

STEAM GENERATOR REPAIR PROGRAM

FOR THE

SURRY POWER STATION

UNIT NO. 2

PROGRESS REPORT - NO. 3

FOR THE PERIOD

JUNE 1, 1979 THROUGH JULY 31, 1979

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VIRGINIA ELECTRIC AND POWER COMPANY

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1.0 INTRODUCTION

This Progress Report contains information on the radiological effects of the Steam Generator Repair Program (SGRP) for Surry Power Station, Unit No. 2, and the measures taken to maintain these effects "as low as is reasonably achievable" (ALARA), during the period June 1 through July 31, 1979.

With regard to radiological effects, the major tasks performed during the reporting period involved installation activities and included: installation of the steam generator lower shells, installation of removed reactor coolant pipe sections, and the steam generator girth welds. Installation of the steam generator recirculation and transfer system, as well as ongoing peripheral and support activities (including: temporary scaffolding, cleanup and decontamination, health physics support and project supervision) also contributed significantly to the total radiological effects assessed during this period.

The report sections which follow provide an assessment of the occupational radiation exposure expended, the dose reduction techniques employed and their effectiveness, and the radioactive effluents and solid waste generated during the reporting period.

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2.0 OCCUPATIONAL RADIATION EXPOSURES

2.1 General

Occupational exposure to radiation may be considered the major radiological effect of the SGRP. Thus, significant importance has been placed upon providing an accurate assessment of the collective radiation exposure which is expended in performing each of the tasks involved. Estimates of these exposures were presented in summary form in Table 5.3-1 of the report entitled "Steam Generator Repair Program", dated August 17, 1977 and amendments thereto, hereafter referred to as the SGRP report.

2.2 Evaluation of Exposure Data

The program established to assess the actual exposures received during the repair effort has been designed to provide data which is compatible with the detail and format of the exposure summary presented in Table 5.3-1 of the SGRP report. This design permits valid comparisons between the estimated and actual exposures for specific tasks. In general, the program utilizes daily worker exposure data, as recorded by self-reading pocket dosimeters, in conjunction with contractor supplied, worker task data to evaluate current manrem expenditures. The worker task data is standardized to a system of discrete work packages (called Engineering Task Assignments) which was developed during the project planning phase. The use of this system to categorize exposure related work for individuals on a daily basis facilitates the process of compiling an accurate breakdown of the collective exposure expended on the many tasks involved. A more detailed description of this program, and

the basis for its design, was presented in Section 2.2 of Progress Report No. 2 for the SGRP.

2.3 Description and Format of Exposure Data

Table 1 presents a summary of the occupational radiation exposure expended during the reporting period, the labor and exposure expenditures to date (i.e. from project commencement on February 3, 1979 to July 31, 1979), and the original estimated expenditures. The following comments are provided for clarification and should be considered when reviewing the data presented.

- (a) Additional tasks performed during the report period which were not listed in Table 5.3-1 of the SGRP report have been included in Table 1. Similarly, exposures received by personnel performing functions not directly attributable to any one task have been listed separately.
- (b) The "Task Status" indications listed in Table 1 are intended to aid in the process of comparing estimated vs. actual manrem expenditures during the repair effort. For tasks indicated as "in progress", significant exposure related work remains to be performed and a realistic comparison is impractical. For "completed" tasks, the manrem and manhour values listed in Table 1 can be considered to represent the major significant expenditures for those tasks, therefore valid comparisons are possible. It should be recognized, however, that factors such as field changes to procedures, dismantling of task related support equipment, localized work area cleanup, etc. may continue to contribute small amounts of additional exposure and labor to a task for some time after completion is indicated.

(c) The Phase Subtotals listed in Table 1 are calculated by a summation of values for completed tasks. Expenditures reported for "Additional Tasks" and "Unassigned Personnel Categories" are allocated to a particular phase based upon the major activities being performed at the time they are incurred. Thus the Phase Subtotals also include these values for phases which can be considered essentially complete. This is the case for Phase I (Shutdown and Preparatory Activities) and Phase II (Removal Activities). For Phase III (Installation Activities), only one of the listed tasks was completed during the reporting period and thus the Phase Subtotal does not yet include the expenditures mentioned above.

2.4 Conclusions

A review of the data presented in Table 1 of this report reveals that the total occupational radiation exposure received for tasks completed as of July 31, 1979 is approximately 9% below the original estimate. The significance of this comparison is somewhat diminished due to the number of "in progress" tasks which could not be included. However, the fact that no worker assigned to the SGRP has to date received radiation exposure in excess of applicable federal standards, and the exposure reductions effected by the techniques described in Section 3 of this report, illustrate clearly that the commitment to maintain occupational exposures ALARA is being successfully applied to the repair effort.

