



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

March 28, 2017

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 050-00133/2017-001

Dear Mr. Halpin:

This letter refers to U.S. Nuclear Regulatory Commission (NRC) inspection conducted from February 27 through March 1, 2017, at the permanently shut down Humboldt Bay Power Plant, Unit 3 facility, near Eureka, California. The purpose of the inspection was to determine whether decommissioning activities were being conducted safely and in conformance with NRC requirements. The results of the inspection were presented to your staff at the conclusion of the onsite inspection on March 1, 2017.

During this inspection, NRC staff examined activities conducted under your license as they relate to public health and safety to confirm 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. The enclosed report presents the results of this inspection. No violations were identified, and no response to this letter is required.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter, its enclosures, and your response, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy or proprietary information so that it can be made available to the Public without redaction.

If you have any questions concerning this inspection, please contact Don Stearns, Health Physicist, at 817-200-1176, or the undersigned at 817-200-1191.

Sincerely,

*/RA/*

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

Docket No: 050-00133

License No: DPR-7

Enclosure:

NRC Inspection Report 050-00133/2017-001

**U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV**

Docket: 050-00133

Licenses: DPR-7

Report: 050-00133/2017-001

Licensee: Pacific Gas & Electric Company

Facility: Humboldt Bay Power Plant, Unit 3

Location: 1000 King Salmon Avenue  
Eureka, California 95503

Dates: February 27 through March 1, 2017

Inspectors: Gerald A. Schlapper, PhD, CHP Health Physicist  
Fuel Cycle and Decommissioning Branch  
Division of Nuclear Materials Safety

Donald L. Stearns, Health Physicist  
Fuel Cycle and Decommissioning Branch  
Division of Nuclear Material Safety

Approved By: Ray L. Kellar, P.E., Chief  
Fuel Cycle and Decommissioning Branch  
Division of Nuclear Materials Safety

Enclosure

## EXECUTIVE SUMMARY

### Humboldt Bay Power Plant, Unit 3 NRC Inspection Report 050-00133/2017-001

This U.S. Nuclear Regulatory Commission (NRC) 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

- The inspectors observed various decommissioning activities in progress. The inspectors concluded that the licensee was conducting decommissioning in accordance with the general guidance provided in the Post-Shutdown Decommissioning Activities Report. The work was being conducted with an emphasis on industrial and radiological safety. (Section 1.2.a)
- The licensee had shifted from self-performance of high risk activities to oversight of a civil works project. While there were lessons learned during the changeover, the contractor had applied the lessons learned and showed a high level of confidence in completing projects on time and within budget. (Section 1.2.b)

#### Safety Reviews, Design Changes and Modifications

- The licensee continued to implement a program of safety reviews, design changes, and modification reviews. (Section 2.2)

#### Solid Radioactive Waste Management and Transportation of Radioactive Materials

- The licensee was characterizing, packaging, and shipping wastes in accordance with procedural requirements and restrictions established in requests previously approved by the NRC. (Section 3.2)

#### Maintenance and Surveillance

- The licensee continued to manage a program for maintenance and calibration of portable radiation survey instruments and the Guardian System for monitoring radiological contaminants in accordance with applicable procedures, license, and regulatory requirements. (Section 4.2)

## REPORT DETAILS

### Site Status

At the time of the inspection, the licensee continued to decommission the site in accordance with the general guidance provided in the Post-Shutdown Decommissioning Activities Report (PSDAR) dated July 19, 2013, (ADAMS Accession No. ML13213A160) Revision 11 to the Defueled Safety Analysis Report (DSAR), and Revision 33 to the Humboldt Bay Power Plant (HBPP) Quality Assurance Plan (QAP) (ML16029A508). The decommissioning work in progress included installation of a ventilation system and excavation of material within the cutter soil mixture (CSM) wall, movement of the excavated soil to the former discharge canal, removal of potentially contaminated soil, concrete, and piping, preparation for removal of piping from the southern end of the discharge canal, and demolition of the former training and administration building, Building 10.

