October 18, 1994

[redacted]

[redacted]

Please log this assignment [redacted]

SUBJECT: Evaluation of Fish

The Environmental Protection Group (EPG) is requesting the Health Physics Division to evaluate if fish collected during Heat Treatments can be free released via counting to part-time SCE employees for educational research and to serve as teaching aids.

To reduce costs, EPG has hired high school teachers, university professors and graduate level students as part-time SCE employees. The purpose is to supplement the EPG staff and to replace high priced contract labor to perform fish impingement activities during heat treatments. During these heat treatments, these part-time employees identify which species that they would like to remove from SONGS property. These species will be disposed of through the normal trash collection after research data is collected or would be preserved at the schools in glass containers for future teaching aids.

Free releasing these species would have numerous benefits. Destructive gill netting can be reduced by local university and positive public relations will be generated among the local schools and universities.

Please determine if these specimens can be free released. If you have any questions, please contact [redacted] at [redacted]

[redacted]

Manager, Site Support Services

MJJ94167.lsp

cc: [redacted]

SONGS HP INDIVIDUAL TASK ASSIGNMENT (ITA)

A. ORIGINATOR: Complete this Section, individual assigning ITA is to complete Section B.

1) Name (Print) [redacted] 2) Enter your next ITA number 94268

3) Describe Task ~~[redacted]~~ TAKE APPROPRIATE ACTIONS IN ACCORDANCE WITH CONCLUSIONS CONCERNING DISPOSAL OF BENTHIC MATERIAL ~~[redacted]~~; SEE REFERENCE ATTACHED

4) Describe what constitutes completion CHEMISTRY AND HP PROCEDURES & PRACTICES REVISED IN ACCORDANCE WITH CONCLUSIONS IN ATTACHED LETTER.

5) List appropriate references Letter, [redacted] TO [redacted] dated 11-18-94; subject Disposal of Benthic Material and [redacted] HANDWRITTEN NOTE

6) Sign and Date [redacted]

B. ASSIGNOR(S): Compliance with this Section is indicated by your signature or initials below.

1) All necessary documents are to be referenced and/or readily available and/or attached.

2) Prime assignor and assignee discuss this ITA and agree on Prime Due Date, assignor enters:
PRIME DUE DATE* of 1-15-95 Assigned to [redacted] By [redacted] On 12-5-94

3) Subsequent assignor and assignee discuss and agree on Sub Due Date, assignor enters:
SUB DUE DATE* of _____ Assigned to _____ By _____ On _____

4) Assignor(s) gives original ITA to assignee and forwards a copy to TAC Coordinator.

*Prime Due Dates should be at least 5 calendar days beyond the date when task first assigned and Sub Due Dates must not be later than Prime Due Dates.

C. DUE DATE EXTENTION REQUEST: This Section is not a substitute for the Prime Due Date in Section B which must be agreed to between assignor/assignee prior to establishment. Required extensions, initiated by assignee, are to be requested as far in advance of the pending due date(s) as possible whenever completion date problems are identified.

1) New SUB DUE DATE of _____ Requested By _____ On _____

2) New PRIME DUE DATE of _____ Requested By _____ On _____

3) Reason why due date cannot be met _____

4) New SUB DUE DATE of _____ Approved By _____ On _____

5) New PRIME DUTE DATE of _____ Approved By _____ On _____

6) Copy of ITA forwarded to TAC Coordinator By _____

D. TASK COMPLETION: To be completed by assignee and forwarded to originator.

1) Statement of completed action See attached E-mail

2) Date completed 2-2-95

3) Is a copy of completion document attached X Yes (ACTION IS NOT COMPLETE WITHOUT THIS)

4) Signature of Assignee [redacted]

5) Originator is to forward original ITA and supporting documentation to TAC Coordinator.

To TACC on _____ date, By _____

Distribution: White - Originator Canary & Pink - Assignee Goldenrod - TAC Coordinator

SCE 80(123) 197 REV. 0 11/24/82

Author: [redacted] at WEST4
Date: 2/2/95 5:40 AM
Priority: Normal
CC: [redacted]
TO: [redacted]
Subject: Re: ITA #94268 - Disposal of Benthic Material
---------- Message Contents ----------

[redacted] Let's consider this assignment closed. Thanks, [redacted]

[redacted]

The action items required to dispose of benthic material without sampling have been completed.

1, [redacted] agreed to add a statement to SO123-III-2.22.23 for Chemistry to notify the Sup. of RMC when the secondary activity exceeds 2E-6 uCi/ml.

2, [redacted] has been assigned to TCN Effluent procedures to Notify HP of liquid radioactive waste releases with an activity greater than 2E-4 uCi/ml.

3, HPP SO123-VII-20.9.3 has been revised and states that RMC must ensure the two conditions above have not been exceeded before releasing benthic material.

[redacted]