

STEAM GENERATOR REPAIR PROGRAM  
FOR  
TURKEY POINT UNIT 3

FINAL RADIOLOGICAL PROGRESS REPORT (NO. 5)

FOR THE PERIOD

JUNE 24, 1981 THROUGH APRIL 7, 1982

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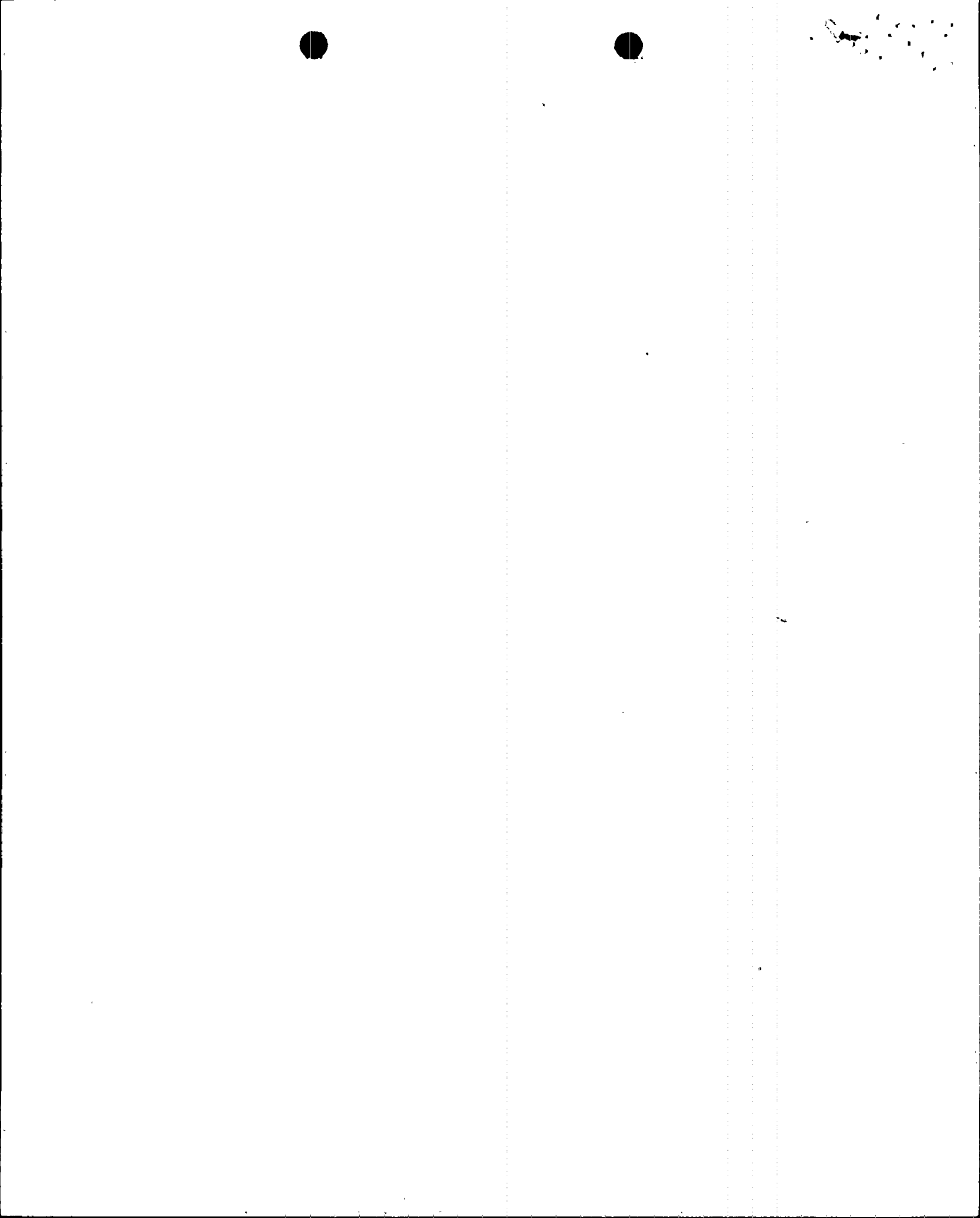


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## 1.0 INTRODUCTION

Radiological Progress Report No. 5 contains information pertaining to the radiological aspects of the Unit 3 Steam Generator Repair Program (SGRP) from project commencement 24 June 1981 through project completion 7 April 1982. This information includes the following:

- 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.
- e. A summary for those tasks where actual person-rem expended was significantly greater than the estimated values and a discussion for the higher expended exposure.
- f. A discussion of additional ALARA techniques planned for utilization during the Unit 4 SGRP.

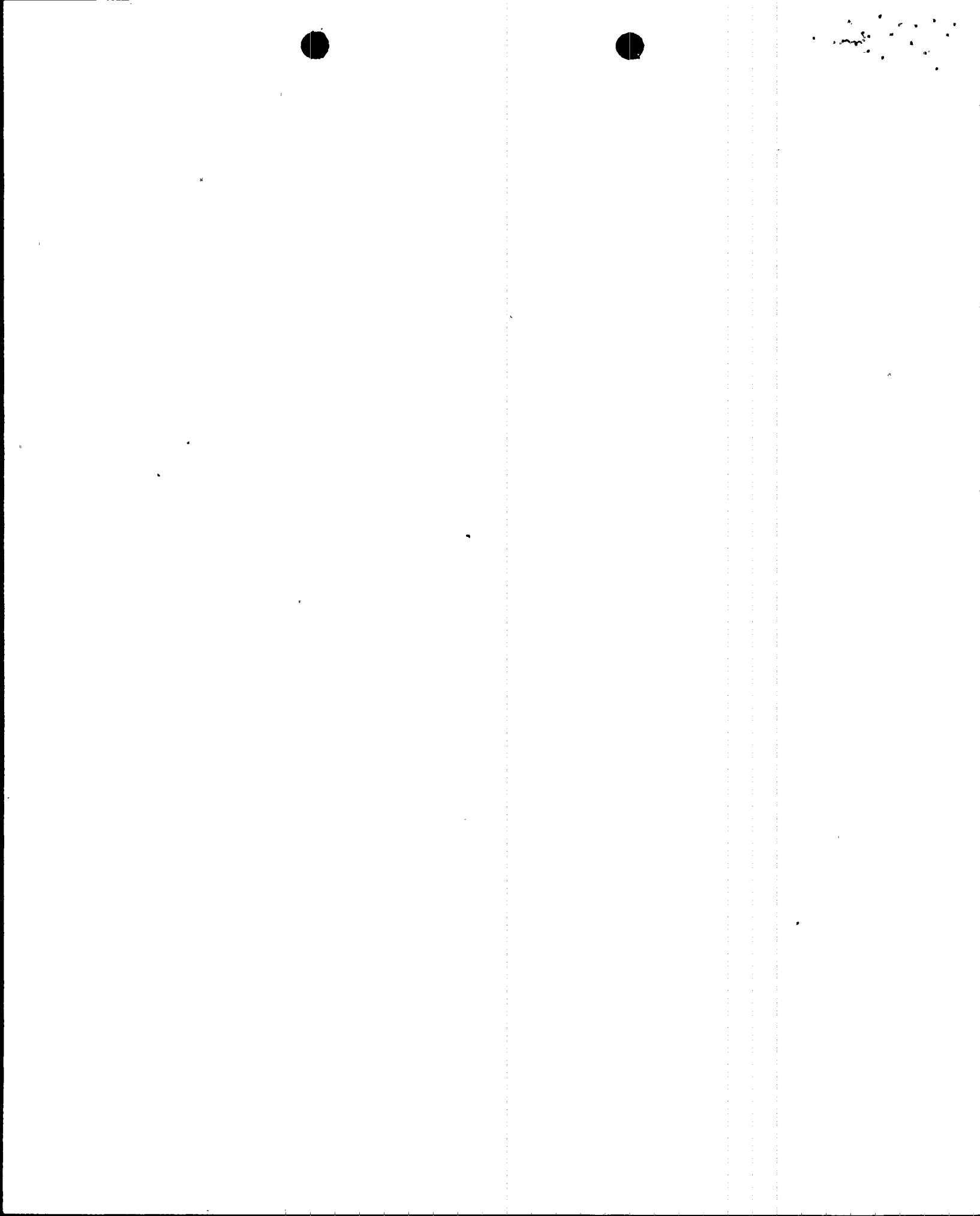
Significant project tasks performed during the final reporting period (4 March, 1982 through 7 April, 1982) included:

1. Installation of miscellaneous steel.
2. Installation of insulation on steam generators.
3. Hot functional testing
4. Cleanup activities (removal of scaffolding and support equipment, removal of temporary shielding, etc.).

## 2.0 OCCUPATIONAL RADIATION EXPOSURE

### 2.1 General

As indicated in previous progress reports, occupational exposure to radiation may be considered the major radiological impact of the SGRP. The program developed to collect exposure information and provide accurate assessments of tasks performed was discussed in detail in Section 2.1 - 2.3 of Radiological Progress Report No. 1. This program was utilized throughout the entire project. A description of the thirteen (13) major tasks is indicated in Table 1.





