UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 EAST LAMAR BLVD
ARLINGTON, TEXAS 76011-4511

August 22, 2013

Mr. Einar T. Ronningen, Superintendent,
Rancho Seco Assets
Sacramento Municipal Utility District
14440 Twin Cities Road, MS N493
Herald, CA 95638

SUBJECT: RANCHO SECO FACILITY AND INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI) INSPECTION REPORT 05000312/2013007 AND 07200011/2013001

Dear Mr. Ronningen:

This letter refers to a routine inspection conducted on June 25 - 26, 2013, of your Rancho Seco Part 50 Facility and the dry cask storage activities associated with your Independent Spent Fuel Storage Installation (ISFSI). The inspection was conducted to confirm compliance with the requirements specified in the Rancho Seco Radioactive Material Storage and Decommissioning Safety Analysis Report (RADSAR), the Technical Specifications associated with Materials License No. SNM-2510, the Rancho Seco ISFSI Final Safety Analysis Report (FSAR), and Title 10 of the Code of Federal Regulations (CFR) Part 72, Part 50, and Part 20. Within these areas, the inspection included a review of radiation safety, cask thermal monitoring, quality assurance, corrective action program, safety evaluations, emergency program, and how you addressed industry issues that affected your facility's programs. Also reviewed, were changes made to your ISFSI and Part 50 facilities since the last decommissioning/ISFSI inspection conducted by the U.S. Nuclear Regulatory Commission (NRC). An exit was conducted with your staff to discuss the findings of the inspection on June 26, 2013. However, during an in-office review, an additional violation of the NRC regulations was identified. On August 1, 2013, a final exit was conducted by telephone, with members of your management and staff.

Based on the results of this inspection, the NRC has determined that two Severity Level IV Violations of the NRC requirements occurred. The violations were associated with the failure to perform a 10 CFR Part 50.59 safety evaluation for changes made to your fire protection system and failure to submit Rancho Seco's ISFSI decommissioning funding plan for NRC approval prior to the December 17, 2012 deadline. Since Rancho Seco has entered the issues into their corrective action program, the safety significance of the issues were low, and because the issues were not repetitive violations or willful, these violations were treated as Non-Cited Violations (NCVs), consistent with Section 2.3.2 of the NRC Enforcement Policy. If you contest these Non-Cited Violations, you should provide a written response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region IV DMNS Director, and the Office of Enforcement.

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 Agency-wide Document Access 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.

Should you have any questions concerning this inspection, please contact me at 817-200-1191 or Mr. Lee Brookhart at 817-200-1549.

Sincerely,

***/RA/***

D. Blair Spitzberg, Ph.D., Chief
Repository & Spent Fuel Safety Branch
Division of Nuclear Materials Safety

Dockets: 50-312, 72-11
Licenses: DRP-54, SNM-2510

Enclosure:
Inspection Report 05000312/2013007
and 07200011/2013001

w/attachments:
1. Supplemental Information
2. Loaded Casks at the Ranco Seco ISFSI

cc w/encl: See next page

cc w/enclosure:

Thomas A. Baxter, Esq.
Shaw, Pittman, Potts & Trowbridge
2300 N. Street, N.W.
Washington, DC 20037

QA/Licensing Superintendent
Rancho Seco Nuclear Generating Station
14440 Twin Cities Road
Herald, CA 95638-9799

Site Document Control Supervisor
Sacramento Municipal Utility District
Rancho Seco Nuclear Generating Station
14440 Twin Cities Road
Herald, CA 95638-9799

Sacramento County Board of Supervisors
700 H. Street, Suite 2450
Sacramento, CA 95814

Assistant General Counsel
Sacramento Municipal Utility District
6201 S Street
P.O. Box 15830
Sacramento, CA 95852-1830

Radiation Program Director
California Radiologic Health Branch
State Department of Health Services
P.O. Box 997414 (MS 7610)
Sacramento, CA 95899-7414

Commissioner's Office
California Energy Commission
1516 Ninth Street (MS 34)
Sacramento, CA 95814-5512

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 Agency-wide Document Access 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.

Should you have any questions concerning this inspection, please contact me at 817-200-1191 or Mr. Lee Brookhart at 817-200-1549.

Sincerely,

***/RA/***

D. Blair Spitzberg, Ph.D., Chief
Repository & Spent Fuel Safety Branch
Division of Nuclear Materials Safety

Dockets: 50-312, 72-11
Licenses: DRP-54, SNM-2510

Enclosure:
Inspection Report 05000312/2013007
and 07200011/2013001

w/attachments:
1. Supplemental Information
2. Loaded Casks at the Ranco Seco's ISFSI

**DISTRIBUTION w/encl**:
See next page

DRAFT: S:\DNMS\!RSFS\brookhart\Rancho 2013\ Racho 2013001-ISFSI-LEB.docx
FINAL: R:_DNMS\ISFSI\Rancho Seco

| | | | | | |
|---|---|---|---|---|---|
| SUNSI Rev Compl. | **X Yes** ☐ No | ADAMS | **X Yes** ☐ No | Reviewer Initials | *LEB* |
| Publicly Available | **X Yes** ☐ No | Sensitive | ☐ Yes **X No** | Sens. Type Initials | |

| | | | | |
|---|---|---|---|---|
| RIV:DNMS/FSDB | RIV:DNMS/FSDB | R-IV/C:FSDB | | |
| LEBrookhart | EJSimpson | DBSpitzberg | | |
| ***/RA/*** | ***LEBrookhart for*** | ***/RA/*** | | |
| 08/21/2013 | 08/21/2013 | 08/22/2013 | | |

OFFICIAL RECORD COPY T=Telephone E=E-mail F=Fax

Letter to Einar T. Ronningen from D. Blair Spitzberg, dated August 22, 2013.

