



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
1600 EAST LAMAR BLVD  
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June 28, 2012

Mr. Edward D. Halpin  
Senior Vice President  
& Chief Nuclear Officer  
Pacific Gas and Electric Company  
P. O. Box 3  
Mail Code 104/6/601  
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SUBJECT: NRC INSPECTION REPORT 050-00133/12-009

Dear Mr. Halpin:

This refers to the inspection conducted on June 11-14, 2012, at the Humboldt Bay Power Plant, Unit 3, facility, in Eureka, California. The enclosed report presents the results of this inspection. This inspection was an examination of activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel. In summary, the inspector determined that you were conducting decommissioning activities in accordance with license and regulatory requirements. The preliminary inspection results were presented to your staff at the conclusion of the onsite inspection.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's documents system (ADAMS), accessible from the NRC's Web site at [HTTP://www.nrc.gov/reading-rm/adams.html](http://www.nrc.gov/reading-rm/adams.html). To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction.

Should you have any questions concerning this inspection, please contact Dr. Gerald Schlapper, Health Physicist, at 817-200-1273 or the undersigned at 817-200-1191.

Sincerely,

/RA/

D. Blair Spitzberg, PhD, Chief  
Repository and Spent Fuel Safety Branch

Docket: 050-00133  
License: DPR-7

Enclosure:  
NRC Inspection Report 050-00133/12-009

Pacific Gas and Electric Company

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U. S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket: 050-00133

License: DPR-7

Report: 050-00133/12-009

Licensee: Pacific Gas and Electric Company

Facility: Humboldt Bay Power Plant, Unit 3

Location: 1000 King Salmon Avenue  
Eureka, California 95503

Dates: June 11-14, 2012

Inspector: Gerald Schlapper, PhD, PE, CHP, Health Physicist  
Repository and Spent Fuel Safety Branch

Approved by: D. Blair Spitzberg, PhD, Chief  
Repository and Spent Fuel Safety Branch

Attachment: Supplemental Inspection Information

Enclosure

## **EXECUTIVE SUMMARY**

### Humboldt Bay Power Plant, Unit 3 NRC Inspection Report 050-00133/12-009

This inspection was a routine, announced inspection of decommissioning activities being conducted at the Humboldt Bay Power Plant (HBPP), Unit 3, facility. In summary, the licensee was conducting site activities in compliance with regulatory and license requirements.

#### **Decommissioning Performance and Status Review at Permanently Shutdown Reactors**

At the time of the inspection, decommissioning remains on schedule and within budget though the sequence of some activities has required adjustment to accommodate the challenges of scheduling. The licensee conducted decommissioning activities in accordance with license and regulatory requirements. The licensee continues to assess what should be the final end state of the facility with special emphasis on determining whether or not underground structures such as the caisson are to be removed. Removal of underground structures will impact the cost of decommissioning and time required to complete the effort. Radioactive postings and boundaries were maintained in accordance with regulatory requirements (Section 1).

#### **Occupational Exposure During SAFSTOR and DECON**

The licensee monitored occupational exposures in accordance with procedures and regulatory requirements. Personnel exposures were well below applicable limits and reflect application of ALARA (as low as reasonably achievable) to work activities (Section 2).

#### **Radioactive Waste Treatment and Effluent and Environmental Monitoring**

The licensee conducted effluent and environmental monitoring in accordance with license and regulatory requirements. Continuation of silt buildup in the discharge canal was again noted by the inspector and confirmed by the licensee. The buildup of silt reduces the volume of water that serves to dilute the monitored effluent discharge stream prior to discharge into Humboldt Bay. The licensee is reviewing the process for discharge of treated and monitored effluent from the liquid radwaste stream and based on measurements has decreased the factor for dilution in the discharge canal. The licensee was in the process of updating applicable sections of the Off-site Dose Calculation Manual to reflect this change in dilution factor. (Section 3).

## **Report Details**

### Summary of Plant Status - Unit 3

During the inspection, the Humboldt Bay Power Plant (HBPP), Unit 3, was being decommissioned by the licensee in accordance with commitments made in its Post Shutdown Decommissioning Activities Report, dated June 30, 2009. The licensee is in the process of analyzing the feasibility and cost of removing subsurface structures as part of the decommissioning process.

