UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

APR 23 1990

Report Nos.: 50/280/90-13 and 50/281/90-13

Licensee: Virginia Electric and Power Company
Glen Allen, VA 23060

Docket Nos.: 50-280 and 50-281 License Nos.: DPR-32 and DPR-37

Facility Name: Surry 1 and 2

Inspection Conducted: March 19-23, 1990

Inspectors: D. A. Seymour 4/23/90
D. A. Seymour Date Signed

R. P. Carrion 23 APR '90
R. P. Carrion Date Signed

Approved by: for T. R. Decker, Chief 4/23/90
T. R. Decker, Chief Date Signed
Radiological Effluents and Chemistry Section
Emergency Preparedness and Radiological
Protection Branch
Division of Radiation Safety and Safeguards

SUMMARY

Scope:

This routine, unannounced inspection was conducted in the areas of confirmatory measurements, radioactive effluents, and the radiation monitoring program.

Results:

The item concerning the operability problem of the component cooling service water monitor was reviewed. It was closed based upon its current status and licensee commitments (Paragraph 2).

The violation concerning modifications to the ventilation system was reviewed. It remains open pending completion of short term and long term corrective actions (Paragraph 2).

Liquid and gaseous radioactive effluents were within the concentrations permitted by 10 CFR 20, Appendix B. Radiation doses were well within the limits allowed by 40 CFR 190 and 10 CFR 20.105(c) (Paragraph 3).

The Radiation Monitoring Program was reviewed. Internal audits and evaluations of the program are considered to be a licensee strength (Paragraph 4).

Confirmatory measurements were made and all but one sample were in agreement (Paragraph 5).

Operation of the PASS was observed. Proper sampling techniques and health physics practices were observed (Paragraph 6).

The licensee's aggressive actions regarding the Liquid Curie Reduction Program were considered to be a strength (Paragraph 7).

No violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*W. Benthall, Supervisor - Licensing
*R. Bilyeu, Licensing Engineer
*P. Blount, Supervisor, Radiation Analysis
*R. Boles, System Engineer
*D. Christian, Assistant Station Manager
*Z. Edwards, Health Physics Technician
*D. Erickson, Superintendent, Radiation Protection
*B. Garber, Supervisor, HP Technical Services
*E. Grecheck, Assistant Station Manager
*D. Hart, Supervisor, Quality Assurance (Audits)
*M. Kansler, Station Manager
*R. McManus, Engineering Supervisor
*M. Paul, System Engineer
*E. Smith Jr, Manager, Quality Assurance
*E. Swindell, Supervisor, Chemistry
*W. Thornton, Director, Corporate Health Physics and Chemistry

Other licensee employees contacted during this inspection included engineers, technicians, and administrative personnel.

Nuclear Regulatory Commission

*D. Collins, Branch Chief, Emergency Preparedness and Radiation Protection Branch
*J. York, Resident Inspector

*Attended exit interview

2. Licensee Action on Previously Identified Findings and Inspector Follow-up Items (92701, 92702)

a. (Closed) IFI 50-280/87-02-03, 50-281/87-02-03: Resolve the inoperability problem of component cooling service water monitor RM-SW-107.

As discussed in Inspection Report Nos. 89-11 and 89-32, the component cooling service water monitor, RM-SW-107, had been out of service since 1987, over 11 years. Debris in the service water had caused plugging of the sample line to the monitor and jamming of associated pumps on a frequent basis. This caused the licensee to declare the monitor inoperable, requiring the periodic grab sampling and analysis as stated in Table 3.7.5(a) of the Technical Specifications (TSs).

The inspectors discussed with the licensee the most current status of the monitor replacement program. To resolve the problem, the licensee plans to mount sodium iodide crystal detectors in dry wells that will be fabricated in replacement component cooling water heat exchangers. The installation of the new detectors will coincide with the replacement of the heat exchangers.