SUBJECT: RANCHO SECO FACILITY AND INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI) INSPECTION REPORT 05000312/2013007 AND 07200011/2013001

**DISTRIBUTION w/encls**:
Acting Regional Administrator (Steven. Reynolds@nrc.gov)
DNMS Director (Anton.Vegel@nrc.gov)
DNMS Deputy Director (Roberto.Torres@nrc.gov)
RSFS Branch Chief (Blair.Spitzberg@nrc.gov)
RSFS Inspector (Lee.Brookhart@nrc.gov)
RSFS Inspector (Eric.Simpson@nrc.gov)
Project Manager, SFST (William.Allen@nrc.gov)
Project Manager, FSME (John.Hickman@nrc.gov)
Public Affairs Officer (Victor.Dricks@nrc.gov)
Public Affairs Officer (Lara.Uselding@nrc.gov)
RITS Coordinator (Marisa.Herrera@nrc.gov)
TSB Technical Assistant (Loretta.Williams@nrc.gov)
Regional Counsel (Karla.Fuller@nrc.gov)
Congressional Affairs Officer (Jenny.Weil@nrc.gov)
RIV/ETA: OEDO (Vivian.Campbell@nrc.gov)
OEMail_Resources@nrc.gov

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

| | |
|---|---|
| Dockets: | 050-00312; 072-00011 |
| Licenses: | DRP-54, SNM-2510 |
| Report Nos.: | 05000312/2013007; 07200011/2013001 |
| Licensee: | Sacramento Municipal Utility District (SMUD) |
| Facility: | Ranch Seco Nuclear Generating Station and<br>Independent Spent Fuel Storage Installation (ISFSI) |
| Location: | 14440 Twin Cities Road<br>Herald, CA 95638-9799 |
| Dates: | June 25-26, 2013 |
| Inspector: | Lee Brookhart, Health Physicist<br>Repository & Spent Fuel Safety Branch |
| Accompanying Personnel: | Eric Simpson, Health Physicist, Inspector-in-Training,<br>Repository & Spent Fuel Safety Branch |
| Approved By: | D. Blair Spitzberg, Ph.D., Chief<br>Repository & Spent Fuel Safety Branch<br>Division of Nuclear Materials Safety |

Enclosure

## EXECUTIVE SUMMARY

Rancho Seco Facility and Independent Spent Fuel Storage Installation
NRC Inspection Report 05000312/2013007 and 07200011/2013001

The U.S. Nuclear Regulatory Commission (NRC) conducted a routine inspection of the licensee's programs and activities associated with the decommissioning of the Part 50 facility and for safe handling and storage of spent fuel at the Rancho Seco Independent Spent Fuel Storage Installation (ISFSI) on June 25 - 26, 2013. The inspection reviewed a number of topics to evaluate compliance with the applicable NRC regulations, the site's safety analysis reports, the site's Decommissioning Order, and the provisions of the site-specific ISFSI license SNM-2510. Rancho Seco facility currently maintains both a Title 10 of the Code of Federal Regulations (CFR) Part 50 license (Docket # 50-312) and a 10 CFR Part 72 license (Docket # 72-11). Class B and Class C low-level radioactive waste material is stored onsite at the Interim Onsite Storage Building (IOSB) under the Part 50 license and spent nuclear fuel and Greater-Than-Class C (GTCC) waste is stored at the ISFSI under the Part 72 license. The remainder of the site has been decommissioned, remediated, and released from the Part 50 license since September 2009. Activities at the site consist of maintaining the radioactive waste and spent fuel in safe storage until options are available to ship the radioactive material offsite for permanent disposal. Twenty two casks had been loaded and stored on the Rancho Seco ISFSI pad. All spent nuclear fuel was moved to the ISFSI between April 2001 and August 2002. The GTCC canister was loaded and placed on the ISFSI pad in August 2004. The ISFSI and the ISOB Part 50 facility were well maintained and dose rates around the ISFSI perimeter were being monitored. A review of the environmental monitoring program demonstrated that radiological exposures to offsite locations and individuals were in compliance with federal regulations.

The NRC routine inspection reviewed documentation relevant to Part 50 and Part 72 activities and operations that have occurred at Rancho Seco since the last NRC inspection that was performed in March of 2010. The documentation reviewed included quality assurance reports, radiological surveys, and corrective action reports. In addition, NRC reviewed documents that demonstrated compliance to technical specifications, compliance with the ISFSI Final Safety Analysis Report (FSAR), compliance with the Decommissioning Order, compliance with Part 50 Radioactive Material Storage and Decommissioning Safety Analysis Report (RADSAR), and response to industry issues that affected your site.

Away-From-Reactor ISFSI Inspection Guidance (60858)

- The licensee was conducting quality assurance audits of the ISFSI and Part 50 programs. A review of the surveillances and audit reports determined that the Quality Assurance Program was covering a broad range of topics. A number of recommendations were identified in the audits to improve the programs at Rancho Seco. (Section 1.2.a)

- Radiation data reviewed from the 2010 through 2012 environmental monitoring reports determined that radiation levels offsite were in compliance with 10 CFR 72.104 federal regulations. (Section 1.2.b)

- Since the last NRC inspection, Rancho Seco had revised their ISFSI FSAR once in Revision 4. No issues were identified in the review of the changes associated with the revision. (Section 1.2.c)

- Selected condition reports were reviewed for the period March 2010 through June 2013. A number of issues pertaining to ISFSI and Part 50 activities had been identified and resolved. Resolutions of the condition reports were appropriate for the safety significance of the issues. No adverse trends were identified during the review. (Section 1.2.d)

- Horizontal Storage Module (HSM) temperature monitoring and vent surveillance requirements of Technical Specification 5.5.3 were performed daily as required. No temperature issues with the casks were found during the review of selected records. (Section 1.2.e)

- Changes to the licensee's emergency planning program since the last NRC inspection in March 2010 were reviewed. The inspector verified that these changes had not reduced the effectiveness of the emergency response or plan and were consistent with the requirements in 10 CFR Part 50 and 72. Rancho Seco had performed the required annual site drills and biennial exercises for the period of 2010 through 2012 in compliance with the site's emergency plan and 10 CFR 72.32 (a)(12) requirements. (Section 1.2.f)

- Each holder of a license under 10 CFR Part 72 must submit a decommissioning funding plan for the NRC review and approval in accordance with 10 CFR 72.30(b). Per Federal Register Notice 35573 dated June 17, 2011, this new rule took effect on December 17, 2012. Contrary to this requirement, Rancho Seco had not submitted their ISFSI decommissioning funding plan by December 17, 2012. The NRC has determined that this is a Severity Level IV Violation of 10 CFR 72.30(b). Since the licensee entered the issue into their corrective action program, and because the issue was not a repetitive violation or willful, this violation was treated as a Non-Cited Violation (NCV), consistent with Section 2.3.2 of the NRC Enforcement Policy. The licensee took the appropriated actions and submitted the ISFSI decommissioning funding report on March 14, 2013. (Section 1.2.g)

- Rancho Seco relocated their records from the vault located in the training and records building to a new vault in the security building. Rancho Seco had received an exemption from 10 CFR 72.72(d) to maintain a single set of spent fuel records at a storage facility that satisfied the fire protection requirements set forth in the American National Standards Institute (ANSI) N45.2.9-1974 and the American Society of Mechanical Engineers (ASME) NQA-1-1983, Supplement 17S-1. The proper documentation was provided that demonstrated the new vault met the ANSI/ASME requirements set forth in the exemption. (Section 1.2.f)

<u>Review of 10 CFR 72.48 Evaluations (60857), Safety Reviews, Design Changes and Modifications (37801)</u>