## 2.2 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 from project commencement on 24 June 1981 to project completion 7 April 1982.\* 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.
- b. Exposures received by certain pre-identified 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 was utilized to "track" exposure for the time period of interest.

A detailed summary of the personnel exposure expended (for the entire project) for preparatory, removal, installation and post-installation activities is presented in Tables 3A, 3B, 3C and 3D respectively. This summary includes both the labor and exposure expenditures and the original estimated expenditures. These tables list a more detailed breakdown of specific job activities which have been incorporated into the appropriate major task descriptions listed in table 2. Table 4 presents a general summary of both labor and personnel exposure expended for each phase of the repair project with the original estimated expenditures.

## 2.3 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 throughout the entire project was well within the estimated range of 1,730 - 2,480 person-rem. These exposures were recorded by computer acquisition as discussed in Progress Report No. 1. A summary for the tasks indicated in Table 2 where actual person-rem expended was significantly greater than the estimated values and a discussion for the higher expended exposure is presented in Section 2.4.

Tables 3A and 3B show that the total actual exposure expended for preparatory and removal phase activities was approximately 40% less than the total estimated exposure for those activities.

\*Self-reading pocket dosimeter (SRPD) results were used to report person-rem since exposure information was immediately available upon exit from the RCA and accordingly recorded in the computer data base. Since thermoluminescent dosimeters (TLD's) were processed primarily on a monthly basis this information was not 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, the accumulated dose reported may be considered as conservative.



Table 3C shows that the total exposure accumulated for installation phase activities was approximately 900 person-rem as compared to the original exposure estimate of 644 person-rem. As discussed in previous progress reports, steam generator channel head interior weld repairs and lower assembly installation activities required more time in the higher radiation fields than originally estimated thereby significantly increasing the total exposure for this phase. Table 3C shows that these activities (items 2, 3 and 6 of table 3C) resulted in a total exposure of approximately 572 person-rem as compared to the original total estimate (for these activities) of 205 person-rem.

Table 3D shows that the total occupational exposure accumulated for post-installation activities was approximately 452 person-rem as compared to the original total estimate of 141 person-rem. As discussed in Radiological Progress Report No. 4, several activities resulted in significant exposure above that estimated for those activities. These activities (items 2, 4, 5, 10-14) resulted in a total expended exposure of approximately 417 person-rem as compared to the original estimate of 95 person-rem. Some of these activities (items 5, 12, 13 of table 3D) were not included in the original estimate. These activities resulted in an exposure of approximately 80 person-rem.

Table 4 contains summarized information for all project phases (detailed in tables 3A, 3B, 3C and 3D). The total exposure expended (by SRPD) during the final reporting period (4 March 1982 through 7 April 1982) was approximately 111 person-rem. As stated, the total exposure expended for the Unit 3 SGRP was approximately 2152 person-rem (by SRPD).

#### 2.4 Summary of Major Tasks with Significant Expended Exposure

Both estimated and actual total labor and exposure expended for the 13 major tasks described in table 1 are shown in table 2. The following discussion presents a summary of those tasks where the person-rem expended was significantly greater than the estimated values. Tables 3A through 3D are appropriately referenced for specific detailed job activities (RWP controlled) within a major task.

##### 1. Task #1 - Concrete and Structural Steel Removal and Replacement

The actual exposure expended for this task was approximately 97 person-rem as compared to the estimate of 88 person-rem. The following RWP controlled activities contributed significantly to this exposure:

- a. Removal/replacement of miscellaneous steel (item 9 and item 4 of tables 3A and 3D respectively).

##### Discussion

The exposure expended for the removal and replacement of miscellaneous steel was approximately 43 person-rem as compared to the estimate of approximately 3 person-rem. This higher expended exposure is attributed to performing work that required more time than originally estimated. The actual labor expended for this activity was approximately 16,000 person-hours as compared to the estimated labor of approximately 12,000 person-hours. Some of this work was performed in higher radiation fields than expected due to the reactor being refueled.



2. Task #3 - Removal, Modification and Re-installation of Steam Generator Upper Assemblies and Major Piping

The actual exposure expended for this task was approximately 304 person-rem as compared to the estimate of 256 person-rem. The following RWP controlled activities contributed significantly to the total exposure:

- a. Installation/removal of scaffolding (items 12, 15, 9, and 10 of tables 3A, 3B, 3C and 3D respectively).
- b. Lifting, inverting, and placing S/G upper assemblies in racks (item 8 of table 3B).
- c. Removal/replacement of piping and valves from S/G cubicles (items 12 and 2 of tables 3B and 3D respectively).

Discussion

The exposure expended for the installation and removal of scaffolding was approximately 120 person-rem as compared to the estimate of approximately 51 person-rem. The additional exposure was attributed to the additional time required in the radiation field to replace the original scaffolding installed at the start of the project with fire-retardant scaffolding. This fire-retardant scaffolding was not available at the time approval was obtained to commence the Unit #3 SGRP. Also, scaffolding activities required more time for installation and removal than was originally estimated.

The exposure expended for lifting, inverting, and placing the S/G upper assemblies in the racks was approximately 12 person-rem as compared to the estimate of 7 person-rem. The exposure expended for the removal and replacement of piping and valves from the S/G cubicles was 84 person-rem as compared to the estimate of approximately 26 person-rem. The higher exposures expended for these activities was attributed to the work requiring more time to complete than originally estimated due to changes in work scope (i.e., replacement of reactor coolant pump oil collection system and the removal and replacement of additional piping interferences not accounted for in the original estimate).

3. Task #6 - Removal and Re-installation of Miscellaneous Piping, Equipment and Insulation

The actual exposure expended for this task was approximately 216 person-rem as compared to the estimate of 125 person-rem. The following RWP controlled activities contributed significantly to this total exposure:

- a. Replacement of S/G insulation (item 7 of table 3C).
- b. Removal and replacement of feedwater piping (item 2 and 5 of tables 3B and 3C respectively).
- c. Removal and replacement of reactor coolant pump motors (item 6 and 5 of tables 3A and 3D respectively).



### Discussion

The exposure expended for the replacement of S/G insulation was approximately 86 person-rem as compared to the estimate of approximately 29 person-rem. This additional exposure was attributed to the additional time required in radiation fields to install the new reflective mirror insulation. This insulation required in-place measurement and fitting. As shown in item 7 of table 3C, the labor expended to complete the task was approximately 25,000 person-hours as compared to the estimate of approximately 3,500 person-hours.

The exposure expended for the removal and replacement of feedwater piping was approximately 26 person-rem as compared to the estimate of 8.3 person-rem. This additional exposure is attributed to the work requiring more time to complete than originally estimated.

The exposure expended for the removal and replacement of reactor coolant pump motors was 5.6 person-rem. This activity was not included in the original scope of work; therefore, no estimate was made.

#### 4. Task #11 - Cut and Remove Old Divider Plate, Weld New Divider Plate

The actual exposure expended for this task was approximately 142 person-rem as compared to the estimate of 29 person-rem. The following RWP controlled activities contributed significantly to this total exposure:

- a. Plasma-arc (flame) cutting of S/G divider plate (item 5 of table 3B).
- b. Welding of S/G divider plate (item 6 of table 3C).