The "D" Component Cooling Water Heat Exchanger and its associated radiation monitor were replaced in February 1990. The Semi-Annual Radioactive Effluent Release Report for the period July 1, 1989 through December 31, 1989, discussed the installation of the remaining heat exchangers and associated monitors. Two of the heat exchangers and monitors are scheduled to be installed during the Unit #1 refueling outage in the Fall of 1990. The remaining heat exchanger and monitor will be installed during the Unit #2 refueling outage in the Spring of 1991. Based on this licensee commitment, and on discussions with the licensee, this item is considered closed.

b. (Open) Violation 50-281/89-32-01: Modifications to Ventilation Systems Resulted in Inadequate Survey of Gaseous Effluents.

Back-pressure problems and general degradation of the auxiliary building ventilation system had caused unmonitored leakage to the environment, and had caused reverse flow out of laboratory fume hoods into areas outside the radiologically controlled area. Also, there was non-representative sampling of gaseous effluents out of the main gaseous effluent pathway (Ventilation Vent #2).

The inspectors reviewed the licensee's short term corrective actions with respect to this item. The inspectors reviewed Procedure No. 1-PT-26.1, entitled "Radiation Monitoring Equipment Check," dated February 28, 1990. This procedure had been modified to incorporate a daily check of sample flow through Ventilation Vent #2 radiation monitors to ensure that the isokinetic flow exists. The inspectors discussed the Process Vent with the licensee to determine whether non-representative sampling could be occurring at this point. The licensee had determined through review of documentation and of the operating system, that isokinetic sampling was occurring at the Process Vent gaseous release point. The inspectors also determined that the hot lab where the blowback was occurring was no longer in use, that radioactive material had been removed from this hood, and that the hood had been tagged as inoperable. The inspectors also discussed with the licensee the plans to reinstate Ventilation Vent #1 back into service. The inspectors also reviewed three Engineering Work Requests (EWRs) concerned with this violation: EWR No. 89-733, Evaluate RM Tubing (Isokinetic Bends), dated March 9, 1990; EWR No. 89-335, Evaluate VG Radiation Monitors Stack Discharge Flow Rate, dated February 20, 1990; and EWR No. 89-470, Evaluate RM Vent Stack Software (no date given). The licensee responses, dated February 22, 1990, and licensee actions up to the time of the inspection were considered acceptable. This item will remain open pending completion of the short term and long term corrective actions.

3. Effluent and Environmental Reports (84750)

TS 6.6.3.C requires the licensees to submit, within 60 days of January 1 and July 1 of each year, routine Radioactive Effluent Release Reports covering the operation of the unit during the previous six months of operation. The inspector reviewed the Semi-Annual Radiological Effluent Release Reports for the period January 1, 1989 through December 31, 1989. The review included an examination of the liquid and gaseous effluent release data. This data is summarized in Attachment 4.

Liquid and gaseous radioactive effluents were within the radioactive concentrations specified in 10 CFR 20 Appendix B. There was an increase in liquid fission and activation products in 1989. The licensee attributed this increase to tube leaks in the component cooling water heat exchanger, most of which have been repaired. There were no unplanned releases in 1989.

TS 6.6.3.C requires the Radioactive Effluent Release Report to be submitted within 60 days after January 1 of each year and to include an assessment of the radiation doses to the maximum exposed member of the public due to radioactive liquid and gaseous effluents released from the site during the previous calendar year. The assessment of the radiation doses is to be performed in accordance with the Offsite Dose Calculation Manual (ODCM). The inspector reviewed the 1989 annual and quarterly doses to the maximum exposed member of the public. According to the ODCM, the maximum exposed member of the public from the release of airborne I-131, tritium, and all radionuclides in particulate form with half lives greater than eight days was defined as an infant, exposed through the grass-cow-milk pathway, with the thyroid as the critical organ. The beta and gamma air doses due to noble gas released from the site were calculated at the site boundary. The maximum exposed member of the public from radioactive materials in liquid effluents in unrestricted areas was defined as an adult, exposed by either the invertebrate or fish pathway with the critical organ being either the thyroid or the gastrointestinal tract. A summary of the 1989 annual doses to the maximum exposed member of the public is presented in Attachment 5.

