

U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION V

Report No. 50-312/80-02

Docket No. 50-312 License No. DPR-54 Safeguards Group _____

Licensee: Sacramento Municipal Utility District

P. O. Box 15830

Sacramento, California 95813

Facility Name: Rancho Seco

Inspection at: Clay Station, California

Inspection conducted: January 21-25, 1980

Inspectors: R. F. Fish 2/20/80
R. F. Fish, Radiation Specialist Date Signed

Date Signed

Date Signed

Approved By: L. A. Wenclawski 2/20/80
for H. E. Book, Chief Date Signed
Fuel Facility and Materials Safety Branch

Summary:

Inspection on January 21-25, 1980 (Report No. 50-312/80-02)

Areas Inspected: Refueling preparations including radiation safety procedures, radiation safety training, personnel monitoring and exposure control, respiratory protection program, instrument calibration, surveys, followup of reported unusual events, licensee action on IE Bulletin 79-19, allegation of possible problems with shipments of liquid radioactive waste and a tour of the facility. The inspection involved 36.5 hours onsite by one NRC inspector.

Results: Of the ten areas inspected, no items of noncompliance or deviations were found in nine areas; one apparent item of noncompliance was found in one area (Deficiency - total chlorine concentration in plant effluent exceeded limit - Paragraph 10).

DETAILS

1. Persons Contacted

- *P. Oubre, Plant Superintendent
- *R. Colombo, Technical Assistant
- *R. Miller, Chemical and Radiation Protection Supervisor
- S. Coats, Plant Health Physicist
- F. Kellie, Plant Chemist
- W. Wilson, Senior Chemical and Radiation Assistant
- D. Gardiner, Senior Chemical and Radiation Assistant

The inspector also talked with and interviewed several contractor, Allied Nuclear Services Company (ANS), health physics technicians and clerks who were assigned to the Rancho Seco Facility.

*Denotes those present at the exit interview.

2. Procedures

The licensee's recent changes to the Radiation Control Manual were examined. Two of the changes involved the addition of calibration procedures for new models of survey meters. A new procedure for bulk radioactive liquid shipments was also added to the manual. Revisions were made to five procedures including those for Radioactive Waste Disposal In-plant and Shipments of Radioactive Materials Off-site. These changes were made during the period June through November 1979. None of the changes to the Radiation Control Manual were made to cover maintenance or other activities that will take place during the current refueling outage. These changes to the Radiation Control Manual had been approved by the Plant Review Committee (PRC) in accordance with applicable plant procedures.

No items of noncompliance or deviations were identified.

3. Radiation Safety Training

A Senior Chemical and Radiation Assistant has been assigned full time to the Training Unit for the purpose of providing all radiation safety and related training. During the current outage a more experienced Chemical and Radiation Assistant has also been assigned to assist in the radiation safety training.

The basic radiation safety training program remains in effect. A short training course that covers 10CFR Part 19 (including Regulatory Guide 8.13), basic radiation safety and emergency response, and safety and fire protection must be attended by all assignees (including contractor personnel) and visitors to the site. A quiz is given at the end of the short course. Personnel who will be working in controlled areas must also take an expanded course on radiation safety that takes

all day. According to the licensee the content of this expanded course is patterned after Table 1 in the August 1979 Draft Regulatory Guide and Value/Impact Statement on Radiation Protection Training for Light-Water-Cooled Nuclear Power Plant Personnel.

The Rancho Seco Chemical and Radiation Assistants received 16 hours of retraining prior to the shut down of the plant for the refueling outage. This retraining was directly related to the outage and included a presentation on the training to be given to contractor personnel who will be working onsite. A written examination was given following the retraining program.

A special training program was established for the contractor health physics technicians (ANS technicians) who were to be used to support and supplement the plant personnel. This training was plant specific and 16 hours in duration. A pretest was given. Those ANS technicians who received a grade of 80% or better on the pretest were permitted to attend the routine short training course. ANS technicians who received less than 80% on the pretest were required to attend the routine full day expanded course. The 16 hours of special training was a self study effort with periodic direct supervision by the Senior Chemical and Radiation Assistant assigned to the Training Unit. The workbook used in this special training contained copies of plant P and ID diagrams, a site layout, radiation/chemistry organization charts for normal operations and this outage, and copies of pertinent procedures from the Radiation Control Manual. The ANS technicians were shown slides of areas, personnel and instruments. Special instructions were also given on air sampling, beta correction factor and contamination limits. The respiratory protection program training given the ANS technicians included an expanded discussion of the equipment and its limitations. A final written examination was given to all technicians classified as seniors. Junior technicians were also given the opportunity to take the examination. The examination results were provided to Chemistry/Radiation supervision as an aid in task assignments.