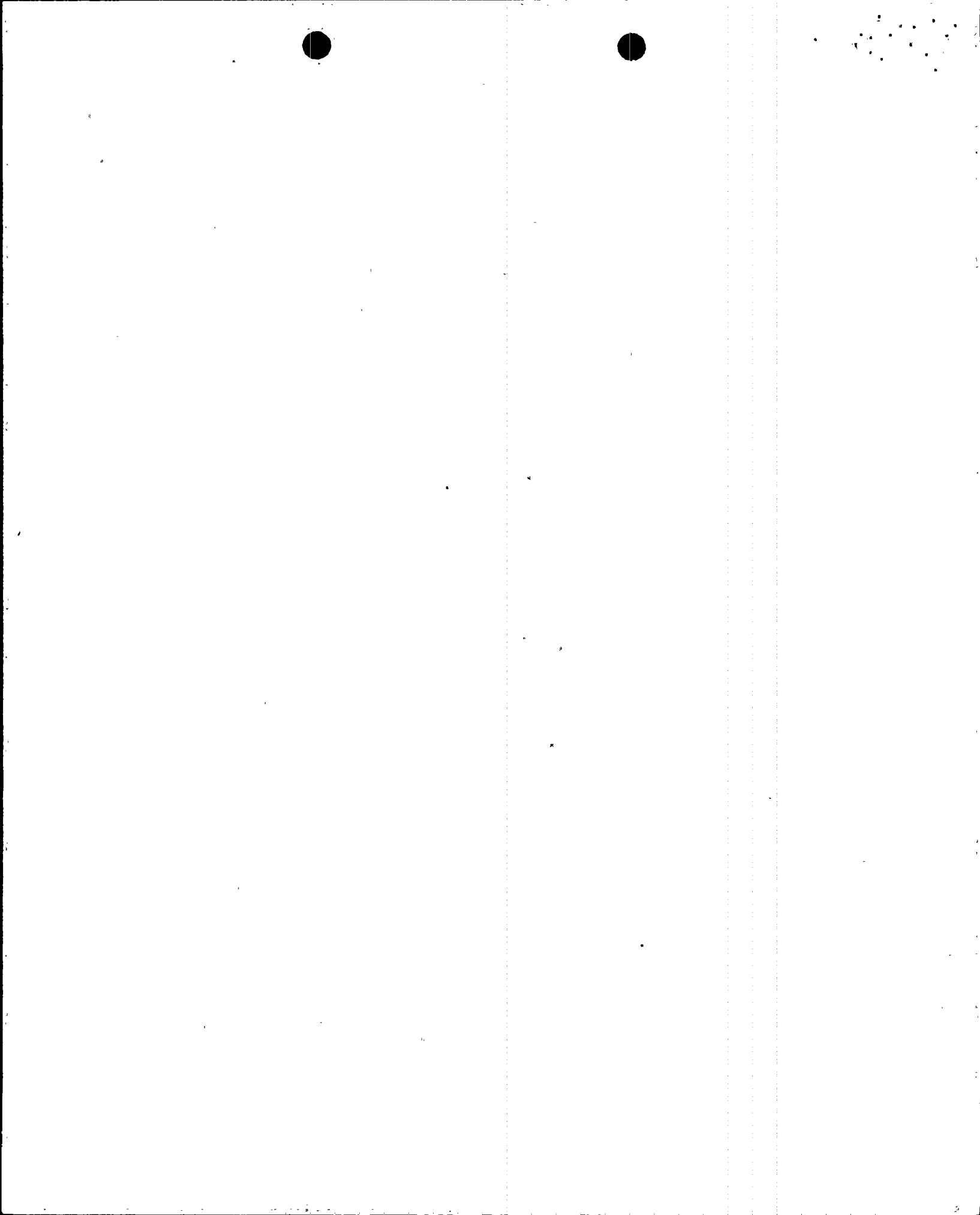
### Discussion

The exposure expended for cutting the S/G divider plates was approximately 22 person-rem as compared to the estimate of approximately 14 person-rem. The exposure expended for welding the new S/G divider plates was approximately 120 person-rem as compared to the estimate of 29 person-rem. The additional exposure for these activities (as discussed in Progress Report #4) is attributed to working in radiation fields higher than originally estimated and performing repairs that required more time in these higher radiation fields. Some of these repairs included the removal of a section of the S/G divider plate to allow access to the entire channel head weld area. The removal and welding of this section was not included in the original scope of the repair work, hence no exposure or labor estimate was available.

#### 5. Task #12 - Install New Steam Generator, Weld Channel Head

The actual exposure expended for this task was approximately 451 person-rem as compared to the estimate of 204 person-rem. The following RWP controlled activities contributed significantly to this total exposure:

- a. Weld preparation of S/G channel head remnants (item 2 of table 3C).





- b. Installation and welding of new S/G lower assemblies (item 3 of table 3C).

#### Discussion

The exposure expended for weld preparation of the S/G channel head remnants was approximately 69 person-rem as compared to the estimate of approximately 8 person-rem. The exposure expended for the installation and welding of the new SGLAs was approximately 383 person-rem as compared to the estimate of 182 person-rem. As discussed in Progress Report No. 3, the additional exposure for these activities is attributed to working in radiation fields higher than originally estimated (i.e. original estimate was based on radiation fields of 5 to 20 mR/hr in the S/G channel heads; the actual radiation fields after channel head decontamination and shielding were in the range of 50 to 200 mR/hr) and performing repairs that required more time in the higher radiation fields (i.e. approximately 40,000 actual person-hours expended as compared to the estimate of 9,200 person-hours).

#### 6. Task #13 - Placement of Steam Generator in Storage

The exposure expended for this task was approximately 30 person-rem as compared to the estimate of 25 person-rem. The following RWP controlled activities contributed significantly to this total exposure:

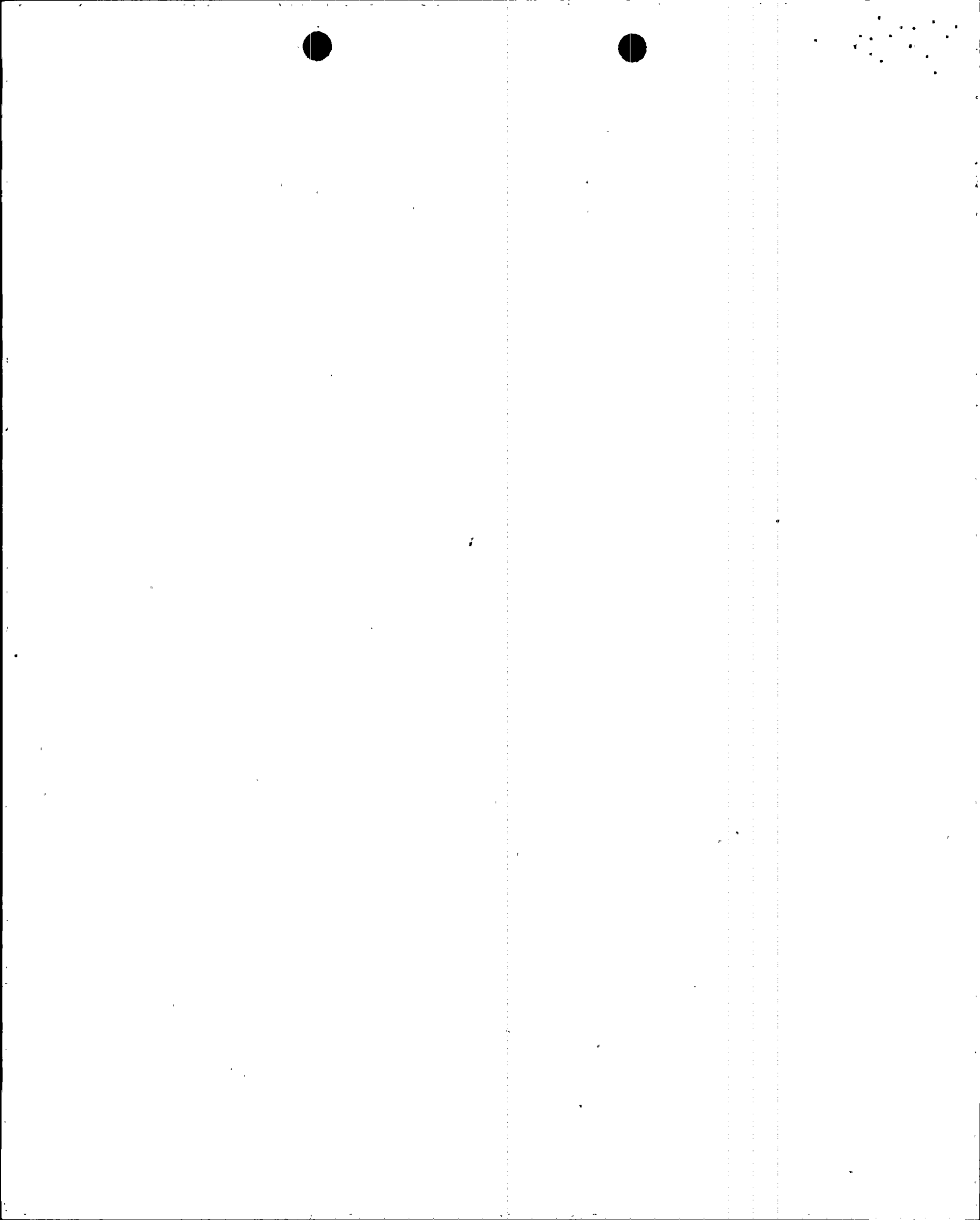
- a. Transfer SGLAs from Reactor Containment Building (RCB) to storage compound (item 13 of table 3B).

#### Discussion

As discussed in Progress Report #2, approval was obtained to place the SGLAs in temporary storage until the storage compound was completed. The exposure expended to remove the SGLAs from the RCB, place them in temporary storage and fill the secondary side with distilled water was approximately 18 person-rem. The exposure expended to drain the SGLA secondary side, move the SGLAs into the storage compound and weld the temporary secondary side vent and drain fittings was approximately 12 person-rem. The additional exposure for this task is attributed to placing the steam generators in temporary storage rather than directly moving them into the storage compound.

#### 2.5 General Discussion of Work Activities Resulting in Underestimated Accumulated Exposure

Two specific areas of work resulted in significant exposure above their estimated values. These areas were work on the S/G bowl during the installation phase (specifically items 2, 3 and 6 of tables 3C) and the reinstallation and removal of piping, equipment and insulation and ongoing decontamination activities (in preparation for startup) during the miscellaneous phase (specifically items 2, 4, 7, 10 & 11 of table 3D).



Based on the ratio of person-rem accumulated to person-hours worked (in the radiation field) on the S/G bowl, the average radiation levels were approximately 1.2 times higher than estimated (units of person-rem per person-hour worked). The actual labor hours worked were approximately 4.2 times greater than that estimated (excess of approximately 35,000 person-hours), resulting in an accumulated exposure underestimate of approximately 367 person-rem. As discussed in Section 3.10 and 3.11, techniques are being planned for the Unit 4 SGRP to minimize the labor hours required to complete this activity as well as reduce the radiation fields occupied.

