QA Record NUCLEAR ENGINEERING CALCULATION

TITLE: CONTROL ROOM DOSES				PLANT/UNIT BFN / 2,3
PREPARING ORGANIZATION NE - MNE	KEY NOUNS: DOSE, CONTROL ROOM, GAMMA DOSE, BETA DOSE, THYROID DOSE			
BRANCH/PROJECT IDENTIFIERS ND-Q0031-920075	REV	(for RIMS use)		RIMS accession number
	R0	920807A0012		R14920727107
APPLICABLE DESIGN DOCUMENT(S): NA	R7			R14 '96 0416 103
	R8			R 14 980428 101
SAR SECTION NA / SYSTEM(S) NA	R9			
Revision 0	R7	R8	R9	Safety Related? X YES ___ NO
DCN No. W17331	N/A	N/A		Calculation Revision: X Entire Calculation; ___ Selected Pages
Prepared J.L.KAMPHOUSE	J.L. Kamphouse	Jack A. Berg		
Checked B.L.SERINI	B.L. Serini	Peter J. Stutz		
Reviewed S.D.FOSTER	B.L. Serini	Peter J. Stutz		
Approved H.A.GOLDMAN FOR HEC	J.D.M. Ferguson, Jr.	for K.F. Gray		
Date 7/27/92	15 Apr 96	4/28/98		
PAGES ADDED	See	See Rev Log		
PAGES DELETED	Rev	See Rev Log		
PAGES CHANGED	Log	See Rev Log		

Statement of Problem:
Determine the control room doses as a function of the new control room parameters for Unit 2 cycle 7. the most significant parameters include:
1. CREVS flow of 3000 cfm, 1500 cfm, and 0 cfm. |R5 |R5
2. New X/Q values for the new CREVS air intake locations.
3. 3717 cfm unfiltered inleakage into the Control Building Habitability Zone.
4. Inclusion of 11.5 SCFH MSIV leakage.
5. Replacement of stack isolation dampers with automatic backdraft dampers.
6. 10 cfh leakage from closed HWWV valves. |R6
7. 600 CFH base of stack damper leakage. |R7

ABSTRACT *This calculation contains an unverified assumption(s) that must be verified later.* ___ YES X NO

Abstract: See next page.

ORIGINAL

~~Rpt 13a total pages~~ MCO 4-17-98

■ Microfilm and return calculations to: CALC LIBRARY

Calculation No. ND-Q0031-9275	Rev: R8	Plant: BFN	Page: Abst. 1 of 1
Subject: Control Room Doses		Prepared: MCS	Date: 4-17-98
		Checked:	Date:

ABSTRACT:

The Control Room (CR) doses were determined in this calculation. The STP code was used to determine the releases from the base of the stack and from the top of the stack. These releases were used as input into the COROD code to determine the control room doses. The most significant parameters utilized in this calculation were:

(1) CREVS flow of 3000 cfm
(2) 2 CREVS air intake locations, each with different X/Q values
(3) 3717 cfm unfiltered inleakage into the Control Building Habitability Zone.
(4) A continuous 10 cfm release from the base of the stack
(5) A continuous 10 cfh leakage from the primary containment to the base of the stack via the Hardened Wetwell Vent valves.

The results of the calculation were as follows :

Control Room Dose [rem]

Thyroid	11.109	(ICRP-30)
Gamma	1.541	
Beta	0.285	

The control room doses are below the limits of 10CFR50 App.A GDC 19 (ref.21) of 5 rem whole body or equivalent (30 rem thyroid, 30 rem beta).

TVA

Title: CONTROL ROOM DOSES

REVISION LOG

ND-Q7031-920075

Revision No.	DESCRIPTION OF REVISION	Date Approved
0	INITIAL ISSUE Legibility evaluated and accepted for issue. Jerry A Goldrow 7.27.92 Signature Date	
1	PAGES CHANGED:- COVERSHEET, REV LOG 5, 22, 23, 25, 28-30, 32-35, ATTACHMENT 3 (2 pages) PAGES DELETED:- ABSTRACT 1-4 6-21, 24 26, 27 31, 36-40, ~~ATTACHMENT 3 (1 page)~~ ATTACHMENT 2 (2 pages), ATTACHMENT 5 (1 page). PAGES ADDED:- ABSTRACT, 1-4, 6-21, 24, 26, 27, 31, 36-~~38~~ 38, 38A CLASSIFICATION & CATEGORIZATION SHEETS (2), JK 8.28.92 INDEPENDENT REVIEW SHEET, ATTACHMENT 9 (6 pages) ATTACHMENT 10 (7 pages) ATTACHMENT 3 (3 pages) ATTACHMENT 11 (5 pages)	
2	Pages added : NONE Pages deleted : ~~NONE~~ R0,1: CLASS+CAT SHEETS (4) IND. REVIEWS (2) JK 9-16-92 38, 38A (Page #'s only) Pages Changed: coversheet, abstract, Rev log, classification sheets, IND. Review form, 1, 7, 8, 9, 10, 15, 17, 18, 21, 23-37, Number of pages IN R2 : 80 This REVISION was to change the reactor building's mixing volume and flow Rates. Legibility evaluated and accepted for issue. Signature Date 9/23/92	

TVA 10534 (EN DES 4-78)

TVA

Title: CONTROL ROOM DOSES

REVISION LOG

NDQ 7031-920075

Revision No.	DESCRIPTION OF REVISION	Date Approved
3	Added Attachment 12 – Calculation of doses due to stack leakage through 3 inch drain line. PAGES ADDED: Attachment 3 (6 pages), Rev Log (1 page) Classification & Categorization Sheets (2 pages) Independent Review (1 page). PAGES DELETED: None PAGES CHANGED: Coversheet, Abstract, Table of Contents [page 1 of calc.]. Legibility graduated and accepted for issue. For ALL PAGES Signature Date 12/16/92	12/16/92
4	Revised calculation to reflect DCN W17999 which installs automatic backdraft dampers in the offgas stack which reduced base of stack release to 5 cfm continuous. Increased scope of calculation to include unit 0 & ~~and~~ 3. See Sheets 7+8 for UI restriction. 1/13/93 Calc number updated to Unit 0, Unit 3 added to unit applicable. Pages added: Revision 4 Cover sheet, Calc Classification and categorization sheets (2), Independent Review sheet Pages deleted: None Pages Changed: Revision 0 Coversheet, Coversheet Sheet 1 of 1, Pages 2, 3 thru 11, 13, 14, 16 thru 20, 21, 23 thru 34, 36, 37	1-20-93

TVA

Title: CONTROL ROOM DOSES

REVISION LOG

NDQ 7031920075

Revision No.	DESCRIPTION OF REVISION	Date Approved
5	Added cases for CREVs flow rate of 1500 cfm and 0 cfm. Pages added: Additional Rev Log Sheet Calc Classification Sheets (2) Independent Review Sheet Page 37A Attachment 13 (59 pages) Pages deleted: None Pages changed: Coversheet Coversheet Continuation Sht 1 of 1 Pages 8, 29, 34, 36	3/28/93
6	Evaluated 10 scfh leakage through hardened wetwell vent valves. Deleted Attachment 12 since DCN 524922 authorized the opening of the stack drain valves and demonstrated that no ground level radiological release would occur. Hardened wetwell vent installed by DCNs: W17337 common, W17491 U2, W17931 U3. Pages added: Attachment 14 (4 pages) Independent Review Sheet (1 page) Pages deleted: Calc Classification sheets for Revisions 2, 3 and 4, Attachment 12 (Total of 12 pages) Pages changed: Coversheet, Coversheet Continuation Table of Contents Shts 2, 5, 7, 15, 20, 21, 24, 36	12/15/93

TVAN CALCULATION RECORD OF REVISION

ND-Q0031-920075 Page _____ of _____

Title Control Room Doses

MLD 4-27-98
Bad 4/27/98

Revision No.	DESCRIPTION OF REVISION	Date Approved
7	This revision evaluated the dose to the control room from a base of stack release rate of 10 cfm for the duration of the accident (30 days). This dose was added to the model and a new total dose was calculated. Microfiche #TVA-F-A000038. Revision 7 contains a total of 161 pages. Pages added: coversheet, abstract, revision log, calculation classification and categorization (2), independent review form, computer file storage information sheet, Appendix A (3 sheets) pages deleted: none	4-15-96
8	Revision 8 was performed to incorporate new X/Q values and to include both east and west control room intakes in the calculation. The Hardened Wet Well Vent leakage of 10 cfh was modified to start later in the accident to simulate the finite travel time to the stack. The MSIV leakage component was eliminated from the analysis. Incorporated Appendix A into the text. **This calculation is in support of UFSAR (section 14.6.3) change package RIMS# R92 980427 958, SA RIMS# R92 980427 959, and SE RIMS# R92 880427 960.** Pages added: independent review, microfiche information sheet pages changed: cover, calculation classification forms (2 pages), computer input storage information sheet, 1- 4, 6, 8, 9, 12-15, 18, 19, 21-36 pages deleted: p2 of abstract, classification forms (R5, 2 pages), Appendix A, Attachments 8-11, Attachment 14 R8: 131 total pages	

TVA

Page

TVAN CALCULATION CLASSIFICATION FORM

CALCULATION INFORMATION:

Plant BFN Unit 2/3 Identifier ND-Q0031-920075 Rev R8

Issue Date

Title **Control Room Doses**

System(s), Component, Feature or Subject of Calculation

	SYSTEM/DESCRIPTION
☐ Safety system	System No.
☐ Safety-related feature	
☐ Nonsafety system	System No.
☐ Nonsafety-related feature	
☐ Quality related system	
☐ Quality related feature	
☐ Non Quality related system	
☐ Non Quality related feature	
☐ Plant environment (EQ, etc.)	
☐ Appendix R	
☐ Civil structures	
☐ Instrumentation (PAM, etc.)	
■ Licensing	10CFR50 App A GDC19
☐ Other	

Calculation Category NA

Final Classification

■ Essential ☐ Desirable ☐ File Only ☐ Superseded ☐ Cancel ☐ Obsolete ☐ Engineering Output ☐

Preparer Marc A Berg DATE 4-17-98

Checker Peter Stutz DATE 4/23/98

Verifier Peter Stutz DATE 4/23/98

TVA

Sheet

TVAN CALCULATION CLASSIFICATION FORM

Identifier: ND-Q0031-920075 R8

Preliminary Classification

■ Essential
☐ Desirable

☐ File Only
☐ Superseded

☐ Cancel
☐ Obsolete

☐ Engineering Output
☐

CALCULATION CLASSIFICATION JUSTIFICATION:

Preparer

Calculation shows compliance with 10CFR50 App.A GDC 19 control room operator doses

MCH 4/7/98

Checker ■ Agree with classification ☐ Disagree - comments required

RLS 4/23/98

Verifier ■ Agree with classification ☐ Disagree - comments required

RLS 4/23/98

CALCULATION DESIGN VERIFICATION (INDEPENDENT REVIEW) FORM

NDQ2031920075 — Calculation No.

2 — Revision

Method of design verification (independent review) used (check method used):

1. Design Review
2. Alternate Calculation
3. Qualification Test

X

Justification (explain below):

Method 1: In the design review method, justify the technical adequacy of the calculation and explain how the adequacy was verified (calculation is similar to another, based on accepted handbook methods, appropriate sensitivity studies included for confidence, etc.).

Method 2: In the alternate calculation method, identify the pages where the alternate calculation has been included in the calculation package and explain why this method is adequate.

Method 3: In the qualification test method, identify the QA documented source(s) where testing adequately demonstrates the adequacy of this calculation and explain.

This calculation utilizes calculational methods commonly used throughout the nuclear industry for many years. Input and detailed assumptions relative to the particular calculation are adequately given and documented. The results of the calculation are in agreement with the inputs and assumptions and hence the calculation is technically adequate.

The GE calculation of the Control Room dose which is incorporated into this calculational package by reference (MSIV dose) stands on its own and incorporates the GE BWR/6 methodology for determining the Control Room dose as noted on NEDO-31858 (P) Rev 1. This is not a "standard" licensing calculation in that it has been submitted to NRC for their approval even tho all results were obtained until previously approved methods. The NSER (Safety Evaluation Report) has been received from NRC. Therefore the entire calculational package is deemed technically adequate.

J. Tompkins — Design Verifier (Independent Reviewer) — 9/16-92 — Date

Steve D. Date — 9-24-92

CALCULATION DESIGN VERIFICATION (INDEPENDENT REVIEW) FORM

ND-Q2031-920075 — CALCULATION NO.

03 — REVISION

METHOD OF DESIGN VERIFICATION (INDEPENDENT REVIEW) USED (CHECK METHOD USED):

1. DESIGN REVIEW — X
2. ALTERNATE CALCULATION —
3. QUALIFICATION TEST —

JUSTIFICATION (EXPLAIN BELOW):

METHOD 1: IN THE DESIGN REVIEW METHOD, JUSTIFY THE TECHNICAL ADEQUACY OF THE CALCULATION AND EXPLAIN HOW THE ADEQUACY WAS VERIFIED (CALCULATION IS SIMILAR TO ANOTHER, BASED UPON ACCEPTED HANDBOOK METHODS, APPROPRIATE SENSITIVITY STUDIES INCLUDED FOR CONFIDENCE, ETC.)

METHOD 2: IN THE ALTERNATE CALCULATION METHOD, IDENTIFY THE PAGES WHERE THE ALTERNATE CALCULATION PACKAGE AND EXPLAIN WHY THIS METHOD IS ADEQUATE.

METHOD 3: IN THE QUALIFICATION TEST METHOD, IDENTIFY THE QA DOCUMENTED, SOURCE(S) WHERE TESTING ADEQUATELY DEMONSTRATES THE ADEQUACY OF THIS CALCULATION AND EXPLAIN.

A through review was made of the computer codes used and their input to perform R3 to this calculation. The input used in the codes was checked and found to be conservative. The R3 results are reasonable. Because R2 of this calculation was previously found to be technically acceptable, R3 to the calculation is accepted.

B. L. Serini
DESIGN VERIFIER

12-15-92
DATE

CALCULATION DESIGN VERIFICATION (INDEPENDENT REVIEW) FORM

ND-Q0031-920075 — **Calculation No.**

4 — **Revision**

Method of design verification (independent review) used (check method used):

1. Design Review — X
2. Alternate Calculation
3. Qualification Test

Justification (explain below):

Method 1: In the design review method, justify the technical adequacy of the calculation and explain how the adequacy was verified (calculation is similar to another, based on accepted handbook methods, appropriate sensitivity studies included for confidence, etc.)

Method 2: In the alternate calculation method, identify the pages where the alternate calculation has been included in the calculation package and explain why this method is adequate.

Method 3: In the qualification test method, identify the QA documented source(s) where testing adequately demonstrates the adequacy of this calculation and explain.

The STP and CORCD computer codes utilize methodologies which are common to the nuclear industry and TVA. The outputs are in accordance with the inputs and previous calculations. Therefore this calculation is technically adequate.

J. Singleton
Design Verifier
(Independent Reviewer)

1-20-93
Date

CALCULATION DESIGN VERIFICATION (INDEPENDENT REVIEW) FORM

ND-Q0031-920075 — Calculation No.

5 — Revision

Method of design verification (independent review) used (check method used):

1. Design Review — X
2. Alternate Calculation
3. Qualification Test

Comments:

This revision only changed CREVS pressurization flow rates. The results are commensurate with the inputs. The methods used were exactly the same as in the earlier revisions. For these reasons the calculation is technically adequate

J. L. Lambert — Design Verifier (Independent Reviewer)

3-28-93 — Date

6431k

CALCULATION DESIGN VERIFICATION (INDEPENDENT REVIEW) FORM

ND-Q0031-920075	6
Calculation No.	**Revision**

Method of design verification (independent review) used (check method used):

1.	Design Review	✓
2.	Alternate Calculation	
3.	Qualification Test	

Comments:

This revision addresses the leakage from the Hardened Wetwell Vent and deletes the Attachment 12 which evaluated the potential release path through the stack drain. The HWWV leakage was determined to be an insignificant contributor to the control room dose. The methodology utilized was a direct comparison of the HWWV leakage source term, hold-up time, and atmospheric dispersion coefficients to other dose contributors evaluated in the computer runs of this calc. This comparis is based on each respective release mechanisms and hence, design inputs. Also, actual computer runs of CORDO and STP are referenced to validate the conclusions drawn by the comparison.

The Attachment 12 deletion is based on an issued, design verified, & DCN which provides the basis for deletion. Based on this review of design inputs, methodology, and conclusions; this calc revision is technically adequate.

Karen B Kahn
Design Verifier
(Independent Reviewer)

12-4-98
Date

CALCULATION DESIGN VERIFICATION (INDEPENDENT REVIEW) FORM

ND-Q0031-920075 — CALCULATION NO.

07 — REVISION

METHOD OF DESIGN VERIFICATION (INDEPENDENT REVIEW) USED (CHECK METHOD USED):

1. DESIGN REVIEW ✓
2. ALTERNATE CALCULATION
3. QUALIFICATION TEST

JUSTIFICATION (EXPLAIN BELOW):

METHOD 1: IN THE DESIGN REVIEW METHOD, JUSTIFY THE TECHNICAL ADEQUACY OF THE CALCULATION ANI EXPLAIN HOW THE ADEQUACY WAS VERIFIED (CALCULATION IS SIMILAR TO ANOTHER, BASED UPOI ACCEPTED HANDBOOK METHODS, APPROPRIATE SENSITIVITY STUDIES INCLUDED FOR CONFIDENCI ETC.)

METHOD 2: IN THE ALTERNATE CALCULATION METHOD, IDENTIFY THE PAGES WHERE THE ALTERNAT CALCULATION PACKAGE AND EXPLAIN WHY THIS METHOD IS ADEQUATE.

METHOD 3: IN THE QUALIFICATION TEST METHOD, IDENTIFY THE QA DOCUMENTED, SOURCE(S) WHERE TESTIN(ADEQUATELY DEMONSTRATES THE ADEQUACY OF THIS CALCULATION AND EXPLAIN.

This revision utilizes calculation methodologies commonly used throughout the nuclear industry foı many years. Input and detailed assumptions relative to this particular revision are adequately given and documented. The results of this calculation are in agreement with the input changes and the assumptions.. Hence, the calculation is technically adequate.

Therefore, the entire calculation package, revision 7, is deemed to be technically adequate.

Barry L. Serini — DESIGN VERIFIER

5-9(— \TE

TVAN CALCULATION DESIGN VERIFICATION (INDEPENDENT REVIEW) FORM

ND-Q0031-920075	8
Calculation No.	Revision

Method of design verification (independent review) used:

1. Design Review ☒
2. Alternate Calculation ☐
3. Qualification Test ☐

Comments:

This calculation is being revised to incorporate new X/Q values and to include both east and west intakes into the control room into the calculation.

The calculation uses STP and COROD software models developed in previous revisions to determine the control room operator doses. Additional runs were made using the COROD models to more realistically account for the plant design having two air intakes to the CREVS system on opposite sides of the control building.

The calculation also eliminates the specific dose calculation resulting from MSIV leakage by assuming that this leakage is included in the 2% per day design basis leakage value. This is found to be appropriate and acceptable. For this leakage to occur during a LOCA occuring inside of the drywell, the break flow would be required to pass through the wetwell pool water and then reenter the steam lines through openings which are in the process of releasing break flow. This is an unrealistic scenario. In addition, even if the scenario were considered credible, the liquid portion of the break flow will accumulate on the drywell floor, while the passage of the vaporous portion of the break flow through the wetwell pool water would result in the stripping of significant amounts of those iodine isotopes which would otherwise contribute significantly to the control room dose.

The calculation continues to be technically adequate. The elements of section 3.2.5D of NEDP-2 and Appendix A of NEDP-5 were addressed by this review and the calculation was found to satisfactorily address the checklist items.

Design Verifier — Date: 4/27/98

TVA

TVAN COMPUTER INPUT FILE STORAGE INFORMATION SHEET

MJS 4-17-98
Rpm 4/23/98

Document ND-Q0031-920075	Rev. R8	Plant: BFN	Page

Subject:
Control Room Doses

☐ Electronic storage of the input files for this calculation is not required
Comments:

■ Input files for this calculation have been stored electronically and sufficient identifying information is provided below for each input file. (Any retrieved file requires re-verification of its contents before use.)

The computer input is permanently stored in FILEKEEPER file # 301063

TVAN COMPUTER OUTPUT
MICROFICHE INFORMATION SHEET

MLS 4-17-98
BAS 4/28/98

Document ND-Q0031-970075	Rev. R8	Plant: BFN	Page

Subject:
Dose on the Refueling Floor Without the Bioshield Blocks Installed at the Equipment Hatch

Microfiche Number	Description
TVA-F-A000038	R7 output
TVA-F-A000050	R8 output

Name	Code	Description
N9275S8	STP	Releases
N9275C8A	COROD	control room dose, stack base, west (U1 side) intake
N9275C8B	COROD	control room dose, stack base, east (U3 side) intake
N9275C8C	COROD	control room dose, stack top, west (U1) intake
N9275C8D	COROD	control room dose, stack top, east (U3) intake

SUBJECT: ND-Q0031-920075 PROJECT: BFN/2,3

CONTROL ROOM DOSES

Replaced by revision 7

R9: RWS 4/17/98
Conn 4/23/98

TABLE OF CONTENTS

Purpose

The purpose of this calculation is to determine the control room doses following a Loss of Coolant Accident (LOCA). This calculation is being performed as the new calculation of record in support of the modifications being made to CREVS in order to demonstrate compliance with 10CFR50 App.A GDC 19 and the modification to install automatic backdraft dampers in the offgas stack and the installation of the hardened wetwell vent (HWWV).

Methodology

The STP code (reference 2) was used to determine the source strength to be inserted in the COROD code (reference 3) which determines the Control Room (CR) doses. The source terms calculated by STP were the source coming out of the bottom of the stack and that coming out of the top of the stack. The code was also set up such that the sources for the first 30.0 minutes were separate from the sources for the remaining duration of the accident, i.e. from 30.0 minutes through 30 days. The reason for this was that new ICRP-30 conversion factors could be applied to the dose for the time period 0-30.0 minutes and for the dose for the remaining 30.0 minutes - 30 days.