- All safety screenings and safety evaluations that were reviewed had been performed in accordance with site's procedures and 10 CFR 72.48/50.59 requirements. All screenings and safety evaluations reviewed were determined to be adequately evaluated. One Severity Level IV Violation of 10 CFR 50.59(d)(1) was identified due to Rancho Seco's failure to perform a 10 CFR 50.59 safety evaluation on changes that were performed on the site's fire protection system. Since the licensee entered the issue into their corrective

action program, the issue was of low safety significance, and because the issue was not a repetitive violation or willful, this violation was treated as a Non-Cited Violation (NCV), consistent with Section 2.3.2 of the NRC Enforcement Policy. (Section 2.2)

Organization, Management and Cost Controls (36801), Occupational Exposure During SAFSTOR and DECON (83100), Radioactive Waste Treatment and Effluent and Environmental Monitoring (84750), Solid Radioactive Management and Transportation (86750), and Self-Assessment, Auditing, and Corrective Action (40801)

- The licensee was adequately staffed and organized for conducting activities currently required by their Part 50 license. Rancho Seco had been updating their Decommissioning Safety Analysis Report (DSAR) every 24 months in compliance with the requirements specified in the Decommissioning Order issued on March 20, 1995 and federal regulation 10 CFR 50.71(e)(4). (Section 3.2.a)

- Changes made to the licensee's quality assurance program were verified to not reduce commitments in the program as previously accepted by the NRC. (Section 3.2.b)

- A tour of the Interim Onsite Storage Building (IOSB) verified safe storage of low-level radioactive waste in accordance with NRC regulations. All areas storing radioactive waste were properly posted and controlled as radioactive material areas. (Section 3.2.c)

- Access to radiological sources was controlled to prevent personnel from receiving exposures that required personnel dosimetry in accordance with 10 CFR 20.1502. (Section 3.2.d)

- Rancho Seco shipped some radiological calibration instruments to Humboldt Bay Power Plant of Eureka, CA. All radiological transfer documentation was reviewed and no issues were identified. (Section 3.2.e)

## Report Details

Summary of Facility Status – Independent Spent Fuel Storage Installation, Docket 72-11

The Sacramento Municipal Utility District (SMUD) maintains a site-specific 10 CFR Part 72 license for its Independent Spent Fuel Storage Installation (ISFSI) at the Rancho Seco site. Twenty-one canisters contain 493 spent fuel assemblies and one canister contains Greater-Than-Class C (GTCC) waste on the ISFSI pad. The spent fuel and the GTCC waste were stored in Horizontal Storage Modules (HSMs) as associated with the TransNuclear NUHOMS design. The Rancho Seco dry shielded canisters (DSCs) each are based on the Standardized NUHOMS 24P - DSC design. On the pad there are 20 DSCs filled with 24 pressurized water reactor (PWR) fuel assemblies, one DSC loaded with 13 failed fuel assemblies, and the one GTCC canister. The 21 canisters containing fuel were loaded using SNM-2510 License Amendment 0 and FSAR Revision 1 or 2. The GTCC canister was loaded using SNM-2510 License Amendment 2 and FSAR Revision 3. All casks are currently maintained under SNM-2510 License Amendment 3 and the FSAR Revision 4 at the time of the inspection.

Summary of Plant Status – Interim Onsite Storage Building, Docket 50-312

The Rancho Seco Nuclear Generating Station began commercial operations in April 1975 and was permanently shut down in June 1989. The licensee commenced with decommissioning in February 1997 and by August 2002, all spent reactor fuel had been transferred from the spent fuel pool to the onsite ISFSI. The NRC approved the License Termination Plan (LTP) in November 2007. The licensee completed all final status surveys to release the reactor facility areas to unrestricted use and on September 25, 2009 the NRC approved the licensee's request to reduce the footprint of the 10 CFR Part 50 license to only the area of the IOSB. The IOSB is used for the temporary storage of Class B and C waste until an acceptable disposal site is available. There is no Greater-Than-Class C waste or high level waste stored in the IOSB.

## 1 Away-From-Reactor ISFSI Inspection Guidance (60858)

### 1.1 Inspection Scope

The ISFSI inspection of the loaded casks at Rancho Seco was completed to verify compliance with requirements of their SNM-2510 License, their ISFSI FSAR, and federal regulations. The inspection reviewed a broad range of topics including audits conducted by the licensee, condition reports related to the ISFSI, environmental radiological data collected around the ISFSI for the past several years, review of changes made to license documents, review of the emergency program, and review of industry issues that may have affected the site's ISFSI programs. A tour of the ISFSI area was performed and radiological dose rates measured by the licensee around the perimeter of the ISFSI pad and near the casks.

### 1.2 Observations and Findings

#### a. Quality Assurance Audits and Surveillances

The SMUD had been performing Rancho Seco Part 50 and Part 72 ISFSI audits and surveillances as required by the quality assurance (QA) program. A total of 30 individual audit reports from 2010, 2011, 2012, and 2013 were reviewed during the inspection. Audit report topics included Emergency Preparedness; Inspection, Test, Operating

Status, and ISFSI Maintenance Program; Radiological Safety, Control, and As Low As Reasonably Achievable (ALARA) Program; Technical Specification and License Conditions; Program for Control and Accountability of Special Nuclear Material (SNM); Security; Organization, Performance, and Qualification of Facility Staff; Nonconforming Materials and Corrective Actions Programs; Radiological Environmental Monitoring Program; Fire Protection; and other ISFSI activities. None of the reviewed audit reports uncovered issues that were potentially detrimental to quality (PDQ) or any issues that resulted in corrective action requests (CARs). However, many of the audit reports provided recommendations. Recommendations were tracked for completion in follow-up audit reports. Many of the recommendations were made in response to out of date procedures that needed to be revised to reflect current plant configuration, organization, and status. Between 2010 and 2013, SMUD had initiated numerous changes in the organization and staffing at Rancho Seco, including the removal of several ISFSI staff positions. As such there were some procedures which required updating to accurately represent the organizational conditions at the time that many of the internal audits took place.

One audit report that was reviewed included the SMUD Rancho Seco Audit Report Number 13-A-003, issued March 19, 2013 which covered the Rancho Seco Fire Protection Program. This Audit Report found that an electric fire pump associated with the IOSB had been taken out of service and the diesel fire pump was replaced with an equivalent model. The fire protection system for the IOSB currently relied on the diesel driven water pump to charge the fire suppression system. The audit report noted that a 10 CFR 50.59 safety evaluation was not performed on the changes made to the fire protection system and recommended that an evaluation be performed and documented. Section 2.2 of this inspection report discusses findings related to 50.59 safety evaluation reports.