Training records can be found in two locations. The records of non-plant personnel training are in the form of cards maintained by the Training Unit. Plant personnel training records are kept in individual folders by the Training Unit. Weekly training performed for the benefit of the Rancho Seco Chemistry and Radiation personnel has been recorded in memorandum form and maintained by the Senior Chemistry and Radiation Assistant assigned the responsibility for intra-unit training and quality assurance. A random check of these records confirmed they were being prepared and maintained as described.

No items of noncompliance or deviations were identified.

4. Radiation Safety Organization

Attachment 1 shows the functional organization of radiation safety at the facility for the current outage. The second work shift (swing) started on January 24; however, radiation safety had been working both shifts all of the week that started January 20.

No items of noncompliance or deviations were identified.

5. Personnel Monitoring and Exposure Control

The licensee uses film badges furnished and processed by R. S. Landauer to monitor personnel exposure. Personnel entering a controlled area are also required to wear two direct reading pocket dosimeters. The licensee possesses dosimeters with ranges of 0-200, 0-500 and 0-1000 mR. The licensee also has TLD dosimeters and a TLD reader. The TLD dosimeters will be worn during specific jobs identified by the Health Physics Senior Chem-Rad Assistant.

The issuing of the dosimeters and recording of dosimeter readings have been assigned to ANS clerks who are located near the two entrances to the controlled areas. The second controlled area entrance became operational on January 25, 1980. The clerks prepare the cards (one for each individual) used for recording the dosimeter readings and exposure at the time of first entry. The clerks also zero, issue and read the dosimeters. Information on the cards includes the individual's name, social security number, dosimeter readings and exposure for each entry, the Radiation Work Permit (RWP) covering each entry and authorization(s) - as indicated by initials - for exposure in excess of 300 mRem per week or 1000 mRem per quarter. The cumulative quarterly exposure received is also recorded on the card. New cards will be prepared each week.

The dosimeter data on the cards are transferred on a daily basis to a summary sheet for each individual. The transferring is performed during the off-shift. The summary sheet shows the daily exposure (sum of individual entries) and the quarterly exposure to date. The dosimeter data is also fed into a computer for accumulating exposure received by individuals. A daily printout of the computer information on weekly and quarterly exposures received plus applicable exposure limits is received by health physics. Copies of the daily computer exposure printout is provided to each organization on site and a copy is posted on the wall outside of the health physics office.

The licensee has continued the normal exposure control program. An exposure history is obtained and an exposure file prepared for each

individual assigned a film badge. Permission for an individual to receive an exposure greater than 100 mRem per week or 1000 mRem per quarter must be received prior to receiving such exposure. Authority for granting approval of exposure in excess of these values has been assigned as follows: 100 mRem/week, immediate supervision; 300 mRem/week, Plant Health Physicist or Chemical and Radiation Supervisor; 1000 or 2000 mRem/quarter, Plant Review Committee. There is an administrative absolute exposure limit of 2500 mRem/quarter. The written instructions for use by the ANS clerks specifically addresses the subject of exposure approval and the clerks have been directed to assure such approvals have been obtained prior to exceeding any of the above limits.

During this inspection some time was devoted to observing the clerks working at the 40 foot level access control point and worker actions with respect to RWP's. Clerks working with the summary sheets, computer inputs and exposure histories were also observed. The inspector confirmed the ANS clerks were performing their duties including a reminder to the workers to sign the RWP. Two workers were observed signing an RWP; however, it did not appear that they read the various requirements. Responding to a direct question by the NRC Inspector, one of the workers said he hadn't read the RWP but he had been instructed on what to wear. Subsequent to this observation and its disclosure, the Rancho Seco Senior Chemical and Radiation Assistant informed the Inspector that the workers told him they had read the RWP. The Senior Chemical and Radiation Assistant stated that the need to read the RWP and understand its requirements would be re-emphasized to all levels of organization. During the next morning shift information meeting, attendees (responsible supervision from all organizations onsite) were cautioned to assure that personnel read, understand, follow and sign the RWP's. The RWP Procedure, No. AP 305-4, states that the Initiator is to "explain to assigned workers...to assure compliance with the RWP." A note in the procedure says each individual signing in on an RWP is responsible for all requirements and information relating to that particular RWP.