SUBJECT ND-Q2031-920075 PROJECT BFN-2,3 | R4
CONTROL ROOM DOSES

COMPUTED BY JK DATE 8-28-92 CHECKED BY BLS DATE 8-28-92

JDC 1/20/93 JK 1-20-93 | R4

R8: MLO 4-17-98
BAA 4/28/98

ASSUMPTIONS:

1. The Standby Gas Treatment System is operating at a total flow of 22,000 cfm.

   Technical Justification: Reference 1 gives the flow rate of the SGTS during Special Test 89-07 as approximately 20,000 cfm with all three trains in service. The 22,000 cfm value represents a 10% margin on the 20,000 cfm; see also References 5,10 & 40. Reference 40 applicable to Units 1 and 3 for SGTS flow. | R4

2. The maximum unfiltered inleakage into the Control Room is 3717 cfm.

   Technical Justification: See Reference (27).

3. The activity is released under fumigation conditions from the top of the stack for the first 30.5 minutes of the accident. | R4

   Technical Justification: Regulatory Guide 1.145 (Reference 20) section 2.1.2(a) states "...a fumigation condition should be assumed to exist at the time of the accident and continue for 1/2 hour." A memorandum from Atmospheric Science (Reference 8) also states fumigation for 1/2 hour should be considered. ~~The fumigation assumption results in a X/Q of 3.26E-4 sec/m^3, see Reference (28). [Note the 3.26E-4 value was a preliminary value; the final value was 3.31E-4 which is an insignificant difference].~~ | R8

   ~~[The 30 sec (0.5 min) was added to the 30 minutes in order to account for electronic and damper closure times for the base of stack release].~~ | R4

TENNESSEE VALLEY AUTHORITY

SUBJECT: ND-Q0031-920075
CONTROL ROOM DOSES

COMPUTED BY: WDC DATE: 1/20/93 CHECKED BY: DATE: 1-20-93 R4

AR: HLS 4-7-98
Lmd 4/23/98

ASSUMPTIONS:

4. The Control Room emergency pressurization system filter efficiency is 90%/90% for inorganic and organic iodine, respectively.

Technical Justification: The Restart Design Criteria BFN-50-7030A (Reference 12) states the charcoal adsorbers shall have a 99% efficiency at design flow. The current FSAR Chapter 14 accident analysis section 14.6.3.5 uses an efficiency of 90%/70% for inorganic and organic, respectively. The BFNP Technical Specification 3.7.E.2.b requires a demonstrated efficiency of 90% for all iodine, see Reference (30).

5. The release at the base of stack is a continuous ~~5~~ 10 cfm for the duration of the accident.

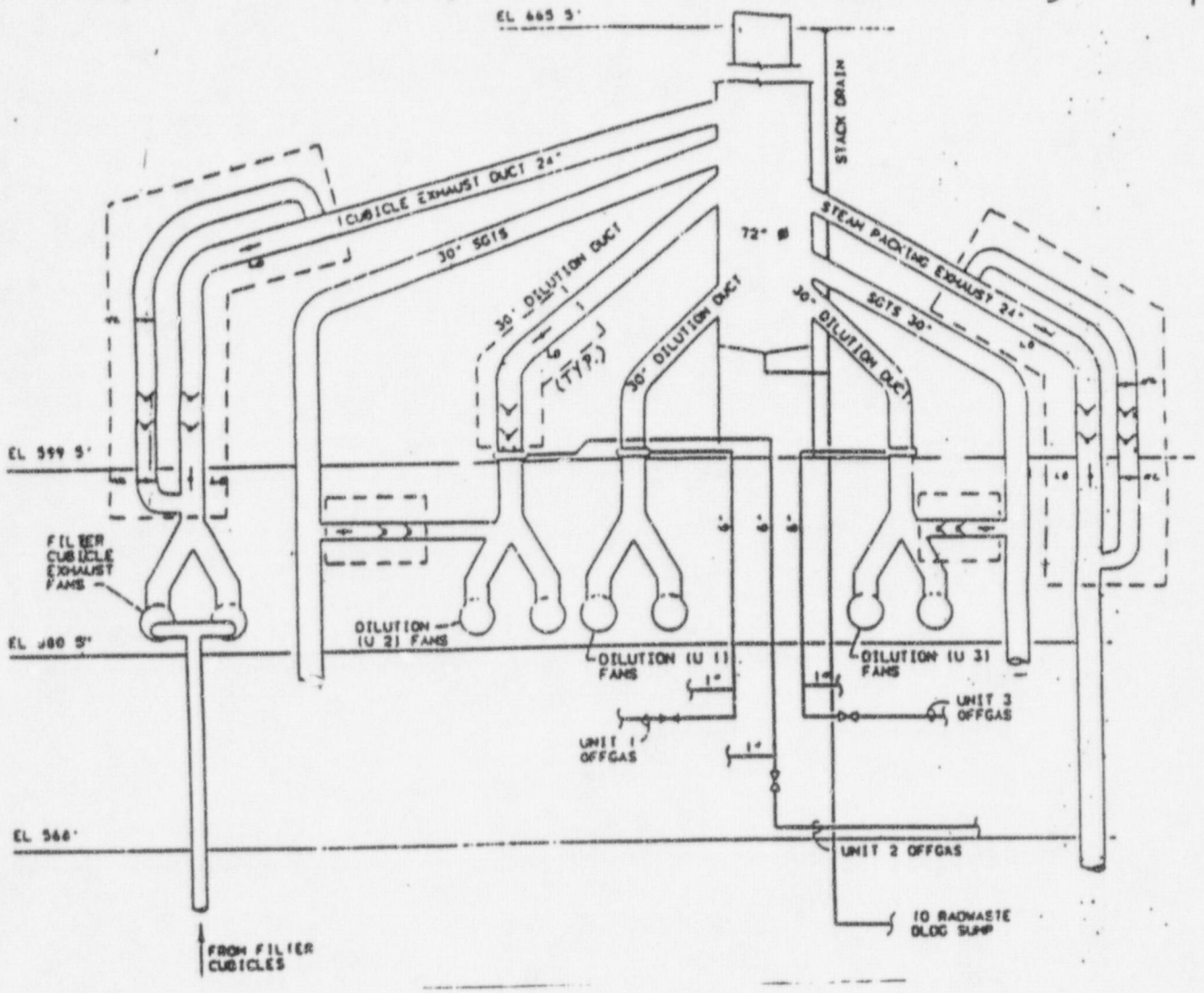
Technical Justification: DCN W17999 installs dual automatic backdraft dampers in all three unit's dilution ducts and in the cubicle exhaust and steam packing exhaust ducts. The unit 1 dilution fan path has been reconnected by this DCN. The backdraft dampers in a flow path will close automatically on low flow or reverse flow and thus close prior to the creation of large backflows. When closed, the backdraft dampers restrict the total flow from the base of the stack to less than ~~5~~ 10 cfm (Reference 24). The backdraft dampers are counter balanced to remain closed with no differential pressure. If the flow path is experiencing positive flow, the dampers will open. In this configuration, no leakage from the base of the stack will be possible since the flow is up the stack for this condition. The dual dampers protect against single failures. All flow paths contain bubble tight isolation dampers and blind flanges which are closed during maintenance and thus prevent any leakage during maintenance activities on a flow path. The cubicle exhaust and steam packing exhaust ducts contain bypass lines with identical dampers as the normal flow path in order to allow maintenance on the normal flow path. R4

TENNESSEE VALLEY AUTHORITY

SUBJECT: ND-Q0031-920075
CONTROL ROOM DOSES

COMPUTED BY:	DATE:	CHECKED BY:	DATE:
WDC	1/11/93	JK	1-20-93
~~WDC~~	12/8/93	~~KBK~~	12-14-93

R4
R6



R4

R6

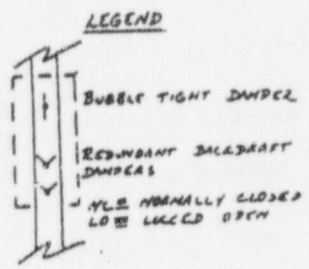


DIAGRAM 1 - BASE OF STACK FLOW CONFIGURATION

SUBJECT ND-Q2031-920075 PROJECT BFN-2,3 | R4
CONTROL ROOM DOSES

COMPUTED BY JK DATE 8-28-92 CHECKED BY BLS DATE 8-31-92

2DC 1/20/93 JK 1-20-93 | R4

AB: MJS 4-17-98
QA 4/28/98

ASSUMPTIONS:

6. The source terms are based on TID-14844 methodology using a design power of 3458 MWt as noted by Reference (5) and 1,000 effective full power days (EFPD) of operation.

   Technical Justification: The source terms used in this calculation are the same as used in Calculation ND-Q0999-880158 Revision 2 (Reference 10). The TID-14844 methodology is the same as used in the FSAR Chapter 14 Section 14.10 evaluation.

7. The drywell leak rate is 2% volume per day (i.e. 235.8 cfh) for 30 days.

   Technical Justification: Regulatory Guide 1.3 Section C.1.e (Reference 7) states "the primary containment should be assumed to leak at the leak rate incorporated...in the technical specifications for the duration of the accident." The BFN ~~Unit 2~~ Technical Specification 3.7.A.2.b (Reference 9) allows a leak rate of up to 2% volume per day at the 49.6 PSI design basis accident pressure. The volume of the drywell is taken as 283,000 cubic feet (Reference 17). | R4

   (283,000 cuft)(0.02/day)(1 day/24 hr)=235.8 cuft/hr

   Included in this 2% leakage is MSIV leakage. MSIV leakage is therefore not explicitly modeled. | R8

8. The LOCA source term, 100% of the core inventory of noble gases and 25% of the iodines, is released instantaneously to the primary containment. The iodines are comprised of 4% Organic iodine and 96% Inorganic iodine (91% elemental plus 5% particulate); the particulate portion is assumed to plate out and is therefore not included in the STP model.

   Technical Justification: Regulatory Guide 1.3 sections C.1.a and C.1.b (Reference 7) specify the release term for a LOCA for a Boiling Water Reactor.

ASSUMPTIONS:

9. The leakage from the primary containment to secondary containment is assumed to mix instantaneously and uniformly in 1,931,502 ft^3 of the reactor zone and refueling floor before passing to the SGTS. |R6

Technical Justification: Based on the physical configuration of the plant and engineering judgement this assumption is reasonable. The total leakage from the drywell can be expected to occur from a large number of different penetrations located on various elevations and drywell perimeter positions. The leakage must then pass through the reactor building free volume in order to reach an SGTS intake duct. As such, mixing with some portion of the reactor building air must occur. Furthermore, SGTS also takes suction from the refuel floor. The air on the refuel floor is clean and thus effectively reduces the activity concentration of the contaminated air being processed by the SGTS.

Revision one of this calculation assumed a 29.4% / 70.6% flow split between the reactor zone and the refueling floor, respectively. The tacit assumption made there was that the ~~Unit 2~~ refueling floor equipment hatch was in place to assure that the air being taken into the SGTS from the refueling floor was clean. |R4

Now if we consider the equipment hatch to be open, the air flow through the open hatch is not known and hence 2 possible conditions need to be considered:

(1) There is no flow through the open hatch or the flow goes from the refueling floor to the reactor zone.

(2) There is flow from the reactor zone to the refueling floor.

For condition (1), if there is no flow through the hatch, this would exactly be what was previously modelled and analyzed by revision 1 of this calculation. If the flow was to go from the refueling floor into the reactor zone this would only serve to dilute the reactor zone's source term and hence would not be as bad a case as if the hatch were closed. Therefore revision 1 of this calculation covers condition (1).

For condition (2), the flow is assumed to go to the refueling floor and hence it is reasonable to assume a mixing volume of the reactor zone plus a fraction of the refueling floor. This was evaluated in calculation MD-Q2065-920473 (Reference 66), and given as 1,931,502 ft^3 for Units 2 and 3 and 1,311,209 ft^3 for Unit 1. Since the volume for Unit 1 is less than for Units 2 and 3, this calculation is |R4

restricted to Units 2 and 3 until the calculations are performed with the Unit 1 mixing volume. | R

10. The Containment Atmospheric Dilution (CAD) System is assumed to operate for a period of 24 hours at a flow rate of 139 cfm at 10 days, 20 days, and 29 days postaccident.

Technical Justification: References 13 and 14 in conjunction with FSAR section 5.2 (page 5.2-44) and FSAR Figure 5.2-18 provide the justification for this assumption. The FSAR section referenced indicates the CAD should be assumed to operate at 10, 20, and 30 days postaccident. The use of 29 days in this analysis provides added conservatism since the period evaluated ends at 30 days.

11. The SGTS filter efficiencies for this calculation were 90%/90% for inorganic and organic iodines, respectively.

Technical Justification: The BFNP Technical Specification 3.7.B.2.b requires a demonstrated efficiency of 90% for all iodine, see Reference (29).

12. The Control Room Emergency Ventilation System (CREVS) operates at a flow of 3000 cfm. Additional cases run for CREVs flow of 1500 cfm and 0 cfm. | R5

Technical Justification: See References (31) & (62) for basis of 3000 cfm. Reference (62) is given as Attachment 6. Cases for 1500 and 0 cfm to demonstrate analytical limits for CREVs flowrate. The 1500 cfm flow is an arbitrarily chosen value for which this calculation demonstrates the acceptability based on control room dose.

13. The stack dilution fans (actually includes the cubicle exhaust fans and the steam packing exhaust fans also) leak into the rooms at the base of the stack which form a mixing volume. This free volume is given as 69,120 cubic feet of which 50% is assumed to be effectively used as the mixing volume for the escaping gases and therefore 50% of 69,120 is 34,560 cubic feet.

Technical Justification: See Reference 15 for the free volume calculation. The leakage in the stack rooms occurs on a middle elevation, i.e. between elev. 568 and 597.5, at about elev. 582. Also, the leakage occurs at about 1/4 of the stack radius. The exit path from this stack area is through the louvers and doors at the full radius of the stack; therefore, the escaping gases must mix in that volume and hence a 50% mixing volume is deemed a valid assumption.

This assumption was deemed conservative because the room is relatively open with no dead ended spaces. If in the future, additional dilution is required, increasing the mixing volume percentage would need to be examined.

ASSUMPTIONS:

14. The following X/Q values were utilized in COROD:
Technical Justification: From Reference (28):

RELEASE PATH	TIME PERIOD	X/Q (sec/cum) West/U1	East/U3 Intake
FUMIGATION TOP OF STACK	0-30.0 min	3.40E-5	3.02E-5
TOP OF STACK RELEASE	30.0 min - 2 hr	5.90E-15	9.64E-7
	2 hr - 8 hr	4.29E-15	1.89E-7
	8 hr - 1 day	3.65E-15	8.37E-8
	1 day - 4 day	2.58E-15	1.43E-8
	4 day - 30 day	1.57E-15	1.13E-9
BOTTOM OF STACK RELEASE	0-30.0 min	3.70E-3	1.20E-3*
	30.0 min - 2 hr	3.70E-3	1.20E-3
	2 hr - 8 hr	2.38E-3	7.91E-4
	8 hr - 1 day	1.91E-3	6.42E-4
	1 day - 4 day	1.19E-3	4.09E-4
	4 day - 30 day	5.97E-4	2.14E-4

* reference 28 actually only gives the 0.5-2 hr X/Q. However that is a typographical error in the calculation and is really a 0-2 hr X/Q (= 0-0.5 hr and 0.5-2 hr X/Q)

15. The dose from both the top and bottom of the stack released during 0-30.0 minute time frame may be divided by a factor of 1.7 in order to account for the use of the so-called ICRP-30 conversion factors; the dose released during the 30.0 minute to 30 day time frame may be divided by a factor of 1.35.

Technical Justification: The complete justification for the division by 1.7 is given in Reference (35) where the iodine isotopic spectrum weighted conversion factor in the COROD code and the iodine isotopic spectrum weighted conversion factor given by ICRP-30 are in the ration of 1.7 for the first 30 minutes of the accident. The I-131 isotope is largely going to dominate the long term iodine release because the I-131 half life is about 8 days as opposed to a maximum of less than one day for any of the other iodine isotopes. The iodine conversion factors were compared between COROD and the CRAC2 code (see References 36-38), which used and early version fo the ICRP-30 conversion factors, and this comparison shown on page 10 of Ref.(35) indicates that I-131 has the lowest ration of the conversion factors: that is 1.48E6/1.1E6 =1.35. Hence utilizing the 1.35 ratio is conservative for times greater than 30.0 minutes. Reference 35 information for ICRP factors is independent of which unit it is applied to.

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RDC	1/20/93	JJC	1-20-93

R4 R4

ASSUMPTIONS:

16. The flow split between the Unit 2 ~~or 3~~ reactor zone and the refueling floor was taken as 29.4%/70.6%, respectively, for revision 1 of this calculation. For revision 2, the total SGTS flow of 22000 CFM (1,320,000 CFH) was taken from the reactor zone plus a part of the refueling floor, see Assumption 9. R4

Technical Justification: This is the flow split determined in Reference 32. For Revision 2, see reference 66.

17. ~~This calculation is for Unit 2 operation only.~~ This assumption is deleted. R4

Technical Justification: ~~Since the blanking off of the Unit 1 dilution fans affects the leakage from the base of the stack, the calculational results would change if Unit 1 were operational. (The Unit 3 dilution fans have dampers as opposed to being blanked off). However, the X/Q values as well as other parameters would not change.~~ The unit 1 dilution duct has been reconnected by DCN W17999. The calculation has been revised to reflect the total leakage from the stack. R4

18. Control room operator occupancy times are as follows:

Percent occupancy	Time
100%	0 - 1440. min.(1 day)
60%	1440. min. - 5760. min.(4 days)
40%	5760.min.-Duration of accident (30days)

Technical Justification: See Reference 6.

19. The dimensions of the Unit ~~2~~ 1/2 Control Room are: 153.95 ft x 36.83 ft x 15.33 ft. These dimensions bound Unit 3. R4

Technical Justification: See Reference 22. These dimensions have no bearing on the thyroid dose which uses the total Control Room volume, input as a separate item.

20. The receptor point location in the COROD model was taken at 76.97 ft, 18.42 ft, 6.0 ft.

Technical Justification: This is as close to the geometric center of the room as a six foot tall individual may be expected to be. This would be the worst case location for whole body dose to an individual who was six feet tall.

21. The Control Room roof thickness is 2.25 ft of concrete.

Technical Justification: See Ref.(22).

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2Dc 11/20/93 JK 1-20-93 IR4

ASSUMPTIONS:

22. The Control Room free volume is given as 210,000. cubic feet. (41, 42, 43) IR4

Technical Justification: Dimensions from Ref.(22). The length of the control room habitability zone is very close to 464.5 ft including the end wall thicknesses. The width is 36.83 ft. The height is 15.33 ft. Therefore the volume is 262,259. cubic feet. Considering a reduction for equipment and some walls, the free volume is customarily assumed to be 80% of the calculated gross volume; this yields a free volume of (0.80)(262,259.) = 209,807. cubic feet. This is rounded to 210,000. cubic feet.

23. The time intervals for the COROD runs are given below:

Time Interval	Time Interval in Seconds
0 - 30 min	1,800.
30 min - 2 hr	5,400.
2 hr - 8 hr	21,600.
8 hr - 24 hr	57,600.
24 hr - 96 hr	259,200.
96 hr -720 hr	2,246,400.

24. In accordance with Ref.(3), the following Adult Inhalation Thyroid Dose Conversion Factors were utilized internal to the COROD runs:

	COROD	
ISOTOPE	MREM/CURIE	REM/CURIE
I-131	1.48E9	1.48E6
I-132	5.35E7	5.35E4
I-133	4.00E8	4.00E5
I-134	2.50E7	2.50E4
I-135	1.24E8	1.24E5

For the conversion to ICRP-30 factors, see Assumption 15.

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2DC 11/20/93 JK 1-30-93 IR4

R8: MKD 4-17-98
Bmd 4/23/98

ASSUMPTIONS Cont'd

25. In accordance with Ref.(3), the following breathing rates were utilized internal to the COROD runs:

TIME POST ACCIDENT	M^3/ SEC
0 - 8 HR	3.47E-4
8 - 24 HR	1.75E-4
GREATER THAN 24 HR	2.32E-4

SINCE THE PRESENT CALCULATION DOES NOT DETERMINE THE DOSES FROM THE MSIV LEAKAGE DIRECTLY ~~BUT ONLY INCORPORATES THOSE DOSES BY REFERENCE,~~ ASSUMPTIONS 26-33 ARE ONLY PERIFERALLY RELATED TO THE PRESENT CALCULATION BUT ARE INCLUDED FOR READY REFERENCE AND EXPLANATORY VALUE. ~~PLUS THE FACT THAT~~ THEY ARE APPROPRIATE TO THE GE CALCULATION WHICH DETERMINED THE DOSES FROM MSIV LEAKAGE AND HENCE ARE RELEVANT. INPUT TO THE GE CALCULATION IS GIVEN IN ATTACHMENT 9. EXPLICIT INPUTS, ASSUMPTIONS, AND SO ON TO THAT CALCULATION ARE NOTED BY THAT CALCULATION. IT IS EXPLICITLY NOTED THAT THE GE CALCULATION UTILIZES A 100% POWER LEVEL OF 3293 MWt AS OPPOSED TO THE "STRETCH" POWER LEVEL OF 105% OR 3458MWt USED IN DETERMINING THE DOSES FROM THE STACK IN THE PRESENT CALCULATION.

R8

26. All piping remains intact from the MSIVs to the condenser even though it is not seismically qualified. The condenser also remains intact.

Technical Justification: See Refs.(~~25~~)&(26). This appears to be in accordance with the BWROG (BWR Owner's Group) position as well as others in the industry. It is also assumed that a large flow path to the condensers is open for all times during the accident scenario, see Ref.(23).