In addition to the QA audit reports, 17 surveillance reports were issued from 2010 through June 2013. Those surveillance reports were issued to document particular observed activities at the Rancho Seco site, including eight emergency drills/exercises; six instances of SNM accounting data being prepared (biennially) for NRC and the Department of Energy (DOE); Interim Onsite Storage Building cell inspections of the Class B and C radioactive wastes stored therein; relocation of Rancho Seco records from the first floor vault of the training and records building to a new vault in the security building; and a meeting between SMUD and local law enforcement agencies to discuss Rancho Seco status and emergency response coordination. No deficiencies were noted in any of those surveillance reports.

b. Radiological Conditions Related to Stored Casks

A tour of the ISFSI pad was performed during the inspection. A recent radiological survey of the ISFSI was provided to NRC inspectors prior to their arrival at the ISFSI pad. The ISFSI Superintendent and a site security manger accompanied the NRC inspectors during the pad tour. A calibrated sodium iodide radiation survey meter was provided to the NRC inspectors for measuring gamma exposure rates. The tour found the 22 loaded HSM storage casks to be in good condition. No flammable or combustible materials were observed inside the ISFSI protected area. Radiation readings were taken and recorded on approach to the ISFSI pad from the security building, walking east to west. Background measurements taken outside the security building measured 8 microRoentgen per hour (μR/hr). At the 100 meter fence location, the gamma

exposure rate was 12 µR/hr. At the ISFSI perimeter fence (outer security fence) doses measured 100 µR/hr and at the ISFSI boundary fence (inner security fence) dose measured 140 µR/hr. Survey meter readings were taken at selected locations on the ISFSI pad and at environmental optically stimulated luminescence dosimeter (OSL) monitoring locations on the ISFSI perimeter fence. Survey readings on the ISFSI pad ranged from 130 µR/hr at the western edge of the pad to 10 milliRoentgen per hour (mR/hr) in front of the center cask location on the south side of the pad at the HSM vent openings. The most elevated radiation levels were observed on the north and south sides of the ISFSI pad. The measurements taken onsite confirmed the survey results that were provided to NRC prior to the ISFSI walk-down.

The Rancho Seco Records Management Group provided quarterly ISFSI radiological surveillance data for the 2010, 2011, 2012, and 2013 (through February 21) calendar years (CYs) for review. The documents were titled "Surveillance Manual Quarterly Direct Radiation Monitoring of the ISFSI," SP-1112, Revision 2, (multiple dates, from April 15, 2010 to February 21, 2013). Those data reports presented the results from eight OSL monitoring locations around the ISFSI pad that were responsible for measuring the direct radiological impact of the loaded casks on areas in close proximity. The OSL sample identifiers were ISFSI-1, -2, -3, -4, -5, -6, -7, and -8. The monitoring locations were equally spaced on all four sides the ISFSI perimeter fence (see Table 1, below).

**Table 1, Yearly ISFSI Direct OSL Monitoring Results, in mrem**

| Sample ID | Location | 2010[1] | 2011[2] | 2012[3] | Average[4] |
|---|---|---|---|---|---|
| ISFSI-1 | North Fence | 301 | 270 | 312 | 299 |
| ISFSI-2 | North Fence | 419 | 372 | 444 | 418 |
| ISFSI-3 | West fence | 100 | 85 | 116 | 101 |
| ISFSI-4 | West fence | 102 | 93 | 110 | 103 |
| ISFSI-5 | South Fence | 274 | 238 | 285 | 270 |
| ISFSI-6 | South Fence | 433 | 374 | 428 | 418 |
| ISFSI-7 | East Fence | 92 | 74 | 92 | 87 |
| ISFSI-8 | East Fence | 101 | 67 | 95 | 89 |

Survey measurements, taken at the time of the inspection by the NRC, at the eight OSL monitoring locations were consistent with the environmental surveillance data from 2010, 2011, and 2012. The eight ISFSI OSLs are not part of the Radiological Environmental Monitoring Program (REMP) at Rancho Seco.

Offsite and onsite monitoring data from the 2010, 2011, and 2012 Rancho Seco Nuclear Station Annual Radiological Environmental Operating Reports were reviewed. Those reports were generated by SMUD in accordance with the REMP Manual. As part of this program, Rancho Seco collected data from 24 environmental OSL monitoring locations onsite, including two offsite control locations for background measurements. For CY 2012, Rancho Seco reduced the monitoring locations from 24 to 14. This was because the REMP only required 14 locations be monitored. Prior to 2012, data was collected

[1] Monitoring-year 2010 generated 8760 hours of monitoring data.
[2] Monitoring-year 2011 generated 8064 hours of monitoring data
[3] Monitoring-year 2012 generated 9072 hours of monitoring data
[4] Average data was normalized to represent an 8760 hour year.

and tracked from the ten additional historical monitoring locations for informational purposes only.

Raw quarterly REMP OSL monitoring results for 2010 and 2011 ranged from 13 to 24 milliRoentgen equivalent man (mrem). Correcting the monitoring results for background showed that site conditions ranged from background to 26 mrem per year above background, depending on location. The highest readings for both years were measured at historical (non-REMP) onsite monitoring location number 3, "site fence west near south of rail spur." That location measured 24 mrem in 2010 and 26 mrem in 2011 and was the nearest onsite monitoring location to the ISFSI. Site-boundary REMP monitoring locations ranged from 1.5 mrem to 18.5 mrem above background for 2010 and 2011. The highest site boundary reading (18.5 mrem) was taken for the CY 2010 at monitoring location number 94, "ISFSI fence north."

In 2012, changes were performed to the environmental operating report program. First, the 2012 report only tracked data from the 14 REMP required monitoring locations. In addition, the monitoring results reported for CY 2012 were markedly lower than previous years due to the changes made to the handling and storage of the Luxel Quality Control (QC) OSLs used for the environmental monitoring program at Ranch Seco. The 2012 environmental operating report (Adams Accession No. ML13142A214) stated that "in the current configuration, while the total numerical values of the doses in the monitoring and control locations show no change, the net dose is now not distinguishable from QC dosimeter doses, in almost all instances". The QC handling change had resulted in the 2012 report documenting that most locations had dose impacts below the minimum reporting value of 1 mrem provided by the dosimeter vendor. The highest REMP dose reading for 2012 was documented as 5 mrem per year at monitoring location number 90, "ISFSI west fence." Correcting for background, this equated to 1 mrem for the year above background at that location. After discussions on this topic with the licensee, a condition report was initiated to evaluate why the environmental monitoring results changed in the 2012 report.

