SENSITIVE

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SACRAMENTO MUNICIPAL UTILITY DISTRICT ☐ P. O. Box 15830, Sacramento CA 95852-1830, (916) 452-3211
AN ELECTRIC SYSTEM SERVING THE HEART OF CALIFORNIA

MPC&D 02-132

November 26, 2002

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Docket No. 50-312
Rancho Seco Nuclear Station
License No. DPR-54

RANCHO SECO DEFUELED SAFETY ANALYSIS REPORT, AMENDMENT 5

Attention: John Hickman

Attached is Amendment 5 to the Rancho Seco Defueled Safety Analysis Report (DSAR). DSAR Amendment 5 represents the updated licensing basis for the decommissioning Rancho Seco nuclear facility. The updated DSAR reflects NRC Orders, facility license amendments, and facility changes made pursuant to 10 CFR 50.59, through November 2002.

DSAR Amendment 5 replaces DSAR Amendment 4 in its entirety. With all of the fuel removed from the 10 CFR Part 50 licensed site, there are no longer any systems, structures, or components that are important to safety. This DSAR revision streamlines the DSAR by deleting information that is no longer necessary or that is redundant with information contained in other licensing basis documents.

The enclosed attachments include removal/insertion instructions, an updated List of Effective Pages, and the revised DSAR. Members of your staff requiring additional information or clarification may contact Bob Jones at (916) 732-4843.

Sincerely,

FOR SJR

Steve J. Redeker
Manager, Plant Closure & Decommissioning

cc w/attachments: E. W. Merschoff, NRC, Arlington, Texas

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DSAR AMENDMENT 5 REMOVAL/INSERTION INSTRUCTIONS

REMOVE	INSERT
DSAR Amendment 4 in its entirety	Replace with DSAR Amendment 5

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DEFUELED SAFETY ANALYSIS REPORT

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RANCHO SECO DEFUELED SAFETY ANALYSIS REPORT

DSAR CHAPTER - 1 INTRODUCTION

1.1 INTRODUCTION

The Defueled Safety Analysis Report (DSAR) represents the licensing basis for the operation of the shut down Rancho Seco nuclear facility. The DSAR replaced the Updated Safety Analysis Report (USAR) (through Amendment No. 8) as the primary licensing basis document applicable to the operation of Rancho Seco. The DSAR reflects:

1. The Possession-Only License (POL) status of the Rancho Seco nuclear facility.

2. NRC approved license amendments, exemptions, and waivers that were granted based on the permanently defueled condition of the Rancho Seco nuclear reactor.

3. The NRC order approving the Rancho Seco Decommissioning Plan and authorizing decommissioning of the Rancho Seco nuclear facility.

4. That all of the spent nuclear fuel has been removed from the 10 CFR Part 50 site and is in dry storage at the 10 CFR Part 72 licensed Independent Spent Fuel Storage Installation (ISFSI). Accordingly, there are no important-to-safety systems, structures, or components left on the 10 CFR Part 50 site.

This DSAR contains the changes to the licensing basis information and analyses submitted to the NRC in the original Final Safety Analysis Report (FSAR) in 1971, and reflects the changes made since Rancho Seco permanently shut down reactor operations on June 7, 1989. The Sacramento Municipal Utility District (SMUD) will update the DSAR in accordance with the methodology specified in 10 CFR 50.71(e), except that the frequency of updates shall be at least every two years. Revisions to the DSAR are numbered, starting with Amendment 1. DSAR revisions shall include a page change identification table and change indicator lines in the right margin in the area where a change occurred.

The purpose of the DSAR is to provide a Safety Analysis Report that provides assurance that, based on the decommissioning activities described in the Post Shutdown Decommissioning Activities Report (PSDAR) and the administrative controls and programs in place during decommissioning, no undue risk to the public health and safety will occur during normal operations and postulated accident conditions.

The following provides a history of major plant operation and licensing-related actions:

1. Rancho Seco initially went critical on September 16, 1974, and began commercial operation on April 18, 1975.

2. Following approval of a public referendum on June 6, 1989, SMUD permanently shut down Rancho Seco on June 7, 1989.

3. SMUD completely defueled the Rancho Seco reactor on December 8, 1989.

4. The Nuclear Regulatory Commission (NRC) issued an Order and license condition on May 2, 1990, that prevented SMUD from moving fuel into the Rancho Seco reactor building without prior NRC approval.

5. SMUD submitted a proposed Decommissioning Plan for Rancho Seco on May 20, 1991.

6. The POL and Permanently Defueled Technical Specifications (PDTS) for Rancho Seco became effective on April 28, 1992.

7. The NRC issued a decommissioning order and approved the Rancho Seco decommissioning funding plan on March 20, 1995.

8. Technical Specification Amendments 129 and 130 became effective on August 21, 2002, when Rancho Seco completed transferring all of its spent nuclear fuel to the 10 CFR 72 licensed ISFSI. Technical Specifications no longer allow spent nuclear fuel on the 10 CFR Part 50 licensed facility.

9. Technical Specification Amendment 131 became effective on October 10, 2002. This amendment eliminated the security plan requirements from the 10 CFR Part 50 site

DSAR Chapter 7 evaluates the accidents considered credible during decommissioning.

1.2 SITE CHARACTERISTICS

The 2,480-acre site is characterized by a security fence which surrounds the Rancho Seco Industrial Area.

The Rancho Seco Reactor Building is not maintained as a leak-tight structure (i.e., Containment integrity is not required).

Since there are no design basis accidents that could approach 10 CFR 100 limits, no Safety Features are necessary to keep public exposures below the 10 CFR 100 dose limits under worst-case postulated accident conditions.

1.3 QUALITY STANDARDS

The Rancho Seco Quality Manual describes the 10 CFR 50, Appendix B quality assurance program.

1.4 FIRE PROTECTION

The Fire Protection Plan describes the overall fire protection program in place at Rancho Seco. DSAR Section 4.3 also discusses the fire protection system.

1.5 CONTROL OF RELEASES OF RADIOACTIVE MATERIALS

The radioactive waste systems and radiological administrative control programs at Rancho Seco effectively control the collection, segregation, processing, packaging, and discharge or disposal of radioactive solids and liquids. These systems and programs function to control releases to as low as is reasonably achievable levels and are designed to give reasonable assurance that the numerical guidelines defined in 10 CFR 50.34a, 50.36a, and 10 CFR 50, Appendix I, and contained in the Off-site Dose Calculation Manual (ODCM) will be met.

