

UNITED STATES NUCLEAR REGULATORY COMMISSION REGION IV 1600 E LAMAR BLVD ARLINGTON, TX 76011-4511

October 23, 2014

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 050-00133/14-009

Dear Mr. Halpin:

This refers to the inspection conducted on September 23-26, 2014, 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 inspectors 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 https://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.

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/

Ray L. Kellar, P. E., Chief Repository and Spent Fuel Safety Branch Division of Nuclear Materials Safety

Docket No: 050-00133 License No: DPR-7

Enclosure: NRC Inspection Report 050-00133/14-009

cc: Attached

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U. S. NUCLEAR REGULATORY COMMISSION REGION IV

Docket:	050-00133
License:	DPR-7
Report:	050-00133/14-009
Licensee:	Pacific Gas and Electric Company
Facility:	Humboldt Bay Power Plant, Unit 3
Location:	1000 King Salmon Avenue Eureka, California 95503
Dates:	September 23-26, 2014
Inspector:	Gerald A. Schlapper, PhD, CHP, Health Physicist Repository and Spent Fuel Safety Branch
Accompanied by:	Eric Simpson, Health Physicist, Inspector-in-Training Repository and Spent Fuel Safety Branch
Approved by:	Ray L. Kellar, P. E., Chief Repository and Spent Fuel Safety Branch Division of Nuclear Material Safety
Attachment:	Supplemental Inspection Information

EXECUTIVE SUMMARY

Humboldt Bay Power Plant, Unit 3 NRC Inspection Report 050-00133/14-009

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, Costs, and Status Review

The licensee conducted decommissioning activities in accordance with license and regulatory requirements. The licensee was maintaining decommissioning costs within accepted limits. (Section 1)

Audits, Self-assessment, Auditing and Corrective Actions

The licensee conducted audits, self-assessments and corrective actions 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. Transportation of liquid waste was also reviewed and found to be in compliance. (Section 3)

Occupational Exposure

The inspector concluded that the licensee had adequate calibrated instrumentation to ensure compliance with monitoring requirements. The inspector also reviewed the licensee's approach to control of occupational exposure during current work. Exposure controls were effective in maintaining exposures ALARA. (Section 4)

Report Details

Summary of Plant Status - Unit 3

At the time of the inspection, decommissioning was progressing at a slower rate than what was initially planned due to changes in scope. The contractor for the civil works portion of the decommissioning, Chicago Bridge and Iron (CB&I), had commenced work. A License Termination Plan (LTP) was submitted to the U.S. Nuclear Regulatory Commission (NRC) on May 3, 2013 and was followed with submittals in response to NRC requests for additional information. On August 13, 2014, LTP Revision 1, which included information included in the above submittals, was submitted. This plan will further define the end state of the site, refine decommissioning cost estimates and thereby provide a detailed baseline for cost and schedule considerations.

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, Rev. 4, dated July 19, 2013. The licensee continues to transport waste to appropriate disposal 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, Management and Cost Controls (71801, 36801)

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 and that financial commitments were consistent with allowed costs.

1.2 Observations

Primary efforts for the remainder of calendar year 2014 are to complete segmentation and packaging of the reactor vessel for shipment and burial, remediate the discharge canal, remove the spent fuel pool liner, begin trenching for study of slurry wall installation and transport construction debris to proper burial sites. 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 continue to be implemented in order to maintain safety of the workers and public. At the time of the inspection segmentation of the reactor vessel was subject to a safety stand down due to licensee identified incidents of concern. Work has since resumed in this activity. Reactor vessel removal is the last major effort that is considered to be self-performed/selfdirected. The project then transitions to demolition of major structures, site remediation and waste disposal phases, conducted by the civil works contractor under licensee oversight.

Demolition of support buildings was underway with emphasis on the radiologically contaminated machine shop, the Unit 2 slab, and the Secondary Alarm Station (SAS) structure and associated off-gas tunnel. The SAS structure was initially designed as a Secondary Alarm Station but was never utilized as such by the licensee. The inspectors reviewed the conduct of radiation surveys of the debris to allow for recycle on-site or disposal as waste at the appropriate site. Inspectors observed the installation of a cofferdam on the Humboldt Bay side of the discharge canal. The purpose of the cofferdam is to enable dewatering and remediation of the discharge canal while preventing remediation operations from impacting the environment of the Bay. The licensee notified the inspector that cofferdam installation was completed on October 8, 2014. Next steps of the project involve removal of the discharge culverts, dewatering the canal and dredging of silt material. The rocks and boulders which line the canal will be surveyed and characterized for reuse or disposal as waste.