R8

This calculation does not consider MSIV leakage as a separately accounted for bypass path from secondary containment directly into the turbine building. MSIV leakage is considered as a component of the total containment leakage of 2%/day, all of which is assumed to leak into the secondary containment enclosure. **Assumptions 26-29 and 31-35 are no longer applied to this calculation. Modeling feature/considerations resulting from these assumptions have been removed in R8.**

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CONTROL ROOM DOSES

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27. Free volume of Low Pressure (LP) turbines and free volume of the ~~Unit 2~~ condensers was taken as 51,000 ft^3 and 136,000 ft^3, respectively; this was modelled in STP as a single volume called "Condensers" with a total volume of 125,000 ft^3. | R4

    Technical Justification: This was obtained by multiplying the total free volume of 187,000 ft^3 by (2/3). This volume is deemed conservative. The volume of the main steam piping and other small bore piping was neglected because its volume is insignificant with respect to the volume of the condensers and the LP turbines, see Ref.(39). Reference 39 reviewed and determined applicable to Unit 1 and 3 turbines and condensers. | R4

28. MSIV leakage rate was taken as 11.5 SCFH per valve.

    Technical Justification: There are four main steam lines and therefore the total leakage was (4)(11.5)= 46 SCFH, see Refs.(42)&(43).

29. The free volume of the turbine building (TB) was taken as 2,100,000 ft^3 and consisted of the ~~Unit 2~~ area of ~~the~~ one unit's turbine deck. This value was used as the mixing volume in the TB. This value is the average for all three units. | R

    Technical Justification: see Ref.(39). This was deemed a reasonable assumption in this case because the leakage was assumed to come from all the LP turbine seals which are spread out over a considerable area; and the vents in the TB roof, which release the effluent, are spread over the entire length of the TB.

30. The new air intake locations are as noted in Ref.(45), [See Attachment 3].

31. The MSIV leakage flow rate used in the STP model was taken as 32.6 CFH.* | R

    Technical Justification: See section entitled MSIV FLOW RATE and Attachment 4.

    * This flow was deleted in R8 | R

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R8: MWS 4-17-93 DA 4/23/93

32. Deleted.

33. The flow rate out the TB roof vents for any of the three units was taken as 8,640,000 CFH = (144,000 CFM)(60 min/hr). | R4

Technical Justification: See Ref.(47).

34. The dose from the MSIV release via the Turbine Building (TB) roof vents is added to the dose from the stack (base and top). [Not used in R8] | R8

Technical Justification: The wind directions are mutually exclusive for the X/Q value only for the short time period, i.e. 0-2 hrs; however, for the annual average values the wind direction probabilities are taken into consideration. Intermediate values of X/Q are obtained by a logarithmic interpolation between the short time X/Q and the annual average value. Therefore the doses obtained by using the X/Q set from the stack (top and bottom) and the doses obtained by using the X/Q set from the TB are added to assure a conservative result. See Attachment 3.

35. The dose from the MSIV leakage may be divided by 2 because of the dual air intake configuration.

Technical Justification: Now according to Ref.(63), page 6.4-10: "With dual air inlets placed on plant structures on opposite sides of potential radiation release points (e.g., containment building) and capable of functioning with an assumed single active failure in the inlet isolation system, the following considerations may be applied to the evaluation of the control room X/Qs:
(i) Dual inlet designs without manual or automatic selection control ... [use] ... least favorable inlet location to estimate X/Qs. The estimated values can be reduced by a factor of 2 to account for dilution effects..."
Therefore, since the new BFN CREVS design will function with a single active failure and the new air inlets are on opposite sides of the Turbine Building where MSIV leakage is released, the factor of 2 reduction in X/Q [Equivalent to dividing the MSIV doses by 2] is applied to the MSIV leakage contribution to the total dose

36. The hardened wetwell vent isolation valve (FCV-64-221, -222) leak a maximum of 10 cfh of drywell atmosphere following a LOCA.

Technical Justification: The HWWV valves are periodically tested via the Appendix J test program to determine their leakage at pressures typical of the peak pressure following a LOCA. References 67 and 68 state that the maximum allowable leakage for these valves is 10 scfh. The values are for Unit 2; however, the Unit 3 system design is identical and thus will have the same acceptance criteria.

37. The HWWV leakage is assumed to start 8 hours post LOCA.

Technical Justification: The leakage of the valves actually starts at the start of the accident. However, the 14" SCH 30 (ID=13.25", ref.71) line is over 500 feet long (ref.70). Therefore the travel time from the valves to the stack is :

$\pi (13.25"/12in/ft)^2 * 500\ ft/(4*10\ cfh) = 47.88\ hr$

Since it takes longer than 47 hours to reach the stack, the use of 8 hours for the start of the leak is very conservative.

REFERENCES:

1. Memorandum to Plant Operations Review Committee (PORC) from W.C. Thomison, Acting Technical Support Superintendent, dated January 4, 1990, Closure of Special Test (ST) 89-07, "Off-Gas Stack Backflow Measurement", [RIMS# R40 900104 873].

2. STP - Source Transport Program User's Manual, Code Version 6, ID# 262165.

3. COROD - Code Version 3, ID# 262347; User's Manual for COROD, Rev 1, By R.L.Sanders, TVA, April 12, 1991, [W13910419300]; Genna13-009.

| R4

4. Deleted.

5. ND-Q0999-880134 R0 "Offsite and Control Room Operator Doses Following a LOCA with a Ground Level Stack Release" [B22'88 0921 105].

6. 13th AEC Air Cleaning Conference, "Nuclear Power Plant Control Room Ventilation System Design for Meeting General Criterion 19," K.G.Murphy and K.M.Campe.

7. U. S. Atomic Energy Commission Regulatory Guide 1.3, Revision 2, June 1974.

8. Memorandum from J.P. Blackwell, Atmospheric Science, to D.W. Wilson, Chief Nuclear Technology Engineer, dated July 13, 1988 [B45'880714 600].

9. Browns Ferry Nuclear Plant Unit 1,2,3 Technical Specifications 3.7.A.2.b and 3.7.B.2.b (as revised through Amendments 189, 204 and 161, respectively) | R4

10. ND-Q0999-880158 R2 "Control Room Operator Dose as a Function of Time Following a LOCA or FHA" [B22'88 1222 102].

| R4

11. Deleted.

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REFERENCES:

12. System ~~Restart~~ Design Criteria BFN-50-7030A Revision ~~0~~ 7 "Control Bay and Reactor Building Board Rooms Environmental Control System" ~~4-10-92 [B22920410304]~~ - Units 2 and 3 12/3/92 [R14921203 202] | R4

13. Significant Conditions Report SCRBFNEEB8510 R2 BFNP Units 1, 2, & 3 [B22'87 0327 019].

14. Memorandum from R.J. Smith, Project Engineer, to Guy G. Campbell, Plant Manager, dated September 28,1989, "BFN - Nuclear Engineering (NE) Position Concerning the Use of Containment Atmosphere Dilution (CAD) Following a Loss of Coolant Accident (LOCA)" [B22'89 0928 003].

15. ND-Q0065-920078 R0, "Determine the Free Volume in the SGTS Stack at Elevation 568ft to 597.5ft," [R14920724102].

16. ND-Q0000-890013 R~~0~~ 2 "Post-LOCA Control Room Gamma Dose from Secondary Containment and Core Spray Piping" [~~B22'89 0421 105~~]. R14 93 0114 112 . | R4 | R4

17. ND-Q0065-890057 R0 "Postaccident Heat Loads on the SGTS Filters" [B22'90 0208 114].

18. MD-Q0000-88280 R0 "Reactor Building Free Volumes" [B22'88 0720 103].

19. BFNP Unit 0 Design Change Notice (DCN) No. W11053, Nuclear Engineering, "Prevent Ground Level Releases", System 66 [Replaces ECN E-0-P7217].

20. U.S. NRC Regulatory Guide 1.145 Revision 1 "Atmosphere Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants," November 1982.

21. Code of Federal Regulations (CFR) Title 10, Energy, Parts 0 to 199.

22. Drawings: 47E200-16 RB, 0-47E605-1 R002, 41N1001 RA, 41N701 RA.

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RV RLS	9-11-92	JK	9-16-92
20c	1/20/93	JK	1-20-93

REFERENCES:

23. "BWR Report for Increasing MSIV Leakage Rate Limits and Elimination of Leakage Control Systems," NEDC-31858P, Class III, DRF B21-00461, GE Nuclear Energy. February, (1991).

24. Test Instruction 0-TI-225, Test Deficiency Report #4, Written 4/15/96

25. "Performance of Condensers and Main Steam Piping in Past Earthquakes," Report No. 50032.02-R-01, Revision 0, by S.P.Harris and T.R.Roche, EQE Engineering. Prepared for GE and incorporated as Appendix D of GE Report NEDC-31858P, Ref.(23) above.

26. Letter: T.A.Green to E.Trottier, OG91-603-09, Submittal of Revised BWR Owners Group (BWROG) MSIV Leakage Closure Committee Draft Documentation and Other Supporting Information for NRC Review and Comment," Attachment 2, "Verification of Main Steam Piping and Condenser Seismic Adequacy," July 26, 1991.

27. Calculation MD-Q0031-920154 R0, "Evaluation of Habitability Zone Unfilterd Inleakage," [R22920615104].

28. Memorandum from C.E.Cronan (Stone and Webster) to H. Lee Williams dated April 3, 1998 "BROWNS FERRY NUCLEAR STATION RESPONSE TO NRC QUESTIONS ON ATMOSPHERIC DISPERSION FACTORS/CONTROL ROOM HABILITABILITY ATMOSPHERIC DISPERSION FACTOR CALCULATIONS" RIMS# P92 980414 949

29. see ref. 9 ~~Browns Ferry Nuclear Plant Units 1,2,3 Unit 2 Technical Specifications 3.7.A.2.b and 3.7.B.2.b (As revised through Amendments 201, 184, 204 and 161, respectively)~~

30. Browns Ferry Nuclear Plant ~~Unit 2~~ Units 1,2,3 Technical Specifications 3.7.E.2.b "Control Room Emergency Ventilation," page 3.7/4.7-19, Amendments ~~No. 173, Sept. 18, 1989.~~ 184, 204 and 161 respectively.

REFERENCES:

31. TVA Drawing 0-47E865-4 R026.

32. ~~MD-Q2065-920326 R0, approved 7/25/92, "Estimated Percentage of SGTS Flow from the Refuel Floor and Reactor Building," [R14920727103].~~ Superseded by Reference 66 |R4

33. Calculation 02837.1401, "Accident Elevated X/Q from Top of Stack to Control Room Air Intakes," ENVR/WM(B)-3, dated 7/27/92; "Accident Ground Level X/Q from Base of Stack to Control Room Air Intakes," ENVR/WM(B)-2, dated 7/27/92, by Stone & Webster Engineering Corporation, Environmental Division, Boston, Massachusetts. [See Attachment 8]. TVA Calculation ND-Q0303-920092 R0, "Accident Ground Level X/Q From Base of Stack to Control Room Air Intakes", [R14 920828 110]

34. Federal Register / Vol. 56, No. 98 / Tuesday, May 21, 1991 / Rules and Regulations / 23394.

35. Calculation ND-Q2031-910015 R0, "Control Room LOCA Doses - CREVS Modifications," [B22910904104].

36. NUREG-1169, "Resolution of Generic Issue C-8," by J.N.Ridgely and M.L.Wohl, USNRC, Washington, DC 20555, (1986).

37. ICRP. 1977. Recommendations of the International Commission on Radiological Protection. International Commission on Radiological Protection, Publication 26, Pergamon Press, Oxford, England.

38. ICRP. 1979. Limits for Intakes of Radionuclides by Workers. International Commission on Radiological Protection, Publication 30, Part 1, Pergamon Press, New York, New York.

39. Letter: J.R.Rupert to Patrick P. Carier, dated July 8,1991, "BFNP - Boiling Water Reactor Owner's Group (BWROG) Plant - Specific Radiological Dose Calculations Data Sheets - MSIV Leakage," with attached data sheets, [B22910708002]. Given as Attachment 1.]

40. Calculation ND-Q2031-920012 R0, "Control Room LOCA Doses," [B22920429112].

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41. DCN W11053B, Closed 5/16/91, [B22910516009].

42. Browns Ferry Nuclear Plant Units 1, 2, and 3 Technical Specifications, Containment Systems, Surveillance Requirements, 4.7.A.2.i. (Amendments 189, 204, and 161)

43. Letter: T.A.Green to J.L.Kamphouse dated July 8, 1991, OG91-568-09, "Browns Ferry Control Room Dose Calculations in Accordance with the BWROG Radiological Dose Methodology (11.5 SCFH per steam line)." See Attachment 7.

44. Letter: A.L.Jenkins to J.L.Kamphouse, "Browns Ferry Control Room Dose Calculations in Accordance with the BWROG Radiological Dose Methodology (11.5 SCFH per Steam Line) Revision 1," dated August 28, 1992, with attachment: "Browns Ferry Nuclear Plant Calculation of LOCA Doses to the Control Room from MSIV Leakage," DRF A00-04146 Section C, Performed by GE Nuclear Energy, August 1992. [See Attachment 10].

45. Sketches based on Drawings: 3-47W200-8 R000, 47E200-15 RB, 10N212 R13; and the relevant drawings of DCN W18060A. [Given as Attachment 3.]

46. Reference deleted.

47. Drawings: 2-47E865-3 R005, 1-47E865-3 R005, 3-47E865-3 R006.

48. Reference deleted.

49. Thermodynamics: An Engineering Approach, by Y.A.Cengel and M.A.Boles, McGraw-Hill Book Company, New York, p.55, (1989).

50. Fundamentals of Physics, 3rd Edition, by D.Halliday and R. Resnick, John Wiley & Sons, Inc., New York, p. 486, (1988).

51. Fan Engineering, 7th Edition, Edited by R.Jorgensen, Buffalo Forge Co., Buffalo, New York, page 317, (1970).

52. Reference deleted.

53. BFNP FSAR, Figure 14.6-10, "LOCA Primary Containment Pressure Response," and Figure 14.6-11, "LOCA Drywell Temperature Response." [Given as Attachment 4.]

54-59. References deleted.

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| R6

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REFERENCES:

60. Fundamentals of Classical Thermodynamics, 2nd Edition, G.J.VanWylen and R.E.Sonntag, John Wiley and Sons, Inc., New York, (1973).

61. Reference deleted.

62. Procurement Request Form, H.Crisler to R.Hyde for purchase of two CREVS filter assemblies. [Given as Attachment 6].

63. USNRC Standard Review Plan, 6.4 Rev 2, "Control Room Habitability System," p 6.4-8, July, 1981.

64. Base Drawing (CCD U1-3) 0-47E865-4, DCA Number W17527-003 Rev 000; and Base Drawing (CCD) 0-47E865-4, DCA Numbers: W18060-001 R000, W18060-002 R000, W18060-003 R000, W18060-004 R000.

65. Base Drawing (CCD-0) 0-47E930-21 R000, DCA Number W18060-022 R000.

66. MD-Q0065-920473, "Estimated Mixing Volume and SGTS Flow During a Design Basis Accident on Unit 2 With the Equipment Hatches Removed", Revision 1 [R14 930104 101]

67. Site Standard Practice (SSP) 8.7, Revision 4, "Containment Leak Rate Program", pages 89 and 136.

68. Surveillance Instruction 2-SI-4.7.A.2.g-3/64f, Revision 4, "Primary Containment Leak Rate Test Hardened Wetwell Vent: Penetration X-205", Section 6.1. R6

69. ND-Q0064-920091, "Hardened Wetwell Vent Bypass Leakage Dose Evaluation", Revision 1.

70. BFN drawing 0-17E401-11 R1

71. Perry's Chemical Engineers' Handbook, 6th ed.

F

SUBJECT ND-Q2031-920075 PROJECT BFN-2,3 IR4

CONTROL ROOM DOSES

COMPUTED BY	DATE	CHECKED BY	DATE
JK	7-26-92		
R1 JK	8-28-92	BLS	7-27-92

AS: MJS 4-17-98
MH 4/28/98

CALCULATIONS:

MSIV FLOW RATE (Not used in R8) AS

The properties of an ideal gas at two different states are related to each other by: Refs.(49)&(50).

$$(P_iV_i)/T_i = (P_fV_f)/T_f$$

where P = pressure in PSIA
V = volume or volumetric flow rate, e.g. CFH.
T = absolute temperature, °R.
Subscript "i" indicates initial condition and "f" indicates final condition.

Consequently: $V_f = P_iV_iT_f/P_fT_i$

Initial conditions are standard temperature and pressure, i.e. the flow rate of 11.5 SCFH [Refs.(42)&(43)] is taken at 70°F and 1 atmosphere [Ref.(51); taken as 14.4 PSIA at BFNP]. The valve is tested at a pressure of 25 or 26 PSIG; see Ref.(43). Examination of Ref.(53) indicated that it was appropriate to determine the MSIV flow rate for two time periods under two different conditions, i.e. for two sets of values for P_f and T_f. Ref.(53) is given as Attachment 4 where the selection of the P_f and T_f parameters are shown. The two time periods were 0 - 1100 seconds and 1100 seconds - 30 days. All these parameters are shown below:

INITIAL CONDITIONS	0 - 1100 SEC	1100 SEC - 30 DAYS
P_i=14.4 PSIA(1 at)	P_f=27 PSIG+14.4 PSIA	P_f=10 PSIG+14.4 PSIA
	P_f=41.4 PSIA	P_f=24.4 PSIA
T_i=70°F=529.67°R	T_f=275°F=734.67°R	T_f=175°F=634.67°R
V_i=11.5 SCFH		

The absolute temperature Rankine scale is related to the Fahrenheit scale as follows:

°R = °F+459.67 See Ref.(60).

0 - 1100 SECONDS:

$V_f = \frac{(734.67°R)(14.4\ PSIA)(11.5\ SCFH)}{(41.4\ PSIA)(529.67°R)} = 5.548\ CFH.$

1100 SECONDS - 30 DAYS:

$V_f = \frac{(634.67°R)(14.4\ PSIA)(11.5\ SCFH)}{(24.4\ PSIA)(529.67°R)} = (0.7072)(11.5) =$

$V_f = 8.132 CFH.$

Since there are 4 steam lines the MSIV leakage from one line as given above must be multiplied by 4; therefore the leakages are (4)(5.548)=22.19 CFH and (4)(8.132)=32.6 CFH for the two time periods, respectively. The worst case leakage of 32.6 CFH will be used for the entire duration of the accident.

CALCULATIONS:

STP MODEL

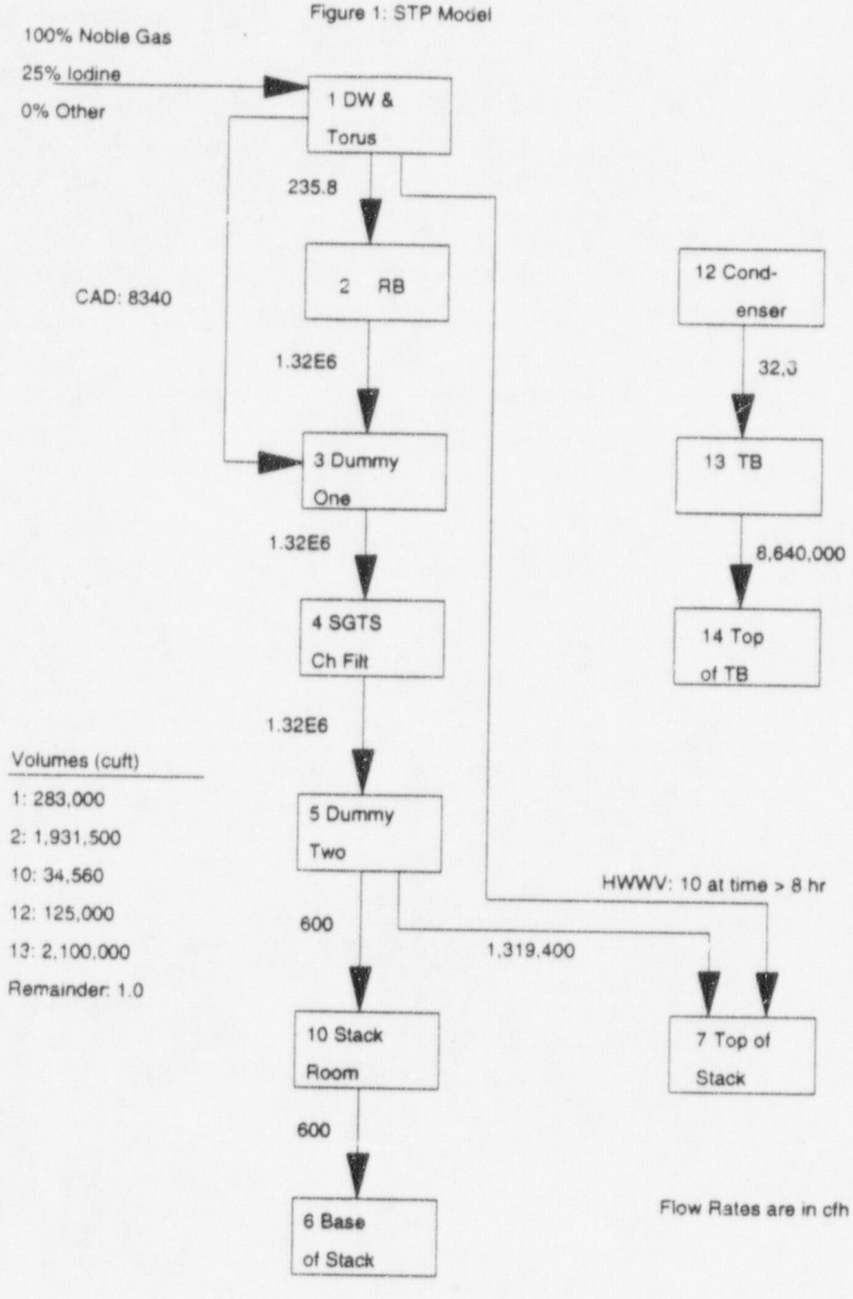
The STP model used to determine the released activities from the top and base of the stack for the control room dose analysis is shown in Figure 1. In this model the source term is released into the drywell (component 1) and then leaks at 235.8 cfh into the reactor building (component 2). The volume of the reactor building is taken as 1,931,502 ft^3 which indicates that mixing, and thus holdup and decay, takes place in the reactor building as well as the refuel floor. The SGTS flow from the reactor building is taken as 22,000 cfm (1,320,000 cfh) through the SGTS charcoal filter (component 4). The filter efficiency is taken as 90% for the inorganic and organic iodines. The CAD flow from the drywell to the SGTS is at a flow of 139.0 cfm (8340 cfh) for 24 hour periods beginning at 10 days, 20 days, and 29 days. The flow for the first 30.0 minutes to the base of stack (components 10 & 6) is 10 cfm (~~600~~ cfh) and 21,995 cfm (1,319,700 cfh) to the top of stack (component 8) under fumigation conditions. After 30.0 minutes fumigation ceases) and the 21,995 cfm is released from the top of the stack (component 7) via normal atmospheric conditions. R4 /R5

The flow from the containment to the main steam lines and the condensers is not used and has been discontinued in R8 (see figure 1). However the volumes/components are retained in the STP input for historical purposes. The historical flow (32.6 cfh) into the main steam lines and condensers was directed into component 12 which was a combined volume. The same flow is directed to the turbine deck which is component 13. The exhaust flow out the top of the TB vents is 8.640.000 cfh. This is directed to component 14.