No items of noncompliance or deviations were identified.

6. Respiratory Protection Program

The inspection included observing a training class on the licensee's respiratory protection program. The class was divided into two parts. The first part consisted of a slide/tape presentation covering the types of equipment used at Rancho, their use, locations of the various types of equipment and cautions related to using respiratory protection equipment. The slide/tape presentation was supplemented

by instructor comments and responses to questions. The second half of the presentation was devoted to an examination of the various parts of a full face mask, the proper technique for putting on and removing such a mask and a restatement of the cautions associated with the use of such equipment. Each attendee was given a full face mask to practice putting on and examine. A written examination was given at the end of the class. According to the instructor the training given the ANS technicians on the respiratory protection program was expanded to include a more thorough discussion of the equipment onsite and its limitations.

The inspector also observed the mask testing requirement. The licensee uses a test booth and DOP (dioctyl phthalate) to test personnel for mask fitting. The testing was performed in accordance with procedure No. AP 305-15F of the Radiation Control Manual. Before or after the testing, personnel were given the opportunity to connect and wear a supplied air mask.

The inspection covered the maintenance procedures being followed. The masks are being cleaned in a washer. Following the wash the masks have been checked for fixed and removable contamination. The removable contamination limit on the mask is 1000 dpm/100 cm² beta-gamma and 100 dpm/100 cm² alpha. The fixed radiation limit is 0.2 mR/hr. A technician issuing the masks informed the inspector that the particulate filters used on the full face masks were being checked for possible reuse. The filters that meet the contamination limits and show no visible damage have been resealed and made available for reuse. With respect to possible increased resistance resulting from prior use, the Plant Health Physicist said that there is little dust in the areas where the masks have been used and personnel wearing the masks have been instructed to discard it or replace it if they experience any discomfort or question if the mask is operating properly.

The licensee stated that exposure to airborne activity has been kept to less than the equivalent of 2 hours per day or 10 hours per week at a concentration specified in Table 1, Column 1, of Appendix B to 10CFR Part 20. The licensee's policy is not to permit personnel to work in areas where airborne activity exposure would exceed these limits. The only records related to airborne activity exposure consist of the signature sheets from related RWP's attached to the appropriate survey (air sampling) record(s).

No items of noncompliance or deviations were identified.

7. Instrument Calibration

An examination of records showing the most recent calibrations of radiation

monitors identified in Technical Specifications 3.8.1 and 3.8.10, Appendix A, was made. According to the records the most recent calibration of the following monitors was as shown.

Reactor Building Particulate - R15001A	1/19/80
Reactor Building Gas - R15001B	1/19/80
Reactor Bldg. Incore Instrument - R15026	12/26/79
Reactor Bldg. Fuel Handling Bridge - R15027	12/26/79
Fuel Storage Bldg. Spent Fuel Pool Area - R15028	12/26/79
Reactor Bldg. Personnel Access Hatch - R15025	12/26/79

These instruments were found to be operational and calibrations were performed in accordance with the written procedures. The environmental air samplers were last calibrated on January 3, 1980.

No items of noncompliance or deviations were identified.

8. Surveys

Rancho Seco and ANS technicians have been making routine radiation and contamination surveys at least once per day. Special surveys have been made when necessary. Survey records made since the facility shut-down for refueling were examined on a random basis. The initial entry reactor building survey on January 17, 1980 showed removable contamination levels varied over the range of 18,000 dpm/100 cm² to 16 mrad/hr. Radiation levels around the reactor head varied over the range of 10 to 150 mR/hr. The January 21 survey record showed removable contamination levels varied over the range of 1,500 to 1X10⁶ dpm/100 cm² inside the containment building. The following radiation levels were found inside the containment building on January 21.