In May 2016, the contractor completed demolition of the low level waste and solid radioactive waste buildings. The CSM wall was completed in June 2016. Demolition of the high level storage vault and liquid radioactive waste building was completed in July 2016. The licensee began excavating the caisson structure within the CSM wall during the last quarter of 2016. The final demolition of the refueling building and remediation of the intake canal were completed in the final quarter of 2016. Hydro seeding and habitat construction in the intake canal will be completed in May 2017. After completion of site decommissioning, the licensee plans to conduct final status surveys and site restoration work. The licensee currently plans to complete all field work by February 2019.

A License Termination Plan (LTP) was submitted to the NRC on May 3, 2013 (ML13130A009, ML13130A011). To address requests for additional information the licensee submitted LTP Revision 1 on August 13, 2014 (ML14246A157, ML14246A158, and ML14246A159). The plan defined the end state of the site, refined decommissioning cost estimates, and provided a detailed baseline for cost and schedule considerations. On May 4, 2016, the NRC issued Amendment No. 45 to Facility Operating License No. DPR-7 (ML15090A339). The amendment revised the Humboldt Bay Unit 3 License to add License Condition 2.C(5) which incorporated the NRC approved LTP and specified limits on the changes the licensee is allowed to make to the approved LTP without prior NRC approval.

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

#### **1.1 Inspection Scope**

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

#### **1.2 Observations and Findings**

##### **a. Completion of the Subsurface CSM Wall**

The inspectors noted completion on June 16, 2016 of one of the critical path elements in the overall decommissioning effort; construction of the CSM wall and, after monitoring for potential radioactive contaminants, transfer of the resultant excavated materials to

the discharge canal for future use as backfill material. Materials not meeting the criteria for reuse on site were packaged and shipped to the appropriate waste site.

The CSM wall consists of five concentric rings of various depth to allow for excavation to a depth of approximately 95 feet. The innermost ring is approximately 110 feet inside diameter and 105 feet deep. Succeeding rings increase depth by approximately 4 foot per ring. The outermost layer of the ring (denoted as the E ring) penetrates into an underlying clay layer at approximately 175 feet depth. Individual panels of the wall are 3 feet thick and 9 feet long. The total thickness of the wall is approximately 13 feet. The inspectors, through observation and discussion with staff, concluded that the licensee conducted work in accordance with work plan requirements.

Due to the potential for some water intrusion into the area surrounded by the CSM wall, the contractor installed four dewatering wells. The wells pump effluent to the ground water treatment system (GWTS) for characterization and treatment followed by discharge to Humboldt Bay. Current measurements reflected a water intrusion rate of approximately 15 to 20 gallons per minute, which was within design specifications.

The contractor began excavation work within the CSM wall during the last quarter of 2016. Access controls were implemented to limit entry into the area. Radiological controls included air monitoring, high-efficiency particulate air (HEPA) ventilation, and area radiation monitoring. Thermoluminescence dosimeter (TLD) badge placement was appropriate for the anticipated levels of radioactivity in the soils and construction materials. The licensee installed a radiation monitoring system in the cab of each excavator working within the caisson area. This system consisted of an electronic dosimeter attached to a wireless transmitter and provided real time radiation data for each of the excavator operators. The system was monitored by the radiation protection personnel providing coverage of the excavation work. The inspectors reviewed data obtained from TLD badges throughout the site and lapel monitors installed in the cabs of the excavators and noted no indication of radiation above background levels for 2016. The licensee also issued a limited number of electronic dosimeters to personnel. Results indicated no dose to personnel from the activities completed and in progress.

The licensee also installed a ventilation ring around the top of the CSM wall. The ventilation system had a number of trunks extending into the excavation area. This system was primarily designed to pull equipment engine exhaust out of the excavation area, but was also monitored for airborne activity. In order to verify the strength of the CSM wall, the licensee and contractor took horizontal core samples from the CSM wall in the first 10 feet of excavation. The samples indicated that the strength of the wall was below the anticipated strength of 1000 psi. In order to ensure the strength of the wall, a wire mesh was placed around the inside of the CSM wall to a depth of approximately 10 feet and additional concrete (shotcrete) was applied to the interior surface of the CSM wall and allowed to cure. Subsequent CSM wall core samples were taken as the excavation reached a level of minus 20 feet. These samples also indicated that the strength of the wall was below the anticipated strength of 1000 psi. At the time of the inspection, additional wire mesh was being installed to add shotcrete from the minus 10 foot level to the minus 20 feet level. The licensee planned to perform additional core sampling in 10 foot increments.