The flows associated with this model are shown in Figure 2.

The hardened wetwell (HWWV) valves (FCV-64-221, -222) provide a leakage path from the drywell to the offgas stack. This flow is 10 cfh.

Figure 1: STP Model



R8

R8

Figure 2
FLOWS IN STP MODEL

COMPONENTS	FLOW RATE
1→2	2%/day = 235.8 cfh
1→7	0 cfh t< 8hr; 10 cfh for t>8 hr
2→3	22,000 cfm = 1,320,000 cfh
3→4	22,000 cfm = 1,320,000 cfh
4→5	22,000 cfm = 1,320,000 cfh
5→7	22,000 - 10 = 21990 cfm = 1,319,400 cfh
5→10	10 cfm = 600 cfh
10→6	10 cfm = 600 cfh
1→3	139 cfm = 8340 cfh for 24 hour periods at 10, 20, and 29 days; 0 cfh for all other times

Figure 3: STP Input

```
1  'CORE INVENTORY (CURIES)'
 1  7.7173+7     2  1.1455+8     3  1.8416+8     4  2.0719+8     5  1.7438+8
 6  3.3922+6     7  5.0351+6     8  8.0945+6     9  9.1072+6    10  7.6652+6
11  3.8936+7    12  1.3977+6    13  7.6039+7    14  1.0720+8    15  1.4002+8
16  1.1873+6    17  5.7251+6    18  2.0252+8    19  3.1599+7    20  1.9842+8
21  1.8343+8    22  1.8795+8
0
T
LOCA MODEL
NJ= 14  KCONC= 0
1 'DRYWELL & TORUS '
2 'U2 REACTOR ZONE'
3 'DUMMY1'
4 'CHARCOAL'
5 'DUMMY2'
6 'BASE OF STACK'
7 'TOP OF STACK'
8 'RB HVAC FAILS'
9 'NOT USED'
10 'STACK ROOMS'
11 'NEVER USED'
12 'CONDENSERS'
13 'TURB BLDG'
14 'TB TOP'
-1
INITIAL ACTIVITY (INSTANTANEOUSLY RELEASED FROM THE CORE) IN COMPONENTS
G 1 1.0E-6  2 1.0E-6  3 1.0E-6  4 1.0E-6  5 1.0E-6
G 6 1.0E-6  7 1.0E-6  8 1.0E-6  9 1.0E-6  10 1.0E-6
G 11 1.0E-6  12 1.0E-6  13 1.0E-6  14 1.0E-6
V 1 283000 CUFT  2 1931502 CUFT  3 1.0  4 1.0  5 1.0 CUFT
V 6 1.0  7 1.0  8 1.0  9 1.0  10 34560 CUFT  11 1.0 CUFT
V 12 125000 CUFT  13 2100000 CUFT  14 1.0
S 1 1 1 0.2>
S 1 1 2 0.25
S 1 1 3 1.00
F 1 2 0 235.8
$ F 2 TO 8 RB HVAC IS OMITTED IN THIS MODEL IT IS LESS THAN 30600 CFH.
F 1 3 0 0.0
F 1 7 0 0.0
$F 1 12 0 32.6 MSIV LEAKAGE OMITTED IN R8                                    | R8
F 2 3 0 1320000.
F 12 13 0 32.6
PF 12 1 10000.
F 13 14 0 8640000.
A 6
A 7
A 8
A 14
N 6 0
N 7 0
N 8 0
N 14 0
U 3 4 5 1320000. 0.90 0.90 0.0
F 5 10 0 600.0
F 10 6 0 600.0
F 5 7 0 1319400.0
0.5 HR
TIME TO 0.5 HR (30 MIN)
N 6 0
N 7 0
N 8 0
N 14 0
P 2 0 6 7
2.000 HR
TIME TO 2.000 HR (2.0 HRS)
N 6 0
N 7 0
N 8 0
N 14 0
P 2 0 6 7
8.0 HR
TIME TO 8.0 HR
N 6 0
N 7 0
N 8 0
N 14 0
P 2 0 6 7
24.0 HR
TIME TO 24.0 HR (1 DAY)
F 1 7 0 10.0
N 6 0                                                                        | R8
```

```
N 7 0
N 8 0
N 14 0
P 2 0 6 7
96.0 HR
TIME TO 96.0 HR (4 DAYS)
N 6 0
N 7 0
N 8 0
N 14 0
P 2 0 6 7
240.0 HR
TIME TO 240.0 HR (10 DAYS)  CAD PURGE FLOW FOR 24 HRS BEGINS
264.0 HR
TIME TO 264.0 HR (11 DAYS)  TURN OFF CAD PURGE FLOW
F 1 3 0 8340.0
480.0 HR
TIME TO 480.0 HR (20 DAYS)  CAD PURGE FLOW FOR 24 HRS BEGINS
F 1 3 0 0.0
504.0 HR
TIME TO 504.0 HR (21 DAYS)  TURN OFF CAD PURGE FLOW
F 1 3 0 8340.0
696.0 HR
TIME TO 696.0 HR (29 DAYS)CAD PURGE FLOW FOR 24 HRS BEGINS
F 1 3 0 0.0
720.0 HR
TIME TO 720.0 HR (30 DAYS)  TURN OFF CAD PURGE FLOW
F 1 3 0 8340.0
P 2 0 6 7
T
T
```

CALCULATIONS:

COROD MODEL

The dose to the control room operators was calculated using the computer code COROD. The COROD model used is based on the one used in Reference 5, however there are differences based on assumptions/technical justifications. The X/Q values are given in assumption 14. The activities released from bottom of the stack as determined by STP are input into the COROD runs N9275C8A (unit 1/west intake) and N9275C8B (unit 3/east intake). The STP output for the top of stack releases were used as input to the COROD runs N9275C8C (unit 1/west intake)and N9275C8D (unit 3/east intake).

The inputs to these four COROD runs are shown in Figures 4-7.

As per assumption 12, two additional cases were run to demonstrate the sensitivity of control room dose to CREVS flow rate. A case of CREVS flow of 1500 cfm was run to determine the lower analytical limit for the low fan flow switch on the CREVS unit. This analysis was performed in Revision 5 and not repeated in Revision 8 with the revised X/Q values or releases. Another case for a CREVS flow of 0 cfm was run in Revision 5 to demonstrate the acceptability of having no CREVS flow for approximately 2 minutes. The two minutes corresponds to the time between tripping the primary CREVS unit and the startup of the standby unit. Having no CREVS during the entire 30 day accident period bounds the thyroid dose for not having CREVS for any two minute period. The input decks for these cases are found in Appendix 13. They were not updated to the Revision 8 X/Q values or Revision 8 STP releases. These results are not used and are kept in the calculation to show the sensitivity of the doses to CREVS intake and for historical purposes.

Figure 4: COROD INPUT "N9275C8A"
U1/West Intake

R8

```
//N9275C8A JOB 264360,9MBERG,BIN111,MSGLEVEL=1,MSGCLASS=T
//*MAIN ORG=LOCAL,CLASS=SB
//JCL JCLLIB ORDER=(APB.NEN.PS264460.PROCLIB)
//STEP1 EXEC COROD,SOUT='*'
//GO.SYSIN DD *
NIT= 22   NR= 1   ITP= 6   FACT= 1.0
LOCA BASE OF STACK 0-30 DAY RELEASE  <-- NOTE: U1/WEST
I 131 I 132 I 133 I 134 I 135
I* 131 I* 132 I* 133 I* 134 I* 135
KRM 85 KR 85 KR 87 KR 88 KR 89
XEM 131 XEM 133 XE 133 XEM 135 XE 135 XE 137 XE 138
   -6  'BASE OF STACK                    ' $ TN=  0.5000E+00
         1 1.656E-04    2 2.198E-04    3 3.908E-04    4 3.325E-04    5 3.603E-04
         6 7.278E-06    7 9.662E-06    8 1.718E-05    9 1.461E-05   10 1.584E-05
        11 3.159E-03   12 1.201E-04   13 5.340E-03   14 8.402E-03   15 2.564E-04
        16 1.020E-04   17 4.901E-04   18 1.738E-02   19 1.433E-03   20 1.672E-02
        21 5.525E-04   22 5.652E-03
   -6  'BASE OF STACK                    ' $ TN=  0.2000E+01
         1 8.193E-03    2 7.822E-03    3 1.870E-02    4 7.125E-03    5 1.593E-02,
         6 3.601E-04    7 3.438E-04    8 8.221E-04    9 3.132E-04   10 7.003E-04
        11 1.322E-01   12 5.967E-03   13 1.472E-01   14 3.178E-01   15 1.026E-05
        16 5.055E-03   17 2.406E-02   18 8.594E-01   19 3.206E-02   20 7.787E-01
        21 5.185E-05   22 1.989E-02
   -6  'BASE OF STACK                    ' $ TN=  0.8000E+01
         1 2.589E-01    2 7.654E-02    3 5.212E-01    4 1.667E-02    5 3.307E-01
         6 1.138E-02    7 3.365E-03    8 2.291E-02    9 7.326E-04   10 1.454E-02
        11 2.252E+00   12 1.915E-01   13 6.628E-01   14 3.810E+00   15 2.932E-13
        16 1.609E-01   17 7.379E-01   18 2.709E+01   19 6.114E-01   20 1.935E+01
        21 3.965E-11   22 1.378E-03
   -6  'BASE OF STACK                    ' $ TN=  0.2400E+02
         1 2.404E+00    2 4.756E-02    3 3.467E+00    4 5.585E-04    5 1.051E+00
         6 1.057E-01    7 2.091E-03    8 1.524E-01    9 2.455E-05   10 4.622E-02
        11 4.511E+00   12 1.853E+00   13 9.039E-02   14 3.570E+00   15 0.0
        16 1.523E+00   17 6.300E+00   18 2.493E+02   19 2.087E+00   20 9.226E+01
        21 0.0         22 1.723E-10
   -6  'BASE OF STACK                    ' $ TN=  0.9600E+02
         1 2.489E+01    2 8.601E-04    3 1.092E+01    4 4.758E-09    5 5.241E-01
         6 1.094E+00    7 3.780E-05    8 4.800E-01    9 2.091E-10   10 2.304E-02
        11 8.978E-01   12 2.265E+01   13 3.745E-05   14 1.565E-01   15 0.0
        16 1.711E+01   17 4.560E+01   18 2.433E+03   19 1.209E+00   20 1.006E+02
        21 0.0         22 0.0
   -6  'BASE OF STACK                    ' $ TN=  0.7200E+03
         1 2.232E+02    2 5.836E-13    3 1.800E+00    4 0.0          5 5.259E-04
         6 9.809E+00    7 2.565E-14    8 7.913E-02    9 0.0         10 2.312E-05
        11 2.637E-05   12 5.250E+02   13 7.660E-22   14 6.074E-09   15 0.0
        16 2.379E+02   17 7.166E+01   18 1.450E+04   19 1.945E-03   20 8.881E-01
        21 0.0         22 0.0
2*3.70E-3 2.38-3 1.91-3 1.19-3 5.97-4
1800  5400  21600  57600  259200  2246400
3000.0 3717.0
0.90 1E-15 0.90 1E-15 210000.0 1E-15
100.0  60.0  40.0  1440.0  5760.0
153.948 36.833 15.33  46.0  9.0  4.0  76.974  18.4165 6.0  0.0
ROOFFLUX DOSE TO CONTROL ROOM PERSONNEL DUE TO SHINE THROUGH ROOF
1000.0  1000.0  1000.0  20.0  20.0  20.0  500.0  500.0  -13.58  2.25
/*
//
```

R8

Figure 5: COROD INPUT "N9275C8B"
U3/East Intake

R8

```
//N9275C8B JOB 264360,9MBERG.BIN111,MSGLEVEL=1,MSGCLASS=T
//*MAIN ORG=LOCAL,CLASS=SB
//JCL JCLLIB ORDER=(APB.NEN.PS264460.PROCLIB)
//STEP1 EXEC COROD,SOUT='*'
//GO.SYSIN DD *
NIT= 22   NR= 1   ITP= 6   FACT= 1.0
LOCA BASE OF STACK 0-30 DAY RELEASE   <-- NOTE: U3/EAST
I 131 I 132 I 133 I 134 I 135
I* 131 I* 132 I* 133 I* 134 I* 135
KRM 85 KR 85 KR 87 KR 88 KR 89
XEM 131 XEM 133 XE 133 XEM 135 XE 135 XE 137 XE 138
   -6  'BASE OF STACK                    ' $ TN=  0.5000E+00
         1 1.656E-04    2 2.198E-04    3 3.908E-04    4 3.325E-04    5 3.603E-04
         6 7.278E-06    7 9.662E-06    8 1.718E-05    9 1.461E-05   10 1.584E-05
        11 3.159E-03   12 1.201E-04   13 5.340E-03   14 8.402E-03   15 2.564E-04
        16 1.020E-04   17 4.901E-04   18 1.738E-02   19 1.433E-03   20 1.672E-02
        21 5.525E-04   22 5.652E-03
   -6  'BASE OF STACK                    ' $ TN=  0.2000E+01
         1 8.193E-03    2 7.822E-03    3 1.870E-02    4 7.125E-03    5 1.593E-02
         6 3.601E-04    7 3.438E-04    8 8.221E-04    9 3.132E-04   10 7.003E-04
        11 1.322E-01   12 5.967E-03   13 1.472E-01   14 3.178E-01   15 1.026E-05
        16 5.055E-03   17 2.406E-02   18 8.594E-01   19 3.206E-02   20 7.787E-01
        21 5.185E-05   22 1.989E-02
   -6  'BASE OF STACK                    ' $ TN=  0.8000E+01
         1 2.589E-01    2 7.654E-02    3 5.212E-01    4 1.667E-02    5 3.307E-01
         6 1.138E-02    7 3.365E-03    8 2.291E-02    9 7.326E-04   10 1.454E-02
        11 2.252E+00   12 1.915E-01   13 6.628E-01   14 3.810E+00   15 2.932E-13
        16 1.609E-01   17 7.379E-01   18 2.709E+01   19 6.114E-01   20 1.935E+01
        21 3.965E-11   22 1.378E-03
   -6  'BASE OF STACK                    ' $ TN=  0.2400E+02
         1 2.404E+00    2 4.756E-02    3 3.467E+00    4 5.585E-04    5 1.051E+00
         6 1.057E-01    7 2.091E-03    8 1.524E-01    9 2.455E-05   10 4.622E-02
        11 4.511E+00   12 1.853E+00   13 9.039E-02   14 3.570E+00   15 0.0
        16 1.523E+00   17 6.300E+00   18 2.493E+02   19 2.087E+00   20 9.226E+01
        21 0.0         22 1.723E-10
   -6  'BASE OF STACK                    ' $ TN=  0.9600E+02
         1 2.489E+01    2 8.601E-04    3 1.092E+01    4 4.758E-09    5 5.241E-01
         6 1.094E+00    7 3.780E-05    8 4.800E-01    9 2.091E-10   10 2.304E-02
        11 8.978E-01   12 2.265E+01   13 3.745E-05   14 1.565E-01   15 0.0
        16 1.711E+01   17 4.560E+01   18 2.433E+03   19 1.209E+00   20 1.006E+02
        21 0.0         22 0.0
   -6  'BASE OF STACK                    ' $ TN=  0.7200E+03
         1 2.232E+02    2 5.836E-13    3 1.800E+00    4 0.0          5 5.259E-04
         6 9.809E+00    7 2.565E-14    8 7.913E-02    9 0.0         10 2.312E-05
        11 2.637E-05   12 5.250E+02   13 7.660E-22   14 6.074E-09   15 0.0
        16 2.379E+02   17 7.166E+01   18 1.450E+04   19 1.945E-03   20 8.881E-01
        21 0.0         22 0.0
2*1.20E-3 7.91-4 6.42-4 4.09-4 2.14E-4
1800  5400  21600  57600  259200  2246400
3000.0 3717.0
0.90 1E-15 0.90 1E-15 210000.0 1E-15
100.0  60.0  40.0  1440.0  5760.0
153.948 36.833 15.33  46.0  9.0  4.0  76.974  18.4165 6.0  0.0
ROOFFLUX DOSE TO CONTROL ROOM PERSONNEL DUE TO SHINE THROUGH ROOF
1000.0  1000.0  1000.0  20.0  20.0  20.0  500.0  500.0  -13.58  2.25
/*
//
```

R8

Figure 6: COROD INPUT "N9275C8C"
U1/West Intake

R8

```
//N9275C8C JOB 264360,9MBERG,BIN111,MSGLEVEL=1,MSGCLASS=T
//*MAIN ORG=LOCAL,CLASS=SB
//JCL JCLLIB ORDER=(APB.NEN.PS264460.PROCLIB)
//STEP1 EXEC COROD,SOUT='*'
//GO.SYSIN DD *
NIT= 22   NR= 1   ITP= 6   FACT= 1.0
LOCA BASE OF STACK 0-30 DAY RELEASE (Note: This title should read "TOP OF STACK") U1/WEST  RM 4/23/9
I 131 I 132 I 133 I 134 I 135
I* 131 I* 132 I* 133 I* 134 I* 135
KRM 85 KR 85 KR 87 KR 88 KR 89
XEM 131 XEM 133 XE 133 XEM 135 XE 135 XE 137 XE 138
   -7  'TOP OF STACK                          ' $ TN=  0.5000E+00
         1 1.227E+02    2 1.651E+02    3 2.900E+02    4 2.555E+02    5 2.682E+02
         6 5.394E+00    7 7.258E+00    8 1.275E+01    9 1.123E+01   10 1.179E+01
        11 2.357E+03   12 8.900E+01   13 4.056E+03   14 6.296E+03   15 4.381E+02
        16 7.556E+01   17 3.634E+02   18 1.288E+04   19 1.336E+03   20 1.245E+04
        21 8.120E+02   22 4.864E+03
   -7  'TOP OF STACK                          ' $ TN=  0.2000E+01
         1 1.332E+03    2 1.328E+03    3 3.053E+03    4 1.304E+03    5 2.627E+03
         6 5.853E+01    7 5.837E+01    8 1.342E+02    9 5.733E+01   10 1.155E+02
        11 2.196E+04   12 9.693E+02   13 2.592E+04   14 5.350E+04   15 4.183E+00
        16 8.216E+02   17 3.921E+03   18 1.398E+05   19 1.393E+04   20 1.288E+05
        21 2.044E+01   22 5.086E+03
   -7  'TOP OF STACK                          ' $ TN=  0.8000E+01
         1 8.859E+03    2 3.239E+03    3 1.819E+04    4 9.570E+02    5 1.213E+04
         6 3.894E+02    7 1.424E+02    8 7.996E+02    9 4.206E+01   10 5.331E+02
        11 8.558E+04   12 6.536E+03   13 3.308E+04   14 1.548E+05   15 2.947E-08
        16 5.509E+03   17 2.555E+04   18 9.307E+05   19 2.012E+05   20 7.139E+05
        21 3.951E-06   22 1.192E+02                                              R8
   -7  'TOP OF STACK                          ' $ TN=  0.2400E+02
         1 3.414E+04    2 9.648E+02    3 5.123E+04    4 1.379E+01    5 1.714E+04
         6 1.500E+03    7 4.241E+01    8 2.252E+03    9 6.063E-01   10 7.532E+02
        11 5.742E+04   12 1.917E+04   13 1.533E+03   14 5.040E+04   15 0.0
        16 1.590E+04   17 6.741E+04   18 2.618E+06   19 6.404E+05   20 1.12?E+06
        21 0.0         22 3.498E-06
   -7  'TOP OF STACK                          ' $ TN=  0.9600E+02
         1 1.268E+05    2 7.407E+00    3 6.438E+04    4 4.368E-05    5 3.869E+03
         6 5.575E+03    7 3.256E-01    8 2.830E+03    9 1.920E-06   10 1.701E+02
        11 5.198E+03   12 8.304E+04   13 2.470E-01   14 9.659E+02   15 0.0
        16 6.453E+04   17 1.817E+05   18 9.221E+06   19 3.681E+05   20 5.468E+05
        21 0.0         22 0.0
   -7  'TOP OF STACK                          ' $ TN=  0.7200E+03
         1 6.212E+0?    2 2.169E+09    3 6.443E+03    4 0.0          5 1.913E+00
         6 2.731E+04    7 9.534E-11    8 2.832E+02    9 0.0         10 8.407E-02
        11 7.091E-02   12 1.204E+06   13 2.096E-18   14 1.648E-05   15 0.0
        16 5.839E+05   17 2.103E+05   18 3.804E+07   19 6.050E+02   20 2.357E+03
        21 0.0         22 0.0
3.40E-5 5.90E-15 4.29E-15 3.65E-15 2.58E-15 1.57E-15
1800  5400  21600  57600  259200  2246400
3000.0 3717.0
0.90 1E-15 0.90 1E-15 210000.0 1E-15
100.0  60.0  40.0  1440.0  5760.0
153.948 36.833 15.13  46.0  9.0  4.0  76.974  18.4165 6.0  0.0
ROOFFLUX DOSE TO CONTROL ROOM PERSONNEL DUE TO SHINE THROUGH ROOF
1000.0  1000.0  1000.0  20.0  20.0  20.0  500.0  500.0  -13.58  2.25
/*
//
```

