U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No. 50-312/90-14

License No. DPR-54

Licensee: Sacramento Municipal Utility District
P. O. Box 15830
Sacramento, California 95813

Facility Name: Rancho Seco Nuclear Generating Station

Inspection at: Clay Station, California

Inspection Conducted: October 3-4, 9-11 and November 2, 1990

Inspected by: _____ 1-8-90
W. K. TenBrook, Radiation Specialist — Date Signed

Approved by: Phillip Qualls FOR _____ 11/14/90
G. P. Yuhas, Chief — Date Signed
Reactor Radiological Protection Section

Summary:

Areas Inspected: Routine unannounced inspection of followup items, followup of licensee event reports, liquid effluent, solid wastes, and allegations. Inspection procedures 92701, 92700, 83750, 84750 and 30703 were used.

Results: Two violations described in Licensee Event Reports resulted in non-cited violations (Section 3). Licensee staff levels in radiation protection, chemistry and radwaste have remained stable since the previous inspection (Section 4). Disposition of contaminated material stored onsite will proceed following resolution of radioactive materials licensing issues (Section 4). The "B" waste gas decay tank had lost inventory. The release was not radiologically significant; however, this matter remained unresolved pending followup of the licensee's investigation of waste gas system operation and condition (Section 6).

DETAILS

1. Persons Contacted

Licensee

M. Bua, Manager, Radiation Protection and Emergency Preparedness
J. Delezenski, Manager, Nuclear Licensing
D. Elliott, Supervisor, Nuclear Quality
D. Gardiner, Radwaste Superintendent
M. Leinwander, Effluent Superintendent
R. Mannheimer, Licensing Engineer
D. Price, Acting Manager, Nuclear Chemistry
S. Redeker, Manager, Operations
E. Ronningen, Radiological Effluents Specialist

The individuals noted above attended the exit meeting on October 11, 1990. The inspector also contacted other members of the licensee's staff during the inspection. Mr. P. Turner, Manager, Technical Services was contacted following the inspection of November 2, 1990.

2. Followup (92701)

Open Item 50-312/88-30-04 (OPEN): This item concerned accurate calibration of site liquid effluent total flow rate. The licensee had committed to development of a periodic surveillance procedure incorporating cross-sectional velocity measurements at various effluent canal flume flows. This method had been used twice before by the US Geological Survey to provide correction factors relating flume level to effluent flow. The licensee intended to have their surveillance procedure prepared by the end of 1990. This item will be examined upon completion of the surveillance procedure.

Open Item 50-312/89-18-02 (CLOSED): This item concerned the licensee's mass balance of the spent fuel pool. The inspector evaluated the licensee's final engineering report on spent fuel pool leakage, dated September 4, 1990, which described all surveillance and remedial activities for spent fuel pool leakage, including mass balance measurements. The mass balance methods and calculations were satisfactory, and indicated that leakage was properly directed to the leak chase and the radwaste system.

During onsite review of the status of spent fuel pool leakage, the inspector learned that one modified flow monitor on the spent fuel pool leak chase was not operating properly. The cognizant engineer stated that the monitors were a "drinking bird" design that employed a small moving catch reservoir. During the performance of a surveillance procedure, the moving joint of the tank farm monitor was discovered to have seized due to inactivity. The licensee was correcting this problem by installation of a new monitor of the same design with improved lubrication and materials in its moving parts.

During review of plant conditions prior to defueling, the NRC had confirmed, by letter dated November 20, 1989, the licensee's commitment to monitor the leak chase consistent with the licensee's interim engineering report on fuel pool leakage, dated November 16, 1989. The inspector inquired what compensatory monitoring was being provided during the current modifications that was consistent with this report. The engineer replied that the radwaste tank that received pool leakage possessed level indication and the spent fuel pool level indication was also available, but added that neither of these methods would be as sensitive as direct monitoring of the leak chases. Because the improvements to the monitors were taking longer than anticipated, the engineer stated that a container would be used to catch any minor leakage for detection and trending. The inspector had no further concerns.