Calendar year 1989 showed an increase in the total body dose due to liquid effluents. The licensee attributed this to work performed to reconstitute the design of the service water system which required the shutdown of several circulating water pumps. This effectively eliminated the licensee's ability to dilute liquid effluents, thus increasing liquid effluent dose. The organ that received the largest dose due to liquid effluents was the GI-LLI with a cumulative annual dose of 0.305 mrem. The thyroid was the critical organ for the gaseous effluents, receiving a cumulative annual dose of 8.40 E-03 mrem. These doses were a small fraction of the limits allowed by 40 CFR 190 and 10 CFR 20.105(c).

No violations or deviations were identified.

4. Radiation Monitoring (84750)

Pursuant to 10 CFR 20.201(b), this area was inspected to determine whether the licensee was performing adequate surveys necessary to evaluate the extent of radiation hazards.

During this inspection the inspectors determined that the liquid and gaseous effluent monitoring program had received management attention. One out of the four component cooling water heat exchangers, and its associated monitor, were replaced in 1989. The remaining three were scheduled for replacement during the next refueling outage for the applicable units (see Paragraph 2). The installed radiation monitor was in operational testing. The licensee will remain in an Technical Specification Action Statement for this item until this work is complete.

In January 1990, Surry established a special subcommittee to identify and evaluate experiences and problems with their radiation monitoring system. The final report, entitled "Radiation Monitoring System Subcommittee Report," was issued on March 15, 1990. The inspectors reviewed this report and noted that the subcommittee examined many different aspects of this program, including: station deviations, licensee events reports, engineering work requests, human factors, the design basis of the program, technical specifications, INPO and NRC concerns, assessments of background problems, isokinetic sampling and setpoint control. The report listed 18 action items with scheduled completion dates. Some of these items included fully automating the sampling system on Ventilation Vent #2 so that isokinetic sampling would be maintained without constant Operations support; and installing a radiation monitor on Ventilation Vent #1. The report also listed nine proposed improvement items for further review. The inspectors considered the report thorough and extensive.

The inspectors also reviewed several Quality Assurance (QA) Audit Findings relating to this area. These findings included the component cooling service water radiation monitor, and specifically addressed the root causes for this monitor being out of service for such a long time. The audit covered the history of the inoperable monitor and made generic recommendations to changes in policy and procedures to prevent repeat occurrences of long term inoperability. Several of these audits were conducted with an outside contractor providing input. The inspectors also reviewed a QA Audit Checklist covering the area of radiological protection.

The implementation of the action items listed in the radiation monitoring program study and the audit findings listed by the QA organization will be followed by regional inspectors during subsequent inspections. The inspectors consider the increased visibility of the Quality Assurance/Quality Control (QA/QC) organization and the management emphasis placed upon the audit findings to be a licensee strength.

No violations or deviations were identified.

5. Confirmatory Measurements (84750)

Pursuant to 10 CFR 20.201(b) this area was inspected to verify the licensee's ability to conduct precise and accurate measurements.

During this inspection, samples of reactor coolant and selected liquid and gaseous process streams were collected and the resultant sample matrices were analyzed for radionuclide concentrations using the licensee's counting laboratory and the NRC Region II mobile laboratory gamma-ray spectroscopy system. The purpose of these comparative measurements was to verify the licensee's capability to measure quantities of radionuclides accurately in various plant systems. Analyses were conducted utilizing two of the licensee's intrinsic germanium gamma spectroscopy systems. Sample types and counting geometries included the following: reactor coolant, 100 milliliter cup; liquid waste, one-liter marinelli; containment atmosphere, 33-cc gas bulb; and a charcoal cartridge. A spiked particulate filter sample was provided for analysis in lieu of licensee samples which did not have sufficient levels of radioactivity for analysis. Comparison of licensee and NRC results are listed in Attachment 1, Table 1 with the acceptance criteria listed in Attachment 2. Except for one case, the results were in agreement for all sample types analyzed. The exception involved one disagreement with Detector #1 for the reactor coolant sample. The licensee recounted the reactor coolant sample twice on Detector #1 and the results for the recounts were in agreement with NRC results. Also, it should be noted that the licensee's results for the diluted reactor coolant sample were in agreement for Detector #1 for the isotope in question (I-133) for the same geometry, indicating that this disagreement was not indicative of a systematic problem in this area.

