STEAM GENERATOR REPAIR PROGRAM

FOR

TURKEY POINT UNIT 3

RADIOLOGICAL PROGRESS REPORT - NO.I

FOR THE PERIOD

JUNE 24, 1981 THROUGH AUGUST 22, 1981

DOCKET NO. 50-250

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FLORIDA POWER AND LIGHT COMPANY

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TABLES

1.0 INTRODUCTION

Radiological Progress Report No. 1 is the first of a series of radiological progress reports to be generated throughout the entire Steam Generator Repair Program. This report and succeeding reports will include the following information relative to the repair program:

a. An assessment and summary of the occupational exposure and labor expended for each reporting period throughout the project.

b. An evaluation of the effectiveness of dose reduction techniques (ALARA principles).

c. An estimate of the radioactivity released in liquid and airborne effluents.

d. An estimate of the solid radioactive waste generated including volume and radioactive content.

Significant project tasks performed during this reporting period included:

1. Removal of miscellaneous piping, structural and component interferences.
2. Installation of steam generator transfer bridge.
3. Refueling cavity decontamination.
4. Installation of containment pedestal cranes.
5. Removal of steam generator insulation.
6. Installation of Steam Generator Grit Blast Equipment inside Containment.
7. Installation of refueling cavity temporary cover.
8. Initial containment decontamination.

Several on-going activities also performed during this period included: installation of temporary scaffolding, cleanup and decontamination, installation of temporary shielding, installation of temporary electrical power and lighting services, health physics support and project supervision.

2.0 OCCUPATIONAL RADIATION EXPOSURES

2.1 General

Occupational exposure to radiation may be considered the major radiological impact 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 3.3-2 of the report entitled "Steam Generator Repair Report" March 1980 Revision 7.

Additional information presented in this progress report is related to the "Steam Generator Repair Report" (SGRR) through revision 7, related license amendments and licensee (FPL) affidavits submitted during the ASLB hearings.

2.2 Description of Exposure Data Collection Program

To assess the occupational exposure reported a program has been designed which provides data that is compatible with the detail and format of the estimated exposure summary presented in Table 3.3.-2 of the SGRR. The data collected permits a valid comparison between the estimated exposure for the major tasks indicated and the actual exposures recorded by self-reading pocket dosimeters. A description of the thirteen (13) major tasks is indicated in Table 1.

In general, these tasks are composed of a number of specific activities identified and controlled by a construction generated document called a process sheet. Each process sheet details the activity to be performed. The process sheet is reviewed by Health Physics to incorporate ALARA recommendations who then generate the Radiation Work Permit(s) necessary prior to starting work. The Radiation Work Permits (RWP) are utilized to "track" the exposures expended for all activities within the major tasks described in Table 1. Each RWP issued is categorized into one of these major tasks. In all cases, repair project activities (those specified by process sheets and those not requiring specific documentation with process sheets) are controlled with an appropriate RWP.

This extensive exposure data base requires the use of a versatile computer system. The system in operation includes, but is not limited to, the following capabilities:

1. Exposure history by Radiation Work Permit, work group classification and individual basis.

2. Classifying RWP controlled activities into one of the SGRP major task groups.

3. Providing a valid comparison of estimated and reported exposure for each major task.

4. An up-to-date, real-time exposure readout for each individual at the Radiation Controlled Area (RCA) control points.

5. Log-in and log-out capability at each RCA Control Point data terminal.

6. Direct Health Physics Shift Supervisor access via computer terminal to initiate/terminate exposure extensions, initiate/terminate RWP's, review individual exposures and verify various H.P. training requirement status.

The person-hours accrued for each specific activity were tabulated by reviewing the actual time expended in the radiation field under each specific RWP. This information was obtained from access/egress containment control points.

System upgrades and changes will be made as necessary to provide information that may be required by applicable regulatory and/or licensing requirements. Should the computer system be inoperative for any reason, exposures are recorded on appropriate log sheets and entered into the computer system when it is returned to service.

2.3 Evaluation of Exposure Data

In general, the system described in 2.2. utilizes worker exposure data as recorded by self-reading pocket dosimeter, in conjunction with contractor supplied task exposure estimates to evaluate current person-rem expenditures.* The use of this system to categorize and determine exposures for individuals facilitates the process of compiling a reliable assessment of the collective exposure expended during the project. The real-time personnel reporting feature at the RCA Control Points allows the individual and Health Physics to have an up-to-the-minute exposure history of each individual. To date this system has proven to be very effective in processing the day-to-day transactions entered and is expected to continue to demonstrate reliability throughout the repair project.

2.4 Description and Format of Exposure Data

Table 2 presents a summary of the occupational radiation exposure expended in person-rem and the labor expended in the radiation field in person-hours during this reporting period (i.e., from project commencement on 24 June 1981 to 22 August 1981). Also included are the original estimated expenditures. The following comments are provided for clarification and should be considered when reviewing the data presented in Table 2.

a. Several activities performed during the repair effort which were not described in Table 1 have been appropriately placed into one of the major task categories in Table 2 and accordingly accounted for.