3.0 APPLICATION OF ALARA PRINCIPLES

3.1 General

This section summarizes the specific dose reduction techniques employed during the reporting period. In general, the techniques described were implemented prior to this period; however, their continued application and effectiveness have provided significant benefits (exposure reductions) to a number of tasks performed during June and July. Where the available data permits, the following evaluations include a quantitative assessment of the manrem savings which can be attributed to the technique used. Additional information on the techniques discussed, and how they relate to the overall steam generator replacement activities can be found in the SGRP report.

3.2 Temporary Shielding

The use of temporary shielding can be attributed with significant reductions in personnel radiation exposure for the SGRP. In the early stages of the project, extensive shielding of piping and components within the lower steam generator cubicles was performed to provide these work areas with minimum radiation exposure levels. Where possible, this shielding has remained in place throughout the repair effort.

In order to minimize radiation streaming from the exposed reactor coolant pipe ends within the cubicles, specially fabricated bags filled with lead beads were placed inside the pipes. Activities involving work on this piping were thus performed in lower radiation fields. These activities consisted primarily of pipe end

refurbishment, and fit-up and welding of the removed pipe sections, and required a combined expenditure of approximately 130 manrem during the reporting period (as listed in Table 1 under "Installation of Reactor Coolant Piping"). Radiation survey data indicates that shielding of the pipe ends was effective in reducing exposure rates for these activities by an average factor of 5, and can thus be attributed with an assumed savings of about 520 manrem.

3.3 Decontamination

The decontamination of reactor coolant pipe sections which were removed from the primary system was completed during the last report period and a detailed assessment of this process was presented in Progress Report No. 2 for the SGRP. In that report it was shown that an average exposure rate reduction factor of 1,000 was achieved for the pipe sections undergoing decontamination, and that the total exposure "cost" expended during this process was approximately 41 manrem. Subsequently, these pipe sections were refurbished in preparation for reuse in the system. The labor involved in this task, although not reported separately from the total to date for installation of reactor coolant piping, has been conservatively estimated at 2,500 manhours for the reporting period. The estimate for the previous 60 day period was 2,000 manhours, and thus a total expenditure of 4,500 manhours is calculated for this task. Radiation survey data, upon which the reduction factor of 1,000 was based, has shown that without decontamination this task might have required working on pipe sections with average contact radiation

readings of 5,000 to 10,000 mR/hour. The resulting exposure to accomplish the task could therefore have reached 45,000 manrem. This projection is provided merely to illustrate the importance of the decontamination technique used and emphasize its contribution to the ALARA commitment.

3.4 Training

The installation of reactor coolant piping represented the major task performed during the reporting period with regard to occupational exposure. While the shielding and decontamination techniques described earlier were effective in reducing the radiation exposure rates associated with this task, the use of mock-ups to train the workers involved can be credited with providing reductions in exposure times. Welders, pipe-fitters, riggers and laborers all received extensive training in the activities to be performed by "dry runs" in full scale piping mock-ups. Completion times were noticeably reduced as the simulated activities were repeated to maximize each worker's familiarity with the actual job situation. Quantifying the exposure savings which have been realized through the use of mock-up training has not been attempted here, however, the inherent benefits of reducing exposure times for this major task are of significant importance to the ALARA program.

3.5 General Techniques

The more general procedures and practices which have been utilized during the reporting period to assure adequate control of occupa-

tional radiation exposure and to maintain this exposure ALARA are described briefly below.

- (a) Periodic work area cleanup and debris removal is performed to avoid buildups and maintain good radiological working conditions.
- (b) Piping, valves and other components which must be refurbished prior to reuse are removed from the containment to allow this work to be performed in an area where exposure rates are lower. A special refurbishment building was constructed for this purpose.
- (c) Other general techniques and programs which were previously described in Progress Report Nos. 1 and 2 have remained in effect during this reporting period and are listed here for completeness:
 - (1) comprehensive Health Physics and training programs,
 - (2) the "work package" concept for task preplanning and review,
 - (3) the project photographic and video-tape documentation,
 - (4) in-containment "rest area" utilization, and
 - (5) contamination control operations and equipment.

Although quantitative assessments have not been performed for these "general" techniques, all have obvious value in contributing to the overall ALARA program for the steam generator replacement project.