## **1 Decommissioning Performance and Status Review (71801)**

### **1.1 Inspection Scope**

The inspector evaluated whether the licensee and its contracted workforce were conducting decommissioning activities in accordance with license and regulatory requirements.

### **1.2 Observations**

The licensee's project team continues to work to determine the end state of decommissioning and key assumptions and costs associated with various options. The majority of the decommissioning effort to date has been the removal of systems and components which the licensee has termed the Plant System Removal Phase. This phase has been characterized by the requirement to maintain systems in service as others were removed, maintain configuration control, and remove large components with the potential for high levels of radiation exposure. The potential for elevated exposures dictated slow and methodical disassembly with removal of contaminated systems and required significant engineering controls in order to maintain safety of the workers and public.

The project team has defined five major project areas that will encompass the completion of the effort. These areas are demolition of the turbine building, remediation of the intake and discharge canals, excavation and demolition of remaining permanent plant structures and facilities, demobilization of office facilities and final site restoration. A feasibility study with a duration of 6 months is underway to analyze removal of the Reactor Caisson and Foundation Piles. This effort, if undertaken, will involve construction of a clay and concrete slurry wall surrounding the Unit 3 area that will act to improve soil stability and also limit ingress of water as the structures are removed. This study will be completed by September 2012 and will support a decision to remove or leave underground the concrete structures.

As noted in a previous inspection report (IR 050-00133/12-07) on Wednesday February 15, 2012, the facility experienced a near miss safety event when a live 480 volt line was penetrated by a worker. The electrician did not notice any electrical shock though this was a near miss to a potentially fatal event. An investigation was initiated and a condition report issued to document the event (SAPN 1282178). A Technical Review Group (TRG-12-03) was formed on

February 15, 2012, to investigate the event. The inspector reviewed the efforts of the Technical Review Group through review of minutes of the meetings of this group. Actions proposed by this Group should act to prevent a repeat of this type of electrical incident.

During site tours, the inspector measured ambient gamma exposure levels with a Ludlum Model 2401-EC2 survey meter (NRC Serial Number 257911, calibration due 01/09/2013). No areas were found that were inconsistent with observed postings made pursuant to 10 CFR 20.1902.

### 1.3 Conclusions

The licensee conducted decommissioning activities in accordance with license and regulatory requirements. Radiation postings and boundaries were maintained in accordance with regulatory requirements. Ongoing work was conducted following applicable procedures and in accordance with license and regulatory requirements.

## **2 Occupational Exposure During SAFSTOR and DECON (83100)**

### 2.1 Inspection Scope

The inspector evaluated the licensee's program for monitoring and tracking occupational exposure of workers to ensure that the program was in accordance with license and regulatory requirements.

### 2.2 Observations

Based on data supplied by the licensee, the inspector noted that the actual personnel exposures through the end of April 2012 of 16.4 Man-Rem is significantly less than the estimated level of 25.6 Man-Rem. Licensee data shows that approximately 4.7 Man-Rem were saved through application of ALARA practices during removal of the cleanup heat exchanger. Licensee estimates of exposure beginning in May 2012 and continuing through November 2012, show an increase in level to approximately 65 Man-Rem due to tasks, such as reactor vessel internals removal and liquid radioactive waste tank removal, that are characterized by higher beta-gamma levels than have been experienced to date. The licensee continues to employ personal protective equipment to include positive air supply respirators to limit internal exposures. Because of the low levels of radioactivity contained in the samples, routine bioassay sample results have been consistently less than limits of detection, so, internal exposures are assigned based on data obtained from counts of lapel samples. In 2011, 4776 lapel samples were evaluated and it was determined that no internal exposures were received. Through April 2012, issuance of lapel samplers continue at approximately the same rate as in 2011 with a total of 1374 samplers issued. During site tours, the inspector observed proper use of lapel samplers by workers in the field. Results of analyses of these lapel samples continues to indicate that no personnel have received an internal exposure.