<u>40' level</u>	<u>Mezzanine Level</u>
top of cavity 7-15 mR/hr.	1 spot 3.3 R/hr
top of reactor 100 mR/hr.	other areas 1-20 mR/hr
<u>Grade Level</u>	<u>-12 Foot Level</u>
1mR/hr.	1 spot 200 R/hr.
	other areas 10-50 mR/hr.
<u>-27 Foot Level</u>	
outside Bioshield 1-60 mR/hr.	
Inside Bioshield 15-3700 mR/hr. (some spots up to 60 R/hr.)	

Air sampling showed iodine concentrations in the range of $4-7 \times 10^{-10}$ uCi/ml. Particulate activity, primarily cesium-134, 137, showed concentrations in the range of $6 \times 10^{-12} - 3 \times 10^{-11}$ uCi/ml. Radioactive xenon-133 was detected in concentrations up to 1×10^{-10} uCi/ml.

No items of noncompliance or deviations were identified.

9. Tour of Facility

On January 23, 1980 a tour of the containment and auxiliary buildings was made. The radioactive waste storage yard was also examined during this inspection. During the tour the inspector observed control of access to the containment and auxiliary buildings, the area postings and contamination control, and the use of RWP's. Stepoff pads had been established at the entrance to the containment building, at several locations inside containment, at several locations in the auxiliary building and at the 40 foot access control point. High radiation areas were posted in accordance with 10CFR 20.203(c)(1) and rope barricades had been erected inside containment to prevent unobstructed entrance. Spots of high radiation levels which dropped to less than 100 mR/hr. at 18 inches were so identified. Doors and gates to normally high radiation areas in the auxiliary building were found to be locked. One gate to the flash tank pump area was unlocked; however, the alarm system-visual and audible at the gate and in the control room - was operating. Some high radiation areas in the auxiliary building were barricaded with radiation tape and stanchions and posted in accordance with 10CFR 20.203(c)(1). During the tour, areas and containers were found to be posted and labelled in accordance with 10CFR 20.203 and the licensee's procedures. Surveys made by the inspector during the tour confirmed that areas were properly posted, posted radiation levels were consistent with measured levels and no high radiation or radiation areas existed without proper posting. No containers were found in these buildings with excessive radiation levels. Generally radiation levels in the auxiliary building were a few mR/hr. The radiation measurements by the inspector were made with a Xetex 303A survey meter that was due to be calibrated again by February 20, 1980.

No items of noncompliance or deviations were identified.

10. Followup of Unusual Events Reported by the Licensee

The inspector interviewed licensee personnel and reviewed actions taken with respect to the following listed unusual events to verify that (1) the licensee had evaluated and reviewed them as required by the Technical Specifications (Appendix B) and (2) corrective actions described in the written letter reports were taken.

UE 79-02, Chlorine concentration in plant effluent greater than T. S. limit of 0.2 mg/liter (Report 11/19/79)

UE 79-03, Chlorine concentration in plant effluent greater than T. S. limit. Report 11/29/79, Follow-up Report 12/12/79

UE 79-04, Chlorine concentration in plant effluent greater than T. S. limit. Report 12/11/79

UE 79-05, Chlorine concentration in plant effluent greater than T. S. limit. Report 12/13/79

UE 79-06, Chlorine concentration in plant effluent greater than T. S. limit. Report 12/24/79

The Plant Review Committee had not yet discussed UE 79-05.

The review of these unusual events disclosed that the required chlorine concentrations in the circulating water system and sewage treatment effluent during normal operations result in plant effluents containing chlorine concentrations only somewhat below the Technical Specification Limit of 0.2 mg/liter. According to the licensee the circulating water system should be in the range of 0.4 to 0.5 mg/liter to control the algae and about 1.5 mg/liter of free chlorine to kill the sewage bacteria.

The addition of chlorine to the sewage treatment system is controlled by the operation of the sump pumps that feed water to the sewage treatment plant. The design is such that about one half of the water pumped from the sump is processed by the sewage treatment plant and the remainder is returned to the sump. Thus unnecessary or extended operation of the sump pump results in increased addition of chlorine to the sewage effluent that may not be needed.