4.0 RADIOACTIVE EFFLUENTS AND SOLID WASTE

4.1 General

Radioactive liquid and gaseous effluents, and radioactively contaminated solid waste generated during the steam generator replacement project are summarized in Table 2. A discussion of each category is given below.

4.2 Airborne Releases

Airborne releases for the reporting period originated primarily from continuous ventilation of the containment during the repair activities. This is necessary to maintain a negative pressure while the equipment hatch is open. The continuous flow is processed through appropriate filter banks to minimize the concentration of airborne particulates released to the environment. Releases for June and July are seen in Table 2 to be consistent with those of the previous two months. No radioiodines or noble gases were detected and the particulates are comprised entirely of those nuclides with relatively long half-lives which would normally be expected at this stage of the repair effort.

4.3 Liquid Releases

The composition of radioactive liquid effluents released during the reporting period is relatively unchanged from that seen in May. The major contributing nuclides are present at quantities which have remained consistent throughout the project, with the exception of Co-58 which appears to be declining due to its short half-life. A notation has been added to page 1 of Table 2 to indicate those months during which a concurrent outage for Surry Unit No. 1

may have contributed to the quantities of radioactive liquids released to the discharge canal. This was necessary since a shared laundry facility is used for both units, and the disposal of laundry waste water continues to be the major source of these effluents.

4.4 Solid Radioactive Waste

The disposal of contaminated paper waste, disposable protective clothing and contamination control materials, and, to a lesser degree, structural materials and components not intended for reuse comprised the major portion of the solid radioactive waste generated during the reporting period. Shipment of the remaining packages containing solidified decontamination solutions generated during previous periods was also accomplished during June.

5.0 CONCLUSIONS

The following general conclusions are based upon the information contained within this report.

- (a) Although some variations can be seen when comparing the estimated vs. actual exposure expenditures for individual tasks, the total exposure (manrem) expended to date remains below the original estimate established prior to commencement of work. This result, and the techniques described in Section 3 which have played an important part in achieving it, confirm that the ALARA concept is being effectively implemented and applied to the steam generator replacement activities.
- b) Radioactive liquid effluents have exceeded slightly the total release estimate for activity presented on page 9.A.5-5 of the SGRP report. The total volume released to date is 65% of the estimated total. This indicates that liquid effluent concentrations are somewhat higher than originally anticipated. It has also been noted that some contributions to the liquid releases reported have occurred due to the concurrent outage for Unit No. 1. Nevertheless, the total activity released to date continues to represent only a small fraction (less than 1%) of that normally expected during station operation.
- (c) Airborne releases of radioactivity remain well below the estimates provided in the SGRP report on page 9.A.8-7 and are not anticipated to reach those estimates during the project.
- (d) Solid radioactive waste generated to date has exceeded the volume and activity estimates originally set forth on page 9.A.9-2 of the SGRP report. This is attributed to the increase

in personnel assigned to the SGRP, and the expected subsequent generation of higher volumes of contaminated paper waste, disposable protective clothing and contamination control materials.

TABLE 1
PERSONNEL RADIATION EXPOSURE SUMMARY
STEAM GENERATOR REPLACEMENT ACTIVITIES - REPORT PERIOD 6/1/79-7/31/79
SURRY POWER STATION-UNIT NO. 2

PAGE 1 OF 12

PHASE DESCRIPTION	ESTIMATED LABOR (MANHOURS)	ACTUAL LABOR EXPENDED TO - DATE (MANHOURS)	ESTIMATED EXPOSURE (MAN-REM)	ACTUAL EXPOSURE FOR REPORTING PERIOD (MAN-REM)	ACTUAL EXPOSURE EXPENDED TO - DATE (MAN-REM)	PHASE STATUS (C=COMPLETE) (I=IN PROGRESS)
COMPLETED TASKS ONLY						
I Shutdown and Preparatory Activities	39,021	149,504	596.27	2.331	383.892	C
II Removal Activities	57,422	189,448	559.6	12.723	697.422	C
III Installation Activities	1,926	6,396	9.63	6.804	11.010	I
IV Post Installation and Startup Activities	0	0	0	0	0	I
V Steam Generator Storage Activities	300	3,499	35.0	0.010	4.876	C
PROJECT TOTALS (Completed Tasks Only)	98,669	348,947	1,200.50	21.868	1,097.200	