Figure 7: COROD INPUT "N9275C8D"
U3/East Intake

R8

```
//N9275C8D JOB 264360,9MBERG.BIN111,MSGLEVEL=1,MSGCLASS=T
//*MAIN ORG=LOCAL,CLASS=SB
//JCL JCLLIB ORDER=(APB.NEN.PS264460.PROCLIB)
//STEP1 EXEC COROD,SOUT='*'
//GO.SYSIN DD *
NIT= 22   NR= 1   ITP= 6   FACT= 1.0
LOCA BASE OF STACK 0-30 DAY RELEASE (Note: This title should read "TOP OF STACK")  U3/EAST  RWA 4/23/
I 131 I 132 I 133 I 134 I 135
I* 131 I* 132 I* 133 I* 134 I* 135
KRM 85 KR 85 KR 87 KR 88 KR 89
XEM 131 XEM 133 XE 133 XEM 135 XE 135 XE 137 XE 138
   -7  'TOP OF STACK                    ' $ TN= 0.5000E+00
         1 1.227E+02    2 1.651E+02    3 2.900E+02    4 2.555E+02    5 2.682E+02
         6 5.394E+00    7 7.258E+00    8 1.275E+01    9 1.123E+01   10 1.179E+01
        11 2.357E+02   12 8.900E+01   13 4.056E+03   14 6.296E+03   15 4.381E+02
        16 7.556E+01   17 3.634E+02   18 1.288E+04   19 1.336E+03   20 1.245E+04
        21 8.120E+02   22 4.864E+03
   -7  'TOP OF STACK                    ' $ TN= 0.2000E+01
         1 1.332E+03    2 1.328E+03    3 3.053E+03    4 1.304E+03    5 2.627E+03
         6 5.853E+01    7 5.837E+01    8 1.342E+02    9 5.733E+01   10 1.155E+02
        11 2.196E+04   12 9.693E+02   13 2.592E+04   14 5.350E+04   15 4.183E+00
        16 8.216E+02   17 3.921E+03   18 1.398E+05   19 1.393E+04   20 1.288E+05
        21 2.044E+01   22 5.086E+03
   -7  'TOP OF STACK                    ' $ TN= 0.8000E+01
         1 8.859E+03    2 3.239E+03    3 1.819E+04    4 9.570E+02    5 1.213E+04
         6 3.894E+02    7 1.424E+02    8 7.996E+02    9 4.206E+01   10 5.331E+02
        11 8.558E+04   12 6.536E+03   13 3.308E+04   14 1.548E+05   15 2.947E-08
        16 [illegible]509E+03   17 2.555E+04   18 9.307E+05   19 2.012E+05   20 7.139E+05
        21 [illegible]951E-06   22 1.192E+02
   -7  'TOP OF STACK                    ' $ TN= 0.2400E+02
         1 3.414E+04    2 9.648E+02    3 5.123E+04    4 1.379E+01    5 1.714E+04
         6 1.500E+03    7 4.241E+01    8 2.252E+03    9 6.063E-01   10 7.532E+02
        11 5.742E+04   12 1.917E+04   13 1.533E+03   14 5.040E+04   15 0.0
        16 1.590E+04   17 6.741E+04   18 2.618E+06   19 6.404E+05   20 1.128E+06
        21 0.0         22 3.498E-06
   -7  'TOP OF STACK                    ' $ TN= 0.9600E+02
         1 1.268E+05    2 7.407E+00    3 6.438E+04    4 4.368E-05    5 3.869E+03
         6 5.575E+03    7 3.256E-01    8 2.830E+03    9 1.920E-06   10 1.701E+02
        11 5.198E+03   12 8.304E+04   13 2.470E-01   14 9.659E+02   15 0.0
        16 6.453E+04   17 1.817E+05   18 9.221E+06   19 3.681E+05   20 5.468E+05
        21 0.0         22 0.0
   -7  'TOP OF STACK                    ' $ TN= 0.7200E+03
         1 6.212E+05    2 2.169E-09    3 6.443E+03    4 0.0          5 1.913E+00
         6 2.731E+04    7 9.534E-11    8 2.832E+02    9 0.0         10 8.407E-02
        11 7.091E-02   12 1.204E+06   13 2.096E-18   14 1.648E-05   15 0.0
        16 5.839E+05   17 2.103E+05   18 3.804E+07   19 6.050E+02   20 2.357E+03
        21 0.0         22 0.0
3.02E-5 9.64E-7 1.89E-7 8.37E-8 1.43E-8 1.13E-9
1800  5400  21600  57600  259200  2246400
3000.0 3717.0
0.90 1E-15 0.90 1E-15 210000.0 1E-15
100.0  60.0  40.0  1440.0  5760.0
153.948 36.833 15.33  46.0  9.0  4.0  76.974  18.4165 6.0  0.0
ROOFFLUX DOSE TO CONTROL ROOM PERSONNEL DUE TO SHINE THROUGH ROOF
1000.0  1000.0  1000.0  20.0  20.0  20.0  500.0  500.0  -13.58  2.25
/*
//
```

Results

The results for a CREVS flow rate of 3000 cfm are shown in Table 1. The whole body gamma dose to the control room from the reactor building shine is 1.511 rem (reference 16). The doses determined by COROD are based on ICRP-2 conversion factors. The table converts the ICRP-2 doses to the ICRP-30 values.

Table 1
Control Room THYROID Doses [rem]

Unit 1 (West Intake)

	0-.5 HR	.5-2 HR	2-8 HR	8-24 HR	1-4 DAY	4-30 DAY	TOTAL
Base Stack	1.326E-04	1.205E-02	3.026E-01	1.032E+00	7.082E+00	2.860E+01	
OF*	1	1	1	1	0.6	0.4	
ICRP-2 DOSE	1.326E-04	1.205E-02	3.026E-01	1.032E+00	4.249E+00	1.144E+01	17.036
DCF**	1.7	1.35	1.35	1.35	1.35	1.35	
ICRP-30 DOSE	7.800E-05	8.926E-03	2.241E-01	7.644E-01	3.148E+00	8.474E+00	12.619
Top Stack	9.045E-01	1.507E+00	8.516E-02	4.031E-07	8.030E-08	2.097E-07	
OF	1	1	1	1	0.6	0.4	
ICRP-2 DOSE	9.045E-01	1.507E+00	8.516E-02	4.031E-07	4.818E-08	8.388E-08	2.497
DCF	1.7	1.35	1.35	1.35	1.35	1.35	
ICRP-30 Dose	5.321E-01	1.116E+00	6.308E-02	2.986E-07	3.569E-08	6.213E-08	1.711

Unit 3 (East Intake)

	0-.5 HR	.5-2 HR	2-8 HR	8-24 HR	1-4 DAY	4-30 DAY	TOTAL
Base of Stack	4.301E-05	3.908E-03	1.005E-01	3.468E-01	2.434E+00	1.025E+01	
OF	1	1	1	1	0.6	0.4	
ICRP-2 DOSE	4.301E-05	3.908E-03	1.005E-01	3.468E-01	1.460E+00	4.100E+00	6.012
DCF	1.7	1.35	1.35	1.35	1.35	1.35	
ICRP-30 DOSE	2.530E-05	2.895E-03	7.444E-02	2.569E-01	1.082E+00	3.037E+00	4.453
Top Stack	8.034E-01	1.842E+00	1.133E+00	6.815E-01	4.666E-01	1.537E-01	
OF	1	1	1	1	0.6	0.4	
ICRP-2 DOSE	8.034E-01	1.842E+00	1.133E+00	6.815E-01	2.800E-01	6.148E-02	4.801
DCF	1.7	1.35	1.35	1.35	1.35	1.35	
ICRP-30 DOSE	4.726E-01	1.364E+00	8.393E-01	5.048E-01	2.074E-01	4.554E-02	3.434

Unit 1 (West Intake) Total: 14.331 rem
Unit 3 (East Intake) Total: 7.887 rem
AVG (both intakes): 11.109 rem

* OF= Occupancy Factor = 1.0 for 0-24 hr, 0.6 for 1-4 day, 0.4 for 4-30 day
** DCF = ICRP-30 Dose Conversion Factor = 1.7 for 0-0.5 hr, 1.35 for 0.5 hr-30 day

Table 2 Gamma and Beta Control Room Doses [rem]

	Gamma	Beta
U1 Base	0.0266	0.2186
U1 Top	0.009535	0.1114
U3 Base	0.009338	0.07658
U3 Top	0.01464	0.1634
RB	1.511	NA
U1 total	1.547135	0.33
U3 total	1.534978	0.23998
Average	1.5410565	0.28499

R8

The final doses for a CREVS flow rate of 3000 cfm are given below:

Table 3
Control Room Dose [rem]

Thyroid	11.109	(ICRP-30)
Gamma	1.541	
Beta	0.285	

The control room doses are below the limits of 10CFR50 App.A GDC 19 (ref.21) of 5 rem whole body or equivalent (30 rem thyroid, 30 rem beta).

The results for CREVS flow rates of 1500 cfm and 0 cfm are provided in Attachment 13. Note that these cases utilized the revision 5 models, and have not been updated to the revision 8 parameters.

ATTACHMENT 13 RESULTS ARE RETAINED FOR HISTORICAL PURPOSES AS EXPLAINED ON PAGE 29 of 37.
[illegible] 4/23/98

TENNESSEE VALLEY AUTHORITY

SUBJECT: ND-Q0031-920075
CONTROL ROOM DOSES

COMPUTED BY:	DATE:	CHECKED BY:	DATE:
WDC	1/20/93	[signature]	1-20-93

IR4

LIST OF COMPUTER RUNS:

Revision 2 IR4

STP RUNS

JOBNAME	JOB NUMBER	DATE
STP011	4388	9/18/92

COROD RUNS

JOBNAME	JOB NUMBER	DATE	DESCRIPTION
COROD06	4836	9/18/92	Base of stack release, t > 30.5 min
COROD07	4771	9/18/92	Top of stack release, t > 30.5 min
COROD08	4755	9/18/92	Fumigation conditions, t ≤ 30.5 min
COROD011	4803	9/18/92	Base of stack release, t ≤ 30.5 min

Revision 4

STP RUNS

JOBNAME	JOB NUMBER	DATE
ND9275S	9383	1/11/93
STP011 *	4388	9/18/92

COROD RUNS

JOBNAME	JOB NUMBER	DATE	DESCRIPTION
ND9275C1	9417	1/11/93	Top of stack release, t ≤ 30 min
COROD07 *	4771	9/18/92	Top of stack release, t > 30 min
ND9275C2	9374	1/11/93	Bottom of stack release, 0 to 30 min
ND9275C3	1087	1/20/93	Bottom of stack release, t > 30 min

R4

* From Revision 2

TENNESSEE VALLEY AUTHORITY

SUBJECT: ND-Q0031-920075 R5
CONTROL ROOM DOSES

COMPUTED BY:	DATE:	CHECKED BY:	DATE:
WDC	3/28/93	[signature]	3-28-93

LIST OF COMPUTER RUNS (cont'd)

Revision 5

COROD RUNS

JOBNAME	JOB NUMBER	DATE	DESCRIPTION
1500 cfm CREVS flow rate			
ND9275C1	7336	3/26/93	Top of stack release, t ≤ 30 min
ND9275C3	7403	3/26/93	Bottom of stack release, t > 30 min
0 cfm CREVS flow rate			
ND9275C1	7292	3/26/93	Top of stack release, t ≤ 30 min
ND9275C3	7377	3/26/93	Bottom of stack release, t > 30 min

Memorandum QA Record B22 91 0708 002

TENNESSEE VALLEY AUTHORITY

ND-Q2031-920075 RO, ATTACHMENT 1 PAGE 1 OF 3

TO : Patrick P. Carier, Manager of Site Licensing, PAB 1C-BFN

FROM : J. R. Rupert, Engineering Manager, Browns Ferry Engineering Project, Nuclear Engineering, EDB 1A-BFN

DATE : JUL 08 1991

SUBJECT: BROWNS FERRY NUCLEAR PLANT (BFN) - BOILING WATER REACTOR OWNER'S GROUP (BWROG) PLANT - SPECIFIC RADIOLOGICAL DOSE CALCULATIONS DATA SHEETS - MSIV LEAKAGE

Reference: Your memorandum to me dated April 10, 1991 (ROB 910410 983)

Please find attached the completed data sheets as requested for Plant-Specific radiological dose calculations by GE for the BWROG MSIV Leakage Committee.

J. R. Rupert

Attachment: Data Sheets

cc (Attachment):
RIMS, ET SLP 3
L. S. Bettis, EDB 1F-BFN
R. E. Crisler, EDB 1F-BFN
R. W. Mundy, TCE A11-BFN
C. W. Pratt, BR 5A-C
R. S. Rusczyk, ATR 1A-BFN
G. A. Silver, EDB 1F-BFN
M. G. Zaalouk, EDB 1A-BFN

0325m-85

RADIOLOGICAL DOSE CALCULATION
DATA SHEET #1

NEDO-32031-920075R0, ATTACHMENT 1 PAGE 2 of 3

PLANT(S) BROWNS FERRY NUCLEAR PLANT - UNIT 2

100% RATED POWER LEVEL 3293 MW THERMAL

Containment

Maximum Allowable Leakage Rate to Reactor Building 2 % per day
Does this include MSIV Leakage? ____ Yes X No

Reactor to Outboard MSIV Pipe Compartment

Number of Lines	4	
Average Pipe Length	141	feet *
Pipe Inside Diameter	23.647	inches
Pipe Outside Diameter	26	inches (Sched. 80)
Pipe Mass Per Unit Length	312	lbm. per foot
Insulation Material	Mirror (Reflective)	
Insulation Thickness	3-1/2	inches

Outboard MSIV to Tubrine Stop Valve Pipe Compartment (HP Turbine Pathway)

Average Pipe Length	189	feet *
Pipe Inside Diameter	21.562	inches
Pipe Outside Diameter	24	inches (Sched. 80 ASTM A106 Gr. B)
Pipe Mass Per Unit Length	297	lbm. per foot
Insulation Material	Calcium Silicate	
Insulation Thickness	2-1/2	inches

Outboard MSIV to Condenser Pipe Compartment (Drain Line Pathway)

Number of Lines	4(3") to 1(4")	*
Average/Equivalent Pipe Length	(125' of 3") (110' of 4")	feet *
Pipe Inside Diameter	2.624/3.826	inches
Pipe Outside Diameter	3.5/4.5	inches (Sched. 160/80 ASTM A106 Gr. B)
Pipe Mass Per Unit Length	14.31/14.98	lbm. per foot
Insulation Material	Fiberglass/Calcium Silicate	
Insulation Thickness	2-1/2	inches
Minimum Diameter of Drain Line Pathway	2.624	inches *

* GE will calculate equivalent values if appropriate drawings are provided (piping segments may not have same diameters or same number of parallel pathyways).

PLANT(S) BROWNS FERRY NUCLEAR PLANT - UNIT 2

Main Condenser/LP Turbine

Free Volume Condenser (not including hotwell)	1.36E5	cubic feet (Unit 2)
Free Volume LP Turbines	5.1E4	cubic feet

Relative Evaluations (Needed to Calculate Effective Volume)

- Surface of Water in Hotwell	2-4	feet - [567' elev. 27" = 190,000 gal 2 min. full power operation]
- Drain Line Inlet to Condenser	@ 590' EL. ℄ Drain Cooler	feet
- Condenser to LP Turbine Bellows	35'-10"	feet - [609'-1" LP Turbine Bellows ℄ 573'-3" Condenser ℄]
- Turbine Center Line	EL. 621'-0"	feet

Turbine Building

Estimated Free Volume	2.1E6	cubic feet (Unit 2 Turbine Deck

HP Turbine

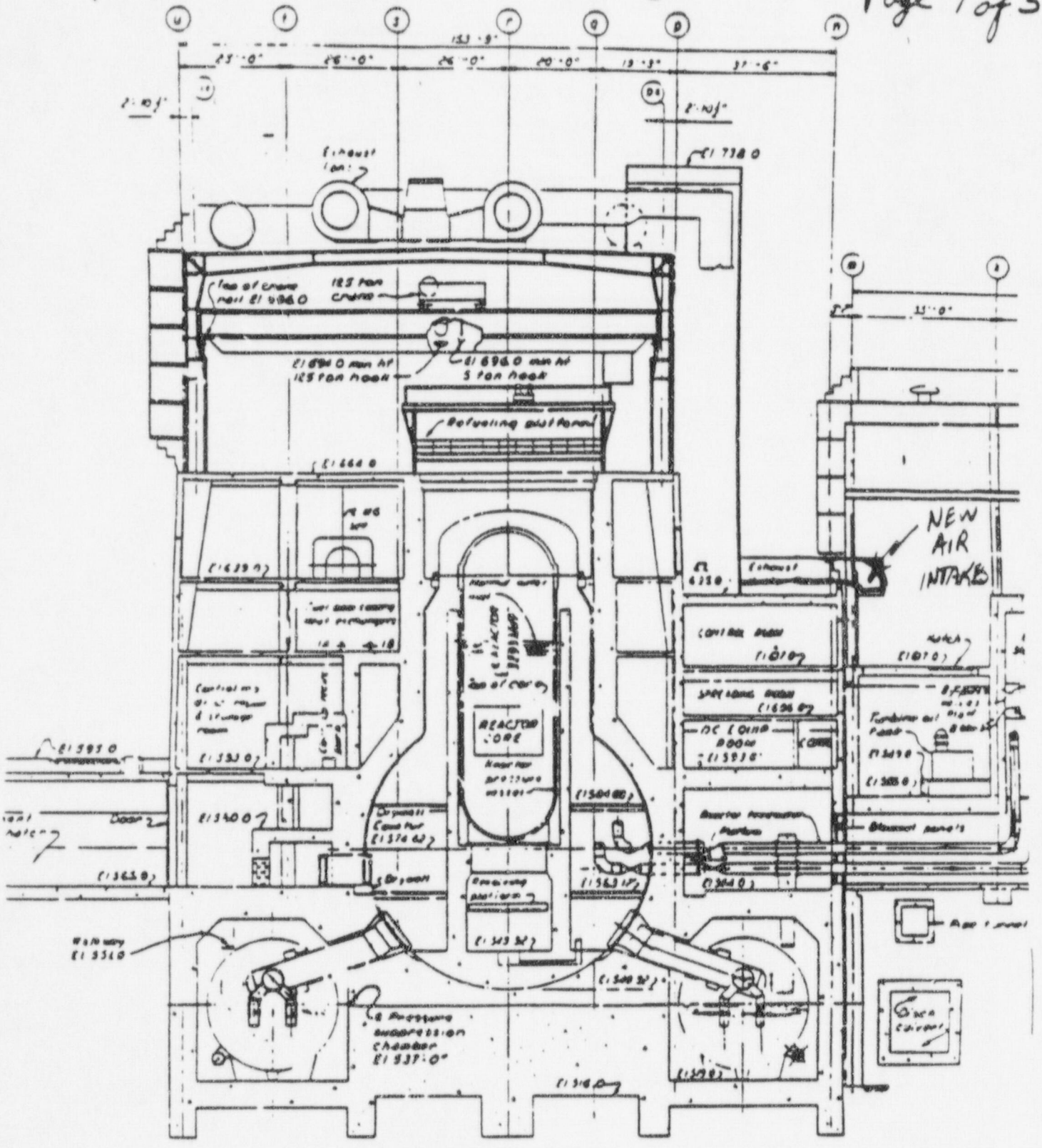
Estimated Free Volume	568.6	cubic feet *
Estimated Internal Area	4402	square feet *

Control Room

Free Volume	210,000	cubic feet [Complete Habitability Zone
Habitabable Volume	210,000	cubic feet
Vent Filter Intake	8.33	cubic feet per second (500cfm)
Vent Unfiltered Intake	45.8	cubic feet per second (2750cfm)
Recirculation Rate	no charcoal filters	cubic feet per second
Intake Filter Efficiency	95% Inorg/95% Org.	% (2 banks of 2 filters in seri
Intake Filter Activated Carbon Bed Depth	2	inches
Recirculation Filter Efficiency	No charcoal filters	%
Recirculation Filter Activated Carbon Bed Depth	No charcoal filters	inches

Is the intake and recirculation filter the same filter? ___Yes X No
(No charcoal filters in recirculation loop.)

* Typical from GE Turbine Department; if you have specific value for your plant, please revise accordingly.