*Self-reading pocket dosimeter results are used since exposure information is immediately available upon exit from the RCA and accordingly recorded in the computer data base. Since thermoluminescent dosimeters (TLD's) are processed primarily on a monthly basis this information could not be readily incorporated into the exposure expended for each specific activity. Historically, SRPD results are higher than TLD results primarily due to drift (caused by factors such as heat and humidity, and initial charging). Therefore, accumulated dose is reported conservatively.

b. Exposures received by certain pre-identifed personnel (e.g. health physics, QC/QA, etc.) performing functions not directly attributable to any one task are listed separately in Item 7.

c. Information detailing exposures reported for specific activities within a major task is contained in the data base. This information is utilized to "track" exposure for the time period of interest.

d. Task items indicating no accumulated exposures have not commenced during this reporting period.

Table 3A presents a detailed summary of the preparatory activity personnel exposure expended during this reporting period. This includes both the labor and exposure expenditures and the original estimated expenditures. Table 4 presents a general summary of both labor and personnel exposure expended per each phase of the repair project along with their original estimated expenditures. The following comments are provided for clarification and should be considered when reviewing the data presented in Tables 3A and 4.

a. Activity status indications are given to allow comparison of actual versus estimated person-rem expenditures.

b. Activities indicated as in progress may require additional exposure prior to completion of the activity; therefore a valid comparison at this time is not justified.

c. For completed activities it should be noted that small amounts of additional exposure and labor may appear sometime after completion is indicated, as a result of such factors as: field changes to procedures, work involving activity related to support equipment, localized work area cleanup, etc.

2.5 Discussion of Exposure Results

A review of the data presented in Table 2 shows that the total occupational radiation exposure recorded for all major tasks is approximately 10% of the original total estimate. The exposure expended to date is primarily attributed to repair project preparatory activities (identified in Section 1.0).

As presented in Table 3A the total occupational exposure accumulated for activities completed during this reporting period is 63.88 person-rem. This value can be compared directly to the original estimate for the same completed activities which result in a projected dose of 65.19 person-rem. Since many activities in the preparatory phase were not yet near completion at this point in-time a comparison between these values for activities still in progress is not meaningful (since additional exposure will be expended). Of special note in Table 3A, several activities were performed during this phase which were not taken into account during the original preplanning. These include reactor cavity decontamination and removal of reactor coolant pump motors (items 2 and 6 respectively). The occupational exposure related to both these activities have been taken into account resulting in the accumulated person-rem still below the

original estimate for completed activities. Also of interest is item 14, "Miscellaneous Activities." This category primarily includes nonmanual labor inside containment. During subsequent reports preparatory phase activities will be updated along with detailed information for removal, installation, and miscellaneous phases.

The information for all preparatory activites in progress or completed as listed in Table 3A are summarized in Table 4. Note that based on the original estimated exposure expended to-date (i.e. 257.27 person-rem) most of the preparatory activities are already in progress. Since many of the activities were still in progress during this reporting period meaningful comparisons between the actual exposure and estimated exposure cannot be made. Some removal activities were also in progress during this period as shown in Table 4 by the 81.72 person-rem accumulated. The activities associated with this phase will be presented in subsequent reports.

The actual exposure discrepancy between Tables 2 and 4 (i.e. 238.51 and 230.08 respectively) can be accounted for primarily due to small miscellaneous preparatory activities which are not listed in Table 3A. Table 2 includes all exposure expended through August 22, 1981 (including both preparatory and removal activities). Table 2 will continue to be used for accumulation of all personnel exposure up to the end of each reporting period.

3.0 APPLICATION OF DOSE REDUCTION TECHNIQUES (ALARA PRINCIPLES)

3.1 General

This section summarizes the techniques and practices which have been effective in providing dose reductions to personnel during the reporting period. Where the available data permits the following evaluations include a quantitative assessment of the person-rem savings which can be attributed to the techniques used. Additional information on these techniques and how they relate to the overall steam generator replacement activities can be found in the SGRR.

3.2 Temporary Shielding

The use of temporary shielding is expected to result in significant exposure reduction throughout the project. A separate work package was established with regard to temporary shielding activities. A procedure was developed to describe temporary shielding requirements and their applicable records. The shielding records maintained include: locations shielded, types of shielding installed, survey data prior to and after shielding, stress analysis results and engineering approvals of free-standing supports used. The shielding package was awarded to a contractor that had extensive shielding experience during the Surry Station Unit 1 SGRP and is familiar with the Turkey Point Units as a result of performing a pre-shielding evaluation. Also, a significant amount of the shielding used at Surry (already pre-formed and cut) was acquired by FP&L for use during the repair project.

Various areas throughout the containment were evaluated as to shielding needs. Those areas where items or components would cause significant exposure rates in high traffic or occupancy areas were evaluated for shielding prior to installation. Various components of the steam generator channel head grit blast system were also shielded to reduce exposure rates in the local work area prior to commencement of this activity.

As of this reporting period the dose accumulated related to the installation of temporary shielding is approximately 8.4 person-rem. The original exposure estimate is approximately 2.6 person-rem (see table 3A). The increase in actual exposure expended is attributed to the increased amount of temporary shielding installed inside containment, primarily in the high occupancy/traffic areas mentioned above. Even though there is an increase in the actual exposure expended for this particular activity this should result in significant decreases in exposure for the various activities to be performed in these reduced general area radiation fields. Subsequent progress reports will provide further assessments of the effects of this dose reduction technique as applied to the repair project for specific activities.