Preparations for removal of the spent fuel pool liner were reviewed. Inspectors attended the job site planning meeting that detailed proposed activities and addressed job hazards, communications and radiological conditions. The inspectors reviewed the Radiological Work Permit, Diving Operations for Decommissioning of the U3 Spent Fuel Pool, RWP No 20140123 and found it to address initial setup activities, actual operations and demobilization activities. Divers performing the underwater operations of cutting the stainless steel liner will be monitored by radiation protection staff throughout the operation.

The inspector reviewed data related to projected and actual costs for decommissioning activities. Currently actual costs are significantly less than costs projected for this time in the decommissioning effort. Delay in startup of some activities accounts only in part for the decreased actual costs. Another factor is delayed billing by the civil works contractor, CB&I. CB&I has revised their organization and financial reporting structure to enhance project reporting and invoicing. The inspector noted that the California Public Utility Commission (CPUC) approved funding of HBPP decommissioning at the amount requested by the licensee.

1.3 <u>Conclusions</u>

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 and costs were maintained within accepted limits.

2 Audits. Self-assessment, Auditing and Corrective Action (40801)

2.1 Inspection Scope

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

2.2 Observations

The inspector reviewed minutes of meetings of the Plant Safety Review Committee (PSRC) conducted on June 5, 2014, July 16, 2014 and July 31, 2014. The PSRC performs reviews, investigations or analysis and prepares reports as requested by an Independent Management Review or the Nuclear Plant Manager. The chair of the committee verified that a quorum of technically qualified members was present for all meetings. Minutes of the committee reflect the fact that they reviewed quality verification assessments to include and assessment of control and management of soil stockpiles (Assessment Number 140860014) and the transfer of radioactive liquid waste from the Filter Ion Exchange System (FIXS) Effluent Hold Tank (EHT) to a truck/tanker for transport to US Ecology, Idaho for disposal (Assessment Number 142190001).

Additionally, the committee reviewed the status of open corrective actions. Procedure HBAP C-12, Problem Identification and Resolution, effective September 15, 1914 describes the Humboldt Bay Corrective Action Program (CAP). A computer program, Systems Application Programs Notification (SAPN) is used to track corrective actions. Data supplied by the licensee noted that the number of corrective actions that have not been closed and that are older than 90 days has been reduced from previous level to now comply with the goal of less than 80 and that this number is continuing to trend downward. This downward trend in open number of corrective actions older than 90 days was attributed to an improvement in the program that placed responsibility for the program on a single staff member. Additionally, Chicago Bridge and Iron (CB&I) has adopted the licensee program to track and close their corrective actions rather than implement their own program. Radiation exposure data, trends, and ALARA presentations were also presented to and assessed by the committee. The inspector found the actions of the committee as documented in the meeting minutes to comply with procedural and regulatory requirements.

The Humboldt Bay Power Plant Quality Assurance Plan (QAP) addresses requirements of the Humboldt Bay Unit 3 Part 50 License and the Independent Spent Fuel Storage Installation (ISFSI) Part 72 License. Independent Assessments of Quality Verification (QV) activities were conducted in February 2011 and April 2012. An independent assessment was conducted in March 2014 that satisfied the requirement of the QAP that an independent assessment be conducted once every 24 months. The inspector reviewed the assessment and noted that the audit and review was conducted by an experienced independent nuclear consultant who was familiar with the site and had served in the past as a member of the Nuclear Safety Oversight Committee (NSOC). The assessment focused on Organization, Quality Assurance Plan, Inspection, and Audits. The independent assessor noted that the issues identified during on-site QV assessments have led to improvements in site activities, such as the loading and storage of greater than class C waste and shipment of Category B and C waste, and also provided for enhanced management controls. The inspector's review of the report noted that the report satisfied regulatory and license requirements.