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TABLE 1
PERSONNEL RADIATION EXPOSURE SUMMARY
STEAM GENERATOR REPLACEMENT ACTIVITIES - REPORT PERIOD 6/1/79-7/31/79
SURRY POWER STATION-UNIT NO. 2

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PHASE DESCRIPTION	ESTIMATED LABOR (MANHOURS)	ACTUAL LABOR EXPENDED TO - DATE (MANHOURS)	ESTIMATED EXPOSURE (MAN-REM)	ACTUAL EXPOSURE FOR REPORTING PERIOD (MAN-REM)	ACTUAL EXPOSURE EXPENDED TO - DATE (MAN-REM)	PHASE STATUS (C=COMPLETE) (I=IN PROGRESS)
ALL TASKS COMMENCED AS OF 7/31/79						
I Shutdown and Preparatory Activities	39,021	149,604	596.27	2.331	383.892	C
II Removal Activities	57,422	189,448	559.6	12.723	697.422	C
III Installation Activities	74,175	198,398	448.23	309.276	385.093	I
IV Post Installation and Startup Activities	14,444	24,217	134.54	41.134	43.733	I
V Steam Generator Storage Activities	300	3,499	35.0	0.010	4.876	C
PROJECT TOTALS (All Tasks)	185,362	565,166	1,773.64	365.474	1,515.016	

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TABLE 1
PERSONNEL RADIATION EXPOSURE SUMMARY
PHASE I-SHUTDOWN AND PREPARATORY ACTIVITIES
SURRY POWER STATION-UNIT NO. 2

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TASK DESCRIPTION	ESTIMATED LABOR (MANHOURS)	ACTUAL LABOR EXPENDED TO DATE (MANHOURS)	ESTIMATED EXPOSURE (MAN-REM)	ACTUAL EXPOSURE FOR REPORTING PERIOD (MAN-REM)	ACTUAL EXPOSURE EXPENDED TO - DATE (MAN-REM)	TASK STATUS (C=COMPLETE) (I=IN PROGRESS)
Erect Equipment Hatch Temporary Enclosure	264	1,073	0.4	0	0.459	C
Prepare and Load Test Polar Crane	210	2,720	1.05	0	2.863	C
Open Equipment Hatch	156	-----	0.23	-----	-----	C (See Note 1)
Defueling and Fuel Storage	585	3,437	11.7	0	22,124	C
Install Reactor Vessel Cavity Cover	130	2,385	1.3	0	1,972	C
Cutting of Pressurizer Cubicle Wall	---	----	----	-	----	(See Note 2)
Installation of Jib Cranes	1,238	13,111	9.19	0.879	14.667	C
Disassemble Manipulator Crane	58	1,501	1.74	0.029	2.416	C
Install Steam Generator Transport System	572	6,805	2.86	0.546	11.737	C
Removal of Biological Shield Wall	1,296	3,959	19.44	0	3.392	C
Disassemble Shroud Cooling System	150	884	3.0	0	1.512	C

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TABLE 1
PERSONNEL RADIATION EXPOSURE SUMMARY
PHASE I-SHUTDOWN AND PREPARATORY ACTIVITIES
SURRY POWER STATION-UNIT NO. 2

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TASK DESCRIPTION	ESTIMATED LABOR (MANHOURS)	ACTUAL LABOR EXPENDED TO - DATE (MANHOURS)	ESTIMATED EXPOSURE (MAN-REM)	ACTUAL EXPOSURE FOR REPORTING PERIOD (MAN-REM)	ACTUAL EXPOSURE EXPENDED TO - DATE (MAN-REM)	TASK STATUS (C=COMPLETE) (I=IN PROGRESS)
Cutting of Crane Wall at Hatch Opening	432	1,379	2.16	0.011	0.446	C
Installation of Temporary Ventilation System	50	9,488	0.05	0.255	1.851	C
Temporary Scaffolding	7,500	14,559	75	0	74.363	C
Temporary Lighting and Power	5,200	6,609	26.25	0	0.563	C
Cleanup and Decon	9,000	17,216	135	0	22.601	C
Polar Crane Operator	1,500	1,368	4.5	0	2.319	C
Shielding	3,600	21,930	270	0.417	143.493	C
H.P., Q.A.	6,480	31,286	32.4	0	33.584	C
ADDITIONAL TASKS						
Installation of Service Air System	-----	2,491	---	0	0.670	C
Work Platform Modification	-----	4,958	-----	0	0.084	C
Removal of Reactor Coolant Pump Motors	-----	1,357	-----	0	4.621	C