3.3 General Containment Decontamination

A program for on-going general containment decontamination was initiated at the start of the repair project. The initial program involved an extensive decontamination of the containment from the refueling elevation 58' to the 14' elevation. Major items/components that were planned for removal during the project were also decontaminated. In most areas of the 58' elevation and 30'6 elevation, loose surface contamination levels were reduced to approximately 1000 - 3000 dpm/100cm^2. Contamination levels on the 14' elevation inside the biological shield will be maintained as low as practical consistent with work in progress. Where appropriate, floor covering (herculite or similar material) has been applied to facilitate cleanup. A decontamination work force has been retained to maintain an ongoing decontamination effort. Surveys are taken on a routine basis to evaluate contamination levels so that decontamination activities can be initiated as soon as practical to maintain optimum radiological working conditions and avoid significant build-up. As noted in Table 3A approximately 27 peson-rem was expended to complete this activity.

The refueling cavity was also extensively decontaminated to reduce exposure rates and minimize airborne potential during the storage of components in the cavity. Surveys indicated that a dose reduction factor of approximately 2 in general area exposure rates was attained as a result of the activity. Approximately 6 person-rem was accumulated to complete this activity.

Although it is difficult to quantify the exposure savings attributable to this technique, the practice of maintaining effective control of contamination thereby reducing the potential for airborne contamination and eliminating the need for respiratory protection devices, is recognized as extremely beneficial in reducing exposure.

3.4 Steam Generator (S/G) Water Level

Until the lower steam generator assembly girth cut is made, the water level in the secondary side is being maintained at a level such that the tube bundle is covered. Experience has shown that general area exposure rates are 4-5 times lower with this water shield. The following tasks have benefited from the effect of maintaining a high water level in the S/G secondary:

a. Installation of scaffolding in preparation of insulation removal.

b. Removal of insulation on shell assembly between 30'6 and 58' elevations.

The doses expended for these tasks to date is approximately 65 person-rem. Without the benefit of water shielding the exposure expended would have been approximately 325 person-rem. Thus a dose savings of approximately 260 person-rem was realized. The following tasks are yet to be performed and will also have the benefit of water shielding:

a. Removal of steam generator instrumentation lines.

b. Layout cut of upershell and set up of cutting equipment.

c. Preparation of removal of S/G upper assembly.

d. Cutting and removal of upper S/G assemblies.

An assessment of the dose savings attributable to maintaining a high steam generator water level will be made in subsequent reports after all associated tasks that derived the benefit of the shielding are completed.*

*NOTE:

A September 16, 1981, meeting was held at the Turkey Point construction site to discuss radiation shielding of the SGLA's when removed from containment and prior to permanent SGSC storage.

It was proposed that radiation levels could be significantly reduced in the general area of temporary SGLA storage, by filling the secondary side of the SGLA's with demineralized (DI) water.

Marshall Grotenhuis, NRC Project Manager for Turkey Point, was contacted and concurred with the decision of filling the SGLA's with DI water in light of ALARA considerations, provided the following precautions are taken:

1) The SGLA's must be completely drained after temporary storage. If possible, desiccant should be placed in SGLA secondary side after draining.

2) Fill and vent connections on the SGLA's must be cap-welded to provide the same sealing boundary as in other SGLA seal welds.

3) Prior to draining, the DI water will be sampled for contamination, and appropriate precautions taken with the water.

3.5 Contamination Control Envelopes and Ventilation

To a large extent, initial containment cleanup and decontamination has minimized the need for extensive use of temporary containment enclosures. However, in areas where significant cutting and grinding work must be performed on highly contaminated components, contamination control envolopes will be utilized to prevent airborne contamination in adjacent areas and minimize the spread of contamination.

One of the more significant applications of this technique has been applied to the area where the steam generator channel headcuts will be made. These areas will be enclosed to make the entire room a single containment. Portable high efficiency (HEPA) filtration units will continuously draw air from these envelopes while cutting and grinding operations are in progress. The discharged filtered air from these portable units will be discharged to the containment ventilation system via the plant stack which is monitored continuously. Personnel working in these contamination control envelopes will be required to wear respiratory protection equipment during those operations that have the potential for causing airborne activity. The exhaust ventilation flow has been designed to maintain a negative pressure in the enclosure.

Tent enclosures were used during removal of insulation from the steam generator shell. In addition, portable ventilation was used to aid in maintaining a negative pressure during this task. The major portion of insulation removed did not create an airborne problem; however, the enclosures did serve to prevent the spread of fine insulation particles (nonradiological) throughout the containment. The insulation removed was handled such that it could be readily surveyed in an area outside containment. This was done to minimize radioactive waste generated since a preliminary survey of the S/G insulation indicated that most of the material was noncontaminated. The only insulation that contained a significant degree of contamination was that around the lower section of the S/G's.

In addition to the containment ventilation system a secondary exhaust system has been placed in operation to provide further air exchange in the containment and assure that a negative pressure is maintained with the equipment and personnel hatches open. This system contains a bank of roughing and HEPA filters. The exhausted air is continuously monitored for radioactivity. Refer to the SGRR for a detailed discussion on this system.