An evaluation of the person-rem per person-hour worked for the specific miscellaneous phase activities stated above indicated that the actual average radiation fields occupied were less than that estimated but the actual labor hours were approximately nine times greater than estimated (excess of approximately 47,000 person-hours). This resulted in an accumulated exposure underestimate of 185 person-rem. Clearly, the original estimate of labor hours required to perform these specific activities was low. Extra efforts are being planned for the Unit 4 SGRP to minimize non-productive time in containment and minimize work in the radiation field that could be performed outside of the containment building.

### 3.0 SUMMARY OF DOSE REDUCTION TECHNIQUES (ALARA PRINCIPLES)

#### 3.1 General

This section discusses the techniques and practices which were effective in providing exposure reductions to personnel throughout the Unit 3 SGRP. Specific details describing the techniques utilized were presented in Radiological Progress Reports 1-4. Where available data permits, the following evaluations include a quantitative assessment of the person-rem savings attributed to the techniques used. Exposure reduction techniques to be utilized during the Unit 4 SGRP are currently being planned taking into account the experience gained during the Unit 3 SGRP. This includes a detailed review of all activities performed (including the re-evaluation of those activities where the actual accumulated person-rem was less than that estimated). Since a complete discussion of this planning is too voluminous to present in this report, a general discussion of the additional ALARA techniques planned for the Unit 4 SGRP are presented.

#### 3.2 Temporary Shielding

The use of temporary shielding in the Unit 3 SGRP was effective in reducing dose rates in high traffic and work areas. The exposure expended for the installation and removal of temporary shielding was approximately 46 person-rem. It is difficult to quantify the exposure savings realized from the use of temporary shielding but experience has shown that substantial reductions in dose to personnel are realized from such practices.

#### 3.3 General Containment Decontamination

The initial containment and on-going decontamination program employed in the Unit 3 SGRP is a practice which is recognized as extremely beneficial in reducing exposure through effective control of contamination thereby reducing



the potential for airborne activity and eliminating the need for respiratory protection devices. This program is planned for utilization in the Unit 4 SGRP. It is also effective in reducing the volume of radioactive waste material that is generated.

#### 3.4 Steam Generator Water Level

The exposure savings realized as a result of maintaining a high water level in the steam generator secondary side was approximately 435 person-rem (as indicated in Progress Report #2). It is expected that a similar exposure savings will be realized in the Unit 4 SGRP.

#### 3.5 Contamination Control Envelopes and Ventilation

The use of contamination control envelopes and ventilation were extremely effective in maintaining contamination control and minimizing the spread of airborne activity to adjacent areas. A discussion of these practices is detailed in Progress Report #1.

#### 3.6 Concrete Cutting Operations

The use of water-cooled concrete cutting equipment was extremely effective in preventing airborne activity. The run-off water contained a slight amount of radioactivity and was discharged as a plant effluent release. A discussion of concrete cutting operations were presented in Progress Reports #1 and 2.

#### 3.7 Channel Head Decontamination and Shielding

The exposure savings realized as a result of channel head shielding and decontamination was approximately 4400 person-rem. The activities benefiting from the S/G channel head decontamination and shieldings are detailed in Progress Reports 2, 3 and 4.

Several modifications to the S/G decontamination system are planned for the Unit 4 SGRP. These include:

- a. A back-flush system for the filters to minimize filter changes.
- b. Improved pump design.
- c. Improved valves and operating equipment.
- d. Reprogramming the existing computer operated spray nozzle arm to allow decontamination of relatively hard to reach areas (i.e., divider plate and channel bowl weld area).
- e. Use of a spray nozzle adapted for the decontamination of the S/G manway openings.
- f. Overall changes to enhance system reliability.

The contractor indicated that these modifications should reduce the exposure expended for channel head decontamination in Unit 4 by 20%. This should result in an expended exposure of approximately 120 person-rem for S/G channel head decontamination during the Unit 4 SGRP.



### 3.8 Flame and Machine Cutting Operations

The use of flame and machine cutting equipment was effective in making the SGLA lower girth and divider plate cuts. As discussed in Progress Report #2, "A" S/G was machine cut while "B" and "C" S/Gs were flame cut. A review of the exposure expended for each S/G lower girth cut indicates the following:

<u>S/G</u>	<u>Type Lower Girth Cut</u>	<u>Exposure (person-rem)</u>
"A"	Machine	17
"B"	Flame	29
"C"	Flame	23

Although the exposure expended for the machine cut was less, the time to complete the machine cut was six days versus one day for the flame cut. Repair project personnel are evaluating the cutting techniques to be used in the Unit 4 SGRP.

### 3.9 Weld Preparation of S/G Channel Head Remnants

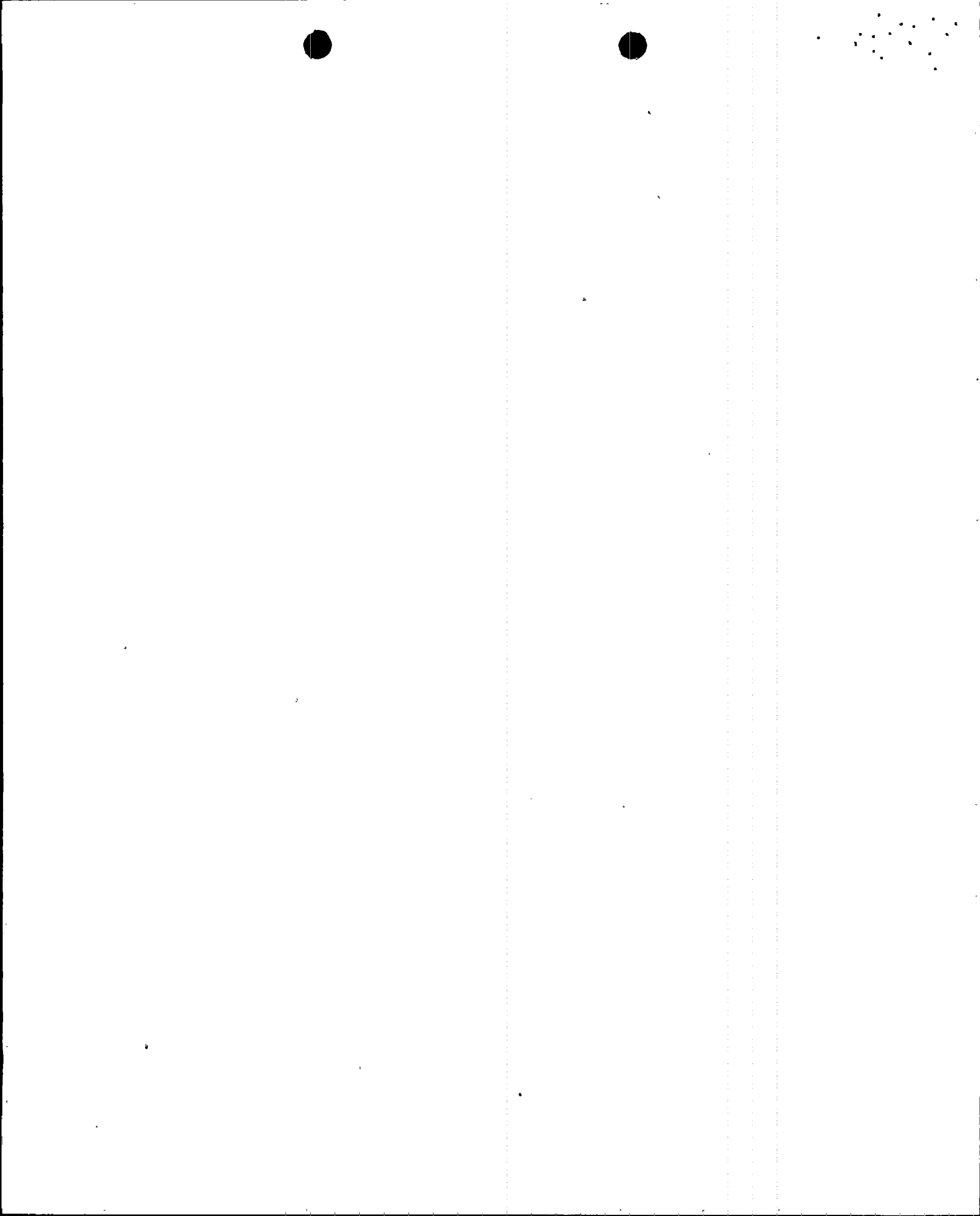
The techniques discussed for this activity were presented in Progress Report #2 and were beneficial in minimizing exposure to personnel conducting channel head remnant weld preparation. A review of the exposure expended for this activity indicated the following:

<u>S/G</u>	<u>Exposure (person-rem)</u>
"A"	123
"B"	115
"C"	138

The machine cutting technique (as performed on "A" S/G lower girth) did not result in significantly lower exposure for channel head welding activities than the flame cutting technique, except in the case of "C" S/G lower girth cut. The flame cutting of "C" S/G resulted in additional repairs of the S/G channel head remnant which required more time in the higher radiation fields as a result of some difficulty encountered with the equipment during the cutting process. Flame cutting equipment requires detailed preparation and control of the proper flame temperature. Repair project personnel are evaluating the flame and machine cutting techniques as planned for the Unit 4 SGRP.