By letter dated June 10, 2014, (ML14176A080) the licensee submitted revision 32

to the QAP which would change the oversight of the QA Program from the NSOC to a requirement for an Independent Management Review function partially associated with the advanced stage of decommissioning of the Humboldt Bay site. In response to an NRC request for additional information, the licensee submitted supplemental information by letter dated August 15, 2014 (ML14227A958). The NRC approved Humboldt Bay's request to change the QAP on September 4, 2014 (ML14238A627). The licensee implemented Procedure HBAP A-6, Independent Management Review (IMR) to control the independent management review process. The inspector reviewed Procedure HBAP A-6, effective September 4, 2014 that included activities associated with Unit 3 and the ISFSI. The procedure notes that the Chief Nuclear Officer (CNO) is responsible for designating the reviewer(s) to assess the effectiveness of the QAP and other appropriate oversight activities associated with decommissioning and storage of spent fuel.

2.3 <u>Conclusions</u>

The inspector reviewed the programs for conduct of audits, safety reviews, corrective actions and changes to the Humboldt Bay QAP 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 documentation for shipment of solid waste material containing primarily construction debris and tooling waste to a Utah site and for shipment of solid waste material to a site approved for Resource Conservation and Recovery Act (RCRA) waste material in Idaho to evaluate compliance with applicable transportation and import/export requirements. Documentation applicable to shipments of water containing low levels of radioactivity to the RCRA site was also examined. For the period of January 1, 2014 through July 13, 2014 the licensee had made 25 shipments containing 9,399 cubic feet of material to the Utah site. For the same time period a total of 89 shipments of solid waste with a volume of 27,735 cubic feet and 8 shipments of liquid waste with a volume of 5,330 cubic feet had been made to the Idaho RCRA site. The total volume of material sent to the RCRA site since shipments were first initiated is less than ten percent of the allowed volume.

3.2 Observations

To ensure compliance with applicable NRC and Department of Transportation (DOT) regulations, the licensee utilized a shipping compliance checklist. The checklist requires that the licensee have documentation on file that certifies that any container used meets 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 with all shipments.

The inspector reviewed shipping checklists and documentation for two shipments of liquid waste to the US Ecology RCRA site located in Idaho. The shipments to the RCRA site reviewed by the inspector were shipments of waste water containing low levels of radioactivity that had been processed through the site Filtered Ion Exchange System (FIXS) system, Shipments Numbered RMS-14-128 and RMS-14-147. 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. 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 indicated that license and regulatory requirements were met. The inspector also verified that individuals involved in the approval of the shipments were properly trained and that training was maintained within regulatory requirements. Prior to departure, a signature by the licensee, in their oversight role, is required that indicates that all documents associated with the shipment have been completed in accordance with licensee procedures and that the material is packaged. characterized, classified, marked, labeled, placarded and transported in accordance with regulatory requirements of US NRC and the Department of Transportation.

3.3 <u>Conclusions</u>

The licensee's program for transportation of material for off-site burial was found to be performed in accordance with license and regulatory requirements. Transportation of liquid waste was also reviewed and found to be compliant.

4 Occupational Exposure During Safstor and Decommissioning (83100)

4.1 Inspection Scope

The inspector reviewed the calibration and performance checks of portable survey and monitoring equipment. The inspector also reviewed data for estimated and actual exposure since the last inspection.

4.2 Observations

The inspector reviewed the database of instrumentation available for use by licensee personnel and determined that the licensee had an adequate supply and variety of instruments suitable for monitoring the radiological hazards at the site. The licensee continues to utilize a database that provides clear visual indication in the form of green, yellow and red color designations that apply to instruments that are in calibration, that are due calibration within 30 days, and that are past due for calibration and removed from service. During tours of the site the inspectors checked calibration dates on selected instruments in use in the field and determined that all were within calibration. Also while touring the site the inspector performed independent gamma surveys (Ludlum Model 2401-EC Survey Meter, NRC Serial Number 21175G, Calibration Due Date 11/7/2014). The accompanying inspector conducted additional surveys (Thermo Scientific RadEye G, Dose Rate Meter, NRC Serial Number 086966, Calibration Due Date 07/18/2015). For all the locations that were surveyed, the inspectors