Open Item 50-312/89-18-06 (CLOSED): This item concerned whether the Post-Accident Sampling System (PASS) was required operable whenever fuel was in the reactor vessel. The licensee defueled the reactor in December 1989, obviating the PASS design function to monitor core and containment conditions after a reactor accident. The inspector verified that the PASS was included in the licensee's program for layup and preservation of plant systems. The inspector had no further concerns in this matter.

Open Item 50-312/90-01-02 (CLOSED): This item concerned the performance of the licensee's contractor for environmental radiological measurements and corrective action for analytical problems. The inspector examined reports from the licensee's contractor describing results from Environmental Protection Agency (EPA) test sample analyses and corrective actions for disagreements for 1989 and the first half of 1990. Immediately after the inspector's observations during the prior inspection, contractor measurements of Cs-137 and Ba-133 in water did not agree within the EPA criteria. The contractor reported that some of the sample had leaked and the volume loss was not accounted for. Also, Sn-113 in the gamma calibration standard, who's gamma energy falls close Ba-133, had decayed to a low level and had impaired the calibration. Recalibration with a new standard, followed by reanalysis of the original spectrum, yielded improved results. Two subsequent EPA tests of gamma in water during 1990 were both successful. The contractor's performance had improved to date. The inspector had no further questions in this matter.

Open Item 50-312/90-04-01 (CLOSED): This item concerned a liquid test sample submitted to the licensee for radiochemical analysis. The sample was diluted to a concentration typical of regenerant hold-up tank releases during operation. The licensee analysis results are presented below.

Analyte	Licensee Result (uCi/ml)	NRC Result (uCi/ml)	NRC Random Uncertainty (uCi/ml)	Ratio: Licensee/NRC	Agreement Range
H-3	4.88E-05	8.75E-08	2.60E-09	557.71	0.75-1.33
Sr-89	3.65E-08	3.29E-08	1.00E-09	1.11	0.75-1.33
Sr-90	1.69E-08	2.09E-08	8.00E-10	0.81	0.75-1.33
Cs-137	4.51E-08	4.33E-08	1.30E-09	1.04	0.75-1.33
Mn-54	3.03E-08	2.91E-08	9.00E-10	1.04	0.75-1.33
Co-60	3.30E-08	3.36E-08	1.00E-09	0.98	0.75-1.33

The results agreed well for all radionuclides except tritium. The tritium disagreement was brought to the attention of the chemistry department and investigated. On April 26, 1990, a leaking check valve allowed the demineralized reactor coolant storage tank to leak to the nitrogen gas system, which sparged the laboratory deionized water supply with nitrogen and tritium-contaminated water. The laboratory water was subsequently decontaminated on May 2, 1990. As a precaution, technicians continued to use potable water for tritium measurements to avoid possible sample contamination. However, on May 9, 1990, the NRC sample was diluted with the laboratory water. On June 17, 1990, a tritium bubbler was also filled with laboratory water, yielding an unusually high result. The laboratory water was again discovered to be contaminated with tritium. The water was believed to have been recontaminated by nitrogen sparging after May 2, contaminating the NRC sample during dilution. Given the resolution of the tritium discrepancy and the agreement between the remaining measurements, the inspector had no further questions regarding the analysis. The contamination of the nitrogen system will be examined during a subsequent inspection (50-312/90-14-01).

Open Items 50-312/IN-90-31, IN-90-33, IN-90-35, IN-90-48 (CLOSED): The listed information notices had been distributed to appropriate licensee personnel for evaluation. The inspector had no further questions in this matter.

3. Onsite Review of Licensee Event Reports (LER) (92700)

Event Report 50-312/90-01-LO (CLOSED): This report concerned gaseous effluent flow rate instruments for the Reactor Building Stack (FE-15044), Auxiliary Building Stack (FE-15045) and Auxiliary Building Grade Level Vent (FE-15546A) which were inoperable for greater than thirty days and not reported in the Semi-Annual Radioactive Effluent Release Report.