During dismantlement, all ventilation treatment systems have been removed, or are being removed, with the exception of the HEPA filters on the Auxiliary and Reactor Building effluent release point.

The Interim On-site Storage Building (IOSB) provides an area of shielded, safe retrievable storage for packaged low-level radioactive waste. Potential release pathways of radionuclides in particulate form are controlled and monitored in accordance with the ODCM.

Liquid and solid wastes are normally processed in batches for off-site disposal. Gaseous effluents (particulates and tritium) could be released during dismantlement activities. During this time, samples will be taken on the Auxiliary Building, Reactor Building, or Interim Onsite Storage Building (IOSB) release points in accordance with the ODCM.

1.6 PERSONNEL SELECTION AND TRAINING

Plant personnel meet the minimum education and experience standards specified in ANSI N18.1-1971, "Standard for Selection and Training of Personnel for Nuclear Power Plants." Retraining and replacement training meets or exceeds the requirements and recommendations of ANSI N18.1-1971. The Radiation Protection Manager meets the minimum qualifications specified in Regulatory Guide 1.8, September 1975.

DSAR Section 6.2 discusses training programs for staff personnel. Retraining and replacement training and records of the qualifications, background, training, and retraining of each member of the plant organization are maintained in accordance with established programs.

1.7 REPORTING OF OPERATING INFORMATION

The Rancho Seco Quality Manual (RSQM) specifies the reporting requirement in 10 CFR 50.59.

Personnel exposure and monitoring procedures have been established to ensure that each individual is provided with records of their exposure, and to safeguard against exceeding exposure limits in the plant. Reports are submitted as required.

A program for administrative and physical control of radioactive sources containing special nuclear material has been established to ensure that the proper reports are provided.

Reporting abnormal events, Licensee Event Reports (LER), overexposure and excessive radiation levels, loss of special nuclear material, and accidents involving licensed material is performed by plant staff in accordance with plant procedures. Established procedures ensure significant events are quickly brought to the attention of plant management and acted upon within the allowed reporting period.

Special Reports are submitted as specified in administrative procedures.

1.8 MEASURING AND REPORTING OF EFFLUENT FROM NUCLEAR POWER PLANTS

The measuring and reporting of radiological effluents from Rancho Seco complies with the requirements of Safety Guide 21.

Annual reports summarizing the quantity of radionuclides released from the site are submitted to the NRC in accordance with 10 CFR 50.36a(a)(2). This summary data is comprised of radioactive release information collected in accordance with the Off-site Dose Calculation Manual (ODCM).

Normal liquid radioactive wastewater discharges are made from the Retention Basins. Before a release of radioactive liquid waste water, grab samples are taken and analyzed for fission product and activation product radionuclides. During radioactive discharges to the environment, the radioactive liquid effluent is monitored in the discharge stream.

Gaseous effluent discharged to the environment is evaluated in accordance with the Offsite Dose Calculation Manual.

Default plant vent stack flow rates and default meteorological data are used in ODCM evaluations. The results of these evaluations are reported in the Annual Radioactive Effluent Release Report, which contains summary data of radionuclides found in routine and abnormal radioactive liquid and gas releases during the applicable period. Each report also includes total curies of each radionuclide released and the fraction of the 10 CFR 50, Appendix I dose guidelines released from the site.

1.9 IDENTIFICATION OF AGENTS AND CONTRACTORS

SMUD is responsible for decommissioning the Rancho Seco nuclear facility.

1.10 CONCLUSIONS

The personnel assembled to decommission Rancho Seco are capable of performing their required project function. The health and safety of the public and plant personnel are among the primary concerns during decommissioning.

The Rancho Seco nuclear facility can be decommissioned in a safe manner and SMUD is qualified to decommission this nuclear facility in accordance with all applicable laws and regulations and in a manner satisfactory to the NRC, the public, and itself.

RANCHO SECO DEFUELED SAFETY ANALYSIS REPORT

DSAR CHAPTER 2. SITE AND ENVIRONMENT

2.1 SUMMARY

The Rancho Seco nuclear facility is located is in the southeast part of Sacramento County, California approximately 26 miles north-northeast of Stockton and 25 miles southeast of the city of Sacramento. The Rancho Seco nuclear facility is approximately 87 acres and sits within a 2480 acre plot of land that is owned and controlled by SMUD. The area around the site is almost exclusively agricultural.

Dilution water for the radioactive liquid waste discharged from the plant is supplied from the Folsom South Canal, which is a feature of the Central Valley Water Project. The canal was constructed by the Bureau of Reclamation. A pipeline and pumping station are located between the plant and the Folsom South Canal.

Groundwater movement in the area is to the southwest with a slope of about ten feet per mile.

The soils at the Rancho Seco site can be categorized as hard to very hard silts and silty clays with dense to very dense sands and gravels.

Figure 2-1 shows the general location of the Rancho Seco site. Figure 2-2 provides a more specific layout of the SMUD-owned land and a general layout of the site.

2.2 SITE AND ADJACENT AREAS

The land in the general vicinity around the Rancho Seco site is presently undeveloped and is used primarily for agricultural activities.

Within a 15-mile radius of Rancho Seco there are five counties (Amador, San Joaquin, Sacramento, El dorado, and Calaveras). Only very small portions of El Dorado and Calaveras counties are within a 15-mile radius of Rancho Seco. Activities in the area immediately surrounding the site are not expected to change extensively.

State Route 104 runs along the northern boundary of the site and connects with State Route 99 and Interstate Route 5 to the west and State Route 88 to the east. Rail access is available via a rail spur from an existing Union Pacific Railroad line that runs roughly parallel to State Route 104 adjacent to the site. Figure 2-2 shows the routing of the rail spur.

The Rancho Seco Independent Spent Fuel Storage Installation (ISFSI) is located on District owned land approximately 600 feet west of the Rancho Seco Interim On-site Storage Building and within a security fence.

SMUD is in the process of licensing a natural gas-fired power plant on the Rancho Seco site, approximately ½ mile south of the Industrial Area boundary. Also on the 2480 acre site are the

Rancho Seco Reservoir and Recreation Area and a solar power (photo-voltaic) electrical generating station.

