

April 2, 2013

Mr. Edward D. Halpin, Senior Vice President & Chief Nuclear Officer Pacific Gas and Electric Company P. O. Box 3 Mail Code 104/6/601 Avila Beach, CA 93424

#### SUBJECT: NRC INSPECTION REPORT 050-00133/13-007

Dear Mr. Halpin:

This refers to the inspection conducted on March 4-7, 2013, 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 <a href="https://www.nrc.gov/reading-rm/adams.html">https://www.nrc.gov/reading-rm/adams.html</a>. 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.

E. Halpin

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 Division of Nuclear Materials Safety

Docket: 050-00133 License: DPR-7

Enclosure: NRC Inspection Report 050-00133/13-007

cc w/encl: See next page

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# U. S. NUCLEAR REGULATORY COMMISSION REGION IV

Docket:	050-00133
License:	DPR-7
Report:	050-00133/13-007
Licensee:	Pacific Gas and Electric Company
Facility:	Humboldt Bay Power Plant, Unit 3
Location:	1000 King Salmon Avenue Eureka, California 95503
Dates:	March 3-7, 2013
Inspector:	Gerald A. Schlapper, PhD, PE, CHP, Health Physicist Repository and Spent Fuel Safety Branch
Accompanied by:	Lizette Roldan-Otero, PhD, Health Physicist Nuclear Materials Safety Branch B
Approved by:	D. Blair Spitzberg, PhD, Chief Repository and Spent Fuel Safety Branch
Attachment:	Supplemental Inspection Information

## EXECUTIVE SUMMARY

#### Humboldt Bay Power Plant, Unit 3 NRC Inspection Report 050-00133/13-007

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 the time of the inspection, decommissioning was progressing at a slower rate than what was initially planned. The sequence of some activities has required adjustment to accommodate the challenges of scheduling. A License Termination Plan (LTP) is to be submitted to the U.S. Nuclear Regulatory Commission (NRC) for approval in the spring of 2013 that will further define the end state of the site, refine decommissioning cost estimates and thereby provide a new baseline for cost and schedule considerations. The licensee conducted decommissioning activities in accordance with license and regulatory requirements. (Section 1)

#### Safety Reviews and Design Changes

The licensee conducted safety reviews and design changes in accordance with procedures and regulatory requirements. (Section 2)

## Solid Waste Management and Transportation

The licensee conducted solid waste management and transportation activities in accordance with procedures and regulatory requirements. (Section 3)

#### Occupational Exposure

The licensee continues to follow as low as reasonably achievable (ALARA) principles, maintaining personnel exposures well below applicable limits. Radioactive postings and boundaries were maintained in accordance with regulatory requirements. Occupational exposures were monitored in accordance with procedures and regulatory requirements. (Section 4)

#### Self Assessment, Auditing and Corrective Actions

The licensee conducts verification audits as required by the quality assurance program and procedures. The corrective action program at the site was revised during 2012 and required changes have been implemented. Assessments, audits and the corrective action program comply with regulatory requirements. (Section 5)

#### Maintenance and Surveillance

The licensee conducted maintenance and surveillance on equipment in compliance with the license and regulatory requirements. (Section 6)

# Organization, Management, and Cost Controls

The licensee organization remains unchanged since the last inspection with no change in management. Cost controls are in place. Decommissioning cost estimates will be baselined following submittal of the LTP, estimated to be in May 2013. (Section 7)

## **Report Details**

#### Summary of Plant Status - Unit 3

During the inspection, the 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 continues to transport waste to appropriate sites. The licensee continues 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 key assumptions and costs associated with various options. Decommissioning efforts to date have emphasized the removal of systems and components where, due to high levels of alpha contamination, the potential for elevated internal exposures resulting from intake of radioactive material dictated slow and methodical disassembly with removal of contaminated systems. Engineering controls were implemented in order to maintain safety of the workers and public. Once these components and systems are removed, work then moves to demolition of major structures, which the licensee describes as civil works projects. Use of more fixed price contracts is anticipated for removal of structures and buildings

The licensee's 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. The effort to remove underground structures to include the reactor caisson 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.

Demolition of the Turbine Building is underway with turnover of the building to the contractor already completed. It is anticipated that building demolition will be completed by mid-year 2013. Concrete rubble from the turbine building is expected to contain low levels of radioactive material and most of the rubble will meet criteria for disposal at the Idaho Resource Conservation and Recovery Act (RCRA) disposal site.