The most elevated readings recorded by the REMP from 2010 to 2012 were made in close proximity to the ISFSI. All of the site boundary monitoring results for 2010, 2011, and 2012 were below the 10 CFR 72.104(a) dose limit of 25 mrem per year at the owner controlled boundary.

c. Changes to the SNM-2510 License and FSAR

At the time of the last inspection in March 2010, Rancho was utilizing SNM-2510 License Amendment 3 and FSAR Revision 3. Since then, Rancho revised the FSAR once to Revision 4, dated June 30, 2010. All changes associated with Revision 4 were administrative in nature. Changes made in Revision 4 included changing the titles of personnel within the organizational structure and editorial changes. No issues were identified during the review of the FSAR revision.

d. Corrective Action Program

A list of condition reports issued since the last NRC inspection was provided to the inspectors by the licensee for the ISFSI and Part 50 activities. Issues were processed in accordance with Rancho Seco Procedure RSAP-1310 "Deviation from Quality", Revision 9. When an adverse to quality issue was identified, the licensee would

document the issue as a potential deviation from quality (PDQ) and assign a PDQ tracking number.

The list of condition reports relating to the site's activities totaled thirty PDQs in the last three years. A number of these PDQs were selected for additional review. The related issues included: training issues, fire alarm false activation in the IOSB, security issues, the ISFSI decommissioning funding plan not having been submitted in a timely manner, and the HSM temperature monitoring system found out of calibration. The temperature monitoring equipment that was found out of calibration was reading the temperatures in a conservative direction. The equipment was subsequently re-calibrated. All other PDQs that were reviewed were well documented and properly categorized based on the significance of the issue. The corrective actions taken were reviewed as appropriate for the situations. No NRC concerns were identified related to the condition reports that were reviewed.

e. Daily Vent Inspections and Thermal Monitoring per Technical Specification 5.5.3

Rancho Seco's License SNM-2510, Technical Specification 5.5.3 required daily visual inspection of the air inlet vents for the HSMs and required daily temperature monitoring of the HSMs' roof temperatures. For temperature monitoring, if any thermocouple rose by more than 80 degrees F in a 24 hour period or if any temperature reading exceeded 225 degrees F, then it was possible that an inlet or outlet vent had become blocked and required corrective action. To perform these actions the licensee utilized Procedure RSIP-710 "ISFSI & Instrument Checks & System Verification Daily Surveillance," Revision 0 for reviewing and recording the concrete temperatures. Additionally, the procedure required the actions to visually inspect the inlet vents on a daily basis. Documentation of both required surveillances was reviewed for the months of June 2010, October 2011, and January 2013. The licensee records indicated that the technical specifications had been performed and correctly documented. No abnormal observations were noted during the reviewed time frames.

f. Emergency Plan

At the time of the last NRC inspection in March of 2010, the Rancho Seco Emergency Plan was at Change 5, Revision 4. The licensee had made one change to the Emergency Plan since the last NRC inspection in Change 6, Revision 1 on October 1, 2010. This change was reviewed and verified to not have reduced the effectiveness of the licensee's emergency response.

Required emergency plan drills and exercises were documented in Section 7.3 of the emergency plan. Each year, Rancho Seco was required to conduct a fire drill, a medical drill, and either a biennial health physics/radiological drill or a biennial exercise. Documentation was reviewed that demonstrated the licensee had successfully conducted all the required drills and exercises since the last ISFSI inspection. The drill packages associated with the 2010 annual exercise, the 2011 fire and medical joint drill, the 2011 annual exercise, and the 2012 annual exercise were selected for additional review. The selected drills/exercises met the objectives of site Emergency Plan Step 7.3.2. The drill and exercise packages included a description of the drill that was conducted, a timeline, a synopsis, and a drill critique. Offsite support agencies' personnel, including the Herald Fire Department, the Sacramento Sheriff, the Federal Bureau of Investigation, California Emergency Management, Sacramento County Office

of Emergency Management, the Department of Energy Radiological Assistance Program had all participated in one of the drills/exercises conducted by the licensee. Licensees are required per 10 CFR 72.32 (a)(12)(ii) to invite outside agencies to participate in the site's emergency plan exercises. Rancho Seco had done well in recruiting actual participation from those agencies in their exercises.

g. Decommissioning Funding Plan

Federal Register Notice 76FR35512, dated June 17, 2011, included a new rulemaking requirement that affected Part 72 licensees. The Federal Register documented a change to 72.30(b) which required Part 72 licensees to submit to the NRC for review and approval an ISFSI decommissioning funding plan. The final rule made changes to the financial assurance requirements for Part 72 licensees to provide greater consistency with similar decommissioning requirements in the 10 CFR Part 50 regulations. Financial assurances are financial arrangements provided by the licensee to ensure funds for decommissioning will be available when needed. The effective date of the new rule was December 17, 2012. The new rule required licensees to submit a decommissioning funding plan to the NRC by the effective date of the rule. Contrary to this requirement, Rancho Seco had not submitted their ISFSI decommissioning funding plan by December 17, 2012. The NRC has determined that this is a Severity Level IV Violation of 10 CFR 72.30(b). Since the licensee entered the issue into their corrective action program, and because the issue was not a repetitive violation or willful, this violation is being treated as a Non-Cited Violation (NCV), consistent with Section 2.3.2 of the NRC Enforcement Policy. The licensee took the appropriate corrective actions and submitted the ISFSI Decommissioning Funding Report to the NRC on March 14, 2013 (ADAMS Accession No. ML13098A100).

h. Relocation of Rancho Seco Records

The Sacramento Municipal Utility District received a license exemption from the requirements of 10 CFR 72.72(d) regarding the storage of spent fuel records for the Rancho Seco Nuclear Generating Station ISFSI on March 15, 2001 (ML010780442). The exemption allowed for SMUD to maintain a single set of spent fuel records at a storage facility that satisfied the fire protection requirements set forth in ANSI N45.2.9-1974 and ASME NQA-1-1983, Supplement 17S-1. SMUD Surveillance Report 12-5-004, July 10, 2012 discussed the relocation of the Rancho Seco records from the first floor vault of the training and records building to a new storage vault that was constructed in the security building. The SMUD staff provided the NRC with evaluations and design drawings that detailed how the new storage vault in the security building satisfied the license exemption requirements. The NRC has reviewed the documents and has concluded that the storage vault is acceptable per the NRC approved license exemption.

1.3 Conclusions

The licensee was conducting quality assurance audits of the ISFSI and Part 50 programs. A review of the surveillances and audit reports determined that the Quality Assurance Program was covering a broad range of topics. A number of recommendations were identified in the audits to improve the programs at Rancho Seco.

Radiation data reviewed from the 2010 through 2012 environmental monitoring reports determined that radiation levels offsite were in compliance with 10 CFR 72.104 federal regulations.