2.3 METEOROLOGY

Rancho Seco uses conservative default atmospheric dispersion and deposition factors in its evaluations of off site gaseous releases to calculate the doses that result from normal gaseous effluent and abnormal or accident release conditions.

2.4 HYDROLOGY

The site is bounded on the north by the Hadselville Creek, which intercepts all drainage from the site and empties into Laguna Creek to the west. Laguna Creek conveys this flow westerly to the Cosumnes River and then into the Mokelumne River. The Mokelumne River is a tributary of the southerly flowing Sacramento River and enters the Sacramento River approximately 20 miles south of the city of Sacramento.

Storm water runoff is controlled primarily by surface ditches. The drainage system was designed to accommodate the 25-year recurrence storm with a minimum of six inches freeboard and the 100-year recurrence storm with zero freeboard. Within recent historical times, no flooding or inundation from storms or runoff has occurred within the site boundaries. It is unlikely that the site can be inundated or flooded, even with abnormal rainfall intensities.

More specific and detailed information regarding the hydrologic study performed to support the design of the reservoir and spillway is documented in the historical records of USAR Amendment No. 8.

Groundwater under the site is approximately 150 feet below the original ground surface. The water is of good quality and is readily extracted by wells.

2.5 ENVIRONMENTAL MONITORING PROGRAM

The Radiological Environmental Monitoring Program (REMP) measures and determines the significance of additions to the existing environmental radioactivity levels resulting from facility operation. Quarterly and annual reports of the operational phase program are maintained and available at the Rancho Seco facility.

Results of the Rancho Seco Environmental Monitoring Program are available to the State of California and federal agencies that have a direct interest and concern in these matters.

The decommissioning REMP is described in DSAR Section 5.5 and is detailed in the REMP manual. Responsibility for the administration and oversight of the program is discussed in DSAR Chapter 6. The design of the program is consistent with the permanently shut down status of Rancho Seco, 10 CFR 50, Appendix I, and NRC Branch Technical Position, Revision 1, dated November 1979, An Acceptable Radiological Environmental Monitoring Program.