### 3.10 Installation of Steam Generator Lower Assemblies (SLGAs)

The techniques used for the installation of the new SGLAs (discussed in Progress Report #3) were effective in minimizing exposure, controlling the spread of contamination and minimizing airborne activity.





As discussed in 2.4, the exposure expended for SGLA installation was significant. Project personnel are evaluating and revising the weld preparation and applicable procedures for Unit #4 SGLA installation to minimize the occupancy time required for repairs in the S/G channel head (thereby reducing the expended exposure). Also, approximately 24 person-rem (item 13 of table 3D) was expended to clean and inspect Unit 3 steam generator tubes as a result of smoke from welding activities penetrating the tube sheet protection and entering the steam generator tubes. The steam generator tube sheet protection (to be used for the Unit 4 SGRP) is being evaluated to determine a method to prevent smoke penetration into the tubes thereby minimizing the exposure associated with tube cleaning.

### 3.11 Welding of Steam Generator Divider Plates

The techniques discussed in Progress Report #4 as applied to personnel welding the new S/G divider plates were beneficial in minimizing exposure. A review of the exposure expended for S/G divider plate welding indicated the following:

<u>S/G</u>	<u>Exposure (person-rem)</u>
"A"	37.70
"B"	46.92
"C"	<u>35.24</u>
	119.86

Project personnel are reviewing the techniques for divider plate cutting and welding as planned for the Unit 4 SGRP.

### 3.12 Reactor Head Preparation for Hot Functional Testing

The use of temporary lead shielding on the reactor head was beneficial in reducing the exposure expended for the following activities:

1. Installation and removal of instrument port conoseals.
2. Detensioning and tensioning of the reactor head.
3. Installation and removal of reactor head studs.

The exposure expended for these activities was approximately 53 person-rem. Without the benefit of head shielding, the exposure expended would have been approximately 95 person-rem. It is expected that this technique will result in a similar exposure savings during the Unit 4 SGRP.

### 3.13 General Techniques and Practices

The general techniques and practices described in Radiological Progress Reports 1-4 contributed to the adequate control of personnel exposure during the Unit 3 SGRP. Experience has shown that such techniques and practices contribute



significantly to an effective overall dose reduction (ALARA) program. Also, numerous photographs were taken of various activities in progress throughout the Unit 3 SGRP. These photographs will be utilized to familiarize personnel with the radiological aspects of the SGRP.

#### 4.0 RADIOACTIVE EFFLUENTS AND SOLID WASTE

##### 4.1 General

Radioactive effluents, comprised of liquid and airborne releases, and low-level solid radioactive waste produced during this reporting period and throughout the repair project to date are summarized in Tables 5 and 6 respectively.

##### 4.2 Liquid Releases

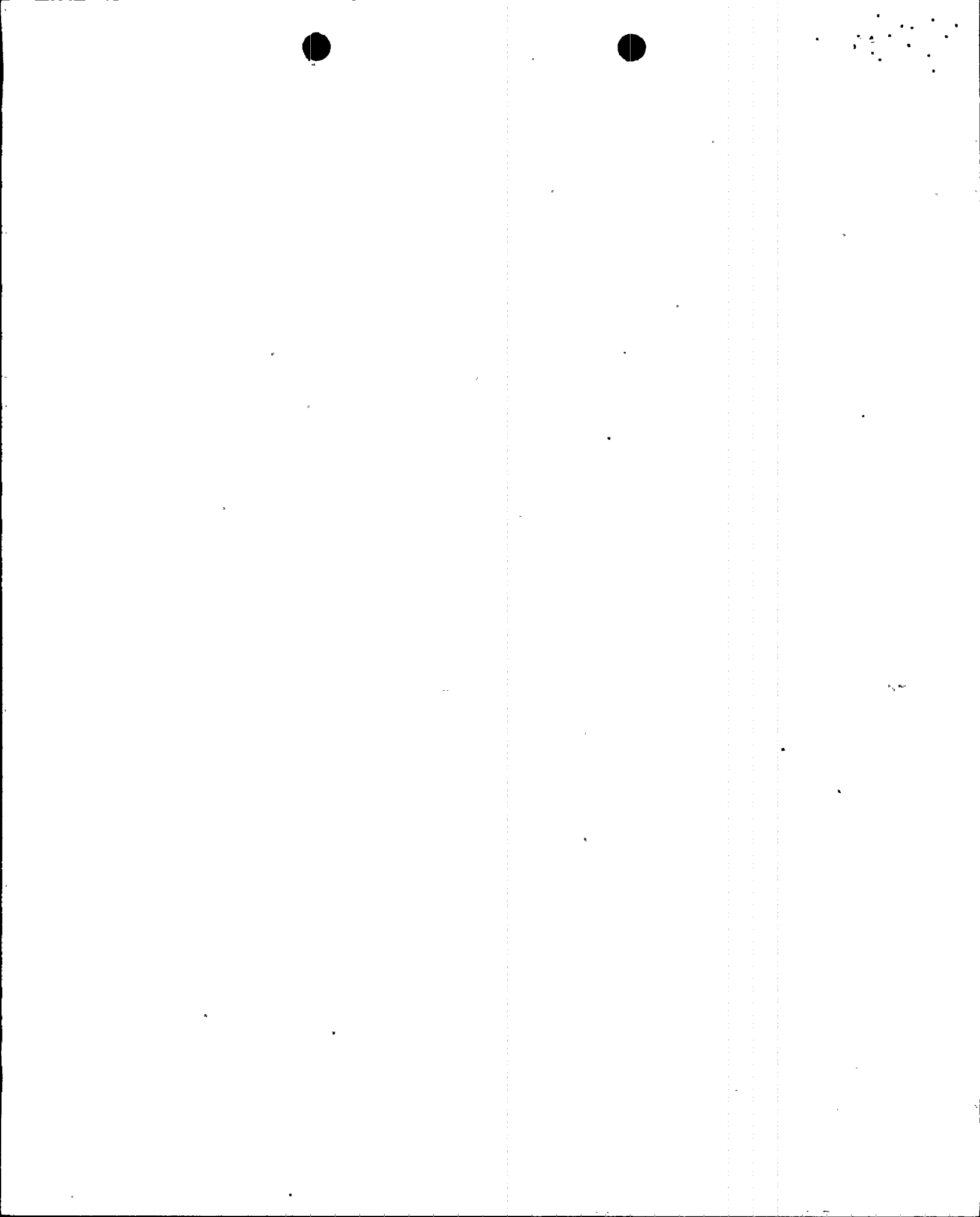
Laundry operations were the major source of liquid releases for the Unit 3 repair project. As shown in Table 5 the composition of radioactive isotopes detected remain relatively unchanged from those detected throughout the project. Approximately 80% of the total activity released during the project was in the form of relatively long-lived corrosion products. The remaining 20% was in the form of fission products (which include Cs-134 and Cs-137) and activation products. The total activity released was approximately 21% of the total estimated activity to be released for the Unit 3 SGRP.

##### 4.3 Airborne Releases

Airborne releases for this reporting period originated primarily from continuous ventilation of the containment during post-installation phase repair activities. A summary of airborne releases for the entire project is shown in Table 5 as well. As indicated in previous progress reports the particulates detected were typical of radionuclides expected as a result of an extended shutdown. The total activity released during the Unit 3 SGRP was less than 1% of the total estimated activity projected to be released.

##### 4.4 Solid Radioactive Waste

A summary of solid low-level radioactive waste generated and shipped as a result of Unit 3 steam generator repair activities is provided in Table 6. The low-level waste shipments during this reporting period were made to both the Barnwell, South Carolina and Richland, Washington Low-Level Waste Disposal Facilities. The total volume of solid low-level radioactive waste generated as a result of the Unit 3 SGRP (excluding the steam generator lower assemblies) was approximately 31% greater than the volume estimated in the Gould Affidavit dated June 12, 1981. It should be noted that the final volume of waste shipped is less than the accumulated volume of waste generated. This can be primarily attributed to additional volume reduction techniques used prior to shipment, which are not accounted for when initially generated. The total quantity of radioactivity shipped as a result of the Unit 3 SGRP (for the volume of repair project waste generated) was approximately 16% of the activity estimated in the SGRR. Approximately 2,260 cubic feet of radioactive waste generated during the Unit 3 project remains to be shipped off-site. This remaining volume has been scheduled for shipment to a disposal facility for burial by 30 June, 1982.



## 5.0 CONCLUSIONS AND OBSERVATIONS

The following general conclusions and observations are based upon information contained in this report:

- a) The total exposure reported (by SRPD) for the entire Unit 3 SGRP was well within the estimated range of 1,730 - 2,480 person-rem. Experience has shown that TLD results (official exposure) are typically less than 95% of SRPD results. Thus, the official dose accumulated is less than the estimate of 2,084 person-rem.

The exposure expended for the preparatory and removal phase activities was approximately 248 and 552 person-rem respectively as compared to their respective estimates of 283 and 1,016 person-rem. The exposure reduction techniques and methods utilized in these phases are expected to result in a similar exposure savings during the Unit 4 SGRP.