Since the last NRC inspection, Rancho Seco had revised their ISFSI FSAR once in Revision 4. No issues were identified in the review of the changes associated with the revision.

Selected condition reports were reviewed for the period March 2010 through June 2013. A number of issues pertaining to ISFSI and Part 50 activities had been identified and resolved. Resolutions of the condition reports were appropriate for the safety significance of the issues. No adverse trends were identified during the review.

Horizontal Storage Module (HSM) temperature monitoring and vent surveillance requirements of Technical Specification 5.5.3 were performed daily as required. No temperature issues with the casks were found during the review of selected records.

Changes to the licensee's emergency planning program since the last NRC inspection in March 2010 were reviewed. The inspector verified that these changes had not reduced the effectiveness of the emergency response or plan and were consistent with the requirements in 10 CFR Part 50 and 72. Rancho Seco had performed the required annual site drills and biennial exercises for the period of 2010 through 2012 in compliance with the site's emergency plan and 10 CFR 72.32 (a)(12) requirements.

Each holder of a license under 10 CFR Part 72 must submit a decommissioning funding plan for NRC review and approval in accordance with 10 CFR 72.30(b). Per Federal Register Notice 35573 dated June 17, 2011, this new rule took effect on December 17, 2012. Contrary to this requirement, Rancho Seco had not submitted their ISFSI decommissioning funding plan by December 17, 2012. The NRC has determined that this is a Severity Level IV Violation of 10 CFR 72.30(b). Since the licensee entered the issue into their corrective action program, and because the issue was not a repetitive violation or willful, this violation was treated as a NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. The licensee took the appropriated actions and submitted the ISFSI decommissioning funding report on March 14, 2013.

Rancho Seco relocated their records from the vault located in the training and records building to a new vault in the security building. Rancho Seco had received an exemption from 10 CFR 72.72(d) to maintain a single set of spent fuel records at a storage facility that satisfied the fire protection requirements set forth in ANSI N45.2.9-1974 and ASME NQA-1-1983, Supplement 17S-1. The proper documentation was provided that demonstrated the new vault met the ANSI/ASME requirements set forth in the exemption.

## 2. Review of 10 CFR 72.48 Evaluations (60857), Safety Reviews, Design Changes and Modifications (37801)

### 2.1 Inspection Scope

The licensee's 10 CFR 72.48 and 10 CFR 50.59 screenings and evaluations since the March 2010 NRC routine inspection were reviewed to determine compliance with regulatory requirements.

2.2 Observations and Findings

A list of modification screenings and evaluations to the ISFSI and Part 50 facility program was provided by the licensee. Twenty-three 72.48/50.59 screenings and 32 full safety evaluations had been performed by the licensee since the last routine inspection. From the list, six screenings and all 32 safety evaluations were selected for further review. The licensee utilized Procedure RSAP-0901 "Safety Review of Proposed Changes, Tests, and Experiments," Revision 24 to perform the safety screenings and evaluations. The 72.48/50.59 screenings that were selected for review that been performed on miscellaneous procedure changes. The procedures that had been changed included the emergency plan implementing procedures, the HSM temperature monitoring procedures, and security related procedures. No issues were identified during review of the safety screenings.

All the 72.48/50.59 safety evaluations that had been performed since the last inspection were on License Basis Documents (LBDs). Rancho Seco was in the process of changing the hierarchy of many of their procedures and programs. The changes reviewed through the safety evaluations were associated with changes to the Rancho Seco Quality Manual, the Part 50 Radioactive Material Storage and Decommissioning Safety Analysis Report (RADSAR), the emergency plan, the quality assurance manual, and other miscellaneous procedures. All changes reviewed were administrative in nature and were identified by the licensee as not having any impact on Technical Specifications or impact on any important to safety equipment. All of the changes passed the safety evaluations and were documented as not requiring NRC approval. No issues were identified in review of the 72.48/50.59 evaluations.

Since the last inspection the licensee had made several changes to the fire protection system associated with the Rancho Seco Facility. The licensee replaced the diesel fire pump with an upgraded model of the same capacity, installed a new 300 gallon day tank, installed a new jockey pump in place of the service water system to provide continuous system pressure for the fire system, removed an electric pump from service, and re-routed the alarms for the fire system to the security alarm station. After the onsite inspection, during an in-office review, it was identified that Rancho Seco had not perform a 50.59 safety evaluation on the fire protection system changes that were performed. A Decommissioning Order from the NRC to Rancho Seco in letter "Order Approving the Decommissioning Plan and Authorizing Decommissioning of Rancho Seco Nuclear Generating Station and Approval of the Decommissioning Funding Plan (TAC NO. M80518)," dated March 20, 1995, required in part that: "With respect to changes to the facility or procedures described in the updated FSAR/DSAR or changes to the Decommissioning Plan, and the conduct of tests and experiments not described in the FSAR/DSAR, the provisions of 10 CFR 50.59 shall apply."

Rancho Seco's DSAR was changed to the RADSAR in April 2011. The fire protection program is described in Rancho Seco's RADSAR in Section 4.2 and changes to that system or program would be a change to the facility as described in the RADSAR. Federal requirements in 10 CFR 50.59 (d)(1) state "The licensee shall maintain records of changes in the facility, of changes in procedures, and of tests and experiments made pursuant to paragraph (c) of this section. These records must include a written evaluation which provides the bases for the determination that the change, test, or experiment does not require a license amendment." Contrary to the above, Rancho Seco failed to perform a written evaluation that provided the bases for the determination

that the change did not require a license amendment. The NRC has determined that this is a Severity Level IV violation of 10 CFR 50.59(d)(1). Since the licensee entered the issue into their corrective action program, the safety significance of the issue was low, and because the issue was not a repetitive violation or willful, this violation was treated as a Non-Cited Violation (NCV), consistent with Section 2.3.2 of the NRC Enforcement Policy.

2.3 Conclusions

All safety screenings and safety evaluations that were reviewed had been performed in accordance with site's procedures and 10 CFR 72.48/50.59 requirements. All screenings and safety evaluations reviewed were determined to be adequately evaluated. One Severity Level IV Violation of 10 CFR 50.59(d)(1) was identified due to Rancho Seco's failure to perform a 10 CFR 50.59 safety evaluation on changes that were performed on the site's fire protection system. Since the licensee entered the issue into their corrective action program, the issue was of low safety significance, and because the issue was not a repetitive violation or willful, this violation was treated as a Non-Cited Violation (NCV), consistent with Section 2.3.2 of the NRC Enforcement Policy.