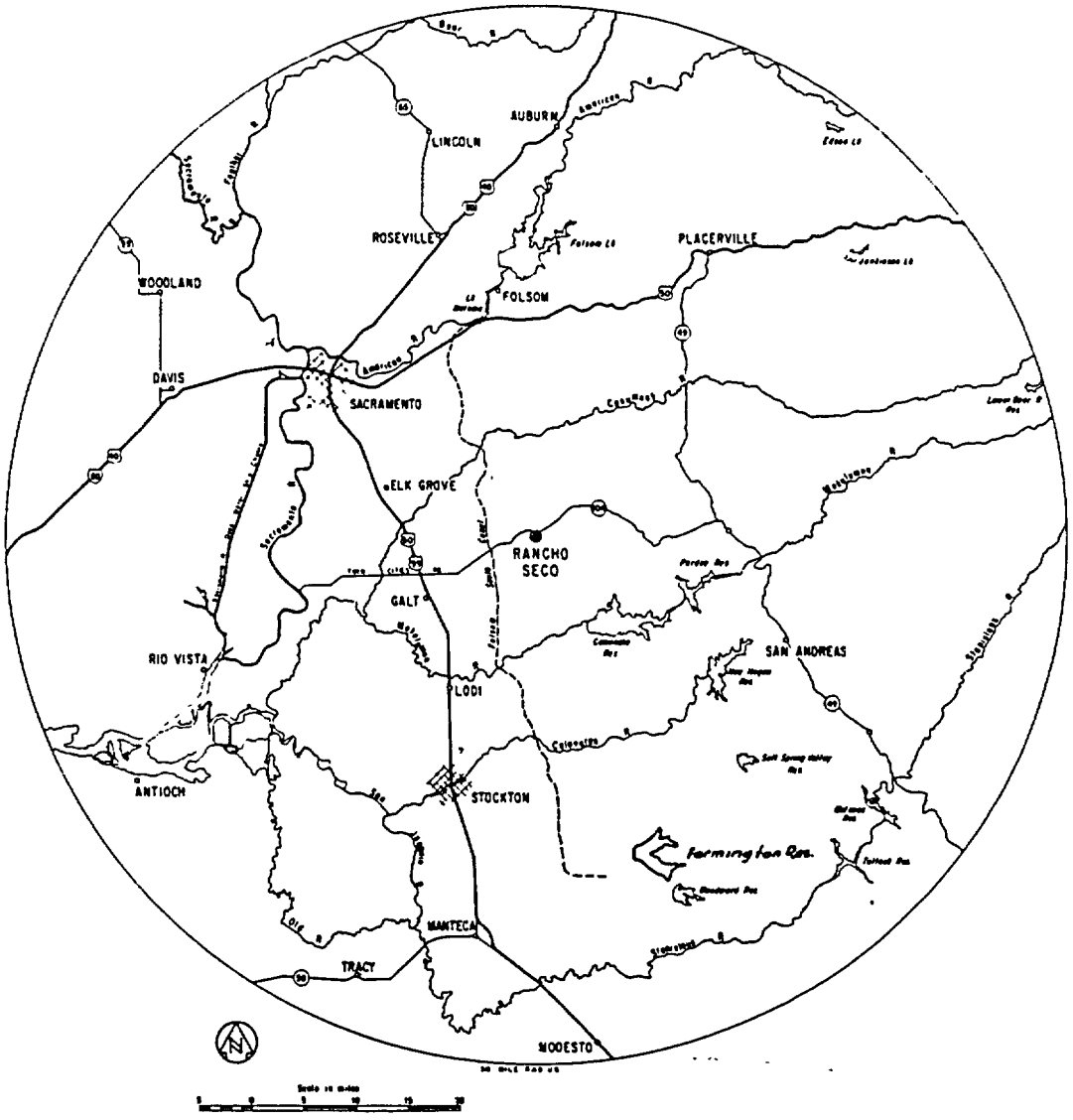

Figure 2-1
General Area Map

SMUD
SACRAMENTO MUNICIPAL UTILITY DISTRICT

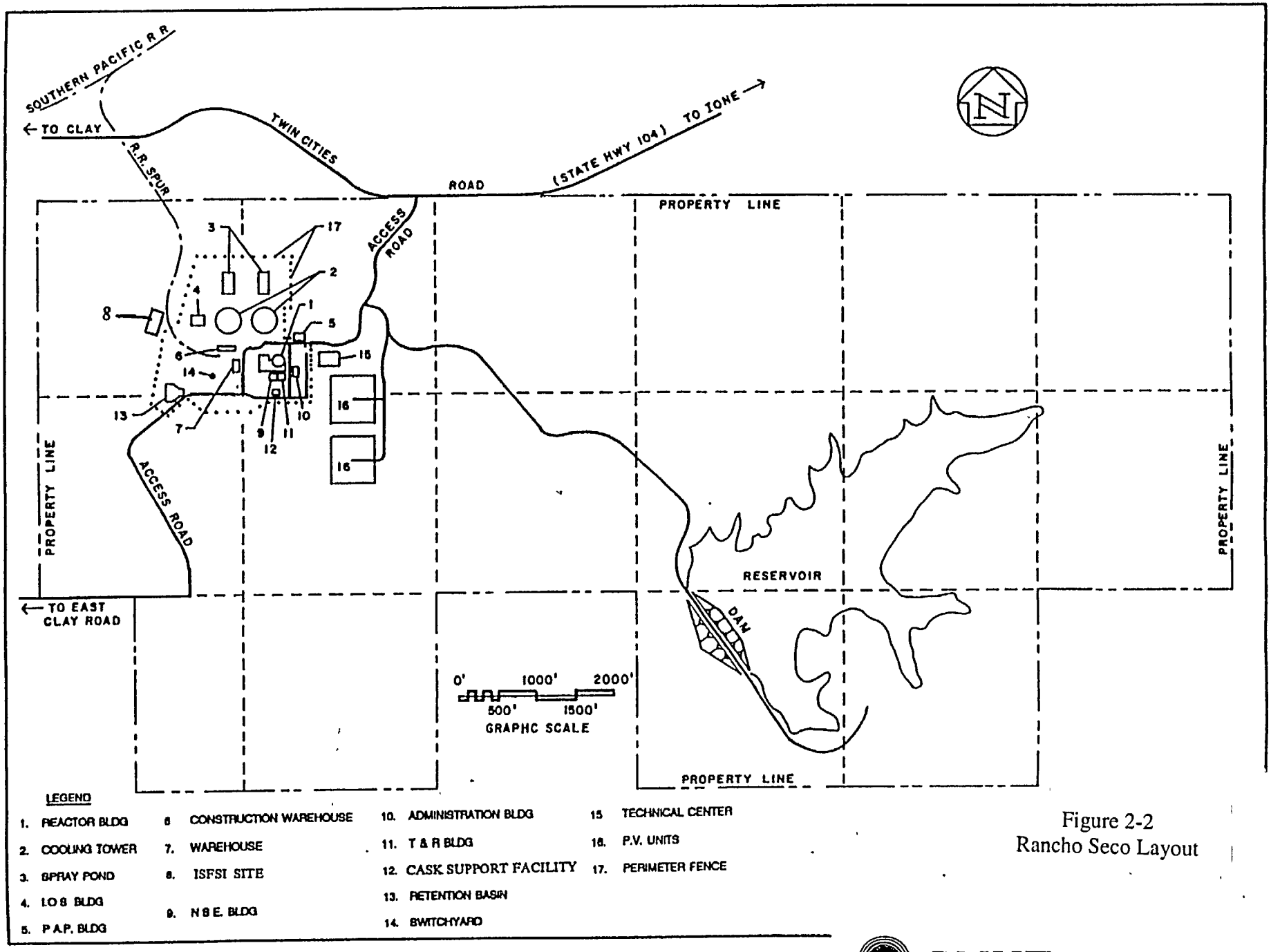

Figure 2-2
Rancho Seco Layout

SMUD
SACRAMENTO MUNICIPAL UTILITY DISTRICT

RANCHO SECO DEFUELED SAFETY ANALYSIS REPORT

DSAR CHAPTER 3. STRUCTURES

3.1 REACTOR BUILDING

The Reactor Building is not required to function except for ALARA considerations to minimize potential occupational personnel exposures and for safe storage of irradiated and contaminated core components until decommissioned.

3.2 AUXILIARY BUILDING

The Auxiliary Building is not required to function except for ALARA considerations to minimize potential occupational personnel.

3.3 FUEL STORAGE BUILDING

The Fuel Storage Building is not required to function except for the ventilation system, which will remain functional until the spent fuel pool is decontaminated.

3.4 INTERIM ON-SITE STORAGE BUILDING

The Interim On-site Storage Building (IOSB) contains packaged low-level radioactive waste (radwaste) in a retrievable mode. The structure is modular in design and allows expansion for added storage volume.

The IOSB stores high activity radioactive waste in a shielded, covered cell arrangement designed to accommodate a range of waste containers from 55-gallon drums to 300-cubic-foot disposable liners. The cells have individual shield covers, with cell cover and waste container handling accomplished by an overhead remotely operated bridge crane system.

In addition, the IOSB stores low activity radwaste in a shielded open floor warehouse arrangement designed to accommodate a range of waste containers from 55-gallon drums to 120-cubic-foot metal bins. Stacking height for the containers is not to exceed 18 feet.

A detailed description of IOSB design and construction is contained in DSAR Amendment 4, Section 5.5.7.

DSAR CHAPTER 4. AUXILIARY SYSTEMS

4.1 GENERAL

The systems considered in this DSAR Chapter are:

1. Station ventilation systems
2. Fire protection system

Design changes, modifications, and additions to existing systems and components are reviewed for compliance with the requirements of 10 CFR 50.59 "Changes, Tests, and Experiments."

4.2 VENTILATION SYSTEMS

4.2.1 Reactor Building

The reactor building exhaust system contains HEPA filters and a fan. The gaseous effluent (particulate) is sampled for radioactivity in accordance with the Offsite Dose Calculation Manual (ODCM). The exhaust fan default flow rate is listed in the ODCM.

The exhaust portion of the Reactor Building ventilation system maintains an adequate supply of fresh air to the building through building openings.

4.2.2 Auxiliary Building

The Auxiliary Building ventilation system consists of supply and exhausts fan and HEPA filters. The gaseous effluent (tritium/particulate) is sampled for readioactivitiy in accordance with the ODCM. The exhaust fan default flow rate is listed in the ODCM.