During the last inspection, the inspector witnessed the transfer of the reactor vessel chimney from the reactor vessel to the spent fuel pool. The chimney is a



large internal component to the reactor vessel that acted as a steam separator. The removal and movement of the chimney was accomplished without incident. However, the Radiological Work Permit (RWP-20120110) had not been closed out as of the end of the last inspection as all data was not available. The licensee completed review of applicable data and terminated the RWP on March 28, 2012. During the remote movement of the chimney, all individuals remained in a shielded area. Actual integrated dose for individuals in the refuel building during the transfer was 3.3 person-mrem. An additional 20 person-mrem was received during rigging of the chimney for the lift and transfer. Derived Air Concentration (DAC) levels reached a peak of approximately 5 DAC with this maximum level attributed by the licensee to removal of contaminated material subsequent to transfer of the chimney. Closeout of the RWP noted that actual dose rates in the refuel building during the transfer were 2 to 2.5 higher than had been estimated. The licensee initiated a condition report to track investigation of this discrepancy (SAPN 1283626). Upon investigation the licensee determined that the basic assumptions and calculational approach were correct and that the error was due to use of an incorrect Curie content in the specification of the source term. The licensee revised procedure RCP-1B, "Performing TEDE ALARA Reviews for Controlling Occupational Radiation Exposure" to require source documentation when available and verification by a second party.

### 2.3 Conclusions

The inspector reviewed techniques for control of occupational exposure during ongoing work. Exposure controls were implemented as described in applicable procedures. The inspector also reviewed the licensee's program for assessing internal exposures and noted that the program met regulatory requirements.

## **3 Radioactive Waste Treatment and Effluent and Environmental Monitoring (84750)**

### 3.1 Inspection Scope

The inspector reviewed effluent and environmental monitoring programs to determine whether the licensee conducted these efforts in accordance with license and regulatory requirements.

### 3.2 Observations

Because of the limited size of the Humboldt Bay Power Plant the licensee has found it necessary to survey decontaminated and decommissioned areas and then backfill, pave over areas or construct temporary facilities to allow for other decommissioning activities, such as storage of materials. Prior to approving an area for an alternate use, the licensee characterizes the area through use of data collected during walkover gamma measurements and soil sampling. During the period since the previous inspection of this area, the licensee had initiated excavation of the old 60 KV yard area as part of their characterization survey effort. The inspector reviewed the characterization survey planning worksheet for this effort (Survey Area OOL01, Unit 05, Name: CW Intake Piping Excavation Area) which is based on the MARSSIM process. The inspector found the worksheet to be adequate. The inspector also reviewed the licensee process for

soil sample tracking, preparation, and analysis (C&RPD-3, Final Status Survey Sample Preparation, Rev 0). The licensee utilizes a bar code system to minimize data transfer errors during collection and analysis. While excavation and sampling was scheduled to be completed during the period of the inspection, delays were experienced due to the licensee encountering unexpected material as soil was removed which included asbestos piping and PCB contaminated soil. Once the excavation is completed, soil samples will be taken for analysis and selected licensee soil samples will be split and retained for future verification by the NRC's contracted laboratory, Oak Ridge Institute for Science and Education (ORISE) in Oak Ridge, TN. Sample analysis at Oak Ridge will be performed in accordance with ORISE Procedures. Results of this laboratory inter-comparison will be documented in a future ORISE report which will be made publicly available in NRC's Agencywide Documents Access & Management System (ADAMS).

As a follow up to a previous inspection (IR 050-00133/11-09), the inspector reviewed the status of the Radioactive Liquid Effluent Monitor System (RLEMS). During the last inspection, the inspector noted that the licensee had determined that the system frequently tripped due to voltage spikes in the electrical supply to the system. The uninterruptable power supply (UPS) system supporting the RLEMS could not maintain system operation as desired, resulting in unnecessary trips requiring operator action to restore system functions. The inspector verified that the licensee has replaced the switching UPS system that was employed previously with a full double conversion in line UPS that has no transfer time and therefore will maintain power to circuits during transitions from the normal feed to battery based feed, avoiding spurious trips. Operation of the improved RLEMS system since installation of the upgraded UPS system has been without incident.