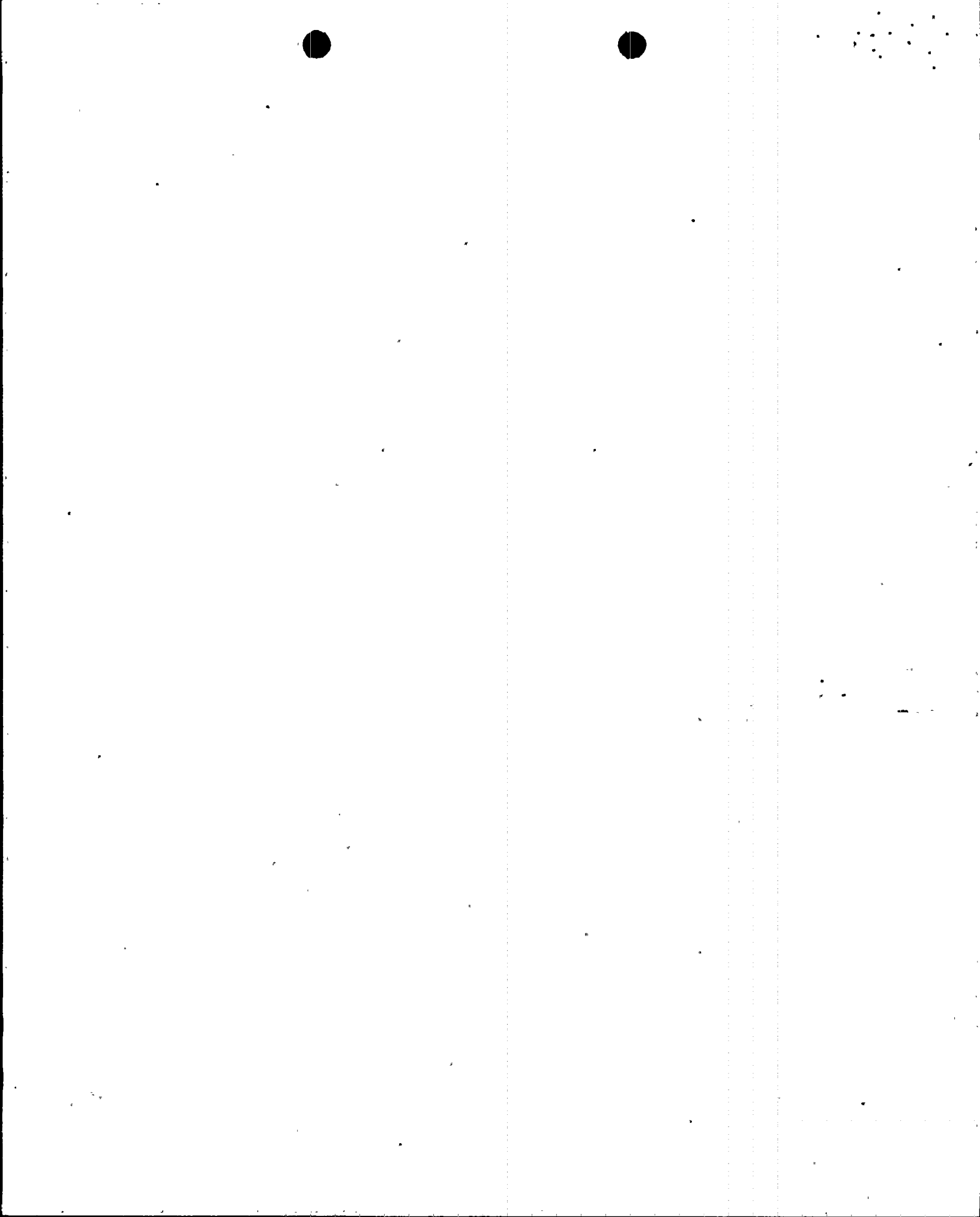
The exposure expended for installation phase activities (approximately 900 person-rem) as compared to the estimate of 644 person-rem was primarily attributed to personnel working in radiation fields higher than originally estimated and performing repairs that required more time in these higher radiation fields.

The exposure expended for post-installation phase activities was approximately 452 person-rem as compared to the estimate of 141 person-rem. This increased exposure is primarily attributed to work requiring more time in these radiation fields than was originally estimated.

Several activities in the preparatory, installation and post-installation phases were not included in the original exposure estimate. These activities included: reactor cavity decontamination and inspection (item 2 of table 3A); removal and replacement of reactor coolant pump motors (item 6 and 5 of tables 3A and 3D respectively); reactor preparation for hot functional testing (item 12 of table 3D); and tube cleaning and inspection of the steam generators (item 13 of table 3D). The total exposure expended for these activities was approximately 88 person-rem. This indicates that the total exposure (for those activities with estimates) for the project was approximately 2,064 person-rem as compared to the estimate of 2,084 person-rem.

The actual labor expended for the project (approximately 319,000 person-hours) was greater than the estimate of approximately 208,000 person-hours. This indicates the uncertainties in predicting the entire scope of work and labor expenditure for the repair project-channel head cut method. It is expected (from the knowledge and experience gained during the Unit 3 SGRP) that the total exposure (by SRPD) for the Unit 4 SGRP will be in the range of 10 to 15% lower than the exposure expended for the Unit 3 SGRP.

- b) The dose reduction techniques (ALARA principles) utilized during the Unit #3 SGRP were effective in controlling personnel exposure. The total exposure savings directly attributed to these techniques was approximately 5,000 person-rem. It is important to note that the actual exposure savings is significantly higher than this value since the more general dose reduction techniques and methods can not be readily quantified. It is expected that a similar exposure savings will be realized during the Unit 4 SGRP.



- c) Radioactive liquid effluents were well below the activity estimated for release in the Steam Generator Repair Report (SGRR). The total activity to be released for the Unit 4 SGRP is expected to approximate the total activity released during the Unit 3 SGRP.
- d) Airborne releases of radioactivity were significantly less than the estimate indicated in the SGRR. Airborne releases for the Unit 4 SGRP are not expected to exceed the estimate in the SGRR.
- e) Solid low-level radioactive waste generated during the Unit 3 SGRP (excluding the steam generator lower assemblies) was approximately 31% greater than the estimate provided in the Gould Affidavit dated June 12, 1981. The amount of compacted dry active waste generated (approximately 21,000 cu.ft.) was greater than the estimate (approximately 13,000 cu.ft.) indicated in table 1 of the Gould Affidavit. This additional volume is primarily due to the conservatism employed in assigning the volume of waste generated to the Unit #3 SGRP even though some of the work was not directly related to the repair project.

The following waste reduction techniques were employed during the Unit #3 SGRP:: initial and ongoing decontamination program; and waste segregation and control of materials used in contaminated areas. Compaction operations were beneficial in reducing the number of packages to be shipped for disposal. These waste reduction and compaction techniques are planned for the Unit 4 SGRP.

The total quantity of radioactivity (for repair project waste shipped) was significantly below the activity estimated in the SGRR.

The waste generated as a result of the Unit #3 SGRP was expeditiously shipped off-site; consequently, there was no significant volume of waste accumulated on-site throughout the repair project.

The Unit 3 SGRP was completed within one week of the time scheduled for completion. This demonstrates the effectiveness of the detailed planning, coordination and job execution required for such a project. Similar planning, coordination and job execution should assure the timely completion of the Unit 4 SGRP and result in a significantly lower expended exposure.





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 7 APRIL 1982  
TURKEY POINT - UNIT 3

TASK DESCRIPTION	LABOR EXPENDED IN RADIATION FIELD (PERSON HOURS)		PERSONNEL EXPOSURE <sup>a</sup> (PERSON-REM)	
	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL
1. Concrete and structural steel removal and replacement.	13,660	23,011	88	97.11
2. Construction of pedestal cranes, preparation of polar crane, miscellaneous cribbing platforms, and steam generator transfer bridge.	10,280	10,029	32	31.60
3. Removal, modification and reinstallation of steam generator upper assemblies and major piping.	24,600	74,106	256	304.35
4. Construction of temporary facilities and support services	19,120	20,493	215	116.90
5. General decontamination and disposal of contaminated materials/cleanup.	42,310	24,944	201	178.69
6. Removal and reinstallation of miscellaneous piping equipment and insulation.	8,850	46,858	125	215.52
7. Non-manuals (e.g. QC, Engineers, Health Physics).	68,540	56,871	436	292.53
8. Decontamination of the channel head.	1,840	6,503	214	155.12
9. Cut channel head and remove old steam generator lower assembly.	3,240	9,752	166	110.56
10. Weld shield cover on lower assembly:				
a. at channel head	760	526	40	10.10
b. at transition end	530	978	53	16.49



TABLE 2 (continued)  
PERSONNEL EXPOSURE SUMMARY - PER TASK  
REPORTING PERIOD 24 JUNE 1981 TO 7 APRIL 1982  
TURKEY POINT - UNIT 3

TASK DESCRIPTION	LABOR EXPENDED IN RADIATION FIELD (PERSON HOURS)		PERSONNEL EXPOSURE <sup>a</sup> (PERSON-REM)	
	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL
11. Cut and remove old divider plate, weld new divider plate.	2,640	6,080	29	141.86
12. Install new steam generator weld channel head.	11,000	39,011	204	450.82
13. Placement of steam generator in storage.	225	331	25	30.18
TOTAL	207,595	319,493	2,084	2,151.83
Estimated Range			1730-2480	

<sup>a</sup> Actual exposures are estimated by self-reading pocket dosimeter totals.