Because of the limited size of the HBPP site, 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 activities associated with decommissioning, such as processing of waste, storage of materials, or associated with future uses of the site, such as upgrading of the 60 kilo volt (kV) transmission facility. For example, the area formerly known as the liquid fuel oil tank area was decommissioned and filled with soil to level this portion of the site and allow for construction of storage buildings and a lay down area. Prior to approving this area for this alternate use, the licensee characterized the area through use of data collected during walkover gamma measurements and soil sampling. During the inspection, the inspectors noted that the licensee was in the process of constructing a material processing/material holding facility on the reclaimed fuel oil tank site.

The inspectors visited the existing 60 kV transmission area and observed the Final Site Survey (FSS) group performing site characterization surveys in an area that had been excavated as part of construction of a new and improved 60 kV transmission system for the Humboldt Bay Generating Station. The surveyors followed site procedures and employed a hand held GPS device coupled with survey meters to characterize the excavated area. The inspectors also reviewed the storage of data and noted that characterization survey data for specific locations could be readily accessed. Data was generated and stored to meet criteria required for final status surveys even though the data was used for characterization purposes.

Removal of material and components internal to the reactor vessel began in March of 2012 and will continue into early 2013. During the inspection, the inspectors reviewed video of the transfer of the Lower Shroud Assembly (LSA) from the reactor vessel to storage in the Spent Fuel Pool (SFP). After placement of the internal components into the SFP, the components will be further size reduced and packaged for shipment to a burial site. After removal of internal components is completed, the reactor vessel will be drained, a fixative applied to limit airborne releases, and the vessel shell will be segmented. The inspectors reviewed licensee's dry run efforts in preparation for removal of the control rod drive mechanisms. Removal of control rod drive mechanisms (CRDM) is projected to begin in March 2013, while work on vessel segmentation is scheduled to begin in mid-2013 and will continue into 2014.

#### 1.3 Conclusions

The licensee conducted decommissioning activities in accordance with license and regulatory requirements. Ongoing work was conducted following applicable procedures and in accordance with license and regulatory requirements.

## 2 Safety Reviews and Design Changes (37801)

#### 2.1 Inspection Scope

The inspector evaluated the licensee's program of review, assessment, and planning for decommissioning.

#### 2.2 Observations

The Quality Assurance Program for the Humboldt Bay Site includes an independent review function implemented by the Nuclear Safety Oversight

Committee (NSOC). The NSOC provides an independent review of changes. tests, experiments, and procedures which constitute a change to the Humboldt Bay Independent Spent Fuel Storage Installation (ISFSI), as described in the Humboldt Bay ISFSI Final Safety Analysis Report (FSAR) or the Humboldt Bay Power Plant Unit 3 Decommissioning Safety Analysis Report (DSAR). Past concerns of the NSOC related to the Corrective Action Program (CAP) at HBPP resulted in changes to the program that were put into effect through revision of the CAP as described in Procedure HBAP C-12, Problem Identification and Resolution, effective November 15, 2012. The revision streamlined the screening, evaluation and trending of corrective actions. Another change in the CAP is the replacement of technical review groups with a single individual who serves as the CAP coordinator who is dedicated to the program and who ensures consistent evaluation and completion of actions. Terminology is also changed so that it is more consistent with industry norms. The inspector reviewed licensee data and noted that the backlog of open notifications had been reduced and that reviews were conducted in a more timely manner, indication that the revised program was being effectively implemented.

The inspectors attended a meeting of the Plant Safety Review Committee (PSRC) conducted on March 5, 2013. The chair of the committee verified that a quorum of technically gualified members was present for the meeting. The PSRC review on this date discussed proposed revisions to the Off-site Dose Calculation Manual that were necessary due to a change of dilution factor when radioactive liquids were released to the discharge canal. The PSRC determined that additional information and clarification was needed before they could proceed with approval of the document. During site tours, the inspectors noted that silting of the discharge canal continues. Licensee data verifies that the amount of tidal volume present in the canal continues to decrease where monitored effluents from the liquid radwaste treatment are mixed in. Effluents being discharged continue to comply with dose limits for individual members of the public pursuant to Title 10 of the Federal Code of Regulations (CFR) 20.1302. With the reduction in tidal volume due to silting, the licensee is reviewing alternate means for disposal of plant liquid effluents to include shipment to an off-site disposal facility. The inspectors noted that installation of a water storage and treatment facility was underway. The facility will be used primarily to remove particulate matter and adjust pH to meet regulatory requirements prior to discharge to the environment of Humboldt Bay.