After failure of the monitors during surveillance testing, the licensee had properly implemented the TS action statements for the inoperable monitors, employing the maximum design flow rates for each effluent path per TS Table 3.16-1. The licensee subsequently restored the monitors to operability and the inspector verified that no other extended periods of inoperability had since occurred. However, the licensee stated that the instruments were *unreliable and* had requested NRC relief from TS 4.20 surveillance requirements for flow instrument operability. The licensee's request, by letter to the NRC Office of Nuclear Reactor Regulation dated March 26, 1990, proposed that the design maximum effluent flow rate be employed in place of the actual monitor indication.

The monitors were being maintained operable pending NRC resolution of the licensee request. CAP-0013, "Preparation of Semiannual Radioactive Effluent Release Reports," had been revised to incorporate flow monitors as part of the reporting requirement, and the most recent effluent report had incorporated amendments explaining the prior monitor inoperability pursuant to TS 3.16.

Technical Specification (TS) 3.16.b states:

> With less than the minimum number of radioactive gaseous effluent monitoring instrumentation channels OPERABLE, take the action shown in Table 3.16-1. Exert best efforts to return the instrument to OPERABLE status within thirty days and, if unsuccessful, explain in the next Semi-Annual Radioactive Effluent Release Report submitted pursuant to Specification 6.9.2.3 why the inoperability was not corrected in a timely manner.

Contrary to this requirement, the licensee did not explain the inoperability of effluent flow monitors FE-15044, FE-15045 and FE-15546A, each inoperable for greater than thirty days during the report period. Licensee corrective actions were complete and adequate to prevent recurrence to date. The licensee-identified violation is not being cited because the criteria in Section V.G of the Enforcement Policy were satisfied (NCV 50-312/90-14-02).

Event Report 50-312/90-02-LO (CLOSED): This report described a failure to obtain two liquid effluent samples during a release from a site retention basin while the liquid effluent radiation monitor, R-15017A, was inoperable.

The inspector examined liquid waste discharge permit 90-33, prepared for a south retention basin release to support surveillance procedure SP.418A, "Quarterly Test of Liquid Effluent Radiation Monitor (R-15017A)." Chemistry personnel properly prepared CAP-0008, "Offsite Releases of Radioactivity in Liquid Effluents," reflecting that R-15017A was operable the day prior to the surveillance. Chemistry personnel obtained and analyzed the required single sample, calculated R-15017A setpoints in accordance with TS 3.17.1 and the Offsite Dose Calculation Manual, and forwarded the permit to operations to proceed with the release. The basin effluent was anticipated to be 0.02% of maximum permissible concentration at minimum dilution flow.

The Shift Supervisor instructed his crew to assume R-15017A was inoperable, so TS actions such as dual valve lineup verifications would be accomplished if the monitor failed the surveillance. However, the Shift Supervisor's declaring R-15017A inoperable was inconsistent with Chemistry personnel's prior verification of operability. This was not recognized by the Shift Supervisor, and the release was initiated without obtaining the second sample required when R-15017A was inoperable. Also, because R-15017A was declared inoperable, the operators did not install the calculated monitor setpoints.

During the release, a chemistry supervisor alerted the shift supervisor that two samples were needed if R-15017A were inoperable. The release

was halted while the licensee determined if R-15017A was indeed operable. The shift supervisor learned that the monitor had passed the surveillance test, declared R-15017A operable, and resumed the release on that basis. However, the calculated setpoints had not been installed, so the monitor did not possess a conservative setpoint per TS 3.15.

Operations Department Event Report 90-08 thoroughly documented this problem. Based on reviews of Report 90-08 and interviews with operations personnel, the inspector concluded that personnel were aware that 1) releases depended upon consistency through the entire permit process and 2) releases depended on both monitor operability and installed conservative setpoints. CAP-0008 had been revised to alert operators to halt the release and have an additional sample obtained prior to continuing if R-15017A was inoperable or assumed inoperable. Release concentrations were not likely to approach 10 CFR 20 limits, given the 0.02% MPC fraction determined from the single sample.