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TABLE 1
PERSONNEL RADIATION EXPOSURE SUMMARY
PHASE I-SHUTDOWN AND PREPARATORY ACTIVITIES
SURREY POWER STATION-UNIT NO. 2

PAGE 5 OF 12

TASK DESCRIPTION	ESTIMATED LABOR (MANHOURS)	ACTUAL LABOR EXPENDED TO - DATE (MANHOURS)	ESTIMATED EXPOSURE (MAN-REM)	ACTUAL EXPOSURE FOR REPORTING PERIOD (MAN-REM)	ACTUAL EXPOSURE EXPENDED TO - DATE (MAN-REM)	TASK STATUS (C=COMPLETE) (I=IN PROGRESS)
Protection of Containment Components	---	1,088	---	0.194	4,016	N/A
UNASSIGNED PERSONNEL CATEGORIES						
Engineering Support	---	Not Reported	---	0	5,657	N/A
Craft Support and Security Escorts	---	"	---	0	10,060	N/A
Project Supervision and Administration	---	"	---	0	17,227	N/A
Visitors and Inspectors	---	"	---	0	1,235	N/A
Subtotal Phase I (Completed Tasks Only)	39,021	149,604	596.77	2,331	383,892	N/A

917197

TABLE 1
PERSONNEL RADIATION EXPOSURE SUMMARY
PHASE II - REMOVAL ACTIVITIES
SURREY POWER STATION-UNIT NO. 2

PAGE 6 OF 12

TASK DESCRIPTION	ESTIMATED LABOR (MANHOURS)	ACTUAL LABOR EXPENDED TO - DATE (MANHOURS)	ESTIMATED EXPOSURE (MAN-REM)	ACTUAL EXPOSURE FOR REPORTING PERIOD (MAN-REM)	ACTUAL EXPOSURE EXPENDED TO - DATE (MAN-REM)	TASK STATUS (C=COMPLETE) (I=IN PROGRESS)
Removal of Insulation (lower shell, RC Piping)	720	2,026	28.8	0	13.791	C
Removal of Insulation (upper shell, mainsteam and radwater piping)	864	80	12.96	0	1.364	C
Removal of Miscellaneous Piping	72	5,424	1.8	0.174	59.337	C
Set Up Steam Generator Girth Cut Equipment	1,152	224	28.8	0	0.229	C
Cut and Remove Steam Generator Upper Shell	330	5,079	8.25	0.845	11.221	C
Cutting of Reactor Coolant Piping	2,982	20,223	149.1	0.036	214.046	C
Cutting of Mainsteam and Feedwater Piping	1,428	2,838	7.14	0.126	1.132	C
Disassembly of Steam Generator Supports	792	9,600	15.84	2.227	46.213	C
Removal of Moisture Separation Equipment	396	6,050	1.98	4.133	6.727	C
Refurbish Steam Generator Upper Shell	9,246	21,655	46.23	4.693	19.811	C

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TABLE 1
PERSONNEL RADIATION EXPOSURE SUMMARY
PHASE II - REMOVAL ACTIVITIES
SURRY POWER STATION-UNIT 1.D. 2

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TASK DESCRIPTION	ESTIMATED LABOR (MANHOURS)	ACTUAL LABOR EXPENDED TO - DATE (MANHOURS)	ESTIMATED EXPOSURE (MAN-REM)	ACTUAL EXPOSURE FOR REPORTING PERIOD (MAN-REM)	ACTUAL EXPOSURE EXPENDED TO - DATE (MAN-REM)	TASK STATUS (C=COMPLETE) (I=IN PROCESS)
Removal of Steam Generator Level Instruments and Blow- down Piping	135	2,311	4.05	0.375	7.671	C
Removal of Steam Generator Lower Shell	1,575	3,859	31.5	0.114	29.875	C
Temporary Scaffolding	7,500	11,969	75.0	0	46.464	C
Temporary Lighting and Power	5,250	6,071	26.25	0	5.910	C
Cleanup and Decon	17,000	26,731	85.0	0	83.718	C
Polar Crane Operator	1,500	1,308	4.5	0	1.038	C
H.P., Q.A.	6,480	32,999	32.4	0	50.960	C
ADDITIONAL TASKS						
Material Handling, Equip- ment Maintenance, and Miscellaneous Construction Activities	-----	30,991	-----	0	53.897	N/A
UNASSIGNED PERSONNEL CATEGORIES						
Engineering Support	-----	Not Reported	-----	0	4.858	N/A