3-47 W200-8 R000

41 N 200
201
202
203
41 N 222 - 226

DCN W1B060A
PAGE 3 OF

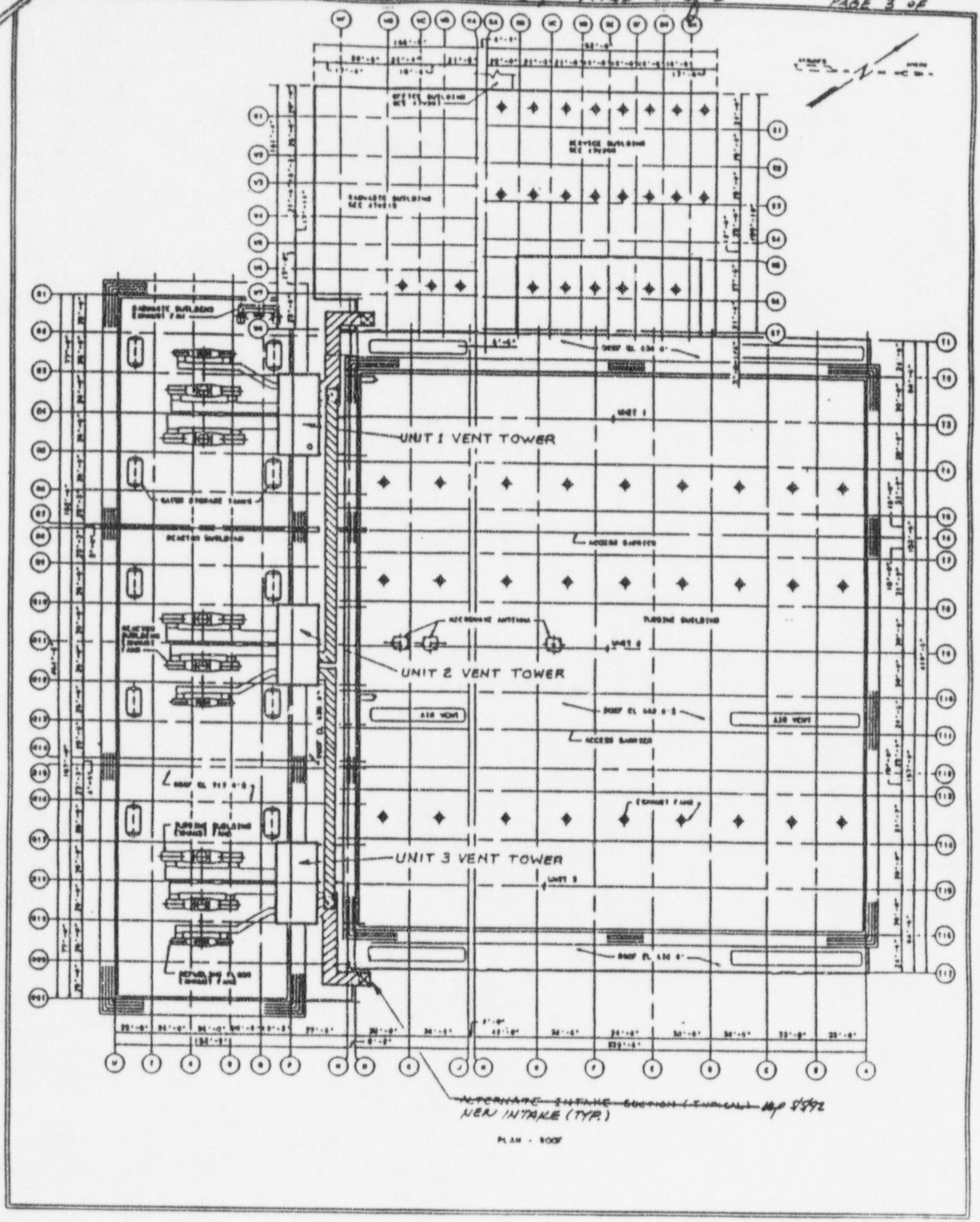
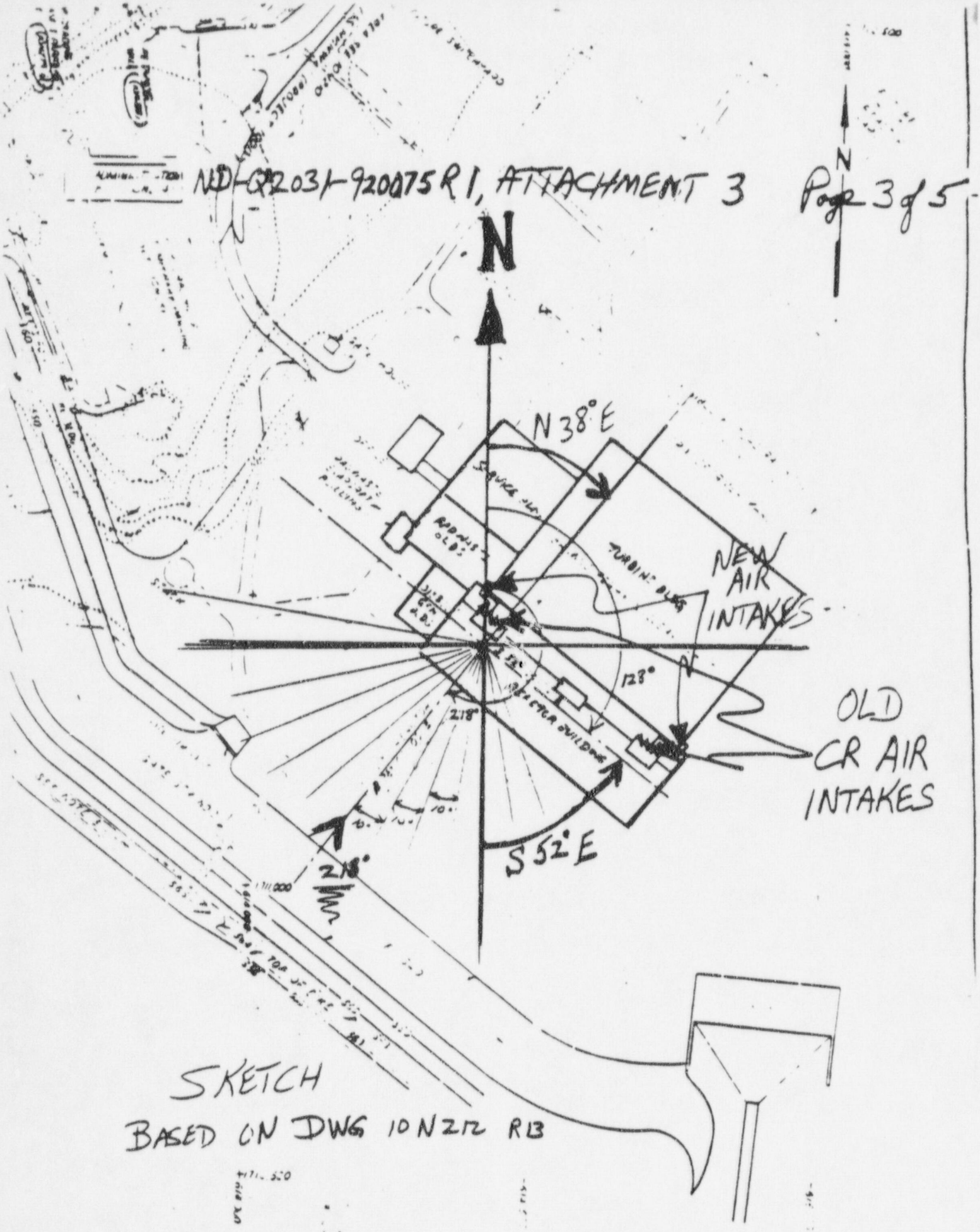
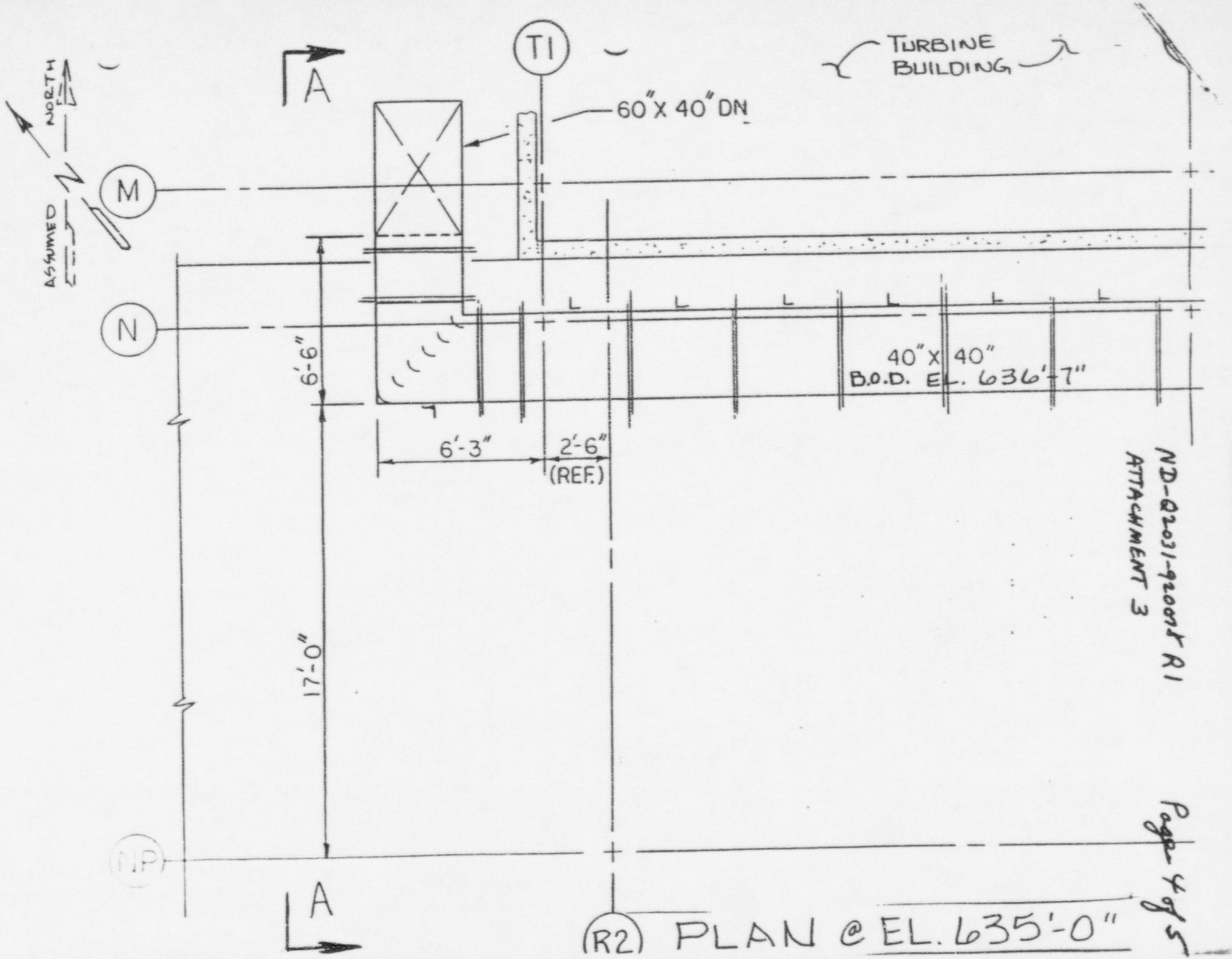


Figure 1

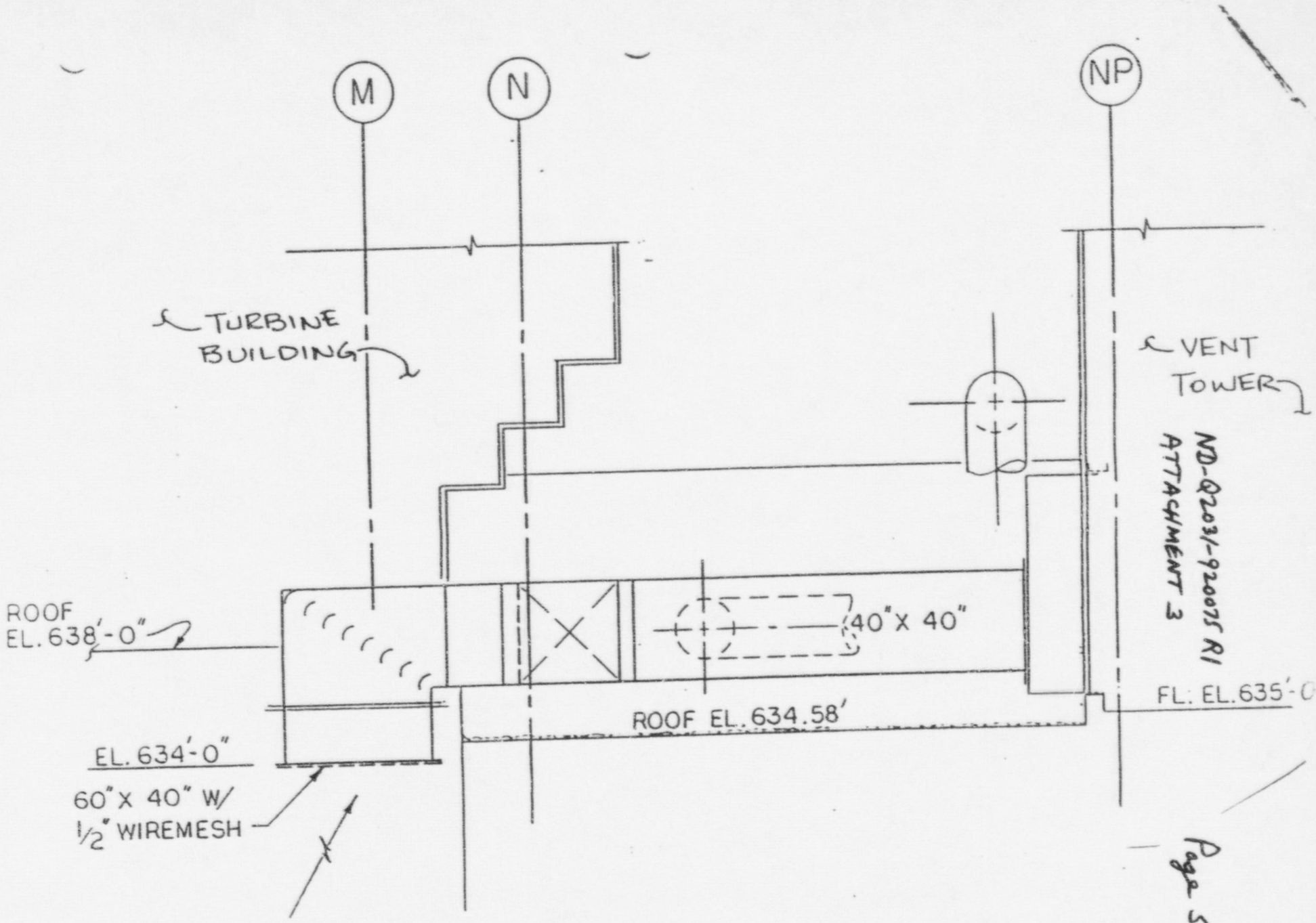


SKETCH

BASED ON DWG 10N212 R13



ND-Q2031-92001 R1
ATTACHMENT 3

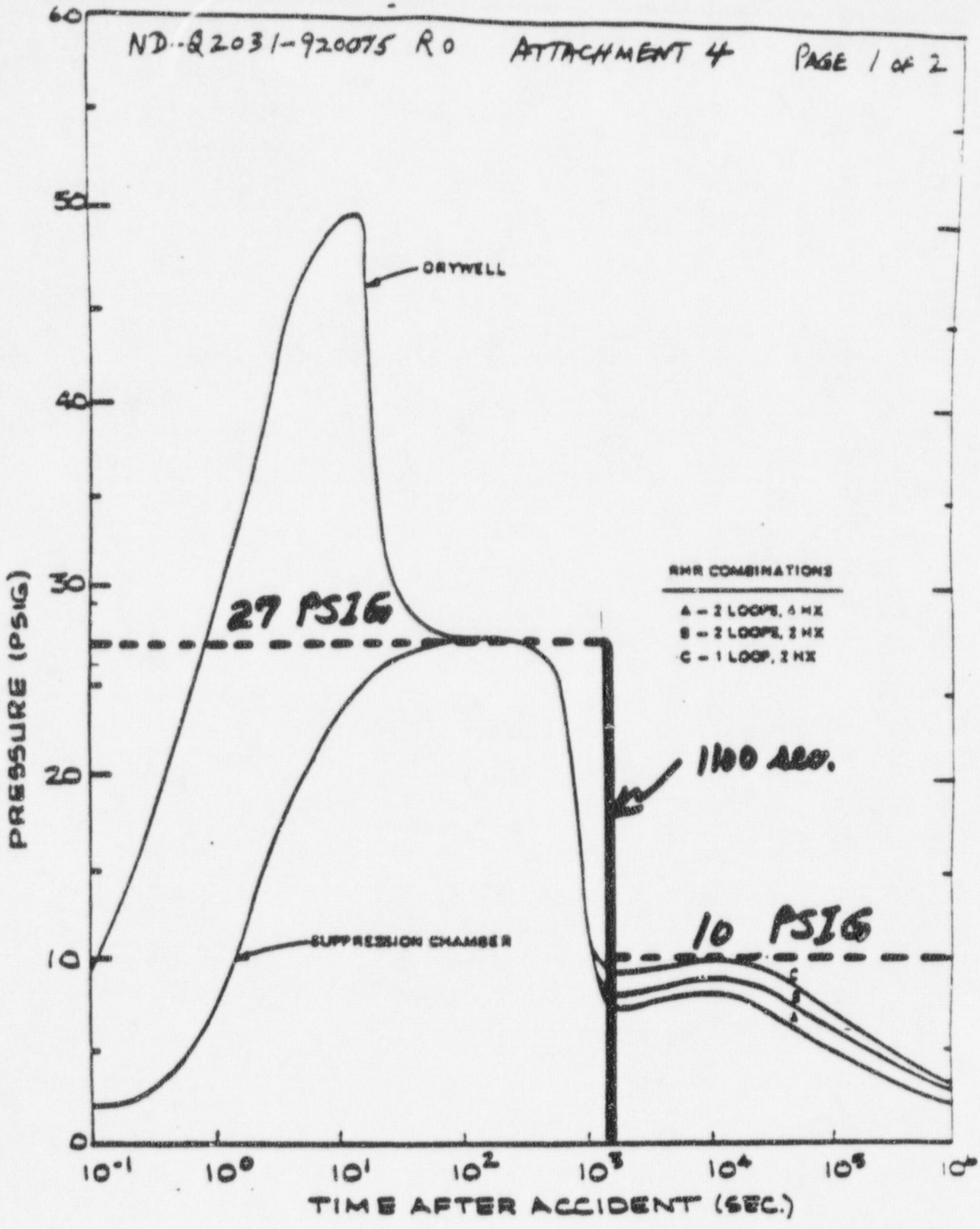


SECTION A-A

LKG. EAST

ND-Q2031-920075 R1
ATTACHMENT 3

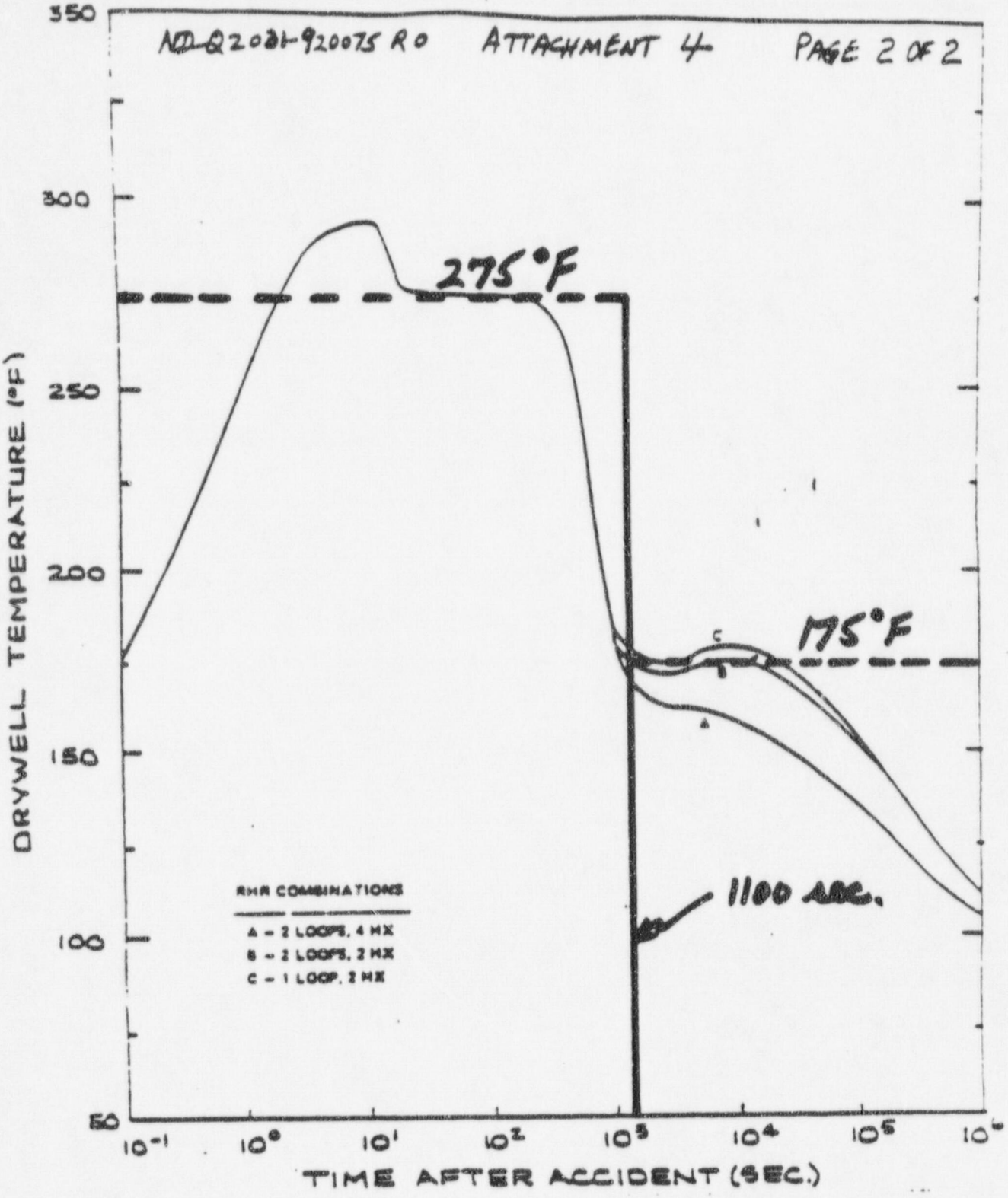
Page 5 of 5



BROWNS FERRY NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

Loss-of-Coolant Accident
Primary Containment Pressure
Response
FIGURE 14.6-10

AMENDMENT 7



BROWNS FERRY NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

Loss-of-Coolant Accident
Drywell Temperature Response
FIGURE 14.6-11

NDQ 2031-920075 R0 ATTACHMENT 6 PAGE 1 OF 3

PROCUREMENT REQUEST FORM

RIMS Accession Number _____

To: R. HOOE, LEAD PROCUMENT, MPC-2A-BFN

From: H. COILER, LEAD MECHANICAL, EDB-FAG-BFN

Date:

Subject: Procurement of Items and/or Materials for BROWNS FERRY NUCLEAR PLANT

PR Number:

Check as required:

- ☐ The item(s) and/or material per the attached procurement request (PR) will be requisitioned by the ONE engineering project. Expected performance dates are noted on the attached PR. (If this item is checked, do not complete the lower half of this form.)
- ☒ Please take the necessary action to procure the item(s) and/or material per the attached PR. Please return within 10 working days a copy of the PR form to me with the requested information on item 10.
- ☐ This PR is unscheduled.
- ☐ This PR is behind schedule.
- ☒ This PR is for an emergency purchase. (See item 14 on PR.)
- ☐ This PR is scheduled.
- ☐ Input data sheet is attached.