TS 3.15 states, in part:

> The radioactive liquid effluent monitoring instrumentation channels shown in Table 3.15-1 shall be OPERABLE with their alarm/trip setpoints set to ensure that the limits of Specification 3.17.1 are not exceeded...
>
> Action a. With a radioactive liquid effluent monitoring instrumentation channel alarm/trip setpoint less conservative than a value which will ensure that the limits of Specification 3.17.1 are met, immediately suspend the release of radioactive liquid effluents...or declare the channel inoperable, or change the setpoint so that it is acceptably conservative.
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> b. With less than the minimum number of radioactive liquid effluent monitoring instrumentation channels OPERABLE, take the ACTION shown in Table 3.15-1.

TS Table 3.15-1 states, in part:

> With the [Retention Basin Effluent Discharge] monitor inoperable, effluent releases may resume provided...1. At least two independent samples are analyzed...

Contrary to these requirements, liquid effluent was released with R-15017A assumed inoperable, and a second independent sample was not obtained. In addition, liquid effluent was subsequently released with R-15017A declared operable, but without its alarm/trip setpoint set to ensure that the limits of TS 3.17.1 were not exceeded. The licensee-identified violation is not being cited because the criteria in Section V.G of the Enforcement Policy were satisfied (NCV 50-312/90-14-03).

4. Radioactive Waste Systems (83750)

Audits

The inspector reviewed multiple audits performed during 1990, with emphasis on resolution of findings through the Potential Deviation from Quality (PDQ) process. The inspector observed that both programmatic auditing and surveillance of work activities were used by the licensee's quality verification organizations. PDQs were written concerning the process control program, radwaste processing documentation, non-radiological environmental TS audits, offsite dose calculations, and radiological sampling. Corrective actions were adequate for the PDQs resolved.

Surveillance 89-S-187 described omission of environmental monitoring documentation and reviews specified in Health Physics Implementing Procedures, and noted that similar problems had been documented in PDQ 89-0777. The recurrence of these problems was addressed in an amended response from the Manager, Environmental Monitoring and Emergency Planning, acknowledging that procedure tasks for record and procedure review were indeed not completed, but that the omissions did not adversely affect the program. The inspector did not identify any omitted tasks required by the technical specifications or the licensee's TS 6.8.1 requirement to implement procedures consistent with Regulatory Guide 4.15, "Quality Assurance Program for Effluent Control and Environmental Monitoring."

Licensee quality organizations had maintained their performance in program audits and surveillance of work activities.

Changes

The licensee was installing a new evaporative system for liquid radwaste concentrates volume reduction and drying. The radwaste blender/dryer was located on the radwaste solidification pad, immediately outside the auxiliary building wall. The pad had been enclosed by a corrugated metal building with roll-up metal doors and a concrete berm. The blender/dryer was designed to evaporate liquid radwaste concentrates in a subatmospheric mixing drum, surrounded by a steam jacket heat source. The dried boric acid and salts mixture would then be mixed with paraffin to render the material less dispersable, although the paraffin addition did not provide for solidification or stability pursuant to 10 CFR 61.56, restricting system operation only to wastes resulting in a Class A, unstable form. The paraffin addition was approved, with the above caveats, by letter from the State of Washington to the disposal site operator dated April 16, 1990.

The licensee evaluated the blender/dryer system under the criteria of 10 CFR 50.59, and determined that there were no unreviewed safety questions involved. However, a revision to the description of the facility in the Safety Analysis Report would be required. These determinations were approved by the Plant Review Committee. The inspector examined the system operation and safety review. Severity and frequency of potential system accidents were bounded by safety analyses currently in the Safety

Analysis Report, and the system could be operated without a TS change. This determination relied on the licensee's proposed administrative controls over the amount of evaporator bottoms transferred to the system and surveillance of system operation.

The licensee's reviews of changes to the facility had maintained their prior scope and depth. No unreviewed changes were identified.

The radiation protection, radwaste and chemistry organizations had not changed significantly since the prior inspection. The radiological operations superintendent had departed and the radwaste superintendent had assumed the combined post of radwaste/radiological operations superintendent. After pending regulatory relief is obtained, the licensee anticipated further staff decreases. The licensee's capabilities had not significantly declined in these areas.