## 2.3 <u>Conclusions</u>

The inspector reviewed the programs for conduct of safety reviews and design changes and found them to be in accordance with procedures and regulatory requirements.

## 3 Solid Waste Management and Transportation (86750)

## 3.1 Inspection Scope

The inspector reviewed site procedures for shipment of solid waste material containing Class A waste and for shipment of solid waste material to a site approved for Resource Conservation and Recovery Act (RCRA) waste material

to evaluate compliance with applicable transportation requirements. The inspector also reviewed methods used by the licensee to ensure continued compliance with requirements of three exemption requests.

## 3.2 Observations

To ensure compliance with applicable NRC and Department of Transportation (DOT) regulations, the licensee utilized shipping compliance checklists. The inspector reviewed the shipping checklist and associated documentation for radioactive material in the form of fissile excepted, non-compactable trash, Class A waste material in the form of off-gas tunnel piping and concrete debris, that was shipped in a Type A package to the Energy Solutions Utah site. A Special Nuclear Material (SNM) Exemption Certification was completed to accompany the shipment. The checklist also requires that the licensee have documentation on file that certifies that the container used meets Type A package qualifications and that vendor provided procedures for use of the container were followed. The package includes documentation that manifested information is consistent with the approved waste profile. Documents supplied in the package indicated that the container had been inspected by the licensee and determined to be in compliance with DOT packaging requirements. Radiation/ contamination survey data sheets were noted that verified compliance with applicable limits as outlined in 10 CFR 71.47. Emergency response information was supplied to include an emergency contact number that was validated by the inspector to be staffed on a 24-hour basis.

The inspector also reviewed documentation for a shipment to the US Ecology RCRA site located in Idaho. Information supplied confirmed that the disposal site criteria and classification was determined by established procedures. Documentation also noted that exemption conditions as approved by NRC were reviewed and followed. The licensee noted that the intermodal utilized for this shipment met the general design packaging requirements of 49 CFR 173.410. Required direct radiation and contamination surveys were conducted and results were acceptable for this shipment. A vehicle inspection checklist was completed prior to approval for the vehicle to depart the site. A review of documents for these selected shipments indicate that license and regulatory requirements were met.

## 3.3 <u>Conclusions</u>

The licensee program for solid waste management and transportation of material for off-site burial was found to be performed in accordance with license and regulatory requirements.

## 4 Occupational Exposure (83101)

## 4.1 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.

## 4.2 Observations

The inspector reviewed licensee data for estimated exposure and actual exposure through the month of January 2013. Integrated exposure for this time in the decommissioning effort was estimated to be 48 Man-Rem compared to an actual value of 30.9 Man-Rem. The licensee attributed the difference to savings resulting from good implementation of ALARA practices of approximately 5.7 Man-Rem during work in the designated cleanup heat exchanger room and approximately 5 Rem in the waste tank vault effort. Additional reductions resulted from the delay due to equipment problems of activities such as reactor pressure vessel internals removal and liquid radioactive waste system decommissioning that were to have occurred during 2012 but were deferred to later dates in 2013.

The inspector also reviewed estimated and actual exposure data for the transfer of the Lower Shroud Assembly (LSA) from the Reactor Pressure Vessel (RPV) to the SFP. This task is similar to the transfer of the reactor chimney that was completed in March 2012. Lessons learned during the chimney lift were incorporated into this effort. The LSA is highly radioactive and contaminated so high gamma dose rates and the potential for airborne activity were anticipated for this high risk evolution. The licensee had developed and implemented contingency plans that detailed response to credible problems that might occur during the transfer. The inspector reviewed the licensee's effort to estimate exposures as presented in Humboldt Bay Calculation NX-422 of March 1, 2013 and found the approach to comply with requirements. The licensee utilized calculated estimates of Curie content of the LSA, appropriate geometry and the program Microshield to generate dose estimates at selected distances for the LSA. The inspector noted that measured gamma dose rate values at various locations during the lift of the LSA from the RPV and transfer to the SFP compared favorably with those calculated prior to the transfer. Engineered controls were employed to minimize airborne radioactivity. Total integrated exposure for the three individuals present in the refueling building during lift and transfer was found to be 1.2 person-mrem based on electronic dosimeter data which validates that the licensee met ALARA criteria. Real time monitoring of airborne radioactivity during the transfer with continuous air monitors and air samplers indicated that there was no airborne radioactivity generated during the transfer and thus engineering controls for minimizing airborne radioactivity were effective.