Overall, the use of contamination control envelopes during the repair project is expected to minimize delays by allowing work to continue in adjacent areas while cutting and grinding on contaminated components are being conducted and provide effective control of any airborne contamination resulting from such operations.

Contamination containments are also utilized to enclose various items and components removed from the containment for placement in temporary storage. To accomplish the construction of such containments, a skilled "tentmaker" was contracted who had considerable experience with the design and construction of various contamination containments at Surry during their SGRP.

3.6 Concrete Cutting Operations

Although concrete cutting operations have not started during this reporting period, it should be noted that the type of concrete cutting equipment selected will have a minimum potential for causing airborne contamination and spreading concrete dust throughout the containment since the cutting tools utilize water-cooled blades. The run-off water used for cooling the blades will be collected and sampled prior to and during discharge. The use of this equipment will eliminate the need for containments, hence an exposure savings is realized together with a reduced amount of waste generated. The results of the concrete cutting operation will be discussed in subsequent reports.

3.7 General Techniques and Practices

In addition to the specific dose reduction techniques described, it is important to note some of the more general practices employed to maintain adequate control of personnel radiation exposure. These practices, include the following;

a. A comprehensive Health Physics program to provide adequate control and surveillance of the radiological conditions associated with repair project tasks. This program includes the use of Radiation Work Permits (RWP's) that address specific radiological aspects involved and the proper measures necessary to perform the work. Health Physics pre-briefings with work crews and others involved in specific activities are conducted for tasks that are considered to have the potential for a major radiological concern. These briefings clarify the technique and areas of concern that apply to the operation. In this manner, potential problems can be identified and solved prior to the actual task performance. Also, in addition to Health Physics personnel assigned to monitor specific tasks, Health Physics personnel survey the various work areas throughout containment to ensure that sound approved radiological work practices are being employed and inspect for conditions which could cause significant changes in radiation exposure rates. These individuals are uniquely identified for assistance to personnel inside containment. Other Health Physics personnel monitoring specific activities are used strictly for that purpose and dedicate their time and attention to that specific task.

b. An extensive training program that provides adequate instruction on the effects of radiation exposure, radiation protection practices and techniques, ALARA considerations, site emergency plan and other related instructions that assist the individual in reducing personnel exposure and implementing sound radiation protection

practices. This training also includes the use of respiratory protection devices and their limitations. A test booth monitoring goodness of fit (facial seal) is utilized to determine the workers ability to wear such a device. Respirator physical exams are also given as part of the respiratory protection training. Training for specific tasks through the use of mockups, photographs, full scale models and "dry" runs are conducted as appropriate. The S/G channel head mockup is used to train personnel making channel head entries. Equipment similar to that used in the actual S/G is also used at the mockup to familiarize personnel with the technique and use of the equipment prior to entering the relatively high exposure fields of the S/G channel head. Protective clothing and respiratory protection devices are worn during mockup training, as appropriate, to simulate the working environment and to provide realistic time estimates of the task so that an estimate of the expected dose can be incorporated into the pre-planning.

c. The use of repair project process sheets which serve to assure adequate pre-planning and review of specific tasks with special emphasis placed on dose reduction considerations (ALARA).

d. The utilization of in-containment "low level radiation waiting areas" to provide workers low exposure rate areas during short term idle periods. These areas are located where the exposure rates are relatively low (<5mr/hr on the average). These low level radiation waiting areas are well posted and workers are encouraged to use these areas whenever possible to minimize exposure.

e. The installation of portable area radiation monitors with local readout and preset alarm capabilities. These monitors are stand-mounted and readily visible to the worker providing them with on the spot continuous exposure rate information.

f. Ongoing decontamination program and periodic work clean-up to minimize the build-up of contamination levels and reduce the amount of decontamination required for materials/items removed from containment throughout the repair project.

g. The use of continuous air sampling devices with preset alarm capabilities to monitor airborne activity in the containment. In addition periodic grab samples are taken routinely in general areas as well as for specific tasks.

h. Use of in-containment tool cribs and weld rod room to support repair work.

i. In the preplanning phase spacial layout considerations were taken into account to effectively take advantage of existing facility shielding. The decision to perform the channel-head cut rather than the pipe cut reduces the need for extensive shielding and occupancy times in the 14' elevation where relatively higher general area radiation levels exist.

Quantitative assessments are difficult to develop for these "general" techniques and practices, but contribute significantly to the overall ALARA commitment for the repair project. An update on these techniques and practices will be discussed in future reports.

4.0 RADIOACTIVE EFFLUENTS AND SOLID WASTE

4.1 General

Radioactive effluents, consisting of liquid and airborne releases, and low level solid radioactive waste produced during this reporting period for Unit 3 are summarized in Tables 5 and 6 respectively. The radioactive waste disposal and monitoring systems at Turkey Point are shared by both Units 3 and 4. The allocations for both units have been taken into account to provide reasonably accurate estimates of the amount and content of radioactive effluents and solid wastes generated specifically by Unit 3.