4.2.3 Interim Onsite Storage Building

The IOSB is served by supply and exhaust HVAC units. The exhaust is sampled for radionuclides, in particulate form, in accordance with the ODCM.

4.3 FIRE PROTECTION SYSTEM

Active and passive design features are provided to detect, contain, and suppress fires. The Rancho Seco fire protection program includes the following fire protection features:

1. Fire suppression systems
2. Fire detection and alarm systems

The fire protection plan describes the organizational requirements, design features, operational requirements, compensatory measures, testing requirements, and off-site fire fighting assistance coordination requirements that collectively define Rancho Seco's fire protection program. Fire loading, ignition sources, and combustible materials are significantly reduced and the possibility for a major fire is greatly diminished from the plant's operational phase.

The District maintains a fire protection program for Rancho Seco that addresses the potential for fires which could result in a nuclear hazard. The objectives of the fire protection program are to: (1) Reasonably prevent such fires from occurring; (2) rapidly detect those fires which do occur; and (3) Ensure that the potential hazard due to fire to the public, environment, and plant personnel is small. The District assesses the Rancho Seco fire protection program on a regular basis and revises the program, as appropriate. The District makes changes to the Rancho Seco fire protection program without NRC approval provided that the changes do not reduce the effectiveness of fire protection measures needed to prevent a nuclear hazard, taking into account the decommissioning plant conditions and activities.

RANCHO SECO DEFULED SAFETY ANALYSIS REPORT

DSAR CHAPTER 5. RADIOACTIVE WASTE AND RADIATION PROTECTION

5.1 RADIONUCLIDE INVENTORY

The largest fraction of the on-site radionuclide inventory is contained in the reactor vessel and internals. Radionuclides are also present in corrosion films within various plant systems. Based on the permanently shutdown and non-operating plant status, most radionuclide sources are not readily dispersible.

5.2 LIQUID WASTE TREATMENT SYSTEMS

During decommissioning, the liquid treatment system consists of various remaining permanent and temporary components that are used to transport and process liquid as necessary before final treatment and disposal. The wastewater disposal system includes tanks, pumps, piping, and processing equipment used to process waste water prior to discharge off site.

The non-radioactive portion of the plant liquid effluent typically consisites of storm drain, roof drain, and sewage treatment plant discharge. The plant effluent is normally diluted with water supplied from Folsom South Canal. Dilution water may also be obtained from the Rancho Seco reservoir, which can be gravity drained to the plant effluent discharge stream.

The flow rate in the plant effluent stream, including the dilution water, is normally maintained at or above the minimum annual average flow rate determined to give reasonable assurance of compliance with the 10 CFR 50, Appendix I, dose guidelines for radioactive releases.

A radioactive liquid discharge typically consists of a batch of liquid that is isolated from other waste streams. This batch is analyzed for radioactivity and then released into the plant liquid effluent stream where, if necessary, dilution water is added to ensure compliance with regulatory requirements.

During the batch release the liquid is monitored by a process radiation monitor that will terminate the release if regulatory requirements may be exceeded. The releases and the process monitor setpoints are performed in accordance with the Offsite Dose Calculation Manual (ODCM).

Off-normal releases are accounted for on a case-by-case basis. This includes tracking the activity and calculating the dose impact. Dose calculations are performed in accordance with the ODCM.

Wet radioactive wastes generated at Rancho Seco, that are to be disposed of at a licensed disposal facility, are processed into an acceptable form in accordance with the Process Control Program (PCP) and applicable implementing procedures.

5.3 GASEOUS WASTE MANAGEMENT

The predominant radioactive isotope discharged from the plant in gaseous effluent is Tritium. All planned radioactive gaseous discharges are administratively controlled through the Offsite Dose Calculation Manual (ODCM).

The Auxiliary Building Stack ventilation exhaust treatment system contains a HEPA filter, which filters the exhaust for particulates prior to release into the Auxiliary Building Stack vent. The gaseous effluent release rates from the plant vents are determined in accordance with the ODCM to assure compliance with the 10 CFR 20 gaseous effluent dose limits.

The pathways for the release of radioactive gaseous effluent are the following:

1. Reactor Building ventilation via the Reactor Building Stack

2. Auxiliary Building ventilation via the Auxiliary Building Stack

The IOSB is another possible source of a miscellaneous gaseous release. Normally the low-level radioactive waste is pre-packaged prior to storage at the IOSB. Accordingly, the possibility for the release of radioactivity (particulates) to the atmosphere is extremely low. Exhaust from the IOSB will be sampled in accordance with the ODCM.

5.4 SOLID WASTE MANAGEMENT SYSTEM

Solid radioactive wastes are collected and processed on a batch basis in accordance with an approved Process Control Program (PCP) and applicable government regulations. Solid wastes are packaged in containers which conform to Department Of Transportation (DOT) requirements (49 CFR) for disposal at a licensed disposal facility. Solid radioactive waste is stored at the IOSB. Solid waste is shipped in accordance with regulatory requirements.

The total curie content and major radionuclide composition by waste type are reported in the Radioactive Effluent Release Report required pursuant to 10 CFR 50.36a.

5.5 RADIOACTIVE WASTE, EFFLUENT CONTROL, AND ENVIRONMENTAL MONITORING PROGRAMS

5.5.1 DESIGN BASIS

The radioactive waste and effluent control programs provide the administrative controls necessary to ensure the disposal of solid, liquid, and gaseous radioactive wastes is appropriately controlled. Also, an environmental monitoring program has been and continues to be in place since the initial construction phase of the Rancho Seco nuclear facility. These programs are designed to ensure that plant personnel and the general public are protected against excessive radiation exposure from radioactive wastes, in accordance with 10 CFR 20, 10 CFR 50, and 40 CFR 190. Requirements for programs that administratively control the discharge of radioactive solids, liquids, and gaseous wastes and address radiological monitoring of the environment are

contained in the Rancho Seco Quality Manual (RSQM). These program element requirements are implemented through the Off-site Dose Calculation Manual (ODCM), the Process Control Program (PCP), and the Radiological Environmental Monitoring Program (REMP), and their implementing procedures.