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TABLE 1
PERSONNEL RADIATION EXPOSURE SUMMARY
PHASE II - REMOVAL ACTIVITIES
SURRY POWER STATION-UNIT NO. 2

TASK DESCRIPTION	ESTIMATED LABOR (MANHOURS)	ACTUAL LABOR EXPENDED TO - DATE (MANHOURS)	ESTIMATED EXPOSURE (MAN-REM)	ACTUAL EXPOSURE FOR REPORTING PERIOD (MAN-REM)	ACTUAL EXPOSURE EXPENDED TO - DATE (MAN-REM)	TASK STATUS (C=COMPLETE) (I=IN PROGRESS)
Craft Support and Security	-----	Not Reported	-----	0	1.281	N/A
Project Supervision and Administration	-----	"	-----	0	37.573	N/A
Visitors and Inspectors	-----	"	-----	0	0.300	N/A
Subtotal Phase II (Completed Tasks Only)	57,422	189,448	559.6	12,723	697.422	

TABLE I

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PERSONNEL RADIATION EXPOSURE SUMMARY
 PHASE III-INSTALLATION ACTIVITIES
 SURRY POWER STATION-UNIT NO. 2

TASK DESCRIPTION	ESTIMATED LABOR (MANHOURS)	ACTUAL LABOR EXPENDED TO - DATE (MANHOURS)	ESTIMATED EXPOSURE (MAN-REM)	ACTUAL EXPOSURE FOR REPORTING PERIOD (MAN-REM)	ACTUAL EXPOSURE EXPENDED TO - DATE (MAN-REM)	TASK STATUS (C=COMPLETE) (I=IN PROGRESS)
Steam Generator Lower Shell Installation	1,926	6,396	9.63	6.804	11.016	C
Installation of Reactor Coolant Piping	6,768	58,295	67.68	129.903	193.247	I
Steam Generator Girth Weld	5,400	28,267	27.0	4.789	11.747	I
Installation of Main Steam Piping	3,735	2,168	18.68	0.421	1.476	I
Installation of Feedwater Piping	2,700	470	13.5	0.171	0.326	I
Installation of Blow- down and Miscellaneous Piping	1,782	1,205	17.82	3.590	3.590	I
Install Steam Generator Level Instruments	2,592	15	12.96	0.021	0.021	I
Installation of Insulation	11,562	37	57.81	0	0.099	I
Temporary Scaffolding	7,500	7,694	75.0	20.113	20.113	I
Temporary Lighting & Power	5,250	7,285	26.25	5.440	5.440	I

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TABLE 1
PERSONNEL RADIATION EXPOSURE SUMMARY
PHASE III-INSTALLATION ACTIVITIES
SURRY POWER STATION-UNIT NO. 2

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TASK DESCRIPTION	ESTIMATED LABOR (MANHOURS)	ACTUAL LABOR EXPENDED TO - DATE (MANHOURS)	ESTIMATED EXPOSURE (MAN-REM)	ACTUAL EXPOSURE FOR REPORTING PERIOD (MAN-REM)	ACTUAL EXPOSURE EXPENDED TO - DATE (MAN-REM)	TASK STATUS (C=COMPLETE) (I=IN PROGRESS)
Cleanup and Decon	17,000	27,377	85.0	45.920	45.920	I
Polar Crane Operator	1,500	1,306	4.5	0.918	0.918	I
H.P., Q.A.	6,460	36,639	32.4	35.396	35.396	I
ADDITIONAL TASKS						
Material Handling, Equip- ment Maintenance, and Miscellaneous Construction Activities	-----	21,244	-----	11.666	11.666	N/A
UNASSIGNED PERSONNEL CATEGORIES						
Engineering Support	-----	Not Reported	-----	3.331	3.331	N/A
Craft Support and Security	-----	"	-----	0.451	0.451	N/A
Project Supervision and Administration	-----	"	-----	40.119	40.119	N/A
Visitors and Inspectors	-----	"	-----	0.223	0.223	N/A
Subtotal Phase III (Completed Tasks Only)	1,926	6,396	9.63	6.804	11.010	

917202

TABLE 1
PERSONNEL RADIATION EXPOSURE SUMMARY
PHASE IV - POST INSTALLATION AND STARTUP ACTIVITIES
SURREY POWER STATION-UNIT NO. 2