The inspectors reviewed the licensee's procedures for ensuring that excavated materials from various on-site locations were not contaminated with radioactive or non-radioactive

contaminants and were thus acceptable for use on-site as backfill. The licensee and its contractor implemented several controls including collection of samples and bulk container monitoring. The inspectors verified that the licensee was ensuring that concentrations of any contaminants were below the soil cleanup derived concentration guideline levels in use by the licensee. The bulk sampling program consisted of surveying truckloads of excavated material using the onsite GUARDIAN detector systems. A truck/trailer scan was conducted just prior to transfer of the spoils to the onsite discharge canal. Further discussion of the use of these systems is presented in a later section of this report.

The old warehouse building, building #5, was formerly used as an office building and maintenance area. At the time of the inspection, the building was no longer in use, asbestos abatement was completed on the interior, and preparations were being made for asbestos abatement of the exterior. Some communication system wiring currently runs through the building and must be rerouted prior to demolition of the building. Demolition of building #5 was scheduled to be completed in September 2017.

The inspectors reviewed data applicable to the exposure pathways of airborne and direct radiation. The airborne pathway exposures were based on measurements at five on-site locations and one off-site location. Direct radiation exposure levels were measured using TLD monitoring stations. These included a minimum of eight on-site locations, four off-site locations, and one off-site control location. Data presented indicated that levels were essentially at background levels, verifying that the licensee's techniques to minimize exposure to personnel on-site and off-site were appropriate.

b. Civil works project status

The contractor for the civil works portion of the decommissioning, Chicago Bridge and Iron (CB&I), continued to prepare the remaining portions of site buildings for demolition. From 2012 through 2015, the licensee shifted from self-performance of high risk activities to oversight of the civil works projects. The licensee noted that the civil works project is over eighty percent complete after three and one-half years of work execution. Discussions with the licensee and the civil works contractor noted that alternative approaches to decommissioning proposed by CB&I enhanced completion of work and resulted in a projected contract completion date of early 2019. Items targeted for completion in 2017 include completion of the intake canal in May, demolition of the activated drywell in the caisson finished by June 2017, building #5 demolition finished by September 2017, and removal of Unit 1, 2, and 3 circulating water lines completed by October 2017.

The site continued to face challenges of site congestion, contaminated underground systems and utilities, frequent adverse weather, soil and water management, below grade obstructions, limited site access, and proximity to the surrounding community and the active Humboldt Bay Power Generating Station.

1.3 Conclusions

The inspectors observed various decommissioning activities in progress. The inspectors concluded that the licensee was conducting decommissioning in accordance with the general guidance provided in the PSDAR, DSAR and HBPP QAP. The work was being

conducted in accordance with approved work plans and with an emphasis on industrial and radiation safety.

## **2 Safety Reviews, Design Changes and Modifications (37801)**

### **2.1 Inspection Scope**

The inspectors reviewed the licensee's implementation of its safety review, design change, and modification program as required by 10 CFR Part 50, license, and procedural requirements. The licensee's implementation of these reviews rests primarily on action of the Plant Staff Review Committee (PSRC) and an independent management review. The licensee also provided daily information briefings in the form of a Management Plan of the Day meeting that involved management from the licensee and the civil works contractor. This management meeting was followed by a radiation protection briefing that ensured coverage was available for all activities of the day, along with, tailboards that provided detailed information to involved workers for scheduled activities of the day. Following these discussions was a meeting termed the Oversight Plan of the Day where the licensee personnel outlined information presented in the preceding sessions.