The inspectors observed the licensee obtain the Unit #1 containment atmosphere sample and one of the Unit #2 reactor coolant samples. Proper sampling techniques and health physics practices were observed. The inspectors reviewed selected portions of Procedure No. 1-PT-50.7, entitled "Health Physics-Containment Atmosphere," dated July 19, 1989. The portions reviewed were adequate for the intended purpose.

No violations or deviations were identified.

6. Post Accident Sampling System (84750)

NUREG-0737, Criterion 2a requires the licensee to establish an onsite radiological analysis capability to provide quantification of noble gases, iodines, and non-violatile radionuclides in the reactor coolant and containment atmosphere.

Pursuant to these requirements, the inspectors examined the Unit #2 Post-Accident Sampling System (PASS) for reactor coolant, gaseous effluents, and containment atmosphere. The inspectors discussed PASS operation and maintenance experience with licensee personnel. During this inspection the inspectors observed the licensee operate the PASS to obtain a sample of Unit #2 hot leg reactor coolant. This sample, and a Unit #2

reactor coolant sample obtained using nonaccident methodology were counted by the licensee on their gamma spectroscopy systems. NUREG-0737, Criterion 10 and Attachment No. 1 to the Generic Letter specifies that the results of the gamma spectral measurements should be accurate within a factor of two. The results of the licensee's analyses are summarized in Attachment 1, Table 2. The licensee met this criteria for the PASS sample. Proper sampling techniques and health physics practices were observed.

The inspectors reviewed Procedure No. 2-PT-38.48, entitled "High Radiation Sampling System Operability Test and Operator Training," dated May 25, 1989. This procedure contained detailed guidance for the operation of the PASS and it was followed by the licensee during the acquisition of the PASS sample. The procedure was adequate for the purpose stated. The inspectors determined that the licensee performed monthly PASS operability tests per the aforementioned procedure. The inspectors reviewed monthly data sheets for April, 1989 to March, 1990, which summarized the analytical results for these tests, and compared the PASS results to reactor coolant sample results.

No violations or deviations were identified.

7. Liquid Curie Reduction Program

The licensee is currently involved in a Liquid Curie Reduction Program. The inspectors reviewed documentation and discussed this program with the licensee and determined that this program included the building of a new radwaste processing facility. The facility had incorporated the latest ALARA concepts and waste reduction technology and should be ready for cold functional testing in late 1990. The inspectors were given an extensive tour of this building (still under construction) as part of this inspection. Corporate goals for the radwaste facility include: the reduction in the volume of radwaste shipped offsite; reduction in the amount of radioactivity released to the environment; reduction in man-rem to station personnel; the use of state of the art technology; reliability; and the use of an advanced control system for operation. The facility will have several radwaste processing systems, including: a liquid waste system; a laundry drain system, a dry active waste system, a spent ion exchange handling system, and an asphalt solidification system. The facility will also include a hot machine shop and a radiochemical hot laboratory.

Other aspects of the Liquid Curie Reduction program included the use of more retentive resins; the development of improved methods for the regeneration of resin; and component cooling water heat exchanger replacements. Surry also had 50 percent implementation of a newly developed resin separation process. This system saved approximately 40,000 gallons of water a day from discharge during the regeneration of the condensate demineralizer resin. Surry is in the process of the developing a program to recycle the remaining 60,000 gallons of water used daily in the regeneration process to a makeup system for reuse. Surry is

also in the process of replacing their sump pumps and seven out of twelve pumps have already been replaced, with the last five scheduled in the next quarter. The inspectors will follow the progress of this program during subsequent inspections, but consider the licensee's aggressive actions in this direction to be a strength.