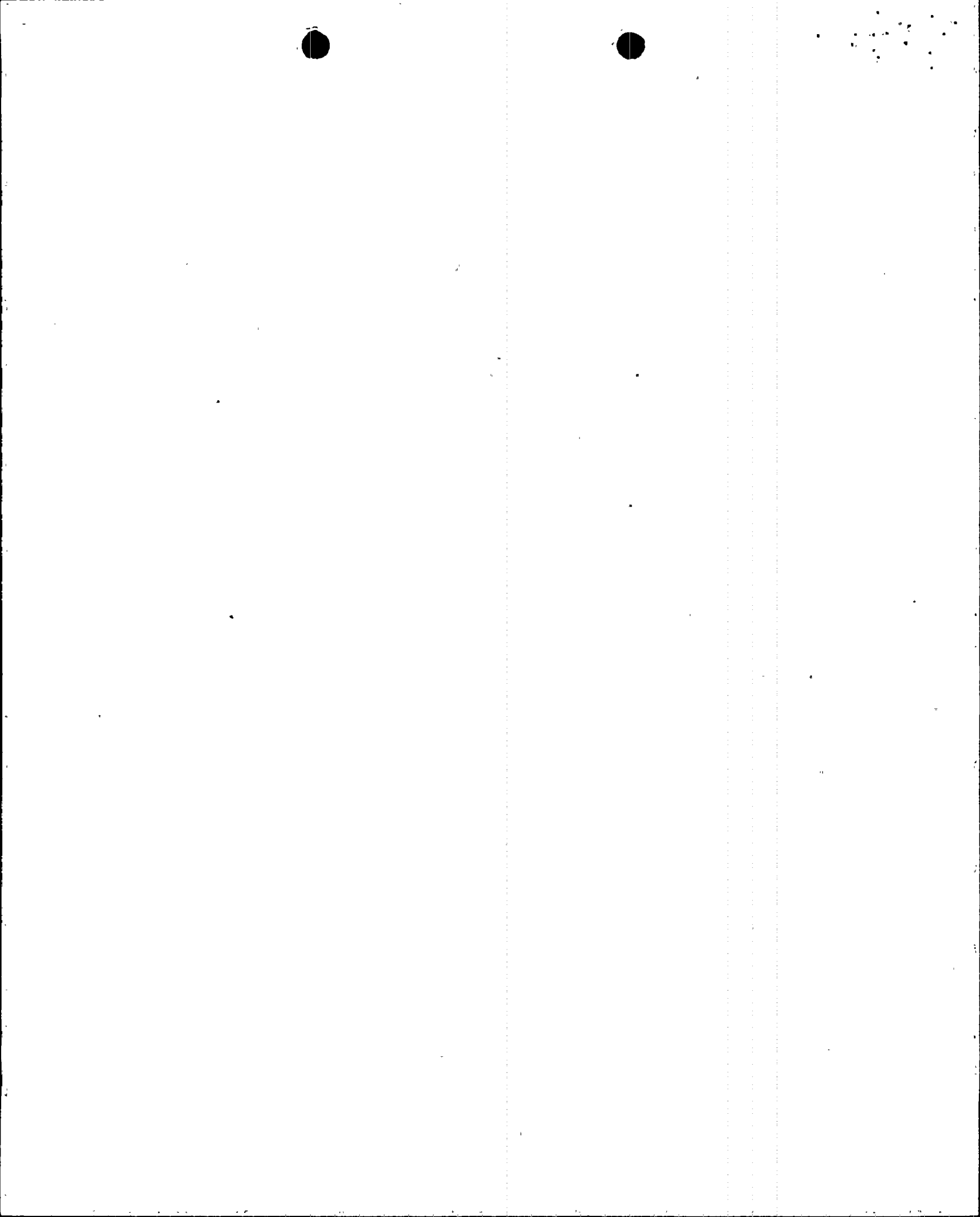




TABLE 3A  
SUMMARY OF PREPARATORY ACTIVITY EXPOSURES  
REPORTING PERIOD 4 MARCH 1982 TO 7 APRIL 1982  
TURKEY POINT - UNIT 3

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	0.00	27.07	C
2. Reactor Cavity Decontamination and Inspection	0	373	0	0.00	5.58	C
3. Install Steam Generator Transfer Bridge	960	1,473	1.21	0.00	7.80	C
4. Remove Emergency Containment Coolers, Control Rod Drive Mechanism Coolers and Fans, Manipulator Crane, and Rerate Polar Crane and Load Test	6,860	5,157	11.83	0.00	7.80	C
5. Install Cherry Pickers	2,430	2,990	7.15	0.00	17.88	C
6. Remove Reactor Coolant Pump Motors	0	386	0	0.00	2.43	C
7. Disconnect/ Remove Permanent Electrical Equipment and Cables	430	281	3.31	0.00	2.50	C
8. Install Temporary Power, Lighting and Electrical Cables	1,148	2,962	49.48	0.00	11.68	C
9. Remove Miscellaneous Steel	580	1,702	1.25	0.00	7.05	C
10. Install Temporary Containments and/or Ventilation Systems	245	1,740	4.29	0.00	12.62	C



TABLE 3A (Continued)  
SUMMARY OF PREPARATORY ACTIVITY EXPOSURES  
REPORTING PERIOD 4 MARCH 1982 TO 7 APRIL 1982  
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)
11. Install Temporary Shielding	120	1,388	2.58	0.00	31.05	C
12. Install Scaffolding All Levels	1,440	1,895	13.27	0.00	9.95	C
13. Cut and Remove Concrete	5,334	3,913	58.00	0.00	45.49	C
14. Miscellaneous Activities	9,425	5,419	85.63	0.00	59.04	C
TOTAL - PHASE I	34,992	31,787	283.00	0.00	247.94	C



TABLE 3B  
SUMMARY OF REMOVAL ACTIVITY EXPOSURES  
REPORTING PERIOD 4 MARCH 1982 TO 7 APRIL 1982  
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. Remove insulation from A, B & C steam generator	3,850	7,569	77.00	0.00	70.80	C
2. Remove Feedwater Piping A, B & C steam generator	147	2,473	1.50	0.00	9.95	C
3. Cut A, B & C S/G Upper Assembly (U.A.) and remove and modify U.A. internals	6,318	13,379	125.40	0.00	60.02	C
4. Install tube bundle shield covers A, B & C S/G	530	978	53.00	0.00	16.49	C
5. Cut divider plate & channel head A, B & C S/G - Rig to 58' elevation	1,722	5,087	97.14	0.00	72.07	C
6. Rig/lift A, B & C S/G Lower Assembly (L.A.) to cut/remove seismic ring	84	142	6.60	0.00	0.72	C
7. Install tube sheet shield cover A, B & C S/G	760	527	40.00	0.00	10.10	C
8. Lift A, B & C S/G U.A., invert and place in rack	525	2,143	6.75	0.00	11.79	C
9. Remove main steam piping A, B & C S/G	126	499	0.61	0.00	2.84	C
10. Install laydown cribbing for A, B & C S/G 58' elevation	252	199	2.65	0.00	0.49	C



TABLE 3B (Continued)  
SUMMARY OF REMOVAL ACTIVITY EXPOSURES  
REPORTING PERIOD 4 MARCH 1982 TO 7 APRIL 1982  
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)
11. Conduct channel head decontamination A, B & C S/G	1,840	6,503	214.00	0.00	155.12	C
12. Remove miscellaneous piping from A, B & C S/G cubicles	1,410	6,050	17.62	0.00	29.79	C
13. Remove A, B & C S/G L.A. from RCB and transfer to storage compound	225	322	25.00	0.00	30.18	C
14. Maintain temporary power lighting and electrical cables	2,100	1,578	55.00	0.00	4.70	C
15. Maintain/erect/remove scaffolding	840	5,686	8.40	0.00	29.85	C
16. Ongoing decon activities/remove and dispose contaminated materials	14,500	2,914	62.40	0.00	16.57	C
17. Miscellaneous Activities	33,900	5,103	221.93	0.00	31.00	C
TOTAL PHASE II	69,129	61,252	1016.00	0.00	552.48	C





TABLE 3C  
SUMMARY OF INSTALLATION ACTIVITY EXPOSURES  
REPORTING PERIOD 4 MARCH 1982 TO 7 APRIL 1982  
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. Installation of A, B & C S/G Upper Assemblies	17,540	6,534	73.70	0.00	9.81	C
2. Weld Preparation of A, B & C S/G Channel Head Remnants	840	4,552	7.71	0.00	69.09	C
3. Installation and Welding of A, B & C S/G Lower Assemblies	8,360	35,381	182.00	0.90	382.64	C
4. Installation of A, B & C S/G Main Steam Piping	1,250	2,068	5.50	0.00	4.16	C
5. Installation of A, B & C S/G Feedwater Piping	1,680	4,892	6.80	0.00	15.71	C
6. Welding of A, B & C S/G Divider Plates	1,554	5,479	15.10	0.00	119.86	C
7. Install Insulation A, B & C Steam Generators	3,486	25,393	29.40	33.67	85.72	C
8. Maintain Temporary Power, Lighting and Electrical Cables	2,850	6,301	65.00	0.00	13.99	C
9. Maintain/Erect/Remove Scaffolding	2,840	9,794	21.80	0.00	31.81	C
10. Ongoing Decon Activities/ Remove/Dispose Contaminated Materials	14,500	12,280	62.40	0.00	66.19	C