found that the licensee was meeting the posting requirements of 10 CFR 20.1902. General site exposure values were essentially at background level. The inspector selected licensee external and internal radiological exposure data summaries for July 2014 for review. External exposure data from electronic dosimeters indicated a total integrated level of 1.10 person-rem. Approximately 90 site personnel were monitored utilizing electronic dosimetry during July. The maximum indicated external dose during this month was 127.7 mrem that was received by an individual whose primary work during this period was sectioning of the reactor vessel. The licensee continues to utilize lapel air samples to assess the potential for internal exposure via inhalation. During the month of July 2014, 258 lapel air samples were analyzed with no samples indicating a potential for internal exposure. For the period January 1 through July 31, 2014 a total of 2,796 personnel airborne monitoring lapels had been issued. This number is consistent with that for the year 2013 when a total of 5,077 lapel air samples were analyzed. The total assigned CEDE for integrated internal exposures for the period January 1 through July 31, 2014 was 8.33 personmrem. There were no positive whole body counts during July 2014. In addition to scheduling whole body counts when an individual is exposed to certain radiological environments, the licensee requires a whole body count on an annual basis. Compliance with the annual requirement is tracked through the Sentinel database which prevents approval of entry into the radiological controlled area if an individual fails to comply with this requirement. The inspectors verified that the database will indeed indicate that a whole body count is required and that entry is not approved if the whole body count is not completed as required within the one year period.

Sectioning of the reactor vessel prior to removal continues. This activity, which is controlled by the requirements of Radiological Work Permits 2014-0108 and 2014-0116, is one of the more challenging activities from the perspective of potential external radiological exposure. The ALARA plan estimate for this activity is 10 person-rem for sectioning and removal of the vessel. The estimate for this point in the evolution is 7.5 person-rem. The actual value as of September 23, 2014 is 4.15 person-rem, a significant reduction in exposure. The highest assigned dose for any one individual is 0.411 rem. The actual versus estimated comparison emphasizes the advantages of use of training mockups as a training tool and for improved dose estimation when work in a high risk environment is required.

The inspector reviewed summary data through September 21, 2014 and noted that total radiological exposure for the period of decommissioning had reached 66.2 person-rem. Earlier ALARA projections for this time period had predicted a radiological exposure level of 99.1 person-rem, a savings of 32.9 person-rem. The licensee was able to identify 26.4 person-rem of the radiological exposure savings were due to enhanced ALARA efforts during specific evolutions of decommissioning. The estimate for the total radiological dose at completion of decommissioning was reduced from 149 person-rem to 108 person-rem due to changes in the methodologies employed to remove the reactor vessel and the spent fuel pool. The 108 person-rem estimate can be compared with actual values of past decommissioning efforts of 772 person-rem at Main Yankee and 380 person-rem at Trojan.

4.3 <u>Conclusions</u>

The inspector concluded that the licensee had adequate calibrated instrumentation to ensure compliance with monitoring requirements. The inspector also reviewed the licensee's approach to control of occupational exposure during current work. Exposure controls were effective in maintaining exposures ALARA.

5 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 September 26, 2014. 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

J. Chadwick, ALARA Supervisor

P. Coutts, CBI Program Manager

M. Erickson, FSS and LTP Engineer

- D. Evans, Security Director
- S. Jones, QV Supervisor

R. King, RPV Project Manager

D. LeBoeuf, CBI Deputy Program Manager

G. Mason, CAP Coordinator

J. Morris, Regulatory Services

W. Parish, RP Engineer

K. Rod, Decommissioning Manager

S. Schlerf, RP Foreman

L. Sharp, Director and Plant Manager

M. Smith, Engineering Manager

D. Sokolsky, Licensing Supervisor

M. Strehlow, Deputy Director

INSPECTION PROCEDURES USED

- IP 36801 Organization, Management and Cost Controls at Permanently Shutdown Reactors
- IP 40801 Audits, Self-Assessment, Auditing and Corrective Action at Permanently Shutdown Reactors
- IP 71801 Decommissioning Performance and Status Review at Permanently Shutdown Reactors
- IP 83100 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	Agencywide Documents Access and Management System
ALARA	as low as reasonably achievable
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CPI	cost performance index
CRDM	control rod drive mechanisms
DAC	derived air concentration
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
SAS	Secondary Alarm Station
SFP	Spent Fuel Pool
SNM	Special Nuclear Material
SPAMS	Stack Particulate Airborne Monitoring System
SPI	schedule performance index