TASK DESCRIPTION	ESTIMATED LABOR (MANHOURS)	ACTUAL LABOR EXPENDED TO - DATE (MANHOURS)	ESTIMATED EXPOSURE (MAN-REM)	ACTUAL EXPOSURE FOR REPORTING PERIOD (MAN-REM)	ACTUAL EXPOSURE EXPENDED TO - DATE (MAN-REM)	TASK STATUS (C=COMPLETE) (I=IN PROGRESS)
Install Biological Shield Wall	3,240	214	16.2	0.025	0.099	I
Repair Crane Wall Opening	473	308	2.37	0.387	0.392	I
Repair Pressurizer Cubicle Wall	-----	-----	-----	-----	-----	(See Note 2)
Install Steam Generator Recirculation and Transfer System	9,000	23,486	90.0	40.494	42.980	I
Remove Reactor Cavity Cover	130	30	0.60	0	0.030	I
Reassemble Manipulator Crane	1,176	36	23.25	0.041	0.045	I
Remove Steam Generator Transport System	425	143	2.12	0.187	0.187	I

Subtotal Phase IV
(Completed Tasks Only)

917203

TABLE I
PERSONNEL RADIATION EXPOSURE SUMMARY
PHASE V - STEAM GENERATOR STORAGE ACTIVITIES
SURRY POWER STATION-UNIT NO. 2

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TASK DESCRIPTION	ESTIMATED LABOR (MANHOURS)	ACTUAL LABOR EXPENDED TO - DATE (MANHOURS)	ESTIMATED EXPOSURE (MAN-REM)	ACTUAL EXPOSURE FOR REPORTING PERIOD (MAN-REM)	ACTUAL EXPOSURE EXPENDED TO - DATE (MAN-REM)	TASK STATUS (C=COMPLETE) (I=IN PROGRESS)
Steam Generator Storage Activities	300	3,499	35.0	0.010	4.876	C

TABLE NOTATION

1. Labor and Exposure expenditures for this task were included in other task totals. (Primarily "Defueling and Fuel Storage"). Labor and Exposure estimates are included in the Subtotal Values.
 2. This task was cancelled due to equipment changes. Labor and Exposure Estimates are not included in the Subtotal values.
- N/A- Not Applicable. Labor and Exposure Expenditures are included in the Subtotal Values for Phases I and II. They are not included in the Subtotal Values for Phase III (See Report Section 2.3.c).

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TABLE 2
SURREY POWER STATION
STEAM GENERATOR REPLACEMENT PROJECT
REPORT OF RADIOACTIVE EFFLUENTS

PAGE 1 OF 2

YEAR: 1979

I. LIQUID RELEASES

		FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	
Isotopes Released MPC μ Cl/ml								
I-131	3×10^{-7}	2.76E-5	4.62E-4	6.28E-5	*	*	*	
I-132	8×10^{-6}	*	*	*	*	*	*	
I-133	1×10^{-6}	*	*	*	*	*	*	
I-134	2×10^{-5}	*	*	*	*	*	*	
I-135	4×10^{-6}	*	*	*	*	*	*	
Cs-134	9×10^{-6}	3.21E-3	2.23E-3	2.43E-3	1.35E-3	2.43E-3	2.20E-3	
Cs-137	2×10^{-5}	7.24E-3	5.90E-3	5.82E-3	3.97E-3	6.20E-3	2.90E-3	
Co-57	4×10^{-6}	5.54E-6	1.71E-6	9.00E-5	*	*	4.00E-6	
Co-58	9×10^{-5}	2.35E-2	1.15E-2	3.47E-2	7.90E-3	6.10E-3	1.60E-3	
Co-60	3×10^{-5}	2.03E-2	9.09E-3	1.72E-2	6.10E-3	1.10E-2	8.50E-3	
Hu-54	1×10^{-4}	1.28E-3	3.42E-4	7.32E-4	1.34E-3	3.34E-4	2.20E-4	
Na-24	3×10^{-5}	*	*	*	1.10E-5	*	*	
Cr-51	2×10^{-3}	5.55E-3	6.48E-4	3.40E-3	1.50E-2	2.00E-5	*	
Fe-59	5×10^{-5}	*	*	1.42E-6	*	*	*	
Sb-95	1×10^{-6}	1.98E-4	8.81E-5	2.52E-4	*	5.60E-5	2.70E-5	
Sb-124	2×10^{-5}	*	*	2.10E-4	1.40E-4	*	*	
Sb-125	1×10^{-4}	1.23E-4	*	1.63E-4	4.50E-5	*	*	
Zn-65	1×10^{-4}	1.11E-5	4.06E-6	4.70E-5	2.10E-5	3.40E-6	1.30E-5	
Zr-95	6×10^{-5}	7.01E-6	*	1.54E-4	5.20E-5	*	*	
Mo-99	4×10^{-5}	5.92E-5	7.48E-6	2.94E-5	*	*	*	
Ru-103	8×10^{-5}	*	*	*	*	1.16E-6	*	
Xe-133	3×10^{-6}	9.42E-5	1.19E-4	*	*	*	*	
Ag-110m	1×10^{-5}	*	2.66E-5	1.24E-5	*	*	*	
Ni-63	3×10^{-5}	3.46E-3	7.22E-3	2.98E-3	3.55E-3	**	**	
Fe-55	8×10^{-4}	1.07E-2	6.13E-2	1.25E-2	7.88E-3	**	**	
Ce-144	1×10^{-5}	*	9.59E-6	2.15E-6	*	*	5.58E-6	
Tc-99m	3×10^{-3}	*	1.35E-4	*	*	*	*	
Ce-141	9×10^{-5}	*	4.41E-6	*	*	*	3.14E-6	
Volume of Liquid to Discharge Canal	Liters	5.97E+5	7.76E+5	9.60E+5	1.11E+6	1.15E+6	9.93E+5	