4.2 Liquid Releases

The major source of liquid releases from Unit 3 during this reporting period was laundry operations. The composition of radioactive isotopes which were detected is provided in Table 5 as well. Approximately 59% of the activity released was in the form of relatively long-lived corrosion products. The remaining contributors were Cs-137 approximately 22% and Cs-134 approximately 19%. During release, the concentration of all radionuclides were well within the limits of 10CFR20 Appendix B, Table 2. The total activity released during this reporting period is less than 1% of the total estimated activity projected to be released per unit during the repair project (refer to Table 5.2-7 of the SGRR). Laundry effluents are expected to comprise the predominant source of liquid releases during the remainder of the repair effort.

4.3 Airborne Releases

Airborne releases for this reporting period originated primarily from continuous ventilation of the containment during repair activities. The continuous ventilation system provides a negative pressure while the personnel and equipment hatches are open. A continuous flow is directed through filter banks to minimize the concentration of airborne particulates released to the environment. Airborne releases are shown in Table 5. No radioiodines or noble gases were detected and the particulates are comprised primarily of those radionuclides with relatively long half-lives. The fact that radioiodines and noble gases were not detected are attributed to the reactor being shutdown for an extended period prior to starting the repair effort and the associated time interval for decay of short half-lived radionuclides over this extended shutdown period. The particulates detected are typical of radionuclides normally expected as a result of an extended shutdown period. The total activity released during this reporting period is less than 1% of the total estimated activity projected to be released per unit during the repair project (refer to Table 5.2-3 of the SGRR).

4.4 Solid Radioactive Waste

A summary of low level radioactive waste (LLW) shipments from Unit 3 during the reporting period is provided in Table 6. The amount of LLW which had been packaged but not shipped prior to the close of the period is also provided. Approximately 52% of the volume of LLW generated and shipped was sent to the Low Level Waste Disposal Facility in Richland, Washington. All remaining shipments were directed to the Low Level Waste Management Facility at Barnwell, S.C.

The largest volume of LLW shipped (52%) was in the form of insulation and lagging materials which had been removed from piping and equipment within the Unit 3 containment. The majority of the remaining waste volume shipped was compactable and non-compactable Dry Active Waste. Dry Active Waste contains no free standing liquids. Compactable Dry Active Waste is comprised of paper, plastic, cloth, sheet metal, small components or tools and other compressible non-reusable trash which is efficiently packaged using a high density mechanical compactor to reduce its volume. Non-compactable Dry Active Waste consists of larger metal components, filters and other non-reusable materials which cannot be practically compacted.

The amount of LLW packaged and shipped during this reporting period is approximately 12% of the total volume of LLW estimated for the Unit 3 steam generator repair project. It should be noted that none of the LLW generated had to be retained on site due to the unavailability of burial space.

A program has been established to segregate waste through the use of distinct colored packaging to specifically identify radioactive material. Past experience has shown that this system reduces the amount of radioactive waste generated by segregating the clean waste from containers specifically identified for disposal of radioactive waste. This program along with the use of the high density compactor helps to reduce the total volume of radioactive waste both generated and shipped.

5.0 CONCLUSIONS AND OBSERVATIONS

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

a. Based on the activities completed to date the actual personnel exposure expended is slightly lower than the original estimated exposure (i.e. 63.88 and 65.19 person-rem respectively). Since the SGRP for Unit 3 has only been in progress for approximately eight weeks, it is not meaningful to perform a detailed evaluation of the data available to identify significant trends in exposure expended. Should such trends develop as the project progresses, subsequent reports will attempt to describe them and indicate any contributing factors.

b. Radioactive liquid effluents are well within the total release estimate presented in Table 5.2-7 of the repair report. The calculated activity associated with this volume is less than 1% of the estimated total activity in the SGRR.

c. Airborne releases of radioactivity remain below the estimates provided in the SGRR. No radioiodine or gaseous activity was detected. This can be attributed to the time interval for decay since the reactor was shutdown. The airborne activity discharged through the entire repair effort is not expected to exceed the estimate indicated in the SGRR.

d. Solid low level radioactive waste generated and shipped to date represents approximately 12% of the estimate in the SGRR.*

In order to coincide with the routine monthly preliminary radioactive effluent release reports generated at the plant site, subsequent SGRP radiological progress reports will present information based on the reporting periods used at the plant site. Therefore, progress report number 2 will contain information from August 23, 1981 through November 3, 1981.

*Gould affidavit dated June 12, 1981.