TABLE 3C (Continued)  
SUMMARY OF INSTALLATION ACTIVITY EXPOSURES  
REPORTING PERIOD 4 MARCH 1982 TO 7 APRIL 1982  
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)
11. Miscellaneous Activities	27,190	22,699	174.59	0.00	100.60	C
TOTAL PHASE III	82,000	135,373	644.00	34.57	899.58	C

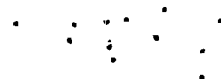


TABLE 3D  
SUMMARY OF POST-INSTALLATION ACTIVITY EXPOSURES  
REPORTING PERIOD 4 MARCH 1982 TO 7 APRIL 1982  
TURKEY POINT - UNIT 3

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. Installation of concrete stop logs, concrete forms, rebar and pouring of new concrete 30'6" and 58' elevation	5,490	3,378	22.00	1.16	8.52	C
2. Installation of miscellaneous piping in S/G cubicles	350	11,211	8.00	1.86	54.21	C
3. Installation of emergency containment coolers, control rod drive mechanism cooler and fans	310	58	3.00	0.00	0.22	C
4. Installation of miscellaneous steel	600	14,018	2.00	9.19	36.06	C
5. Installation of A, B & C reactor coolant pump motors	0	866	0.00	0.00	3.17	C
6. Removal of steam generator transfer bridge	500	663	1.00	0.00	1.19	C
7. Installation of permanent electrical cables, equipment.	580	2,033	6.00	0.01	7.52	C
8. Removal of temporary containments and ventilation systems	970	2,714	12.00	0.09	5.26	C
9. Removal of temporary shielding	84	818	2.00	0.82	11.94	C



TABLE 3D (Continued)  
SUMMARY OF POST-INSTALLATION ACTIVITY EXPOSURES  
REPORTING PERIOD 4 MARCH 1982 TO 7 APRIL 1982  
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)
10. Removal of scaffolding all levels	830	11,710	8.00	12.79	47.96	C
11. Ongoing decon activities/removal/ disposal contaminated materials	3,630	14,273	15.00	17.97	78.65	C
12. Reactor preparation/hot functional testing	0	1,265	0.00	14.32	53.21	C
13. Tube cleaning/inspection A, B & C S/Gs	0	1,290	0.00	0.00	23.83	C
14. Miscellaneous Activities	8,130	26,784	62.00	18.45	120.09	C
TOTAL PHASE IV	21,474	91,081	141.00	76.66	451.83	





TABLE 4  
PERSONNEL EXPOSURE SUMMARY PER PHASE  
REPORTING PERIOD 4 MARCH 1982 TO 7 APRIL 1982  
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	31,787	283	283	0.00	247.94	C
Removal	69,129	61,252	1,016	1,016	0.00	552.48	C
Installation	82,000	135,373	644	644	34.57	899.58	C
Miscellaneous <sup>a</sup>	21,474	91,081	141	141	76.66	451.83	C
Project totals	207,595	319,493	2,084	2,084	111.23	2,151.83	C

<sup>a</sup>Miscellaneous (post-installation) - includes cleanup, storage and miscellaneous preparations prior to start-up.



TABLE 5  
SUMMARY OF RADIOACTIVE EFFLUENT RELEASES  
REPORTING PERIOD 4 MARCH 1982 TO 7 APRIL 1982  
TURKEY POINT - UNIT 3

1982

I. LIQUID EFFLUENT RELEASES		RADIOACTIVITY RELEASED IN LIQUID EFFLUENTS (CURIES)		TOTAL ACTIVITY RELEASED THIS REPORTING PERIOD	TOTAL RELEASED DURING S/G REPAIR TO DATE
ISOTOPE	MARCH 3/4-3/31	APRIL 4/1-4/7			
Co-57	*	*		*	1.33E-04
Co-58	1.43E-03	2.64E-05		1.46E-03	5.21E-02
Co-60	2.23E-03	2.35E-05		2.25E-03	4.16E-02
Cs-134	1.36E-04	*		1.36E-04	1.99E-03
Cs-137	3.48E-04	1.3E-06		3.49E-04	3.96E-03
Fe-59	*	*		*	4.33E-04
Mn-54	7.17E-05	*		7.17E-05	2.21E-03
Zn-65	*	*		*	*
I-131	*	*		*	*
Nb-95	*	*		*	3.50E-04
Sb-124	4.16E-05	*		4.16E-05	3.97E-03
Sb-125	1.54E-04	*		1.54E-04	7.87E-03
Ag-110m	2.58E-04	2.8E-06		2.61E-04	3.34E-03
Zr-95	4.06E-05	*		4.06E-05	8.74E-04
TOTAL	4.71E-03	5.40E-05		4.76E-03	1.19E-01
Liquid Effluent Volume Released (Liters)	8.14E+05	3.26E+04		VOLUME RELEASED THIS REPORTING PERIOD 8.47E+05	VOLUME RELEASED DURING S/G REPAIR TO DATE 1.01E+07

\*Not detectable



TABLE 5 (Continued)  
 SUMMARY OF RADIOACTIVE EFFLUENT RELEASES  
 REPORTING PERIOD 4 MARCH 1982 TO 7 APRIL 1982  
 TURKEY POINT - UNIT 3

1982

I. AIRBORNE RELEASES		RADIOACTIVITY RELEASED IN AIRBORNE EFFLUENTS (CURIES)		TOTAL ACTIVITY RELEASED THIS REPORTING PERIOD	TOTAL RELEASED DURING S/G REPAIR TO DATE
A. NOBLE GASES					
ISOTOPE	MARCH 3/4-3/31	APRIL 4/1-4/7			
Kr-87	*	*		*	*
Kr-88	*	*		*	*
Xe-133	*	*		*	*
Xe-133m	*	*		*	*
Xc-135	*	*		*	*
Xe-138	*	*		*	*
TOTAL	*	*		*	*
B. HALOGENS					
I-131	*	*		*	*
I-133	*	*		*	*
TOTAL	*	*		*	*

\*Not Detectable



TABLE 5 (Continued)  
SUMMARY OF RADIOACTIVE EFFLUENT RELEASES  
REPORTING PERIOD 4 MARCH 1982 TO 7 APRIL 1982  
TURKEY POINT - UNIT 3

1982				
I. AIRBORNE RELEASES				
RADIOACTIVITY RELEASED IN AIRBORNE EFFLUENTS (CURIES)				
C. PARTICULATES				
ISOTOPE	MARCH 3/4-3/31	APRIL 4/1-4/7	TOTAL ACTIVITY RELEASED THIS REPORTING PERIOD	TOTAL RELEASED DURING S/G REPAIR TO DATE
Ce-141	*	*	*	*
Ce-144	*	*	*	*
Co-58	*	*	*	2.34E-05
Co-60	7.7E-07	*	7.7E-07	1.79E-04
Cs-134	*	*	*	1.87E-06
Cs-137	*	*	*	8.38E-06
Fe-59	*	*	*	*
Mn-54	*	*	*	7.63E-07
Zn-65	*	*	*	*
Nb-95	*	*	*	1.15E-07
TOTAL	7.7E-07	*	7.7E-07	2.14E-04

\*Not Detectable





TABLE 6  
SUMMARY OF SOLID LOW-LEVEL RADIOACTIVE WASTE  
REPORTING PERIOD 4 MARCH 1982 TO 7 APRIL 1982  
TURKEY POINT - UNIT 3

I. SOLID LOW-LEVEL RADIOACTIVE WASTE GENERATED FROM U-3 S/G REPAIR

WASTE FORM	VOLUME LLW <sup>a</sup> IN CU-FT FOR REPORTING PERIOD	VOLUME LLW IN CU-FT TO DATE
Compacted Dry Active Waste	2,625	21,210
Non-Compacted Dry Active Waste	100	4,955
Resin and Filter Media	75	1,690
Channel Head Decontamination Waste	0	717.5
Miscellaneous	0	2,775
Totals	2,800	31,347.5

II. SOLID LOW-LEVEL REPAIR ACTIVITY WASTE SHIPPED

REPORTING PERIOD DATES	VOLUME LLW <sup>a</sup> SHIPPED IN CU-FT	ESTIMATED ACTIVITY <sup>b</sup> CURIES
24 June 81 - 22 August 81	3,945	1.48
23 August 81 - 3 November 81	6,700	22.62
4 November 81 - 30 December 81	6,430	5.43
31 December 81 - 3 March 82	9,450	10.00
4 March 82 - 7 April 82	2,240	2.71
Project Totals	28,765	42.24

<sup>a</sup> LLW Low-level (radioactive) waste.

<sup>b</sup> Predominant isotopes <sup>137</sup>Cs, <sup>60</sup>Co, <sup>58</sup>Co.