*Not Detected

**Sample analysis results not yet received from service vendor.
Upon receipt, analysis data will be submitted as a supplement
to this report.

***Includes Radioactive Liquid Waste generated during #1 outage

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TABLE 2
SURREY POWER STATION
STEAM GENERATOR REPLACEMENT PROJECT
REPORT OF RADIOACTIVE EFFLUENTS

PAGE 2 OF 2

YEAR: 1979

II. AIRBORNE RELEASES

Isotopes Released:	UNITS	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY
(a) Particulates	Curies						
Cs-134		*	*	*	*	1.38E-6	1.23E-5
Cs-137		3.95E-6	1.25E-5	4.25E-6	2.03E-5	8.99E-6	3.79E-5
Cr-51		4.51E-5	*	*	*	*	*
Co-58		8.05E-5	4.13E-5	3.58E-5	6.37E-5	8.90E-6	1.73E-5
Co-60		4.17E-5	6.01E-5	4.14E-5	7.79E-5	3.33E-5	6.43E-5
Mn-54		*	*	*	*	*	7.53E-7
Fe-59		*	*	*	*	*	*
(b) Halogens							
I-131		6.88E-6	*	*	*	*	*
I-132		*	*	*	*	*	*
I-133		*	*	*	*	*	*
I-134		*	*	*	*	*	*
I-135		*	*	*	*	*	*
(c) Gases							
Xe-133		9.64E+1	3.00E+0	*	*	*	*
Xe-133m		*	*	*	*	*	*
Xe-135		1.94E+0	*	*	*	*	*
Kr-85m		*	*	*	*	*	*
Kr-85		*	*	*	*	*	*
Kr-87		*	*	*	*	*	*
Kr-88		*	*	*	*	*	*
Ar-41		*	*	*	*	*	*
III. SOLID RADIOACTIVE WASTE DISPOSAL							
(a) Total Amount Solid Waste Packaged	FT ³	1.65E+3	1.11E+4	6.92E+3	6.60E+3	9.30E+3	7.78E+3
(b) Estimated Total Activity	Curies	9.94E-1	3.16E+0	2.76E+1	7.53E+0	1.03E+1	6.98E+0
(c) Date of Shipment and Disposition		Barnwell, S.C.	Barnwell, S.C.	Barnwell, S.C.	Barnwell, S.C.	Barnwell, S.C.	Barnwell, S.C.

*Not Detected

(+) June date of shipments continued
6-25-79, 6-26-79, 6-27-79

2-20-79	3-6-79	3-17-79	4-6-79 (4)	5-5-79	6-1-79	7-7-79
2-22-79	3-7-79	3-19-79	4-9-79	5-11-79	6-7-79 (3)	7-10-79
2-27-79	3-8-79	3-28-79	4-12-79 (2)	5-16-79	6-8-79	7-13-79
2-28-79	3-13-79	3-28-79	4-14-79	5-19-79	6-13-79	7-16-79
	3-13-79	3-29-79	4-17-79	5-23-79 (2)	6-14-79	7-18-79 (2)
	3-15-79	3-29-79	4-22-79	5-25-79 (2)	6-15-79 (3)	7-20-79
				5-29-79	6-22-79	7-23-79
				5-30-79 (2)	6-24-79	7-28-79
					(4)	

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