The five instances where the total chlorine concentration in the plant effluent exceeded the Technical Specification limit have been identified as an item of noncompliance and classified as a deficiency.

11. Licensee Action on IE Bulletin 79-19

By letter dated September 24, 1979 the licensee informed the Director, Region V, USNRC of their actions in response to IE Bulletin 79-19. The inspection confirmed the actions described in the September 24 letter. The following additional information related to the packaging of low-level radioactive waste for transport and burial was obtained.

- a. The most recent information from Nuclear Engineering Company concerning burial site requirements was a December 7, 1979 letter transmitting a copy of the State of Nevada license and a November 20, 1979 letter describing the requirements at the Richland, Washington site. The licensee does not have a copy of the Chem-Nuclear license for the Barnwell, South Carolina site, but does possess a copy of the disposal criteria that was supplied as part of a bid response.
- b. Recently shipments of liquid radioactive waste offsite have been stopped because the receiver, Todd Shipyards in Galveston, Texas, had their authority to receive liquid radioactive waste terminated by the State of Texas. Southwest Nuclear Company had the contract with Rancho Seco (SMUD) to dispose of the liquid waste.
- c. The major revision of Administrative Procedure AP.1, Responsibilities and Authorities, was still in the final stages of review and approval. This revision will include assigning the Chemistry and Radiation Supervisor the responsibility for safe transfer, packaging and transport of low-level radioactive material (including radioactive waste). By telephone call on January 31 the Technical Assistant informed the inspector that the revision would be approved by February 8, 1980. The Resident NRC Inspector confirmed that the final approval was made and the revision issued on February 12.
- d. Three procedures cover present plant activities related to radioactive waste. On November 19, 1979 two of these procedures were revised and the third was issued in original form. The revisions and original procedure were reviewed and approved by the Plant Review Committee and issued in accordance with plant procedure requirements. These procedures do not presently reference the requirements of 10CFR Part 71 except for removable contamination limits on the outer surfaces of the containers.
- e. Personnel in the Chemistry and Radiation organization have received several training sessions on subjects related to the handling, packaging and transportation of radioactive waste. The material covered plant procedures (including recent changes), burial site and liquid waste license requirements and DOT Regulations with special emphasis on marking and labelling.
- f. The SMUD QA Department performed its audit of the transfer, packaging and transport of low-level radioactive waste activities on October 2, 1979. A separate audit of Southwest Nuclear was made and considered to be a part of the audit required to be performed by IE Bulletin 79-19. Of the several corrective actions required by the October 2 audit, four were considered to be "open" and

these will be checked during the next such audit. These audits were performed under QC1-2 (Item 30), SNUD Nuclear Operations Quality Assurance Audit Program. The examination of QC1-2 disclosed that Item 30 references the requirements of 49CFR 170-179 but not 10CFR Part 71. This deficiency was mentioned in a PRC memorandum concerning topical subjects for a joint November 1979 meeting between the Plant Review and Management Safety Review Committees. The QA Department audit of the Radiation Control Manual (implementation and compliance) is performed under Item 8 of QC-2. The audit frequency for Items 8 and 30 is yearly.

- g. During the inspection a visit was made to the yard area where radioactive waste has been stored. The area is double fenced with a dirt shield between and a maze entrance. Gates in the fences are locked with padlocks and entrance is controlled by the Chemistry and Radiation organization. The outer fence is posted in accordance with 10CFR 20.203(b) and the inner fence is posted in accordance with 10CFR 20.203(c)(1) and (e)(1). The drums of low-level radioactive waste were stacked on pallets. Some containers with higher levels of radioactive waste were behind portable shields. All containers had serial numbers. Pertinent information (i.e. drum weight, major isotopes, amount of activity and radiation levels at contact and at 1 meter) was recorded on the top of the low-level waste drums. This pertinent information on a couple of the older drums had been obscured by the effect of rain. Some of the low-level waste drums were labelled "LSA" (low specific activity). The Senior Chemical and Radiation Assistant had records showing information on drum contents and radiation levels by drum serial number. According to the licensee the final labelling and radiation surveys are accomplished at the time the drums are loaded on a truck for transport to a burial site.
- h. The inspection included the opening of one drum of low-level radioactive waste. The drum, serial No. 79-309, was secured with a bolted ring and a rubber gasket sealed the top to the sides. According to the records the contents were compacted waste with 0.78 millicuries of activity. The radiation levels were 2 mR/hr. at contact and 1 mR/hr at 1 meter. Observation confirmed that the drum contained compacted, dry waste inside plastic bags. A survey of the drum showed the radiation level at contact was less than 1 mR/hr. This survey was made with the meter described in paragraph 9 above. There was no labelling on the drum except for the serial number and the pertinent information recorded on the top.