During site tours the inspector measured ambient gamma exposure levels with a Ludlum Model 2401-EC2 survey meter (NRC Serial Number 257911, calibration due date 12/28/2013). No areas were found that were inconsistent with observed postings made pursuant to 10 CFR 20.1902. On initial entry into the radiological controlled area of the plant, the inspector validated that controls were in place to allow entry only after required reviews of applicable radiation work permits (RWPs) were completed and knowledge of requirements specified in the RWP were demonstrated.

#### 4.3 <u>Conclusions</u>

The inspector reviewed the licensee's approach to control of occupational exposure during current work. Exposure controls were effective in maintaining exposures ALARA. Access controls, postings and radiation boundaries were maintained in accordance with regulatory requirements.

#### 5 Self Assessment, Auditing and Corrective Actions (40801)

#### 5.1 Inspection Scope

The inspector reviewed the conduct of audits performed by the licensee as required by the site quality assurance program. Also reviewed was implementation of a revised corrective action program that was initiated during late 2012.

#### 5.2 Observations

The inspector selected for review the report of the quality verification audit of the revised corrective action plan that was completed on February 15, 2013 and assessed the results of actions taken to correct deficiencies identified by the licensee in equipment, systems and methods of operation for the ISFSI and Unit 3. As noted earlier in this report during November 2012 the CAP was substantially revised to improve timeliness of completion of corrective actions and enhance trending of corrective actions. The review was well documented and concluded that procedure HBAP-C-12, "Problem Identification and Resolution," Revision 36 was being effectively implemented. Through discussion with personnel associated with the quality verification and the individual assigned responsibility for implementation of the revised CAP program, the inspector verified that the revised program has reduced the backlog of reviews, provided for more consistent interpretation of the safety significance of deficiencies and allowed for improved trending of actions.

The inspector also reviewed the quality verification report for the Lower Shroud Assembly Transfer dated March 7, 2013. This assessment detailed quality verification oversight of the transfer to include documentation of the evolution, field observations of preparation for the evolution to include quality verification staff attendance of pre-job briefs, verification of personnel qualification, and observation of the transfer. The report was of adequate detail to allow the inspector to assess the level of site planning, preparation and success of execution of the LSA transfer.

## 5.3 <u>Conclusions</u>

The inspector reviewed the quality verification and quality assurance group audits conducted by the licensee and determined that requirements outlined in the site quality assurance program were satisfied. The revised corrective action program has resulted in a reduction of a backlog of reviews.

## 6 Maintenance and Surveillance (62801)

#### 6.1 <u>Inspection Scope</u>

The inspectors reviewed radiation instrument calibration tracking and calibration of the Stack Particulate Airborne Monitoring System.

## 6.2 <u>Observations</u>

The inspectors reviewed data supplied through the calibration database for portable radiation survey instruments. Per procedure, the licensee uses a color coding to track calibration due dates in the database, for example an instrument calibrated and in use is coded green. Once the instrument is due for calibration within 30 days, a yellow flag is coded in the database. If past due for calibration the database entry is red flagged. This approach provides for quick assessment of instruments in the database. The inspector also checked selected instruments and noted that instruments in use were within calibration dates. Field personnel when questioned also noted that prior to use, daily instrument checks had been completed.

The inspectors also reviewed the status of the Stack Particulate Airborne Monitoring System (SPAMS). SPAMS is a continuous alpha-beta monitor installed in the exhaust stack that monitors gaseous release to the environment. The system also allows for collection of particulate on filter paper for subsequent isotopic analysis. The licensee presented to the inspector a general description of how the system functioned and demonstrated knowledge of system operation and limitations. The licensee also discussed with the inspector the recent calibration of the system. Adherence to calibration procedure requirements was noted.

## 6.3 <u>Conclusions</u>

The inspectors noted that the licensee program for maintenance and calibration of selected radiation protection instrumentation complied with applicable procedures and regulatory requirements.

## 7 Organization, Management, and Cost Controls (36801)

## 7.1 Inspection Scope

The inspector reviewed the organizational structure and staffing at the site. The licensee also supplied current cost information to allow for comparison with earlier projections. Preliminary estimates developed for inclusion in the License Termination Plan were supplied.