No violations or deviations were identified.

8. Chemistry Matrix (84750)

As part of this inspection the inspectors provided the licensees with a list of 23 subject areas that covered the elements of the chemistry programs at Region II power reactors. The licensee was asked to provide brief responses to each applicable subject area, which then would be used to provide information about the site in a Region-wide "chemistry matrix." The list of subject areas is included in this report as Attachment #3.

9. Exit Interview

The inspection scope and results were summarized on March 23, 1990, with those persons indicated in Paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection results as listed in the summary. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

10. Acronyms and Initialisms

ALARA - As Low As Reasonably Achievable
cc - Cubic Centimeter
CFR - Code of Federal Regulations
EWR - Engineering Work Request
GI - Gastrointestine
IFI - Inspector Followup Item
INPO - Institute of Nuclear Power Operations
LLI - Lower Large Intestine
mRem - millirem
NRC - Nuclear Regulatory Commission
ODCM - Offsite Dose Calculation Manual
PASS - Post-Accident Sampling System
TS - Technical Specification

ATTACHMENT 1
TABLE 1

NRC-LICENSEE SAMPLE COMPARISON EVALUATIONS FOR
SURRY, MARCH 19-23, 1989

Sample	Isotope	*Concentration (uCi/unit) Licensee	NRC	Resolution	Ratio Licensee/NRC	Comparison
1. Liquid Waste Test Tank, 1 liter liquid marinelli						
a. Detector #1	Co-60	5.02 E-7	4.75 ± 0.94 E-7	5	1.06	Agreement
	Cs-134	1.27 E-6	1.15 ± 0.11 E-6	10	1.10	Agreement
	Cs-137	2.81 E-6	2.74 ± 0.14 E-6	20	1.02	Agreement
b. Detector #2	Co-160	5.40 E-7	4.75 ± 0.94 E-7	5	1.14	Agreement
	Cs-134	9.84 E-7	1.15 ± 0.11 E-6	10	0.86	Agreement
	Cs-137	2.55 E-6	2.74 ± 0.14 E-6	20	0.93	Agreement
2. Unit #1 Radiation Monitoring System (RMS) Gas (containment), 33 milliter gas bulb						
a. Detector #1	Xe-133	6.36 E-4	6.08 ± 0.10 E-4	61	1.05	Agreement
	Xe-135	9.51 E-6	1.10 ± 0.11 E-5	10	0.86	Agreement
b. Detector #2	Xe-133	6.15 E-4	6.08 ± 0.10 E-4	61	1.01	Agreement
	Xe-135	1.02 E-5	1.10 ± 0.11 E-5	10	0.92	Agreement

ATTACHMENT 1
TABLE 1

Sample	Isotope	*Concentration (uCi/unit) Licensee	NRC	Resolution	Ratio Licensee/NRC	Comparison
3. Unit #1 RMS Gas (containment), charcoal cartridge						
a. Detector #1	I-131	2.95 E-4	2.44 ± 0.13 E-4	19	1.21	Agreement
	I-133	3.40 E-4	2.88 ± 0.25 E-4	11	1.18	Agreement
b. Detector #2	I-131	3.18 E-4	2.44 ± 0.13 E-4	19	1.30	Agreement
	I-133	3.24 E-4	2.88 ± 0.25 E-4	11	1.12	Agreement
4. NRC spiked particulate filter						
a. Detector #1	Co-60	3.28 E-2	3.60 ± 0.05 E-2	72	1.06	Agreement
	Co-57	1.09 E-3	9.28 ± 0.51 E-4	18	1.17	Agreement
	Cs-137	4.56 E-2	3.84 ± 0.04 E-2	96	1.19	Agreement
b. Detector #2	Co-60	3.63 E-2	3.60 ± 0.05 E-2	72	1.01	Agreement
	CO-57	1.01 E-3	9.28 ± 0.51 E-4	18	1.09	Agreement
	Cs-137	4.05 E-2	3.84 ± 0.04 E-2	96	1.05	Agreement
5. Unit #2 Reactor Coolant Sample, 1.0 milliters diluted to 100 milliters						
a. Detector #1	I-131	5.20 E-4	4.76 ± 2.20 E-4	2	1.09	Agreement
	I-132	1.25 E-2	1.17 ± 0.10 E-2	12	1.07	Agreement
	I-133	4.08 E-3	5.94 ± 0.36 E-3	17	0.69	Disagree
	I-135	1.17 E-2	1.27 ± 0.18 E-2	7	0.92	Agreement