No items of noncompliance or deviations were identified.

12. Allegation of Possible Problems with Shipments of Liquid Radioactive Waste.

The NRC Resident Inspector received a letter expressing a concern about the shipments of liquid radioactive waste. Specifically, questions were raised about the surveys made in connection with such shipments and the instruments used to make the surveys. The author of the letter was interviewed by the inspector.

During the inspection a discussion was held with the responsible Senior Chemical and Radiation Assistant concerning the shipments of liquid radioactive waste. The Assistant stated that, because radiation levels associated with some of the liquid waste shipments approached the DOT limits, the survey meter used had an effect on the results. The GM type survey meters used by Rancho Seco personnel gave different results from a GM meter used by the Southwest Nuclear employee. Also there were differences in the readings between GM and ionization types of survey meters. According to the Assistant an ionization type of survey meter gave more reliable results and thus would be used to assure compliance with the limits. He also stated that there had been instances when the limits were exceeded and under those situations the shipment was retained until the limits were met. Problems were experienced when the contract shipper changed from Nuclear Engineering Company to Southwest Nuclear. The major problem was related to the change in tank size from about 3,300 gallons to about 5,000 gallons. At the time of this inspection shipments of liquid radioactive waste had been halted. This matter is still considered to be open, pending further investigation (80-02-01).

13. Exit Interview

At the conclusion of the January 21-25, 1980 inspection, the inspector met with those licensee personnel so identified in Paragraph 1 of this report. The following licensee personnel were also present: J. McColligan, Engineering and QC Supervisor; W. Ford, Operations Supervisor; G. Coward, Maintenance Supervisor; R. Lawrence, Site Project Engineer; B. Stiver, Mechanical Engineer; H. Heckert, Nuclear Engineering Technician. G. Zwetzig, NRC Reactor Inspector, P. Narbut, NRC Reactor Inspector, and J. O'Brien, NRC Unit Resident Inspector, were also present at the exit interview. The scope of the inspection and the findings were summarized. One item of noncompliance was identified - the five instances of plant effluent with chlorine concentrations in excess of the Technical Specification Limit of 0.2 mg/liter. The following items were also discussed during the exit interview:

- a. In connection with the item of noncompliance it was noted that (1) the fourth occurrence on December 5, 1979 had not been reviewed and discussed at a Plant Review Committee meeting and (2) proper operation and maintenance of the chlorine addition to the circulating water and sewage treatment systems was necessary because under normal conditions chlorine concentrations in plant effluent approach the technical specification limit. The licensee stated that the December 5 chlorine occurrence would be reviewed and discussed by the PRC at a meeting to be held on January 26, 1980. The Plant Superintendent said that a request had been made to Generation Engineering to evaluate the sewage treatment plant and cooling towers from the standpoint of chlorine addition and the technical specification limit for plant effluent.
- b. The examination of the QA audit program for the packaging of low-level radioactive waste and transportation disclosed that the criteria referenced in the program description (Item 30 of QCI-2) was 49CFR 170-179 and 10CFR Part 71 was not included. Also the related operating procedures in the Radiation Control Manual did not reference Part 71. The licensee said Part 71 would be added to these documents. (80-02-02)
- c. The radioactive waste records were disorganized and obtaining specific information from them was difficult. Also there appeared to be a question as to whether some of the containers stored in the radioactive waste storage yard were labelled as required by Section 3.2 of Procedure AP. 205-10. The licensee did satisfy the requirements in 10CFR 20.203(f)(3) (vi) which provides for an exemption to the labelling required by 10CFR 20.203(f)(1). The licensee stated that they would examine the radwaste program in the light of these comments and take appropriate actions to correct any problems identified. (80-02-03)