5.5.2 OFF-SITE DOSE CALCULATION MANUAL

The ODCM provides the information and methodologies used to evaluate the impact of radiological liquid and gaseous effluent discharged from the plant. The ODCM is used to demonstrate that the plant complies with the requirements of 40 CFR 190 and 10 CFR 20, and the dose guidelines of 10 CFR 50, Appendix I. Calculations for continuous airborne releases use default atmospheric diffusion coefficients and gaseous effluent flow rates. Exposures due to plant decommissioning are estimated by calculational methods specified in the ODCM.

5.5.2.1 Liquid Discharge Pathway

The primary liquid discharge source of potentially contaminated water is from a regenerant hold-up tank (RHUT). Dose accountability for normal radioactive liquid releases is performed at the RHUTs. Waste water is transferred from a RHUT to the north or south Retention Basin. Radioactive liquid releases into the environment are made from the Retention Basins. Waste water collected in the RHUTs is sampled and analyzed to ensure compliance with 10 CFR 50, Appendix I, prior to transfer to a Retention Basin. Waste water collected in the retention basins is sampled and analyzed prior to discharge, and monitored for radioactivity during discharge, to ensure compliance with 10 CFR Part 20.

5.5.2.2 Gaseous Discharge Pathway

The principal discharge sources of normal radioactive gaseous effluent are the Reactor Building purge and Auxiliary Building exhaust pathways. Releases from these pathways have been and are expected to continue to be very small; well within the 10 CFR 50, Appendix I dose guidelines and 10 CFR 20 concentration limits.

5.5.2.3 Offsite Decommissioning REMP

Gaseous radioactive effluent from the plant consists primarily of tritium with the possibility of radioactivity in particulate form being released in the normal plant effluent. Liquid radioactive effluent from the plant consists primarily of very low levels of fission and activation products.

The purpose of the offsite decommissioning REMP is to monitor radiation levels in the environment and to provide a basis for identification of changes in background levels. Measurements are made to determine the radiation levels and the radioactive materials in the exposure pathways which lead to the highest potential radiation exposures to the public. Efforts are made to correlate any significant changes in background levels with events such as fallout from nuclear weapons testing, volcano eruptions, the Chernobyl accident, natural phenomena, or

changes in plant operation. The REMP can be used to verify estimates of exposure from radioactive effluent to a real member of the public as defined in 40 CFR 190.

Plant personnel perform dose calculations in accordance with the ODCM, using plant effluent data collected from plant effluent monitors and/or manual sampling and analyses, to estimate radiation exposures that result from decommissioning activities. The estimated annual exposure, to an individual (whole body dose) living near the plant effluent boundaries, from decommissioning is less than 1 mrem per year. This level of exposure is indistinguishable from natural background exposures due to the variation in natural background radiation.

The REMP supplements the radiological effluent control program (i.e., the ODCM) by verifying that the measurable concentrations of radioactive materials and levels of radiation in the environs near the plant are not higher than expected on the basis of the effluent measurements and modeling of the environmental exposure pathways. The decommissioning REMP is described in and implemented by the REMP Manual and its implementing procedures.

5.5.2.4 Effluent and Waste Disposal Environmental Reports

Periodic reports are submitted to the NRC to meet reporting requirements specified in the Rancho Seco Quality Manual. The reports contain information for the preceding calendar year regarding the environmental protection programs that monitor non-radiological and radiological effects upon the environment. Also, a report submitted to the NRC that contains radioactive effluent information and shows compliance with discharge limits.

5.6 ENSURING THAT OCCUPATIONAL RADIATION EXPOSURES ARE AS LOW AS IS REASONABLY ACHIEVABLE (ALARA)

In accordance with 10 CFR 20.1101, SMUD will make every reasonable effort to maintain individual and collective occupational radiation exposures at Rancho Seco "As Low As Reasonably Achievable" (ALARA). This operating philosophy also applies to radiation exposures to the general population resulting from the conduct of activities at Rancho Seco.

The ALARA Policy applies to all SMUD and contract personnel who require access to the radiologically controlled area of the plant, who work with systems containing radioactive material, or who are responsible for monitoring plant effluent.

The Rancho Seco Radiation Protection program provides reasonable assurance that external dose to personnel from ionizing radiation will be maintained within administrative as well as NRC regulatory limits. The Radiation Protection program controls radioactive materials to provide reasonable assurance that radioactive material is not lost or misplaced, accidental exposure or contamination of personnel will not occur, and accidental release of radioactive material into the environment will not occur.

Radioactive liquids and gases released to the environment as a result of plant activities are maintained as low as is reasonably achievable in accordance with the Radiation Protection

program and the applicable NRC and Environmental Protection Agency (EPA) regulations. Plant personnel conduct environmental monitoring and assessment programs to determine environmental radioactivity levels and the significance of these levels.

Procedures for work in radiological environments include applicable provisions and requirements that are commensurate with the severity of the radiological environment to ensure exposure is maintained ALARA.

Personnel training is conducted to ensure that all personnel are aware of the requirements of the ALARA Policy, and that they have adequate training for working in a radiological environment.

The Plant Manager administers the ALARA Policy. The Quality Audit group performs periodic audits of the ALARA program to ensure the ALARA policy is properly implemented.

5.7 RADIATION SOURCES

Significant radiation include the following:

1. The reactor vessel and internals
2. Radioactive materials handling and processing equipment
3. Spent Fuel Pool

Radiation emanating from the reactor vessel consists primarily of gamma rays emitted from the residual activation of the reactor vessel and internal core components.

5.8 RADIATION PROTECTION DESIGN FEATURES

The general Rancho Seco facility design philosophy incorporates ALARA program concepts to minimize radiation exposure. Shielding in radiation areas is provided to reduce radiation from surrounding sources in accordance with the ALARA program.

5.9 RADIATION PROTECTION PROGRAM

5.9.1 ORGANIZATION

The Plant Manager is responsible for directing the conduct of radiological monitoring and radiation protection control measures at Rancho Seco. The Radiation Protection/Chemistry (RP/Chem) Superintendent is responsible for monitoring radiological conditions within the Industrial Area and the surrounding environs and specifying radiation protection requirements for work activities in radiologically controlled areas. The RP/Chem Superintendent directs radiation control activities, determines acceptable personnel exposures, maintains dose records, and enforces observance of radiation protection standards. The RP/Chem Superintendent reports directly to the Plant Manager.