TABLE 1

DESCRIPTION OF MAJOR TASKS

TASK	TASK DESCRIPTION
1. Concrete and structural steel removal and placement.	1. This task includes all work associated with removal/replacement of concrete and structural steel. Removal items include: Erection of scaffolding to remove piping and electrical components, cut/removal of the concrete shield wall above EL 58' and the floor slab at El 58', the concrete shield wall below El 58', and removal of structural steel. Replacement items include: Installation of rebar and cadweld splices, erection of form work and shoring, concrete placement, and installation of structural steel.
2. Construction of pedestal cranes, preparation of polar crane, miscellaneous cribbing platforms, S/G transfer bridge.	2. This task includes installation/removal of the pedestal crane foundations, assembly and erection of cranes and the polar crane trolley, and disassembly and removal of cranes and the polar crane trolley.
3. Removal, modification and reinstallation of S/G upper assemblies and major piping.	3. Items included in this task are: Erection/removal of scaffolding from El 58' to El 93', removal/installation of insulation and piping, upper assembly girth cut, cutting internal pipe and structural members inside the S/G, upper assembly modifications, and the upper assembly girth weld.
4. Construction of temporary facilities and support services.	4. The major exposure items in this task are: Routing of welding leads, installation of temporary power for small tools and lighting in the area near the S/G (most will be inside the secondary shield wall between El 14' and El 30'6"), and maintenance of temporary power and lighting for the entire outage.
5. General decontamination and disposal of contaminated materials/cleanup.	5. This task includes general area decontamination of the containment prior to commencement of major work, continuous containment decontamination for the entire outage, and removal and disposal of contaminated material for the entire outage.

TABLE 1 (continued)

DESCRIPTION OF MAJOR TASKS

TASK	TASK DESCRIPTION
6. Removal and reinstallation of miscellaneous piping, equipment and insulation.	6. This task includes removal of insulation from the steam generator and main steam and feedwater piping, installation of insulation on the new steam generators, and removal/installation of miscellaneous items.
7. Non-manuals (e.g., QC, Engineers, HPs).	7. The non-manual category includes health physics, quality control, and engineering personnel, visitors, and Bechtel personnel required for the entire outage.
8. Decontamination of the channel head.	8. Included in this task are mechanical grit blast decontamination of the channel head, and installation of inflatable plugs in the reactor coolant piping.
9. Cut channel head and remove old S/G lower assembly.	9. This task includes installation of tenting and temporary shielding, cutting the transition cone, and channel head, and rigging and removal of the lower assembly to the containment equipment hatch.
10. Weld shield cover on lower assembly; a. At channel head b. At transition end	10. The only item in this task is welding of steel plates at each end of the steam generator to provide shielding and to prevent leakage.
11. Cut and remove old divider plate, weld new divider plate.	11. The divider plate was detached from the tubesheet as part of Task 9. Removal and placement of the divider plate to the channel head is included in this task.
12. Install new S/G, weld channel head.	12. This task includes erection/removal of scaffolding, rigging and moving the new steam generator, installation/removal of hydroplugs, channel head welding and grinding, and removal of the inflatable plugs in the reactor coolant pipes.
13. Placement of steam generator in storage.	13. This task includes transporting of the S/G from the containment equipment hatch into the storage compound and construction of a roof once the S/G's are in the compound.

TABLE 2

PERSONNEL EXPOSURE SUMMARY-PER TASK

REPORTING PERIOD 24 JUNE 1981 TO 22 AUGUST 1981

TURKEY POINT - UNIT 3

TASK DESCRIPTION	LABOR EXPENDED IN RADIATION FIELD (PERSON HOURS) ESTIMATED	ACTUAL	PERSONNEL EXPOSURE[a] (PERSON-REM) ESTIMATED	ACTUAL
1. Concrete and structural steel removal and replacement.	13,660	2,275	88	35.82
2. Construction of pedestal cranes, preparation of polar crane, miscellaneous cribbing platforms, and steam generator transfer bridge.	10,280	8,209	32	29.03
3. Removal, modification and reinstallation of steam generator upper assemblies and major piping	24,600	8,977	256	76.33
4. Construction of temporary facilities and support services.	19,120	2,595	215	4.70
5. General decontamination and disposal of contaminated materials/cleanup.	42,310	2,442	201	32.05
6. Removal and reinstallation of miscellaneous piping equipment and insulation.	8,850	2,682	125	20.60
7. Non-manuals (e.g. QC, Engineers, Health Physics).	68,540	2,533	436	20.74
8. Decontamination of the channel head.	1,840	56	214	6.02
9. Cut channel head and remove old steam generator lower assembly.	3,240	651	166	13.22
10.[b] Weld shield cover on lower assembly:				
a. at channel head	760	0	40	0
b. at transition end	530	0	53	0
11.[b] Cut and remove old divider plate; weld new divider plate.	2,640	0	29	0

[illegible]

TABLE 2 (continued)
PERSONNEL EXPOSURE SUMMARY-PER TASK
REPORTING PERIOD 24 JUNE 1981 TO 22 AUGUST 1981
TURKEY POINT - UNIT 3

TASK DESCRIPTION	LABOR EXPENDED IN RADIATION FIELD (PERSON-HOURS)		PERSONNEL EXPOSURE[a] (PERSON-REM)	
	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL
12.[b] Install new steam generator, weld channel head.	11,000	0	204	0
13.[b] Placement of steam generator in storage.	225	0	25	0
TOTAL	182,800	30,420	2,084	238.51
Estimated Range			1730-2480	

[a]Actual exposures are estimated by self-reading pocket dosimeter totals.
[b]Task not started during this reporting period.