Liquid Wastes

Current liquid inventories in radwaste concentrate tanks T-679A, B and C were approximately 29,000 gallons total as compared with 66,000 gallons capacity. Liquid radwaste volume had been declining since July 1990. Virtually all 460 cubic feet of spent resin volume was processed during June and July, 1990, with 56 cubic feet currently stored. The next significant source of liquid radwaste was the processing of the borated water storage tank (BWST). During operation, the BWST contained at least 390,000 gallons of water. The processing of current liquid wastes and the BWST was being delayed until completion of installation, testing and procedures for the blender/dryer system. The additional system would provide for a desired volume reduction factor of four beyond the radwaste evaporator system.

The licensee's storage and processing capacities for liquid radwastes were satisfactory.

Solid Wastes

The inspector reviewed the licensee's management of solid wastes in trailers and cargo vans by direct observation, interviews with personnel and reviews of documents.

The licensee had completed their inventory of all twenty-four cargo vans and five semi-trailers containing contaminated material. The material had been redistributed among the cargo vans, with the semi-trailers emptied, surveyed and prepared for unrestricted release. Sixteen cargo vans were in preparation for shipment. Eight cargo vans were retained to store useable tools and equipment.

The licensee negotiated a contract to broker reusable material, such as scaffolding, to other licensed facilities. The contractor would also provide supercompaction services for non-salvageable radwaste removed from the cargo vans. The inspector examined the radioactive materials license and noted that the facility was only authorized receive material packaged specifically in drums, not cargo van containers. The radwaste superintendent was aware that the license was inconsistent with the

shipment of material in cargo vans and stated that the contractor had applied for a license amendment and was expecting action by the state soon. Shipments of the material were to begin upon resolution of the license inconsistency, following meetings with contractor representatives in late October, 1990.

The licensee had adequately maintained the program for management of solid waste.

Liquid Effluent

The inspector reviewed selected regenerant hold-up tank (RHUT) release permits and verified compliance with CAP-0008, "Offsite Releases of Radioactivity in Liquid Effluents." In addition, the inspector employed the PCDOSE computer program to verify liquid effluent dose calculations through selected pathways. The release conditions and fish consumption dose equivalents are presented below.

RHUT B to North Retention Basin, September 28, 1990
9.34E-7 Ci Cs-137

Organ	Licensee Dose Eq	NRC Dose Eq
Adult Total Body	1.66E-4 mRem	1.66E-4 mRem
Child Liver	2.39E-4 mRem	2.39E-4 mRem

RHUT A to South Retention Basin, September 17, 1990
4.33E-6 Ci Cs-137

Organ	Licensee Dose Eq	NRC Dose Eq
Adult Bone	8.55E-4 mRem	8.57E-4 mRem
Child Bone	1.15E-3 mRem	1.16E-3 mRem

RHUT A to North Retention Basin, August 15, 1990
2.91E-6 Ci Cs-137, 1.2E-6 Ci Co-60

Organ	Licensee Dose Eq	NRC Dose Eq
Adult Liver	7.85E-4 mRem	7.88E-4 mRem
Child Bone	7.77E-4 mRem	7.77E-4 mRem

For the fish pathway, the licensee's estimated doses were in excellent agreement with NRC-approved calculation methods. The NRC PCDOSE program could not accomodate the licensee's calculations for irrigation pathways; however, the fish pathway was expected to be a dominant contributor to calculated doses.

The licensee had maintained their capabilities to control liquid effluent.

5. Plant Tours (83750)

The inspector toured radiologically controlled areas and conducted independent radiation dose rate measurements in the auxiliary building, spent fuel building, tank farm and Interim Onsite Storage Building (IOSB). The inspector observed the following:

- o Personnel in controlled areas wore proper dosimetry and conducted themselves in accordance with radiation protection procedures and radiation work permits.

- o Housekeeping was satisfactory. No bags of debris or waste were accumulating in the auxiliary building or the grade level compaction room. Boxed wastes in the IOSB warehouse were well organized.