### **2.2 Observations and Findings**

Many decommissioning activities involved quality-related structures, systems, and components (SSC). These activities were governed by the HBPP QAP and were therefore subject to independent quality assurance audits. Activities audited included radiation protection controls, effluent monitoring, radioactive waste shipping, site characterizations, fire loss protection and prevention program, Emergency Plan, Security Plan, and Off-site Dose Calculation Manual (OSDCM). The QAP included a requirement for an Independent Management Review (IMR) function, the implementation of which was through Procedure HBAP A-6, Independent Management Review, effective September 4, 2014. The purpose of the independent management review was to assess the effectiveness of the HB Quality Assurance Program. The procedure noted that the Chief Nuclear Officer was responsible for designating the reviewer(s) to assess the effectiveness of the QAP and other appropriate oversight activities at the site. The licensee was committed to conducting a review at a minimum of every two years. The last independent management review was completed on June 19, 2016 and thus the next review must be completed by the June 2018 in order to meet timeliness requirements.

The inspectors also reviewed the schedule for completion of major milestones and budget authorizations for decommissioning activities. Completion of decommissioning activities remained timely and costs were within limits of the decommissioning budget as noted in the Nuclear Decommissioning Cost Triennial Proceeding (NDTCP) of 2012 and 2015. The inspectors noted that the licensee was beginning preparations to present at the 2018 NDTCP.

### **3.3 Conclusions**

The licensee implemented its program of safety reviews, design changes, and modifications in accordance with requirements of 10 CFR Part 50, license, and procedural requirements. A program for the Independent Management Review function



had been established and the required review was completed in a timely manner. Adequate oversight was supplemented through the use of daily briefings that supported licensee oversight and management of resources. The licensee continued to perform within schedule and costs as outlined in the 2012 and 2015 Nuclear Decommissioning Cost Triennial Cost Proceedings.

### **3 Solid Radioactive Waste Management and Transportation of Radioactive Materials (86750)**

#### **3.1 Inspection Scope**

The inspectors reviewed documentation associated with shipments of material to the licensee's respective burial sites. The shipments included solid waste shipments of exempt material to a site approved for Resource Conservation and Recovery Act (RCRA) waste in Idaho, low specific activity solid waste shipment to a Utah burial site, and shipments of low specific activity waste to Waste Control Specialists (WCS) in Texas. The review included documentation required by Department of Transportation (DOT) regulations, and documentation of waste classification required by 10 CFR Part 20.

#### **3.2 Observations**

To ensure compliance with applicable NRC and DOT regulations, the licensee continued to utilize a shipping compliance checklist. The checklist required that the licensee have documentation on file that certifies that any container used meets regulatory qualifications and that vendor provided procedures for use of the container were followed. The documentation included information that the manifest was consistent with the approved waste profile. Other documents supplied in the package indicated that the containers had been inspected by the licensee and determined to be in compliance with DOT packaging requirements. Radiation/contamination survey data sheets verified compliance with applicable limits outlined in 10 CFR 71.47. Emergency response information was supplied with all shipments. Prior to departure, a signature by the licensee indicated that all documents associated with the shipment had been completed in accordance with licensee procedures and that the material was packaged, characterized, classified, marked, labeled, placarded, and transported in accordance with regulatory requirements of the NRC and DOT. A review of documents for the selected shipments indicated that license and DOT regulatory requirements were met.

The inspectors reviewed the licensee's management of exemption wastes shipped to a facility in Idaho. The NRC granted the licensee three exemptions under alternate disposal provisions allowed under 10 CFR 20.2002. As of February 27, 2017, the licensee had shipped a total of 805,584 cubic feet (36.6 percent of allowed volume) under exemptions 1 and 2, and a total of 55,164 cubic feet (55.16 percent of allowed volume) under exemption 3.

The inspector also reviewed documentation for three recently completed shipments for compliance with procedure requirements and NRC regulations. The review included shipments to TOXCO and WCS. Shipments to WCS were in progress during the inspection. The inspector observed licensee staff personnel load the material, perform surveys of the transport containers, and complete shipment documentation.

From January 1, 2017, through February 27, 2017, the licensee made 51 shipments to US Ecology in Idaho under exemptions 1 and 2. Three shipments were made to Energy Solutions in Clive, Utah, one shipment to TOXCO in Oak Ridge, Tennessee, and 40 shipments to WCS in Andrews, Texas, for a total of 95 shipments. The inspectors noted that the number of shipments had not met goals established for this effort. The licensee confirmed that the number of trucks per week had been reduced by approximately 20 percent. This reduction resulted from the need to change routes due to frequent road closures along the previous route, an impact that was caused by an increase in rainfall substantially above normal levels over recent months.