TABLE 3A
SUMMARY OF PREPARATORY ACTIVITY EXPOSURES
REPORTING PERIOD 24 JUNE 1981 TO 22 AUGUST 1981
TURKEY POINT - UNIT 3

ACTIVITY DESCRIPTION	ESTIMATED LABOR (PERSON-HOURS)	ACTUAL LABOR EXPENDED TO DATE (PERSON-HOURS)	ESTIMATED EXPOSURE (PERSON-REM)	ACTUAL EXPOSURE FOR REPORTING PERIOD (PERSON-REM)	ACTUAL EXPOSURE EXPENDED TO-DATE (PERSON-REM)	ACTIVITY STATUS (C-COMPLETE) (I-IN PROGRESS)
1. Initial Containment Decontamination	6,020	2,108	45.00	27.07	27.07	C
2. Reactor Cavity Decontamination and Inspection	0	365	0	5.58	5.58	C
3. Install Steam Generator Transfer Bridge	960	1,299	1.21	6.74	6.74	C
4. Remove Emergency Containment Coolers, Control Rod Drive Mechanism Coolers and Fans, Manipulator Crane, and Rerate Polar Crane and Load Test.	6,860	4,643	11.83	6.01	6.01	C
5. Install Cherry Pickers	2,430	2,450	7.15	16.57	16.57	C
6. Remove Reactor Coolant Pump Motors	0	334	0	1.91	1.91	C
7. Disconnect/Remove Permanent Electrical Equipment and Cables	430	233	3.31	2.33	2.33	I
8. Install Temporary Power, Lighting and Electrical Cables	1,148	673	49.48	4.61	4.61	I

TABLE 3A (CONTINUED)
SUMMARY OF PREPARATORY ACTIVITY EXPOSURES
REPORTING PERIOD 24 JUNE 1981 TO 22 AUGUST 1981
TURKEY POINT - UNIT 3

	ACTIVITY DESCRIPTION	ESTIMATED LABOR (PERSON-HOURS)	ACTUAL LABOR EXPENDED TO DATE (PERSON-HOURS)	ESTIMATED EXPOSURE (PERSON-REM)	ACTUAL EXPOSURE FOR REPORTING PERIOD (PERSON-REM)	ACTUAL EXPOSURE EXPENDED TO-DATE (PERSON-REM)	ACTIVITY STATUS (C-COMPLETE) (I-IN PROGRESS)
9.	Remove Miscellaneous Steel	580	502	1.25	2.24	2.24	I
10.	Install Temporary Containments and/or Ventilation Systems	245	380	4.29	5.09	5.09	I
11.	Install Temporary Shielding	120	651	2.58	8.37	8.37	I
12.	Install Scaffolding All Levels	1,440	1,332	13.27	9.62	9.62	I
13.	Cut and Remove Concrete	5,334	1,773	58.00	33.37	33.37	I
14.	Miscellaneous Activities	9,425	2,522	59.90	18.85	18.85	I
	SUBTOTAL - PHASE I (Completed Tasks Only)	16,270	11,199	65.19	63.88	63.88	C

TABLE 4
PERSONNEL EXPOSURE SUMMARY - PER PHASE
REPORTING PERIOD 24 JUNE 1981 TO 22 AUGUST 1981
TURKEY POINT - UNIT 3

PHASE DESCRIPTION	ESTIMATED LABOR EXPENDED TO-DATE (PERSON-HOURS)	ACTUAL LABOR EXPENDED TO-DATE (PERSON-HOURS)	TOTAL ESTIMATED EXPOSURE (PERSON-REM)	ESTIMATED EXPOSURE EXPENDED TO-DATE (PERSON-REM)	ACTUAL EXPOSURE FOR REPORTING PERIOD (PERSON-REM)	ACTUAL EXPOSURE EXPENDED TO-DATE (PERSON-REM)	PHASE STATUS (C-COMPLETE) (I-IN PROGRESS) (NS-NOT STARTED)
Preparation	34,992	19,265	283	257.27	148.36	148.36	I
Removal	7,090	9,844	1,016	96.20	81.72	81.72	I
Installation	0	0	644	0	0	0	NS
Miscellaneous[a]	0	0	141	0	0	0	NS
Project Totals (Completed Tasks Only)	NA[b]	NA	NA	NA	NA	NA	NA

[a]Miscellaneous - includes cleanup, storage, and miscellaneous prepartions prior to start-up.

[b]NA - not applicable at this time.

TABLE 5
SUMMARY OF RADIOACTIVE EFFLUENT RELEASES
REPORTING PERIOD 24 JUNE 1981 TO 22 AUGUST 1981
TURKEY POINT - UNIT 3

1981

TOTAL LIQUID EFFLUENT VOLUME RELEASED THIS PERIOD 1.41 E+06 LITERS

I. LIQUID EFFLUENT RELEASES

RADIOACTIVITY RELEASED IN LIQUID EFFLUENTS (CURIES)