On the afternoon of April 17, 2012, the Stack Particulate Air Monitoring System (SPAMS) alarmed. As per procedure for an unexpected SPAMS alarm, work was stopped in surface contaminated areas until the cause was determined. An operator and radiation protection technician were dispatched to the SPAMS location and determined that all flows and readings were within acceptable limits. The licensee determined that the cause of the alarm was a momentary change in system air flow that is expected during the approximately 2 minutes required to change out the fixed filter paper. Normally the technician changing out the filter notifies the operator of the change out and so the alarm is anticipated. There was inadequate communication between the operator and the radiation protection technician and thus the operator responded as if the alarm was due to an actual event. The inspector validated that the system performed as designed through review of the procedure, STP 3.16.10, "Calibration of the Stack Particulate-Airborne Monitoring System (SPAMS), dated April 13, 2012. As tracked in the licensee's condition report system (SAPN 1284225), all radiation protection technicians involved in filter changeout were briefed on the alarm issue and were instructed to ensure that an operator is aware of the filter changeout and that the operator acknowledges that an alarm is expected.

During site tours, the inspector noted that silting of the discharge canal continues. Licensee data based on GPS system measurements taken beginning in April 2011, and continuing through June 2012, verifies that the amount of tidal volume available for dilution of treated, monitored effluents from the liquid

radwaste treatment system continues to decrease. Based on recent measurements, the licensee noted that the conservative dilution factors utilized in off-site dose calculations need to be reduced. However, effluents being discharged continue to comply with dose limits for individual members of the public pursuant to 10 CFR 20.1302. The licensee is finalizing a Technical Basis Document (TBD-208, Volume 12, Rev 1) that documents dilution factors used to calculate radioactivity concentrations at the outfall canal and in the Humboldt Bay environment that results from radioactivity contained in liquid releases. Based on this technical basis document, the licensee is also revising appropriate sections of the SAFSTOR/DECOMMISSIONING Off-Site Dose Calculation Manual (ODCM). Data applicable to silting of the discharge canal and resulting impact on radioactive effluent will continue to be of interest in future inspections. The licensee is reviewing alternate means for disposal of radioactive liquid waste should the discharge canal become filled with sand, preventing further discharge into Humboldt Bay.

### 3.3 Conclusions

The licensee conducted effluent and environmental monitoring in accordance with license and regulatory requirements.

## **4 Exit Meeting**

The inspector reviewed the scope and preliminary findings of the inspection during an exit meeting that was conducted at the conclusion of the onsite inspection on June 14, 2012. The licensee did not identify as proprietary any information provided to, or reviewed, by the inspector.

## **SUPPLEMENTAL INSPECTION INFORMATION**

### **PARTIAL LIST OF PERSONS CONTACTED**

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### **INSPECTION PROCEDURES USED**

IP 71801 Decommissioning Performance and Status Review at Permanently Shutdown Reactors  
  
IP 83100 Occupational Exposure During SAFSTOR and DECON  
  
IP 84750 Radioactive Waste Treatment and Effluent and Environmental Monitoring

### **ITEMS OPENED, CLOSED, AND DISCUSSED**

#### **Opened**

None

#### **Closed**

None

#### **Discussed**

None

## LIST OF ACRONYMS

ALARA	as low as reasonably achievable
CFR	<i>Code of Federal Regulations</i>
DAC	derived air concentration
EP	Emergency Plan
EOP	Emergency Operating Procedures
EPIP	Emergency Plan Implementing Procedures
HBPP	Humboldt Bay Power Plant
IP	NRC Inspection Procedure
ISFSI	independent spent fuel storage installation
LBIE	Licensing Basis Impact Evaluation
NFPA	National Fire Protection Agency
ODCM	Offsite Dose Calculation Manual
RCRA	Resource Conservation and Recovery Act
RLEMS	radioactive liquid effluent monitor system
RWP	radiation work permit
SFP	spent fuel pool
UPS	uninterruptable power supply