## 3. Organization, Management and Cost Controls (36801), Occupational Exposure During SAFSTOR and DECON (83100), Radioactive Waste Treatment and Effluent and Environmental Monitoring (84750), Solid Radioactive Management and Transportation (86750), and Self-Assessment, Auditing, and Corrective Action (40801)

3.1 Inspection Scope

Management organization and controls were reviewed to determine if the licensee was maintaining effective oversight of site licensed activities related to the storage of radioactive waste at Rancho Seco. Implementation of the quality assurance program was verified and changes to the quality assurance program reviewed. A tour of the IOSB was completed to review the condition of the facility. Documentation related to off-site radioactive shipments was reviewed. Occupational exposure and environmental monitoring activities were reviewed.

3.2 Observations and Findings

a. Organization, Management and Cost

The licensee was adequately staffed and organized for conducting activities currently required by their Part 50 license at the Rancho Seco site. Rancho Seco followed Procedure RSAP-0101 "Nuclear Organization Responsibilities and Authorities," Revision 32 which described the industrial decommissioning and long term monitoring organizations. This procedure implemented the decommissioning organization as described by the RADSAR Section 6.1 "Plant Organization".

The Decommissioning Order issued on March 20, 1995 and 10 CFR 50.71(e)(4) require an update to the Decommissioning Safety Analysis Report (DSAR) every 24 months. Rancho Seco updated the DSAR on April 21, 2011. In this revision the licensee changed the structure of the document and its title from DSAR to RADSAR. Additionally, the licensee made more changes to the RADSAR in Revision 1 on November 5, 2012.

The 50.59 safety evaluation and changes associated with the Part 50 Safety Analysis Reports (RADSAR Revision 0 and 1) were reviewed. The revisions reflected the completion of the first phase of decommissioning, the continued and ongoing storage of radioactive waste in the IOSB, and future decommissioning activities. No issues were identified in the review of the changes associated with the Part 50 RADSAR.

b. Quality Assurance and Corrective Actions

One revision to the quality assurance program since the last NRC inspection had been conducted and was reviewed. Changes in the Rancho Seco Quality Manual (RSQM) were in accordance with 10 CFR 50.54(a)(3) such that the changes did not reduce commitments in the quality assurance program as previously accepted by the NRC. The changes were administrative and had no impact on the quality assurance program. Rancho Seco had changed the quality manual into a new format. The new quality manual was designated as Rancho Seco Licensing Basis Document (RSLBD) RSLBD-010 "Rancho Seco Quality Manual," Revision 0. Quality assurance audits and corrective action reports for both Part 50 and Part 72 activities were reviewed and documented in Section 1.2.a and Section 1.2.d, respectively.

c. Tour of the Interim On-site Storage Building

A tour of the IOSB was conducted to assess the buildings' physical condition and to verify the safe storage of the radioactive waste. The IOSB is used for the temporary storage of Class B and C waste until an acceptable disposal site becomes available to the licensee. The licensee was maintaining storage of radioactive waste in accordance with site procedures. During the facility tour, the radioactive material area postings and radiological controls to limit personnel access to the radioactive material were observed. All postings and radiological controls complied with regulatory requirements of 10 CFR Part 20. The waste was from components or pieces of the reactor vessel and radioactive resin. The radioactive waste was stored in numerous concrete cells. There was no GTCC waste or high level waste stored in the IOSB. At the time of the inspection, the licensee was maintaining the IOSB with no immediate plans to ship the waste or terminate their Part 50 license.

d. Environmental and Occupational Radiation Monitoring

No personnel monitoring has been performed at Rancho Seco since 2008. Since the late 2008 time frame, the only accessible radiation area at Rancho Seco is the area immediately adjacent to the HSMs stored within the fenced and locked ISFSI. Entries into this radiation area are made infrequently and for short durations. No radiation areas are accessible at the IOSB and no movement of low-level radioactive waste stored in the IOSB has been performed and there is no planned movement of the waste in the near future. Therefore, the licensee has determined it is unlikely that any individual could receive an occupational radiation exposure greater than the values in 10 CFR 20.1502. The site's environmental monitoring was reviewed and is discussed in Section 1.2.b of this report.

e. Transportation of Radioactive Material

Rancho Seco staff provided documentation of the October 2010 transfer of licensed materials from Sacramento Municipal Utilities District of Herald, CA to the Humboldt Bay Power Plant of Eureka, CA for review. The documentation included a *Certification of*

*Source/Device Possession Transfer* and copies of the shipping documents. A J.L. Shepherd and Associates Model 89-260 Calibration Range was packaged by J.L. Shepherd and Associates according to Department of Transportation (DOT) standards (49 CFR) and shipped to the Humboldt Bay Power Plant. The Calibration Range contained NRC regulated materials, including two cesium-137 sources with a combined activity of approximately 143 Curies. The transfer took place in accordance with 10 CFR 40.51, "Transfer of source or byproduct material." All parties involved in the transfer had the appropriate State of California (a U.S. Nuclear Regulatory Commission Agreement State) radioactive materials licenses. This was the only shipment of radioactive materials that took place at Rancho Seco since the last NRC inspection in March of 2010.

3.3 Conclusions

The licensee was adequately staffed and organized for conducting activities currently required by their Part 50 license. Rancho Seco had been updating their Decommissioning Safety Analysis Report every 24 months in compliance with the requirements specified in the Decommissioning Order issued on March 20, 1995 and 10 CFR 50.71(e)(4).

Changes made to the licensee's quality assurance program were verified to not reduce commitments in the program as previously accepted by the NRC.

A tour of the IOSB verified safe storage of low-level radioactive waste in accordance with the NRC regulations. All areas storing radioactive waste were properly posted and controlled as radioactive material areas.

Access to radiological sources was controlled to prevent personnel from receiving exposures that required personnel dosimetry in accordance with 10 CFR 20.1502.

Rancho Seco shipped some radiological calibration instruments to Humboldt Bay Power Plant of Eureka, CA. All radiological transfer documentation was reviewed and no issues were identified.

## 4. Exit Meeting

The inspectors reviewed the scope and findings of the inspection during an exit conducted on August 1, 2013.