5.9.2 EQUIPMENT AND INSTRUMENTATION

Personnel Protective Equipment

Special protective or anti-contamination clothing is furnished and worn as necessary to protect personnel against contact with radioactive contamination. This clothing may consist of coveralls, lab coats, hoods, gloves, and shoe covers. Radiological respiratory protective equipment is available for the protection of personnel against airborne radioactive contamination and the possibility of internal radiation exposure.

Radiation Protection Instrumentation

A variety of instruments are used to cover the entire spectrum of radiation measurements at Rancho Seco.

The radiologically controlled areas on site are divided into areas of increasingly controlled access, depending upon the radiation levels. Control of personnel access to contaminated and radiation areas is accomplished by appropriate radiation or contamination caution signs, barricades, locked doors or gates, and audible and/or visual indicators. The Radiation Work Permit system and other administrative controls control access to radiologically controlled areas.

5.9.3 RADIATION PROTECTION PROCEDURES

The RP/Chem department prepares and implements procedures governing personnel radiation protection. The Radiation Protection group maintains these procedures consistent with the requirements of 10 CFR Part 20. Procedures that address requirements governing the disposal of solid radioactive waste comprise the Process Control Program. Chemistry procedures address the requirements governing the release of radioactive liquid and gaseous effluent to the environment. Administrative controls for radiation protection are subject to the same review and approval as those that govern other facility procedures.

The philosophies, policies, and objectives of radiation protection procedures implement the requirements in the Code of Federal Regulations and are designed to maintain doses to workers and the public ALARA.

5.9.4 PERSONNEL EXPOSURE REPORTING

Two reports are issued annually to meet NRC reporting requirements. These reports contain information for the preceding year in the following areas:

1. Tabulation of personnel receiving exposures greater than 100 mrem during the preceding year according to work and job functions.

2. Tabulation of numbers of personnel for whom exposure monitoring was provided in accordance with 10 CFR 20.2206(b).

RANCHO SECO DEFUELED SAFETY ANALYSIS REPORT

DSAR CHAPTER 6. CONDUCT OF OPERATIONS

6.1 PLANT ORGANIZATION

The details of the SMUD organization that oversees the activities at the Rancho Seco nuclear facility is discussed in the RSQM and in administrative procedures. The Manager, Plant Closure & Decommissioning (Plant Manager) heads the on-site Rancho Seco nuclear organization and directs the activities of the functional on-site departments. The Plant Manager is responsible to the SMUD General Manager, through the AGM Energy Supply, for the safe decommissioning of Rancho.

The Radiation Protection/Chemistry (RP/Chem) Superintendent is responsible for ensuring compliance with regulatory requirements regarding radiation protection, the ALARA program, Radiological Environmental Monitoring Program, Emergency Plan, and Offsite Dose Calculation Manual.

The Decommissioning Project Manager is responsible for plant dismantlement activities and preparing the site for termination of the 10 CFR Part 50 license.

Each member of the plant staff meets or exceeds the minimum qualifications of ANSI N18.1-1971 for comparable positions, except for the RP/Chem Superintendent, who meets or exceeds the recommendations and qualifications of Regulatory Guide 1.8, September 1975, for the Radiation Protection Manager.

6.2 PERSONNEL TRAINING

Plant personnel are selected and trained for their assigned duties, with particular emphasis on the supervisory, technical, and decommissioning staffs, to assure safe and efficient decommissioning of the plant. Each department head is responsible for conducting department training that meets the applicable requirements and standards.

Training programs include those required by the emergency plan, administrative requirements, and applicable state and federal regulations.

Personnel working at Rancho Seco participate in the training programs required for their job position. Training is conducted and documented in accordance with the training program.

6.3 EMERGENCY PLAN

The Emergency Plan in effect during decommissioning provides a description of the organization, equipment, and preparations made to enable appropriate and effective response to postulated emergency situations that may arise at Rancho Seco. The focus of concern for the Emergency Plan is the protection of plant personnel and the surrounding population. The Emergency Planning Zone for Rancho Seco is the Industrial Area.

The emergency conditions considered in the development of the Emergency Plan include those conditions considered credible during decommissioning. DSAR Chapter 7 discusses potential decommissioning accidents.

Emergency response activities performed at Rancho Seco are the responsibility of SMUD management. Offsite emergency response activities are under the authority of public agencies with SMUD providing information to these agencies, as appropriate.

The Emergency Plan reflects many NRC-granted exemptions from the emergency preparedness requirements specified in 10 CFR 50.47(b), 10 CFR 50, Appendix E, and 10 CFR 50.54(q).

6.4 REVIEW OF OPERATIONS

Administrative controls are in place in the form of approved written procedures to ensure the safe conduct of activities and response to emergency situations. Plant management holds meetings to keep staff informed of the status of plant activities during decommissioning.

The Commitment Management Review Group (CMRG) performs required safety evaluation reviews and the ALARA Committee function. The CMRG reports to the plant manager. CMRG requirements and responsibilities are discussed in the RSQM and administrative procedures.

6.5 PLANT PROCEDURES

The performance of work and the conduct of activities at Rancho Seco are guided by procedures. The Rancho Seco Administrative Procedures (RSAPs) define and implement administrative requirements or activities involving inter-departmental processes and administrative responsibilities. Departmental administrative procedures define administrative requirements, activities, or actions generally specific to one department within the nuclear organization. Procedure hierarchy, preparation, review, approval, revision, and control are established in accordance with the applicable RSAPs.

The Quality Manual has been approved separately by the NRC. The manual describes the 10 CFR 50, Appendix B required Quality Assurance Program applicable to Rancho Seco. Changes to the Quality Manual are made and submitted to the NRC in accordance with 10 CFR 50.59 and 10 CFR 50.54(a).

The hierarchy and relationship between the various documents that define the licensing basis for operation of Rancho Seco during the decommissioning phase are presented in Figure 6-1.

6.6 RECORDS

Records are maintained as described in RSQM Appendix A.