ISOTOPE	JUNE 6/24-6/30	JULY 7/1-7/28	AUGUST 7/29-8/22	TOTAL ACTIVITY RELEASED THIS REPORTING PERIOD	TOTAL RELEASED DURING S/G REPAIR TO DATE
Co-58	1.25E-04	4.56E-04	1.46E-04	7.27E-04	7.27E-04
Co-60	4.13E-04	8.12E-04	3.80E-04	1.61E-03	1.61E-03
Cs-134	6.84E-05	2.64E-04	5.07E-05	3.84E-04	3.84E-04
Cs-137	2.06E-04	6.18E-04	1.33E-04	9.57E-04	9.57E-04
Fe-59	*	4.47E-05	*	4.47E-05	4.47E-05
Mn-54	7.61E-06	5.61E-05	3.73E-05	1.02E-04	1.02E-04
Zn-65	*	*	*	*	*
I-131	*	*	*	*	*
Nb-95	*	2.65E-05	4.24E-06	3.08E-05	3.08E-05
Sb-124	7.74E-06	8.85E-05	*	9.63E-05	9.63E-05
Sb-125	1.29E-05	*	*	1.29E-05	1.29E-05
TOTAL	8.41E-04	2.37E-03	7.51E-04	3.97E-03	3.97E-03
Liquid Effluent Volume Released (Liters)	1.20E+05	6.71E+05	6.18E+05		

*Not Detectable

TABLE 5 (CONTINUED)
SUMMARY OF RADIOACTIVE EFFLUENT RELEASES
REPORTING PERIOD 24 JUNE 1981 TO 22 AUGUST 1981
TURKEY POINT - UNIT 3

1981

II. AIRBORNE RELEASES	RADIOACTIVITY RELEASED IN AIRBORNE EFFLUENTS (CURIES)				
A. NOBLE GASES ISOTOPE	JUNE 6/24-6/30	JULY 7/1-7/28	AUGUST 7/29-8/22	TOTAL ACTIVITY RELEASED THIS REPORTING PERIOD	TOTAL RELEASED DURING S/G REPAIR TO DATE
Kr-87	*	*	*	*	*
Kr-88	*	*	*	*	*
Xe-133	*	*	*	*	*
Xe-133m	*	*	*	*	*
Xe-135	*	*	*	*	*
Xe-138	*	*	*	*	*
TOTAL	*	*	*	*	*
B. HALOGENS					
I-131	*	*	*	*	*
I-133	*	*	*	*	*
TOTAL	*	*	*	*	*

*Not Detectable

TABLE 5 (CONTINUED)
SUMMARY OF RADIOACTIVE EFFLUENT RELEASES
REPORTING PERIOD 24 JUNE 1981 TO 22 AUGUST 1981
TURKEY POINT - UNIT 3

1981

II. AIRBORNE RELEASES

C. PARTICULATES

ISOTOPE	JUNE 6/24-6/30	JULY 7/1-7/28	AUGUST 7/29-8/22	TOTAL ACTIVITY RELEASED THIS REPORTING PERIOD	TOTAL RELEASED DURING S/G REPAIR TO DATE
	RADIOACTIVITY RELEASED IN AIRBORNE EFFLUENTS (CURIES)				
Ce-141	*	*	*	*	*
Ce-144	*	*	*	*	*
Co-58	4.0E-08	1.1E-06	1.1E-06	2.3E-06	2.3E-06
Co-60	2.4E-06	6.5E-06	4.6E-06	1.35E-05	1.35E-05
Cs-134	*	1.9E-07	6.2E-08	2.6E-07	2.6E-07
Cs-137	1.2E-06	1.2E-06	8.0E-07	3.2E-06	3.2E-06
Fe-59	*	*	*	*	*
Mn-54	1.6E-8	1.1E-7	*	1.3E-7	1.3E-7
Zn-65	*	*	*	*	*
TOTAL	3.7E-06	9.1E-06	6.6E-06	1.94E-05	1.94E-05

*Not Detectable

TABLE 6
SUMMARY OF SOLID LOW LEVEL RADIOACTIVE WASTE SHIPMENTS
REPORTING PERIOD 24 JUNE 1981 TO 22 AUGUST 1981
TURKEY POINT - UNIT 3

I. RADIOACTIVE WASTE SHIPMENTS

WASTE FORM	PACKAGE	VOLUME CU-FT	ESTIMATED[a] ACTIVITY	DATE(S) SHIPPED	DISPOSITION
Concrete Chips	Steel Drums	225	1.25 mCi	6/24 thru 7/24	Disposal - Barnwell, S.C.
Compacted Dry Active Waste	LSA Boxes	315	38.1 mCi	7/23	Disposal - Barnwell, S.C.
Non-Compacted Dry Active Waste	LSA Boxes	105	3.3 mCi	7/23	Disposal - Barnwell, S.C.
Insulation & Lagging	LSA Boxes	1050	49.6 mCi	7/30	Disposal - Richland, Wa.
Insulation & Lagging	LSA Boxes	1050	91.8 mCi	7/30	Disposal - Richland, Wa.
Compacted Dry Active Waste	LSA Boxes	1050	109.2 mCi	8/4	Disposal - Barnwell, S.C.
Non-Compacted Dry Active Waste	Steel Liner	200	1.19E+03 mCi	8/11	Disposal - Barnwell, S.C.
Total LLW Shipped		3995	1.48E+03 mCi		

[a]Predominant Isotopes - ^{137}Cs, ^{60}Co, ^{58}Co

II. PACKAGED LLW ON SITE AWAITING SHIPMENT AT END OF REPORTING PERIOD

1. Compacted Dry Active Waste LSA Boxes 840 Cu-Ft
2. Non-compacted Dry Active Waste Steel Liners 400 Cu-Ft