ATTACHMENT 1
TABLE 1

Sample	Licensee	*Concentration (uCi/unit)	NRC	Resolution	Ratio Licensee/NRC	Comparison
b. Detector #2	I-131	5.30 E-4	4.76 ± 2.20 E-4	2	1.11	Agreement
	I-132	1.21 E-2	1.17 ± 0.10 E-2	12	1.03	Agreement
	I-133	5.16 E-3	5.94 ± 0.36 E-3	17	0.87	Agreement
	I-135	1.03 E-2	1.27 ± 0.18 E-2	7	0.81	Agreement
5. (cont.) Recount of Unit #2 Reactor Coolant Sample, 1.0 milliliters diluted to 100 milliliters						
a. Detector #1 Recounted at 11:28 AM March 23, 1990	I-131	4.88 E-4	4.76 ± 2.20 E-4	2	1.03	Agreement
	I-132	1.13 E-2	1.17 ± 0.10 E-2	12	0.97	Agreement
	I-133	5.91 E-3	5.94 ± 0.36 E-3	17	0.99	Agreement
	I-135	1.24 E-2	1.27 ± 0.18 E-2	7	0.98	Agreement
b. Detector #1 Recounted at 12:47 PM March 23, 1990	I-131	3.71 E-4	4.76 ± 2.20 E-4	2	0.78	Agreement
	I-132	1.28 E-2	1.17 ± 0.10 E-2	12	1.09	Agreement
	I-133	5.97 E-3	5.94 ± 0.36 E-3	17	1.00	Agreement
	I-135	1.18 E-2	1.27 ± 0.18 E-2	7	0.93	Agreement
6. Unit #2 Reactor Coolant Sample, 0.024 milliliters diluted to 100 milliliters						
a. Detector #1	I-133	4.96 E-3	4.11 ± 0.48 E-3	9	1.21	Agreement
Detector #2	I-133	4.35 E-3	4.11 ± 0.48 E-3	9	1.06	Agreement

ATTACHMENT 1

TABLE 2

LICENSEE PASS SAMPLE VERSUS REACTOR COOLANT SAMPLE

Sample	Isotope	Concentration (uCi/unit) Detector #1	Detector #2
Unit #2 Reactor coolant, 0.024 milliliters diluted to 100 milliliters	I-133	4.96 E-3	4.35 E-3
Unit #2 hot leg PASS sample, 0.024 milliliters diluted to 100 milliliters	I-133	5.29 E-3	7.67 E-3

ATTACHMENT 2

CRITERIA FOR COMPARISONS OF ANALYTICAL MEASUREMENTS

This attachment provides criteria for the comparison of results of analytical radioactivity measurements. These criteria are based on empirical relationships which combine prior experience in comparing radioactivity analyses, the measurement of the statistically random process of radioactive emission, and the accuracy needs of this program.

In these criteria, the "Comparison Ratio Limits"[1] denoting agreement or disagreement between licensee and NRC results are variable. This variability is a function of the ratio of the NRC's analytical value relative to its associated statistical and analytical uncertainty, referred to in this program as "Resolution"[2].