### 3.3 Conclusions

The licensee's program for transportation of solid waste material for off-site burial was performed in accordance with license and regulatory requirements. The schedule for shipments of waste has been impacted by weather in the area and resultant road closures.

## **4 Maintenance and Surveillance (62801)**

### 4.1 Inspection Scope

The inspectors reviewed calibration and maintenance of portable radiation survey instruments.

### 4.2 Observations

The licensee continued to require use of portable radiation survey instrumentation. The inspectors observed the staging, calibration, and use of the instruments. The licensee utilized a color coding system to track calibration due dates of each instrument. For example, "green" indicated the instrument was calibrated and available for use, "yellow" indicated the instrument was within 30 days of the calibration due date, and "red" indicated the instrument was past due for calibration or unavailable for use.

The licensee continued calibrating some of its count-rate instrumentation at the site, but sent other instruments, including dose-rate instrumentation, to a vendor licensed to calibrate instruments. The licensee continued to calibrate two personnel contamination monitors (PCM) and one small article monitor (SAM). The inspectors reviewed the licensee's procedures for calibration of count-rate instruments and calibration of the PCM and SAM monitors. The inspector determined that the methodologies were consistent with American National Standards Institute (ANSI) guidance.

Material excavated from the site was monitored for radioactive contaminants to determine if the material was acceptable for re-use onsite, or if it must be shipped to an offsite burial site for disposal. The excavated material was loaded in dump trucks and monitored via a system (GUARDIAN) to measure the radiological contaminants. If the material had very low levels of contaminants, the material was placed in a staging area for reuse. If the levels of contaminants were above a specific level, the material was placed in a temporary covered area and was packaged for shipment to a burial site. Excavation of the material surrounding the reactor caisson will significantly increase the use of the GUARDIAN system. A second GUARDIAN system was installed during the third quarter of 2016 and was installed adjacent to the first GUARDIAN system. The

second system incorporated a total of six detectors verses four detectors in the first system and resulted in shorter monitoring times for each load of material. The inspectors reviewed the installation, setup, and calibration of the second system.

The inspectors observed trucks of material processed through the GUARDIAN systems and observed the operation of those systems. Daily checks were performed on the detectors to ensure performance was consistent with the performance at the time of system calibration. Control charts were utilized to track the daily performance. The technicians responsible for setup and operation of the systems had sufficient knowledge and experience to perform those tasks.

#### 4.3 Conclusions

The inspectors noted that the licensee programs for maintenance and calibration of portable radiation survey instruments and use of the Guardian System for bulk sample measurement were in compliance with applicable procedures and regulatory requirements. The inspectors also checked selected instruments and noted that the instruments in use were within current calibration dates.

#### **5 Exit Meeting**

The inspectors presented the inspection results to the licensee's representatives at the conclusion of the onsite inspection on March 1, 2017. The licensee did not identify any information reviewed by the inspectors as proprietary.

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### Licensee Personnel

B. Barley, Site Closure Manager  
S. Callihan, Financial Analyst Supervisor  
P. Coutts, Program Manager, CB&I  
J. Gilbert, Project Manager, CB&I  
D. Gilson, Waste Management, CB&I  
M. King, Project Engineer, CB&I  
D. LeBouef, Deputy Program Manager, CB&I  
W. Parish, RP/FSS Engineer  
K. Rowberry, Site Closure Specialist  
J. Salmon, Environmental Manager  
D. Sokolsky, Licensing  
M. Strehlow, Deputy Director

### **INSPECTION PROCEDURES USED**

IP 37801 Safety Reviews, Design Changes and Modifications 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 86750 Solid Radioactive Waste Management and Transportation of Radioactive Materials