Lead Engineer

cc (Attachment): RIMS, SL 28 C-K
RIMS, MR 4N 72A-C (for NU CON use)
D. R. Armentrout, WB C134 C-K (when performance dates are indicated)
Contract Engineer

RIMS Accession Number _____

To:

From:

Date:

Check as required:

- ☐ We acknowledge this procurement request. Expected performance dates are as we have indicated.
- ☐ This PR is being returned per the following remarks: _____

_____

_____ _____

Contract Engineer Assigned

cc (Attachment): RIMS, SL 28 C-K
RIMS, MR 4N 72A-C (for NU CON use)
D. R. Armentrout, WB C134 C-K (when performance dates are indicated)
Contract Engineer

TVA 10508 (ONE 8-86)

Project: BFNP ENGINEERING PROJECT		Date:	PR Number and Revision:
Prepared by and Extension: D.C. CHENG/X-7998		Checked by and Extension: G. GILLIGE/7665	CPM Activity Number:
Descriptive Title: PURCHASE TWO (2) EMERGENCY FILTER MACHINES			
1 Additional Description if Needed: CREVS - CONTROL ROOM EMERGENCY VENTILATION SYSTEM			
Exact Location: A. Building or Area: CONTROL BAY (U-2)		C. Column Lines: N-P/R11-R12	
Exact Location: B. Elevation: 617' FLOOR		D. System: 031 (HVAC)	
2 Attachment(s): APPENDIX A, B, C, D			
3 Procurement Item Number: P		Procurement Item Number: P	
Procurement Item Number: P		%Complete:	RQ/AN Activity Number:
4 Construction Item Number(s): N/A			
5 ECN Number(s): DCN # W17527			
6 A. ANS Safety Class: ANS 52.1		C. ASME Section III Class: N/A	
B. TVA Quality Group: N/A		D. IEEE Class: 1E	
E. Design Criteria (List referenced exceptions): BFN-50-7030A			
Applicable Standards and/or Codes: ASME N509/510, ANSI N6A-1&2, IEEE 112/323/344			
8 Seismic Analysis Required? ☑ Yes ☐ No		Category: 1	
9 Identical or Similar Item/Material was purchased on: Contract Number: 64261	File Number:	Project: BFNP	

10 Scheduled dates from CPM dated	Scheduled Dates	Expected Dates
Procurement Request Issue Date		
Requisition Issue Date (Date released to PURCH)		
Award of Contract		
Submittal of Technical Data (List each info and date required from vendor for TVA design)		
Delivery to Site (Enter Need Date if unscheduled) Start		
Complete	OCT. 16, 1992	

11 Quality Assurance Required? ☑ Yes ☐ No		Part 21 Functional? ☑ Yes ☐ No	
12 Design Basis Verified by (by DNE for NU CON-initiated PRs only)			
13 Shipping Destination	Plant Site: BFNP	Vendor: AAF	Other
14 Remarks: 1. URGENTLY PURCHASE REQUIRED TO MEET FUEL LOAD SCHEDULE 2. VENDOR DRAWINGS NEEDED DATE - JUNE 1, 92/ ENGR DESIGN COMPLETION BY 7/17/92 3. AAF HAS REQUALIFIED DESIGN TO MEET TVA'S SEISMIC LIMITATIONS/SCHEDULES 4. TVA IS TO OBTAIN OPTION TO PURCHASE TWO (2) REPLACEMENT REQUIRED & RELIABILITY			
15 Budget Authorization Number	Work Order Number	Work Authorization Number	

11.0 FACTORY TESTING

a. Factory testing of each fully assembly emergency pressurizing air system, each high efficiency filter, and each charcoal adsorber tray shall be conducted. Minimum performance for acceptance is specified in Section 30 herein.

12.0 PREPARATION FOR SHIPMENT

a. The Contractor shall prepare all materials and articles for shipment in such manner as to facilitate handling and to protect them from damage in transit, and he shall be responsible for and make good any and all damage due to improper preparation for loading for shipment. Boxes and crates shall be marked and have a packing list enclosed showing the parts contained therein.

b. All finished surfaces shall be coated or otherwise protected with an approved rust preventive.

c. Components shall be packaged for shipment in accordance with ANSI N45.2.2 as a minimum:

Component	Level of Packaging
Housing Assembly	D
HEPA/Postfilter	B
Charcoal	B
Instrument	B
Fan and Motor Assembly	D
Electric Duct Heater	B

13.0 INSTALLATION AND TESTING

a. If required by TVA, Contractor shall provide competent engineers to supervise the installation and initial testing of the assembled equipment furnished. Components shall be indelibly marked at the factory for identification and for location and orientation in the assembly. Piping and valves for test connections shall be permanent and shall be suitable for periodically testing the system and components throughout the plant life.

DETAILED SPECIFICATIONS

14.0 GENERAL CONDITIONS

a. Each air filter train shall have a nominal capacity of 3000 SCFM and shall be arranged essentially as shown on and be within the dimensional limits of attached Figure-1 Sheets 1 and 2. External pressure loses through ductwork, and HEPA filters upstream of charcoal filter assembly will be between 1.5" W.G. and 3.0" W.G.

11.0 FACTORY TESTING

a. Factory testing of each fully assembly emergency pressurizing air system, each high efficiency filter, and each charcoal adsorber tray shall be conducted. Minimum performance for acceptance is specified in Section 30 herein.

12.0 PREPARATION FOR SHIPMENT

a. The Contractor shall prepare all materials and articles for shipment in such manner as to facilitate handling and to protect them from damage in transit, and he shall be responsible for and make good any and all damage due to improper preparation for loading for shipment. Boxes and crates shall be marked and have a packing list enclosed showing the parts contained therein.

b. All finished surfaces shall be coated or otherwise protected with an approved rust preventive.

c. Components shall be packaged for shipment in accordance with ANSI N45.2.2 as a minimum:

Component	Level of Packaging
Housing Assembly	D
HEPA/Postfilter	B
Charcoal	B
Instrument	B
Fan and Motor Assembly	D
Electric Duct Heater	B

13.0 INSTALLATION AND TESTING

a. If required by TVA, Contractor shall provide competent engineers to supervise the installation and initial testing of the assembled equipment furnished. Components shall be indelibly marked at the factory for identification and for location and orientation in the assembly. Piping and valves for test connections shall be permanent and shall be suitable for periodically testing the system and components throughout the plant life.

DETAILED SPECIFICATIONS

14.0 GENERAL CONDITIONS

a. Each air filter train shall have a nominal capacity of 3000 SCFM and shall be arranged essentially as shown on and be within the dimensional limits of attached Figure-1 Sheets 1 and 2. External pressure loses through ductwork, and HEPA filters upstream of charcoal filter assembly will be between 1.5" W.G. and 3.0" W.G.

OG91-568-09
July 8, 1991

J. L. Kamphouse
Tennessee Valley Authority
Browns Ferry Nuclear Plant
P. O. Box 2000 (TCE-11)
Decatur, AL 35602

Subject: BROWNS FERRY CONTROL ROOM DOSE CALCULATIONS IN ACCORDANCE WITH THE BWROG RADIOLOGICAL DOSE METHODOLOGY (11.5 SCFH PER STEAM LINE)

Attachments: 1) Dose Calculation Summary for 11.5 scfh Per Steam Line and Computer Code Output

2) Browns Ferry Input Data Sheets

The subject control room dose calculations for Browns Ferry have been verified. These results are high partially because of the large unfiltered intake into the control room, and the high (and relatively constant with time) atmospheric dispersion factors. It appears that there may be a non-compliance at Browns Ferry regarding 10CFR20 requirements; therefore, this situation should probably be evaluated by TVA per 10CFR21 and 10CFR50.72 and 50.73.

MSIV LEAKAGE DOSE CONTRIBUTION (REMS)

	WB(5)	IOD(30)	BETA (30-75)
NOBLE GAS	0.14	0.00	1.49
INORG. IODINE	0.00	0.13	0.00
ORGANIC IODINE (4%)	0.01	325.	0.03
HP TURBINE	0.00	0.00	0.00
ORGANIC IODINE (CONVERSION FROM I-2)	0.00	179.	0.00
TOTAL DOSE FROM MSIV LEAKAGE PATHWAY	0.15	504.	1.52

ND-Q2031-920075 R0, ATTACHMENT 7, P2 of 2

If you have any questions regarding these verified calculations or any other MSIV Leakage Closure Committee issues, please call the undersigned.

Very truly yours,

TA Green

T. A. Green
Sr. Technical Program Manager
BWR Owners' Group
Tel: (408) 925-1308
FAX: (408) 925-2476
Mail Code 382

Attachments
TAG27/TAG/rt

cc: RD Binz IV, MSIV Leakage Closure Committee Chairman
CL Tully, GPC
LS Burns, GE
SJ Stark, GE
GB Stramback, GE

TENNESSEE VALLEY AUTHORITY

sheet 1 of 59

SUBJECT: ND-Q0031-920075 R5
CONTROL ROOM DOSES

COMPUTED BY:	DATE:	CHECKED BY:	DATE:
ZDC	3/28/93		3-28-93

Attachment 13
Evaluation of Reduced CREVS Flow Rates

The Control Room Emergency Ventilation system (CREVs) has two units (a primary unit and a standby unit). As a part of the instrumentation for the CREVs control circuits, a flow test is made to ensure that the fan in an operating unit is functioning properly. This is referred to as the low flow switch. If the flow rate is below a preestablished range, that unit is tripped and the standby unit is started. The CREVs fans were purchased with a flow requirement of 3000 cfm ± 10 percent (i.e., 2700 to 3300 cfm). The low flow instrumentation will be designed with an upper operational limit of 2700 cfm so as not to trip a fully functional unit (i.e., with flow greater than 2700 cfm). The lower limit for the instrumentation was selected as 1500 cfm. This was an arbitrary value If all of the instrument inaccuracies occurred at the same time at their maximum value, a unit would be considered fully functional (by the flow instrumentation) for a flow of as low as 1500 cfm. Revision 5 of this calculation demonstrates that a CREVS flow rate of 1500 cfm will yield acceptable operator doses. All other parameters are the same as used in the COROD runs for Revision 4.

If a CREVs unit is tripped based on low flow or for any other reason, a time period of approximately 2 minutes will exist in which CREVs is not supplying filtered air to the control room. In order to evaluate the acceptability of this situation, cases were run for 0 cfm CREVs flow for the thirty day duration of the accident. All other parameters are the same as used in the COROD runs for Revision 4.

Based on the results in the main body of this calculation it is known that the dose contribution from the base of the stack prior to thirty minutes and the top of the stack after thirty minutes are negligible. Therfore only the cases for the base of the stack after thirty minutes and the top of the stack before thirty minutes were evaluated.

TENNESSEE VALLEY AUTHORITY

SUBJECT: ND-Q0031-920075 R5
CONTROL ROOM DOSES

COMPUTED BY:	DATE:	CHECKED BY:	DATE:
2DC	3/28/93	JK	3-28-93

RESULTS

TABLE 13-1
CONTROL ROOM DOSES [REM] for 3000 cfm CREVs Flow Rate
From Page 34 of ND-Q0031-920075 R5

Source	Whole Body Gamma	Beta	Thyroid
Fumigation "ND9275C1"	0.00833	0.09804	2.394
(Bottom of stack t> 30 min) Base of Stack "ND9275C3"	0.00563	0.04536	4.003

TABLE 13-2
CONTROL ROOM DOSES [REM] for 1500 cfm CREVs Flow Rate

Source	Whole Body Gamma	Beta	Thyroid
Fumigation "ND9275C1"	0.008185	0.09519	2.952
(Bottom of stack t> 30 min) Base of Stack "ND9275C3"	0.005642	0.04542	4.956

TABLE 13-3
CONTROL ROOM DOSES [REM] for 0 cfm CREVs Flow Rate

Source	Whole Body Gamma	Beta	Thyroid
Fumigation "ND9275C1"	0.007970	0.09093	3.947
(Bottom of stack t> 30 min) Base of Stack "ND9275C3"	0.005657	0.04554	6.673

TENNESSEE VALLEY AUTHORITY

SUBJECT: ND-Q0031-920075 R5
CONTROL ROOM DOSES

COMPUTED BY:	DATE:	CHECKED BY:	DATE:
RDC	3/26/93	JK	3-28-93

A ratio of the thyroid dose from the stack for various CREVs flow rates is calculated by comparing the thyroid dose with a CREVS flow rate of 3000 cfm to the dose with a flow rate of 1500 and 0 cfm.

	1500 / 3000
Top of stack (1500 cfm)	2.952 / 2.394 = 1.233
Base of stack (1500 cfm)	4.956 / 4.003 = 1.238

	0 / 3000
Top of stack (0 cfm)	3.947 / 2.394 = 1.649
Base of stack (0 cfm)	6.673 / 4.003 = 1.667

The similar ratios for gamma and beta dose are very close to 1.0 (within 8 percent). Since the calculated doses for gamma and beta are so small compared to the allowable limit, the small effect due to CREVS flow rate reduction is negligible. Therefore the gamma and beta doses reported on page 36 of Revision 5 apply to the cases with reduced CREVS flow rates of 0 and 1500 cfm.

The control room thyroid doses due to MSIV leakage are expected to increase by the same ratios as calculated above. As discussed above for the stack releases, the effect on gamma and beta are negligble. The thyroid dose is expected to increase by the same 1.23 and 1.66 factors calculated above.

The total control room thyroid dose for a CREVS flow rate of 3000 cfm was determined to be 14.33 rems on page 36 of Revision 5 of this calculation. The corresponding thyroid dose for a CREVs flow rate of 1500 cfm would be 17.63 rem (1.23 x 14.33 = 17.63 rem) and the dose for 0 cfm CREVS flow would be 23.79 rem (1.66 x 14.33 = 23.79 rem). Both of these values are within the GDC 19 limits. Therefore it is concluded that a lower limit on the CREVS low flow instrumentation of 1500 cfm is acceptable and not having CREVS operating for a period of two minutes while the standby unit is coming up to speed is acceptable.

ATTACHMENT 13

WD 0031 92 0075

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9JKAMPHOUSE.EDB2FBFN
9JKAMPHOUSE.EDB2FBFN

9JKAMPHOUSE.EDB2FBFN
9JKAMPHOUSE.EDB2FBFN

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NN        NN  DDDDDDDD     9999999999    2222222222   777777777777  555555555555   CCCCCCCCCC        11
NNN       NN  DDDDDDDDD   999999999999  222222222222  777777777777  555555555555  CCCCCCCCCCCC      111
NNNN      NN  DD      DD  99        99  22        22  77        77  55            CC        CC     1111
NN NN     NN  DD      DD  99        99            22           77   55            CC                 11
NN  NN    NN  DD      DD  99        99            22          77    55            CC                 11
NN   NN   NN  DD      DD  999999999999           22          77     555555555     CC                 11
NN    NN  NN  DD      DD  999999999999          22          77      5555555555    CC                 11
NN     NN NN  DD      DD            99         22          77               55    CC                 11
NN      NNNN  DD      DD            99        22          77                55    CC                 11
NN       NNN  DD      DD  99        99       22          77                 55    CC        CC       11
NN        NN  DDDDDDDDD   999999999999  222222222222     77         555555555555  CCCCCCCCCCCC  1111111111
NN         N  DDDDDDDD     9999999999   222222222222     77          55555555555   CCCCCCCCCC   1111111111
```

ND9275C1 JOB07336
ND9275C1 JOB07336

9JKAMPHOUSE.EDB2FBFN
9JKAMPHOUSE.EDB2FBFN

ACCT# 264363
ACCT# 264363

ORIGIN INTERNAL READER
ORIGIN INTERNAL READER

START DATE 26 MAR 93.085
START TIME 13.13.23

STOP DATE 26 MAR 93.085
STOP TIME 13.13.37

XEQ TIME 00.00.14

XEQ NODE CHAGP

PRINTER 631
START TIME 13.23.06
PRINT DATE 26 MAR 93.085

56 CARDS READ
0 CARDS PUNCHED
435 LINES PRINTED

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START START    CHAGP    START START
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ND9275C1 JOB07336
ND9275C1 JOB07336

9JKAMPHOUSE.EDB2FBFN
9JKAMPHOUSE.EDB2FBFN

ACCT# 264363
ACCT# 264363

ORIGIN INTERNAL READER
ORIGIN INTERNAL READER

START DATE 26 MAR 93.085
START TIME 13.13.23

STOP DATE 26 MAR 93.085
STOP TIME 13.13.37

XEQ TIME 00.00.14

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PRINTER 631
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PRINT DATE 26 MAR 93.085

56 CARDS READ
0 CARDS PUNCHED
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9JKAMPHOUSE.EDB2FBFN
9JKAMPHOUSE.EDB2FBFN
9JKAMPHOUSE.EDB2FBFN
9JKAMPHOUSE.EDB2FBFN

```
IRR010I  USERID IDKDQ     IS ASSIGNED TO THIS JOB.
 13:13:22 IAT4401  LOCATE FOR STEP=QACHECK  DD=STEPLIB  DSN=APB.NEW.PS264460.PGMLIB
 13:13:22 IAT4402 UNIT=3380     ,VOL(S)=USGM15
 13:13:22 IAT4401  LOCATE FOR STEP=GO       DD=STEPLIB  DSN=APB.NEW.PS264460.PGMLIB
 13:13:22 IAT4402 UNIT=3380     ,VOL(S)=USGM15
 13:13:22 IAT4401  LOCATE FOR STEP=GO       DD=FT11F001 DSN=APB.NEW.WZ264460.ISOTOPE.ELEVEN
 13:13:22 IAT4402 UNIT=3380     ,VOL(S)=USGS22
 13:13:22 IAT4401  LOCATE FOR STEP=GO       DD=FT12F001 DSN=APB.NEW.WZ264460.ISOTOPE.TWELVE
 13:13:22 IAT4402 UNIT=3380     ,VOL(S)=USGS22
 13:13:22 IAT5110 JOB ND9275C1 (JOB07336) USES      D SOFT83
 13:13:22 IAT5110 JOB ND9275C1 (JOB07336) USES      D USGM15
 13:13:22 IAT5110 JOB ND9275C1 (JOB07336) USES      D SOFT85
 13:13:22 IAT5110 JOB ND9275C1 (JOB07336) USES      D USGS22
 13:13:23 IAT5210 JOB JS3CATLG (JOB07336) SYSM      USING D SOFT83 ON 727
 13:13:23 IAT5210 JOB STEPLIB  (JOB07336) SYSM      USING D USGM15 ON 27A
 13:13:23 IAT5210 JOB JS3CATLG (JOB07336) SYSM      USING D SOFT85 ON 730
 13:13:23 IAT5210 JOB FT11F001 (JOB07336) SYSM      USING D USGS22 ON 777
 13:13:23 IAT2000 JOB ND9275C1 (JOB07336) SELECTED SYSD     GRP=SBATCH
 13:13:23  TVA30262 720  LIMITED TIME CLASS IS IN EFFECT....
 13:13:23  ICH70001I IDKDQ    LAST ACCESS AT 13:13:22 ON FRIDAY, MARCH 26, 1993
 13:13:23  IEF403I ND9275C1 - STARTED - TIME=13.14.13
 13:13:24  BLM51A  ***BLOCKSIZE CHANGE, OLD=03990, NEW=23476, ND9275C1/VFYLKDT */IDRLIST /X.SM264360.FT06.OUTPUT.G6447V00
 13:13:24 IAT5110 JOB ND9275C1 (JOB07336) USES      D USGM15
 13:13:24  TVA002I ND9275C1 USGM15 27A BC=05376   EXCP=00000176 DDN=SYS00001
 13:13:25  TVA002I ND9275C1 USGS22 777 BC=00256   EXCP=00000001 DDN=IDRLIST
 13:13:25  TVA002I ND9275C1 USGM15 27A BC=00000   EXCP=00000004 DDN=STEPLIB
 13:13:26  TVA002I ND9275C1              VIO      EXCP=00000002 DDN=FT16F001
 13:13:26  TVA002I ND9275C1 USGS22 777 BC=00000   EXCP=00000000 DDN=FT11F001
 13:13:26  TVA002I ND9275C1 USGS22 777 BC=00000   EXCP=00000000 DDN=FT12F001
 13:13:36  TVA002I ND9275C1 USGS22 777 BC=00000   EXCP=00000044 DDN=FT12F001
 13:13:36  TVA002I ND9275C1 USGS22 777 BC=00000   EXCP=00002109 DDN=FT11F001
 13:13:36  TVA002I ND9275C1              VIO      EXCP=00000005 DDN=FT16F001
 13:13:36  TVA002I ND9275C1 USGS22 777 BC=00768   EXCP=00000002 DDN=FT06F001
 13:13:36  TVA002I ND9275C1 USGM15 27A BC=00000   EXCP=00000030 DDN=STEPLIB
 13:13:36  TVA002I ND9275C1 USGS22 777 BC=01024   EXCP=00000004 DDN=SYSUT1
 13:13:37  IEF404I ND9275C1 - ENDED - TIME=13.14.27
```

JK 3-26-93

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ATTACHMENT 13

ND-00031 92 0075

```
//*MAIN ORG=LOCAL,CLASS=SB
//PROCLIB DD DSN=APB.MEN.PS264460.PROCLIB,DISP=SHR
//STEP1 EXEC COROD,SOUT='*'
//GO.SYSIN DD *
/*
```