## 7.2 <u>Observations</u>

Management structure has not changed since the inspection of December 2012. Staffing at the site is being adjusted as the site transitions from licensee directed operations to more fixed price civil works projects conducted by contractors under licensee oversight. The operations organization that had been primarily responsible for Unit 3 operations is in the process of being disbanded with the majority of their past responsibilities being assumed by the radiation protection and engineering organizations. While the change of staffing will result in the need for additional training of new and reassigned staff so the inspector reviewed the training program required of radiation workers and radiation protection personnel and noted that the program complied with regulatory requirements.

The licensee in their budget update for February 2013 noted a cost performance index (CPI) of 0.90 and a schedule performance index (SPI) of 0.87, values consistent with those noted in the inspection of December 2012. The CPI is defined as the project's earned value divided by actual costs of work performed and since the CPI is less than unity, physical progress is being accomplished at a slightly greater cost than budgeted. The SPI is defined as the project's earned value divided by the planned value and, since the SPI is less than one, physical progress is slower than what was planned. A major impact on cost and schedule will be the determination of the desired final status of the site. Currently the licensee remains within early cost estimates for decommissioning. Further refinement and re-baselining of cost estimates will be submitted as part of the licensee's LTP.

## 7.3 <u>Conclusions</u>

Management and staffing at the site complies with requirements outlined in the Decommissioning Plan and license. Cost and schedule performance metrics have not changed since the last inspection. Baseline budget and schedule information will be updated and revised in the LTP to be submitted by the licensee in the near future.

#### 8 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 March 7, 2013. The licensee did not identify as proprietary any information provided to, or reviewed, by the inspector.

#### SUPPLEMENTAL INSPECTION INFORMATION

#### PARTIAL LIST OF PERSONS CONTACTED

- J. Albers, Radiation Protection Manager
- D. Anderson, Count Room Supervisor
- W. Barley, RP Consultant and FSS Supervisor
- A. Berry, Rad Waste/Transportation Supervisor
- C. Caldwell, Area Supervisor
- M. Celletti, Training Manager
- J. Chadwick, ALARA Supervisor
- S. Jones, QA Supervisor
- J. Kristofzski, HBPP Strategic Waste Disposal Manager
- S. McDonald, Safety/IH Department Supervisor
- K. Rod, Decommissioning Manager
- S. Schlerf, RP Supervisor
- L. Sharp, Director and Plant Manager
- M. Smith, Engineering Manager
- D. Sokolsky, Licensing Supervisor
- M. Strehlow, Deputy Director
- M. Tuse, QV Supervisor

#### **INSPECTION PROCEDURES USED**

- IP 36801 Organization, Management, and Cost Controls at Permanently Shutdown Reactors
- IP 37801 Safety Reviews, Design Changes and Modifications at Permanently Shutdown Reactors
- IP 40801 Self Assessment, Auditing and Corrective Action at Permanently Shutdown Reactors
- IP 62801 Maintenance and Surveillance at Permanently Shutdown Reactors
- IP 71801 Decommissioning Performance and Status Review at Permanently Shutdown Reactors
- IP 83101 Occupational Exposure During SAFSTOR and DECON
- IP 86750 Solid Waste Management and Transportation of Radioactive Materials

# ITEMS OPENED, CLOSED, AND DISCUSSED

<u>Opened</u>

None

<u>Closed</u>

None

Discussed

None

# LIST OF ACRONYMS

ADAMS ALARA	Agencywide Documents Access and Management System as low as reasonably achievable
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CPI	cost performance index
CRDM	control rod drive mechanisms
DOT	Department of Transportation
DSAR	Decommissioning Safety Analysis Report
FSAR	Final Safety Analysis Report
FSS	Final Site Survey
HBPP	Humboldt Bay Power Plant
IP	NRC Inspection Procedure
ISFSI	Independent Spent Fuel Storage Installation
kV	Kilo Volt
LSA	Lower Shroud Assembly
LTP	License Termination Plan
NRC	U.S. Nuclear Regulatory Commission
NSOC	Nuclear Safety Oversight Committee
RAU	Oak Ridge Associated Universities
PSRC	Plant Staff Review Committee
RCRA	Resource Conservation and Recovery Act
RPV	Reactor Pressure Vessel
SFP	Spent Fuel Pool
SNM	Special Nuclear Material
SPAMS	Stack Particulate Airborne Monitoring System
SPI	schedule performance index