## SUPPLEMENTAL INSPECTION INFORMATION

## PARTIAL LIST OF PERSONS CONTACTED

Licensee Personnel

J. Briggs, Emergency Preparedness Specialist
R. Donovan, QA Engineer
S. Flake, Manager of Power Generation
C. Formhacs, Security Site Manager
B. Gaines, Dosimetry Technician
E. Ronningen, Supt. Rancho Seco Assets

## INSPECTION PROCEDURES USED

| | |
|---|---|
| IP 60858 | Away-From-Reactor ISFSI Inspection Guidance |
| IP 60857 | Review of 10 CFR 72.48 Evaluations |
| IP 36801 | Organization, Management, and Cost Controls |
| IP 37801 | Safety Reviews, Design Changes, and Modifications |
| IP 40801 | Self-Assessment, Auditing, and Corrective Action |
| IP 83001 | Occupational Exposure during SAFSTOR and DECON |
| IP 84750 | Radioactive Waste Treatment and Effluent and Environmental Monitoring |
| IP 86750 | Solid Radioactive Management and Transportation |

## LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

| | | |
|---|---|---|
| 72-011/1301-01 | NCV | Failure to submit 10 CFR 72.30(b) ISFSI Decommissioning Funding Report by December 17, 2012. |
| 50-312/1307-01 | NCV | Failure to perform a 50.59 evaluation on the changes made to the fire protection system. |

Discussed

None

Closed

| | | |
|---|---|---|
| 72-011/1301-01 | NCV | Failure to submit 10 CFR 72.30(b) ISFSI Decommissioning Funding Report by December 17, 2012. |

## LIST OF ACRONYMS

| | |
|---|---|
| ADAMS | Agencywide Documents Access and Management System |
| ALARA | As Low As Reasonably Achievable |
| ANSI | American National Standards Institute |
| ASME | American Society of Mechanical Engineers |
| CAR | Corrective Action Request |
| CFR | Code of Federal Regulations |
| CY | Calendar Year |
| DOE | Department of Energy |
| DOT | Department of Transportation |
| DSAR | Decommissioning Safety Analysis Report |
| DSC | Dry Shielded Canister |
| DNMS | Division of Nuclear Material Safety |
| FSAR | Final Safety Analysis Report |
| GTCC | Greater Than Class C |
| HSM | Horizontal Storage Module |
| IOSB | Interim On-site Storage Building |
| IP | Inspection Procedure |
| ISFSI | Independent Spent Fuel Storage Installation |
| kW | kilo-watt |
| LBD | License Basis Document |
| MPC | multipurpose canister |
| mR | milliRoentgen |
| micro(μ)R/hr | microRoentgen per hour |
| mrem | milliRoentgen equivalent man |
| MWD/MTU | megawatt days/metric ton uranium |
| NCV | Non-cited Violation |
| NRC | U.S. Nuclear Regulatory Commission |
| OCA | owner controlled area |
| OSL | optically stimulated luminescence |
| PDQ | Potential Deviation from Quality |
| PWR | Pressurized Water Reactor |
| QA | Quality Assurance |
| QC | Quality Control |
| RADSAR | Radioactive Material Storage and Decommissioning Safety Analysis Report |
| REMP | Radiological Environmental Monitoring Program |
| RSQM | Rancho Seco Quality Manual |
| RSLBD | Rancho Seco License Basis Document |
| RP | radiation protection |
| SMUD | Sacramento Municipal Utility District |
| SNM | Special Nuclear Material |
| TLD | thermoluminescent dosimeter |
| U-235 | Uranium 235 |

## ATTACHMENT 2:

## LOADED CASKS AT THE RANCHO SECO ISFSI

| LOADING ORDER | DSC Serial No. | HSM No. | DATE ON PAD | HEAT LOAD (kW) | BURNUP MWd/MTU (max) | MAXIMUM FUEL ENRICHMENT % | PERSON-REM DOSE |
|---|---|---|---|---|---|---|---|
| 1 | FO24P-P01 | 20 | 04/19/01 | 9.005 | 35,200 | 3.43 | 0.601 |
| 2 | FC24P-P03 | 18 | 07/19/01 | 8.145 | 37,911 | 3.43 | 0.418 |
| 3 | FC24P-P04 | 16 | 08/28/01 | 8.268 | 36,290 | 3.43 | 0.552 |
| 4 | FC24P-P05 | 14 | 09/26/01 | 8.149 | 37,911 | 3.43 | 0.464 |
| 5 | FO24P-P02 | 12 | 10/10/01 | 8.774 | 37,550 | 3.26 | 0.361 |
| 6 | FC24P-P06 | 10 | 11/20/01 | 8.152 | 36,707 | 3.43 | 0.513 |
| 7 | FC24P-P07 | 8 | 12/12/01 | 8.161 | 37,911 | 3.43 | 0.461 |
| 8 | FC24P-P08 | 6 | 01/07/02 | 8.151 | 36,707 | 3.43 | 0.517 |
| 9 | FC24P-P09 | 4 | 01/23/02 | 8.146 | 38,268 | 3.43 | 0.472 |
| 10 | FC24P-P10 | 2 | 02/07/02 | 8.137 | 38,268 | 3.43 | 0.605 |
| 11 | FC24P-P11 | 1 | 02/27/02 | 8.139 | 38,268 | 3.43 | 0.290 |
| 12 | FC24P-P12 | 3 | 03/13/02 | 8.162 | 37,827 | 3.43 | 0.385 |
| 13 | FC24P-P13 | 5 | 04/03/02 | 8.157 | 37,911 | 3.43 | 0.402 |
| 14 | FC24P-P14 | 7 | 04/17/02 | 8,139 | 37,911 | 3.43 | 0.466 |
| 15 | FC24P-P15 | 9 | 05/08/02 | 8,147 | 36,707 | 3.43 | 0.390 |

| LOADING ORDER | DSC Serial No. | HSM No. | DATE ON PAD | HEAT LOAD (kW) | BURNUP MWd/MTU (max) | MAXIMUM FUEL ENRICHMENT % | PERSON-REM DOSE |
|---|---|---|---|---|---|---|---|
| 16 | FC24P-P16 | 11 | 05/22/02 | 8,156 | 36,290 | 3.43 | 0.323 |
| 17 | FC24P-P17 | 13 | 06/12/02 | 8,132 | 36,290 | 3.43 | 0.371 |
| 18 | FC24P-P18 | 15 | 06/26/02 | 8,141 | 37,911 | 3.43 | 0.410 |
| 19 | FC24P-P19 | 17 | 07/17/02 | 8,144 | 37,550 | 3.43 | 0.343 |
| 20 | FC24P-P20 | 19 | 07/31/02 | 8,127 | 37,827 | 3.43 | 0.433 |
| 21 | FF13P-R21 | 21 | 08/21/02 | 4,642 | 34,403 | 3.43 | 0.442 |
| 22 | GTCC-001 | 22 | 08/24/06 | N/A | N/A | N/A | N/A |

**NOTES:**
- Heat load (kW) is the sum of the heat load values for all spent fuel assemblies in the cask
- Burn-up is the value for the spent fuel assembly with the highest individual discharge burn-up
- Fuel enrichment is the spent fuel assembly with the highest individual “initial” enrichment per cent of U-235

All casks are currently maintained under SNM-2510, License Amendment 3 and the Final Safety Analysis Report, Revision 4.