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

#### Opened

None

#### Closed

None

#### Discussed

None

## LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
ALARA	As Low As Reasonably Achievable
CAP	corrective action program
CB&I	Chicago Bridge and Iron
CFR	Code of Federal Regulations
CSM	cutter soil mix
DSAR	Defueled Safety Analysis Report
FSAR	Final Safety Analysis Report
GWTS	ground water treatment system
HBGS	Humboldt Bay Power Generating Station
HBPP	Humboldt Bay Power Plant
IMR	Independent Management Review
IP	Inspection Procedure
ISFSI	Independent Spent Fuel Storage Installation
LTP	License Termination Plan
NDCTP	Nuclear Decommissioning Cost Triennial Proceeding
NRC	U.S. Nuclear Regulatory Commission
PSRC	Plant Staff Review Committee
PSDAR	Post-Shutdown Decommissioning Activities Report
QAP	Quality Assurance Plan
SSC	Structures, Systems and Components
TLD	thermoluminescence dosimeter
WCS	Waste Control Specialists
$\mu\text{R/hr}$	micro Roentgens per hour
mr	millirem
pCi/g	picocuries per gram

IR 050-00133/2017-001 HUMBOLDT BAY POWER PLANT – DATED March 28, 2017

Distribution:

Mark.Shaffer@nrc.gov, D:DNMS  
 Jack.Whitten@nrc.gov, C:FCDB  
 Eric.Simpson@nrc.gov, FCDB  
 Lee.Brookhart@nrc.gov, FCDB  
 John.Hickman@nrc.gov, NMSS  
 Theodore.Smith@nrc.gov, D:DSFM  
 Marisa.Herrera@nrc.gov, DRMA/FRMB

Linda.Howell@nrc.gov, DD:DNMS  
 Gerald.Schlapper@nrc.gov, FCDB  
 Robert.Evans@nrc.gov, FCDB  
 Don.Stearns@nrc.gov, FCDB  
 Bruce.Watson@nrc.gov, NMSS  
 Jose.Cuadrado@nrc.gov, DSFM  
 Jeremy Bowen@nrc.gov, RIV/ETA: OEDO

cc:

Hossein Hamzehee Regulatory Services Mgr.  
 Diablo Canyon & Humboldt Bay Power Plant  
 Pacific Gas and Electric Company  
 P.O. Box 56  
 Avila Beach, CA 93424

Redwood Alliance  
 P.O. Box 293  
 Arcata, CA 95521

Jennifer L. Post, Esq.  
 Pacific Gas and Electric Company  
 P.O. Box 7442  
 San Francisco, CA 94120

Director, Radiologic Health Branch  
 State Department of Health Services  
 P.O. Box 997414 (MS 7610)  
 Sacramento, CA 95899-7474

Loren Sharp, Director and Plant Manager  
 Humboldt Bay Power Plant, PG&E  
 1000 King Salmon Avenue  
 Eureka, CA 95505

Dr. James F. Davis, State Geologist  
 Dept. of Conservation/Mines & Geology  
 801 K Street MS 12-30  
 Sacramento, CA 95814-3531

Chairman  
 Humboldt County Board of Supervisors  
 825 Fifth Street  
 Eureka, CA 95501

Gretchen Dumas, Esq.  
 Public Utilities Commission State of California  
 5066 State Building  
 San Francisco, CA 94102

Law Office of Linda J. Brown, Esq.  
 999 5th Avenue, Suite 430  
 San Rafael, CA 94901

Director  
 Energy Resources & Development Commission  
 1516 9th Street  
 Sacramento, CA 95814

Regional Radiation Representative  
 U.S. EPA Region IX Office  
 75 Hawthorne Street  
 San Francisco, CA 94105

Dr. Robert B. Weisenmiller, Chair  
 California Energy Commission  
 1516 Ninth Street (MS 34)  
 Sacramento, CA 95814

California Public Utilities Commission  
 505 Van Ness, Room 4102  
 San Francisco, CA 94102

Deputy Attorney General State of California  
 110 West A Street, Suite 700  
 San Diego, CA 92101

Dr. Rich Ferguson, Energy Chair/Sierra Club  
 California  
 1100 11th Street, Suite 311  
 Sacramento, CA 94814

ADAMS ACCESSION NUMBER: ML17083A588

SUNSI Review By: GAS	ADAMS <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Publicly Available <input type="checkbox"/> Non-Publicly Available	<input checked="" type="checkbox"/> Non-Sensitive <input type="checkbox"/> Sensitive	Keyword: NRC-002
OFFICE	RIV/DNMS:FCDB	RIV/DNMS:FCDB	C:FCDB	
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