For comparison purposes, a ratio between the licensee's analytical value and the NRC's analytical value is computed for each radionuclide present in a given sample. The computed ratios are then evaluated for agreement or disagreement based on "Resolution." The corresponding values for "Resolution" and the "Comparison Ratio Limits" are listed in the Table below. Ratio values which are either above or below the "Comparison Ratio Limits" are considered to be in disagreement, while ratio values within or encompassed by the "Comparison Ratio Limits" are considered to be in agreement.

TABLE

NRC Confirmatory Measurements Acceptance Criteria
Resolution vs. Comparison Ratio Limits

Resolution	Comparison Ratio Limits for Agreement
<4	0.4 - 2.5
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

[1]Comparison Ratio = $\frac{\text{Licensee Value}}{\text{NRC Reference Value}}$

[2]Resolution = $\frac{\text{NRC Reference Value}}{\text{Associated Uncertainty}}$

ATTACHMENT 3

1. Concurrence with EPRI/SGOG primary and secondary chemical guidelines
2. Steam cycle chemical control program (Boric Acid, Ammonia, Hydrazine, Morpholine, etc.)
3. Sludge removal history (PWR only)
4. Hydrogen water chemistry control (BWR only)
5. MIC problems in raw water systems
6. Rx coolant B/Li control scheme (PWR)
7. Macrofouling in raw water systems (clams, oysters, etc.)
8. Steam generator tubes
   a. integrity
   b. types of cracks/indicators and locations
   c. potential crevices
   d. number of tubes plugged
   e. S/G repair/PM history (shot peening, heat treatments, etc.)
9. Erosion corrosion monitoring/control program
10. Control of chemicals on plant site (i.e., hazardous organics in radwaste system - i.e., Hatch MOWAR intrusion)
11. Primary secondary leak rates (BWR)
12. Sulfate hideout return data (PWR)
13. Online chemistry monitoring capability
14. Condensate polisher operation and problems
15. Management involvement and philosophies toward chemistry
16. Condenser in-leakage history
17. Materials of construction in secondary system (i.e., copper in FW heaters, condenser tube materials, etc.)
18. Procedure adequacy
19. Technician training adequacy
20. Heat exchanger (raw water) performance

21. Cooling waters chemical treatment schemes (chromates, molybdates, chlorides, dispersants, surfactants)

22. Make-up water quality

23. S/G blowdown recycle capabilities

ATTACHMENT 4

SURRY RADIOACTIVE EFFLUENT SUMMARY

	1987	1988	1989
No. of Unplanned Releases			
a. Liquid	0	0	0
b. Gaseous	0	0	0
Activity Released (curies)			
a. Liquid			
1. Fission and Activation Products	5.17E+00	2.41E+00	4.05E+00
2. Tritium	8.15E+02	4.94E+02	4.29E+02
3. Gross Alpha	3.91E-05	8.00E-05	6.98E-06
b. Gaseous			
1. Fission and Activation Gases	3.08E+02	3.66E+02	1.37E+02
2. Iodines	1.81E-02	9.58E-03	3.89E-04
3. Tritium	3.04E+01	2.79E+01	2.75E+01
4. Particulate	2.84E-03	1.06E-02	1.99E-03
c. Volume of Liquid Wastes Released (prior to dilution) (liters)	2.96E+08	2.58E+08	2.94E+09

ATTACHMENT 5

SURRY ANNUAL DOSE SUMMARY (mrem)

Year	Liquid			Gaseous		
	Total Body	Thyroid	GI-LLI	Alpha	Beta	Thyroid
1989	2.30E-01	1.40E-03	3.05E-01	6.17E-02	1.36E-01	8.90E-03
1988	9.79E-02	1.23E-02	4.14E-01	2.22E-01	5.28E-01	1.90E-01
1987	2.37E-02	3.07E-02	1.54E-01	2.08E-01	5.14E-01	3.60E-01