- o During a tour of the Reactor Building, the inspector and resident inspector noted that crane tackle had not been retracted to a normal position, but hung over an open chase leading to grade level. The inspectors learned that the crane had malfunctioned, halting in the observed position, and the licensee was taking action to correct the crane position. In addition, nuclear service water and component cooling water piping at grade level was superficially corroding and its paint coating blistering. Rust was collecting at several locations on floors below the corroding pipes. The licensee was informed of these conditions and stated they would investigate the location and extent of corrosion and respond to the resident inspector.

6. Allegation RV-90-A-0068

On October 31, 1990, a licensee employee contacted the Region V office regarding a safety concern raised to licensee supervision that had not been satisfactorily addressed. This concern is presented below.

Concern: The "B" waste gas decay tank was depressurizing. Tank pressure had decreased from 50 psig to 15 psig, and management had not addressed the issue.

Resolution: Substantiated. The licensee maintained that waste gas decay tank "B" had been leaking through its pressure relief valve, PSV-65510, and discharging to the gas collection header. Operations personnel then repressurized the "B" tank with surge tank gas by periodically operating the waste gas compressor.

To evaluate the licensee's position, the inspector reviewed "B" tank pressure and surge tank pressure from the time at which the tank had been put in service until the inspection. On September 20, 1990, the "B" tank was 50 psi. During the inspection, tank pressures were 2, 3, 5 and 8 psi, sequentially, and surge tank pressure was near zero. These pressures were inconsistent with a redistribution of gas within the system, indicating unaccounted leakage from the collection header and tanks.

The inspector observed valves WGS-042, FV-65513 and WGS-046, which isolated waste gas tank "B" from the auxiliary building stack, and verified that each was closed. These valve positions were consistent with procedure A.23, "Conduct of Operations," for waste gas system isolation.

Nuclear chemistry analyzed a sample from waste gas tank "B," detecting 1.21E-3 uCi/ml of Kr-85. Given this concentration in tank "B," a

pressure reduction of 50 psi to 8 psi, and 2E+7 cc/second of dilution flow in the auxililiary building stack, release of the Kr-85 over a period in excess of one to two hours was not expected to be detectable above the 4.8E-7 uCi/cc detection limit of the auxiliary building stack monitor, R-15045. The inspector obtained trends of R-15045, covering the previous four hours, day and month. All measurements for the prior month were indistinguishable from background. The inspector also performed an independent site boundary dose calculation based on the above data and 10 cubic feet/minute waste gas flow (maximum gauge), resulting in very low doses, less than 0.01 mRad gamma or beta.

The leakage from the waste gas system was to be investigated and resolved by the licensee under PDQ 90-328. The licensee planned to assess any radiation dose from unaccounted leakage in an unplanned release permit under the PDQ. Waste gas decay tank "B" was removed from service and tank "D" placed on-line. The licensee also informed the inspector that the waste gas system was soon to be declared inoperable per TS 3.18, and all gas collection header inputs sent to the auxiliary building plenum without holdup. This matter is considered unresolved pending completion of the licensee's investigation (50-312/90-14-04).

7. Exit Meeting (30703)

The inspector discussed the scope and findings of the inspection with licensee management on October 1 and November 2, 1990. The inspector stated that LERs 90-01 and 90-02 were each reported as operations prohibited by the technical specifications, and were therefore considered apparent violations. The inspector also stated that licensee-identification would be considered in NRC enforcement action for the violations.

Enclosure

Criteria for Accepting the Licensee's Measurements

Resolution			Ratio		
<4			No comparison		
4	-	7	0.5	-	2.0
8	-	15	0.6	-	1.66
16	-	50	0.75	-	1.33
51	-	200	0.80	-	1.25
200			0.85	-	1.18

Comparison

1. Divide each NRC result by its associated uncertainty to obtain the resolution. (Note: For purposes of this procedure, the uncertainty is defined as the relative standard deviation, one sigma, of the NRC result as calculated from counting statistics.)

2. Divide each licensee result by the corresponding NRC result to obtain the ratio (licensee result/NRC).

3. The licensee's measurement is in agreement if the value of the ratio falls within the limits shown in the preceding table for the corresponding resolution.