DECOMMISSIONING LICENSE BASIS DOCUMENTS HIERARCHY

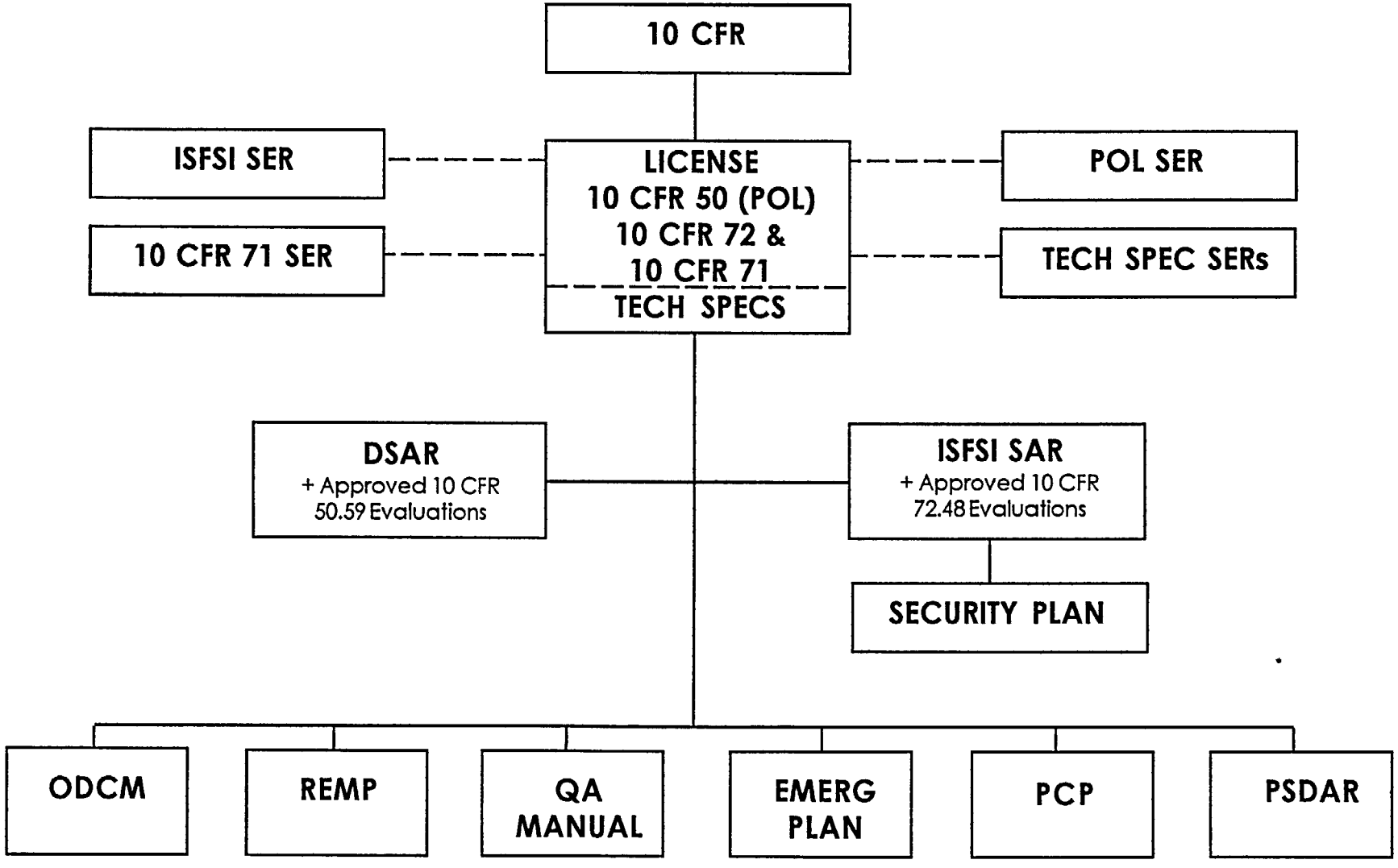

Figure 6-1
Licensing Basis Document Hierarchy

DSAR CHAPTER 7. SAFETY ANALYSIS

7.1 DECOMMISSIONING ACCIDENT ANALYSIS

The Rancho Seco Decommissioning accident analysis is part of the Rancho Seco licensing design basis.

While decommissioning radioactively contaminated structures, systems, and components at Rancho Seco, it is necessary to assure the safety of the public in the surrounding area and workers. Worker safety is addressed in the Rancho Seco Radiation Protection Program, which relies on ALARA principles, and the Rancho Seco Safety Program, which is defined in the Rancho Seco Safety Manual. The safety of the public is principally related to potential hazards associated with an airborne release of radioactive materials from Rancho Seco during decommissioning operations.

During decommissioning the District will perform decontamination and dismantlement of structures, systems, and components in addition to maintenance, waste management, and surveillance. The accidents discussed in NUREG/CR-0130 associated with immediate dismantlement would be applicable during decommissioning at Rancho Seco. However, the potential consequences associated with these accidents would be less because of a reduction in the Rancho Seco radionuclide inventory due to:

1. Decontamination efforts made before decommissioning,
2. Prior radioactive waste shipments, and
3. Radioactive decay.

Therefore, the potential decommissioning accidents at Rancho Seco are bounded by the accident evaluation specified in NUREG/CR-0130.

Operational accidents during decommissioning could result from equipment failure, human error, and service conditions. With spent fuel removed from the plant, operational accidents during decommissioning may be categorized as follows:

1. Radioactive waste transportation accidents.
2. Explosions and/or fires associated with explosive and/or combustible materials,
3. Loss of contamination control,
4. Natural phenomena, and

5. Human caused events external to Rancho Seco.

These potential operational accidents during decommissioning are addressed in NUREG/CR-0130 for immediate dismantlement. Therefore, for decommissioning operations at Rancho Seco, the associated, potential accidents are bounded by the NUREG/CR-0130 evaluation.

REFERENCES

1. License Amendment No. 117, dated March 17, 1992, Possession-Only License

2. Rancho Seco Updated Safety Analysis Report (USAR), Amendment No. 8

3. NRC Order Approving the Rancho Seco Decommissioning Plan, dated March 20, 1996.

4. Rancho Seco License Amendment No. 122, dated July 19, 1995.

5. License Amendment Nos. 129 and 130, dated February 5, 2002, Deletion of Operations and Administrative Requirements, respectively.

6. Rancho Seco Independent Spent Fuel Storage Installation Safety Analysis Report

7. NUREG/CR-0130, "Technology, Safety, and Cost of Decommissioning a Reference PWR Power Station"

8. NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities"

9. License Amendment 131, dated October 10, 2002, Exemption from Requirements of 10 CFR Part 50 Security Requirements.