```
       1 //ND9275C1 JOB 264363,'JKAMPHOUSE.LDB2FBFN',MSGLEVEL=1,MSGCLASS=T
       2 //PROCLIB DD DSN=APB.MEN.PS264460.PROCLIB,DISP=SHR
       3 //STEP1 EXEC COROD,SOUT='*'
       4 XXCOROD   PROC T=5,LIBRARY='APB.MEN.PS264460.PGMLIB',SOUT='*',
         XX            ELEVEN='APB.MEN.WZ264460.ISOTOPE.ELEVEN',
         XX            TWELVE='APB.MEN.WZ264460.ISOTOPE.TWELVE'
       5 XXQACHECK EXEC PGM=VFYLKDT,REGION=4096K,TIME=1,
         XX            PARM='/JDATE=91071,PATH=APB.MEN.PS264469.PGMLIB(COROD)'
       6 XXSTEPLIB  DD  DSN=&LIBRARY,DISP=SHR
         IEF653I SUBSTITUTION JCL - DSN=APB.MEN.PS264460.PGMLIB,DISP=SHR
       7 XXPLIDUMP  DD  SYSOUT=&SOUT
         IEF653I SUBSTITUTION JCL - SYSOUT=*
       8 XXSYSPRINT DD  SYSOUT=&SOUT
         IEF653I SUBSTITUTION JCL - SYSOUT=*
       9 XXIDRLIST  DD  DSN=K.SN264360.FT06.OUTPUT(+1),DISP=(NEW,PASS),
         XX            UNIT=ALLOC,SPACE=(TRK,(20,5),RLSE),
         XX            DCB=(SYS1.MODEL,RECFM=FBA,LRECL=133,BLKSIZE=3990)
      10 XXSYSDUMP  DD  SYSOUT=&SOUT
         IEF653I SUBSTITUTION JCL - SYSOUT=*
      11 XXGO      EXEC PGM=COROD,TIME=&T
         IEF653I SUBSTITUTION JCL - PGM=COROD,TIME=5
      12 XXSTEPLIB  DD  DSN=&LIBRARY,DISP=SHR
         IEF653I SUBSTITUTION JCL - DSN=APB.MEN.PS264460.PGMLIB,DISP=SHR
      13 XXFT06F001 DD  DSN=K.SN264360.FT06.OUTPUT(+1),DISP=(MOD,PASS)
      14 XXFT11F001 DD  DSN=&ELEVEN,DISP=SHR
         IEF653I SUBSTITUTION JCL - DSN=APB.MEN.WZ264460.ISOTOPE.ELEVEN,DISP=SHR
      15 XXFT12F001 DD  DSN=&TWELVE,DISP=SHR
         IEF653I SUBSTITUTION JCL - DSN=APB.MEN.WZ264460.ISOTOPE.TWELVE,DISP=SHR
      16 XXFT16F001 DD  UNIT=SYSDA,DCB=(RECFM=FB,LRECL=80,BLKSIZE=3120),
         XX            SPACE=(TRK,(1,1),RLSE)
      17 XXSYSUDUMP DD  SYSOUT=&SOUT
         IEF653I SUBSTITUTION JCL - SYSOUT=*
      18 XXABNLIGNR DD  SYSOUT=&SOUT
         IEF653I SUBSTITUTION JCL - SYSOUT=*
      19 XXFT05F001 DD  DDNAME=SYSIN
      20 //GO.SYSIN DD *,DCB=BLKSIZE=80
      21 XXPRINT   EXEC PGM=IEBGENER,COND=EVEN
      22 XXSYSPRINT DD  SYSOUT=&SOUT
         IEF653I SUBSTITUTION JCL - SYSOUT=*
      23 XXSYSUT1   DD  DSN=K.SN264360.FT06.OUTPUT(+1),DISP=(OLD,PASS)
      24 XXSYSUT2   DD  SYSOUT=&SOUT
         IEF653I SUBSTITUTION JCL - SYSOUT=*
      25 XXSYSIN    DD  DUMMY
      26 XXCATALOG EXEC PGM=IEFBR14
      27 XXDD1      DD  DSN=K.SN264360.FT06.OUTPUT(+1),DISP=(OLD,CATLG,CATLG)
```

JK 3-28-93

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ATTACHMENT 13

ND 00031 92 0075

```
ICH70001I IDKDQ     LAST ACCESS AT 13:13:22 ON FRIDAY, MARCH 26, 1993
IEF236I ALLOC. FOR ND9275C1 GACHECX STEP1
IEF237I 27A  ALLOCATED TO STEPLIB
IEF237I JES3 ALLOCATED TO PLIDUMP
IEF237I JES3 ALLOCATED TO SYSPRINT
IGD100I 777 ALLOCATED TO DDNAME IDRLIST  DATACLAS (        )
IEF237I JES3 ALLOCATED TO SYSDUMP
BLM51A  ***BLOCKSIZE CHANGE, OLD=83990, NEW=23476, ND9275C1/VFYLKDT */IDRLIST /K.SN264360.FT06.OUTPUT.G6447V00
IEF237I 27A  ALLOCATED TO SYSLIB001
TVA002I ND9275C1 USGM15 27A BC=05376   EXCP=00000176 DDN=SYSLIB001
IEF285I   APB.MEN.PS264460.PGMLIB                    KEPT
IEF285I   VOL SER NOS= USGM15.
TVA002I ND9275C1 USGS22 777 BC=00256   EXCP=00000001 DDN=IDRLIST
TVA002I ND9275C1 USGM15 27A BC=00000   EXCP=00000004 DDN=STEPLIB
IEF142I ND9275C1 GACHECX STEP1 - STEP WAS EXECUTED - COND CODE 0000
IEF285I   APB.MEN.PS264460.PGMLIB                    KEPT
IEF285I   VOL SER NOS= USGM15.
IEF285I   IDKDQ.ND9275C1.JOB07336.D000000A.?         SYSOUT
IEF285I   IDKDQ.ND9275C1.JOB07336.D0000008.?         SYSOUT
IEF285I   K.SN264360.FT06.OUTPUT.G6447V00            PASSED
IEF285I   VOL SER NOS= USGS22.
IEF285I   IDKDQ.ND9275C1.JOB07336.D000000C.?         SYSOUT
*************************************************** TVA  JOB/STEP  INFORMATION ***************************************************
* STEP NAME  GACHECX                START TIME  13.14.13.45                STEP CPU    00.00.00.13                                 *
* PGM  NAME  VFYLKDT                STOP TIME   13.14.15.41                JOB  CPU    00.00.00.13                                 *
* SERV UNIT      629                ELAP  TIME  00.00.01.96                CONDITION CODE  0000                                    *
*********************************************************************************************************************************
*********************************************************************************************************************************
*                                                        EXCP STATISTICS                                                        *
*  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT        *
*  27A          4      777          1      27A        176                                                                        *
* TOTAL EXCP       181       VIO PAGE IN        0        VIO PAGE OUT          0       PAGES SWAPPED IN          0              *
*********************************************************************************************************************************
IEF373I STEP /GACHECX / START 93085.1314
IEF374I STEP /GACHECX / STOP  93085.1314 CPU    0MIN 00.13SEC SRB    0MIN 00.01SEC VIRT  4224K SYS   284K EXT       4K SYS    8900K
IEF236I ALLOC. FOR ND9275C1 GO STEP1
IEF237I 27A  ALLOCATED TO STEPLIB
IEF237I 777  ALLOCATED TO FT06F001
IEF237I 777  ALLOCATED TO FT11F001
IEF237I 777  ALLOCATED TO FT12F001
IGD101I SMS ALLOCATED TO DDNAME (FT16F001)
        DSN (SYS93085.T131321.RA000.ND9275C1.R0000001    )
        STORCLAS (SCTEMP) MGMTCLAS (        ) DATACLAS (        )
IEF237I JES3 ALLOCATED TO SYSUDUMP
IEF237I JES3 ALLOCATED TO ABNLIGNR
IEF237I JES3 ALLOCATED TO FT05F001
TVA092I ND9275C1              VIO        EXCP=00000002 DDN=FT16F001
TVA002I ND9275C1 USGS22 777 BC=00000   EXCP=00000000 DDN=FT11F001
TVA002I ND9275C1 USGS22 777 BC=00000   EXCP=00000000 DDN=FT12F001
TVA002I ND9275C1 USGS22 777 BC=00000   EXCP=00000044 DDN=FT12F001
TVA002I ND9275C1 USGS22 777 BC=00000   EXCP=00002109 DDN=FT11F001
TVA002I ND9275C1              VIO        EXCP=00000005 DDN=FT16F001
TVA002I ND9275C1 USGS22 777 BC=00768   EXCP=00000002 DDN=FT06F001
TVA002I ND9275C1 USGM15 27A BC=00000   EXCP=00000030 DDN=STEPLIB
IEF142I ND9275C1 GO STEP1 - STEP WAS EXECUTED - COND CODE 0000
IEF285I   APB.MEN.PS264460.PGMLIB                    KEPT
IEF285I   VOL SER NOS= USGM15.
IEF285I   K.SN264360.FT06.OUTPUT.G6447V00            PASSED
IEF285I   VOL SER NOS= USGS22.



IEF285I   APB.MEN.WZ264460.ISOTOPE.ELEVEN            KEPT
IEF285I   VOL SER NOS= USGS22.
IEF285I   APB.MEN.WZ264460.ISOTOPE.TWELVE            KEPT
IEF285I   VOL SER NOS= USGS22.
IGD105I SYS93085.T131321.RA000.ND9275C1.R0000001     DELETED,   DDNAME=FT16F001
IEF285I   IDKDQ.ND9275C1.JOB07336.D000000D.?         SYSOUT
IEF285I   IDKDQ.ND9275C1.JOB07336.D000000E.?         SYSOUT
IEF285I   IDKDQ.ND9275C1.JOB07336.D0000009.?         SYSIN
*************************************************** TVA  JOB/STEP  INFORMATION ***************************************************
* STEP NAME  GO                     START TIME  13.14.15.44                STEP CPU    00.00.01.41                                 *
* PGM  NAME  COROD                  STOP TIME   13.14.26.56                JOB  CPU    00.00.01.54                                 *
* SERV UNIT      8,830              ELAP  TIME  00.00.11.12                CONDITION CODE  0000                                    *
*********************************************************************************************************************************
*********************************************************************************************************************************
*                                                        EXCP STATISTICS                                                        *
*  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT        *
*  27A         30      777          2      777        2,109    777          44      VIO          5                                 *
* TOTAL EXCP       2,190       VIO PAGE IN        0        VIO PAGE OUT          0       PAGES SWAPPED IN          0              *
*********************************************************************************************************************************
IEF373I STEP /GO      / START 93085.1314
IEF374I STEP /GO      / STOP  93085.1314 CPU    0MIN 01.41SEC SRB    0MIN 00.24SEC VIRT  3968K SYS   708K EXT       8K SYS    8920K
IEF236I ALLOC. FOR ND9275C1 PRINT STEP1
IEF237I JES3 ALLOCATED TO SYSPRINT
IEF237I 777  ALLOCATED TO SYSUT1
IEF237I JES3 ALLOCATED TO SYSUT2
IEF237I DMY  ALLOCATED TO SYSIN
TVA002I ND9275C1 USGS22 777 BC=81024   EXCP=00000004 DDN=SYSUT1
IEF142I ND9275C1 PRINT STEP1 - STEP WAS EXECUTED - COND CODE 0000
IEF285I   IDKDQ.ND9275C1.JOB07336.D000000F.?         SYSOUT
IEF285I   K.SN264360.FT06.OUTPUT.G6447V00            PASSED
IEF285I   VOL SER NOS= USGS22.
IEF285I   IDKDQ.ND9275C1.JOB07336.D0000010.?         SYSOUT
*************************************************** TVA  JOB/STEP  INFORMATION ***************************************************
* STEP NAME  PRINT                  START TIME  13.14.26.60                STEP CPU    00.00.00.06                                 *
* PGM  NAME  IEBGENER               STOP TIME   13.14.27.13                JOB  CPU    00.00.01.60                                 *
* SERV UNIT      180                ELAP  TIME  00.00.00.53                CONDITION CODE  0000                                    *
*********************************************************************************************************************************
*********************************************************************************************************************************
*                                                        EXCP STATISTICS                                                        *
*  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT        *
*  777          4                                                                                                              *
* TOTAL EXCP         4       VIO PAGE IN        0        VIO PAGE OUT          0       PAGES SWAPPED IN          0              *
*********************************************************************************************************************************
IEF373I STEP /PRINT   / START 93085.1314
IEF374I STEP /PRINT   / STOP  93085.1314 CPU    0MIN 00.06SEC SRB    0MIN 00.00SEC VIRT   372K SYS   240K EXT       4K SYS    8928K
IEF236I ALLOC. FOR ND9275C1 CATALOG STEP1
IEF237I 777  ALLOCATED TO DD1
IEF142I ND9275C1 CATALOG STEP1 - STEP WAS EXECUTED - COND CODE 0000
IEF285I   K.SN264360.FT06.OUTPUT.G6447V00            CATALOGED
IEF285I   VOL SER NOS= USGS22.
*************************************************** TVA  JOB/STEP  INFORMATION ***************************************************
* STEP NAME  CATALOG                START TIME  13.14.27.18                STEP CPU    00.00.00.02                                 *
* PGM  NAME  IEFBR14                STOP TIME   13.14.27.69                JOB  CPU    00.00.01.62                                 *
* SERV UNIT       48                ELAP  TIME  00.00.00.51                CONDITION CODE  0000                                    *
*********************************************************************************************************************************
*********************************************************************************************************************************
*                                                        EXCP STATISTICS                                                        *
*  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT        *
* TOTAL EXCP         0       VIO PAGE IN        0        VIO PAGE OUT          0       PAGES SWAPPED IN          0              *
*********************************************************************************************************************************
```

ATTACHMENT 13

NU 00031 92 00075

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```
CATALOG / STOP  93085.1314 CPU     0MIN 00.02SEC SRB     0MIN 00.00SEC VIRT      4K SYS    240K EXT       4K SYS
********************************** TVA  JOB/STEP  INFORMATION **********************************
* JOB NAME ND9275C1  PROGRAMMER 9.KAMPHOUSE.EDB2FBFM  START DATE 03/26/93     START TIME 13.14.13.45  CONDITION CODE  0000      *
* JOB NUMB JOB07336  ACCT DATA    264363    :STEPLIB      STOP  DATE 03/26/93     STOP  TIME 13.14.27.71  CPU TIME  00.00.01.62  *
* JOB CLASS  SB                    MVS SP3.1.3  REL 03 .8                       ELAP  TIME 00.00.14.26  SERVICE UNITS      9,679 SYSD*
********************************** TVA  JOB/STEP  INFORMATION **********************************
IEF375I  JOB /ND9275C1/ START 93085.1314
IEF376I  JOB /ND9275C1/ STOP  93085.1314 CPU     0MIN 01.62SEC SRB     0MIN 00.25SEC
```

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ATTACHMENT 13

ND 00031.92 0075

JC 3.28.93

IEB352I WARNING : OUTPUT RECFM/LRECL/BLKSIZE COPIED FROM INPUT

PROCESSING ENDED AT EOD

ZBC 3/26/93

ATTACHMENT 13

9/59

ND 00031 92 0075

OX 3-28-93

LDC 3/28/93

ATTACHMENT 13

10/59

WD 00031 92 0075

DX 3-28-93

93/03/26 @ 13.14.14.408 LINKAGE EDITOR LOAD MODULE DATE VERIFICATION PAGE 0000

```
CCCCCCCCCC   0000000000   RRRRRRRRRR   0000000000   DDDDDDDDD
CCCCCCCCCCC  0000000000   RRRRRRRRRRR  0000000000   DDDDDDDDDD
CC      CC   00      00   RR      RR   00      00   DD      DD
CC           00      00   RR      RR   00      00   DD       DD
CC           00      00   RR      RR   00      00   DD       DD
CC           00      00   RRRRRRRRRRR  00      00   DD       DD
CC           00      00   RRRRRRRRRR   00      00   DD       DD
CC           00      00   RR    RR     00      00   DD       DD
CC           00      00   RR     RR    00      00   DD       DD
CC      CC   00      00   RR      RR   00      00   DD      DD
CCCCCCCCCCC  0000000000   RR       RR  0000000000   DDDDDDDDD
 CCCCCCCCCC  0000000000   RR       RR  0000000000   DDDDDDDDD
```

FILE: APB.NEN.PS264460.PGMLIB
MODULE: COROD
LASTLINK: 91/071

QA CHECK RESULTS

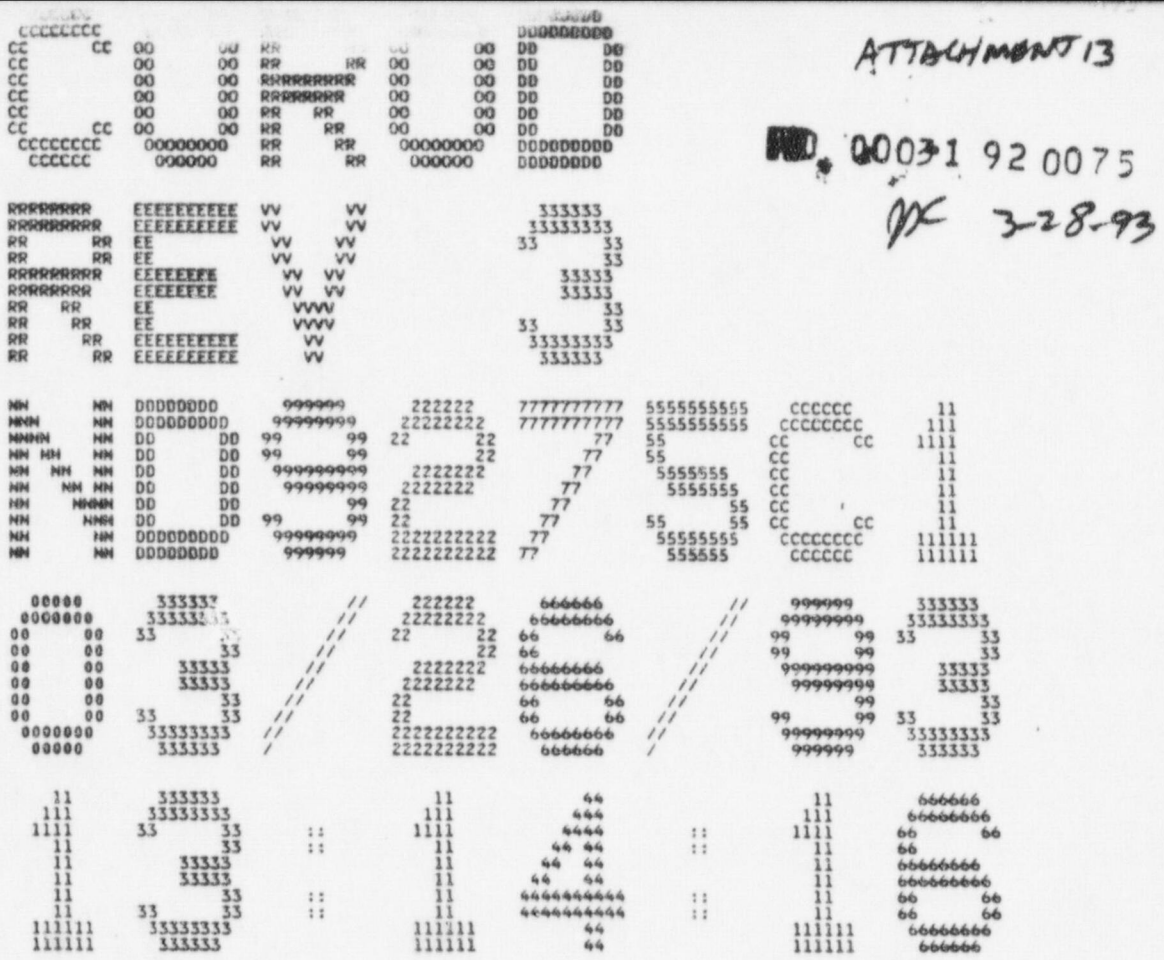
```
 PPPPPPPPPP    AAAAAAAAAA    SSSSSSSSSS    SSSSSSSSSS   EEEEEEEEEEE  DDDDDDDDD
 PPPPPPPPPPP  AAAAAAAAAAA  SSSSSSSSSSS  SSSSSSSSSSS  EEEEEEEEEEE  DDDDDDDDDD
 PP      PP   AA      AA   SS          SS  SS          SS  EE           DD      DD
 PP      PP   AA      AA   SS              SS          EE           DD       DD
 PP      PP   AA      AA   SSS             SSS         EE           DD       DD
 PPPPPPPPPPP  AAAAAAAAAAA   SSSSSSSSS     SSSSSSSSS    EEEEEEEE     DD       DD
 PPPPPPPPPP   AAAAAAAAAAA    SSSSSSSSS     SSSSSSSSS   EEEEEEEE     DD       DD
 PP           AA      AA         SSS             SSS   EE           DD       DD
 PP           AA      AA          SS              SS   EE           DD      DD
 PP           AA      AA   SS     SS   SS         SS   EE           DD      DD
 PP           AA      AA   SSSSSSSSSSS  SSSSSSSSSSS  EEEEEEEEEEE  DDDDDDDDD
 PP           AA      AA    SSSSSSSSS    SSSSSSSSS   EEEEEEEEEEE  DDDDDDDDD
```

ATTACHMENT 13

11/59

[redacted] 00031 92 0075

[redacted] 3-28-93



ADC 3/28/93

ATTACHMENT 13

12/59

ND 900319200075

OK 3-28-93

REPRODUCTION OF INPUT DATA DECK

```
+         +         +         +         +         +         +         +

NIT= 22   NR= 1   ITP= 6   FACT= 1.0
LOCA DOSE FUMIGATION- ND-00031-920075 RS
I 131 I 132 I 133 I 134 I 135
I= 131 I= 132 I= 133 I= 134 I= 135
KRM 85 KR 85 KR 87 KR 88 KR 89
XEM 131 XEM 133 XE 133 XEM 135 XE 135 XE 137 XE 138
    8  '30 MIN FUMIGATION                    ' $ TN=  0.5000E+00
         1 1.227E+02     2 1.652E+02     3 2.900E+02     4 2.556E+02     5 2.683E+02
         6 5.395E+00     7 7.260E+00     8 1.275E+01     9 1.123E+01    10 1.179E+01
        11 2.357E+03    12 8.902E+01    13 4.057E+03    14 6.297E+03    15 4.382E+02
        16 7.578E+01    17 3.635E+02    18 1.288E+04    19 1.336E+03    20 1.245E+04
        21 8.121E+02    22 4.865E+03
    8  '30 MIN FUMIGATION                    ' $ TN=  0.2000E+01
         1 0.0           2 0.0           3 0.0           4 0.0           5 0.0
         6 0.0           7 0.0           8 0.0           9 0.0          10 0.0
        11 0.0          12 0.0          13 0.0          14 0.0          15 0.0
        16 0.0          17 0.0          18 0.0          19 0.0          20 0.0
        21 0.0          22 0.0
    8  '30 MIN FUMIGATION                    ' $ TN=  0.8000E+01
         1 0.0           2 0.0           3 0.0           4 0.0           5 0.0
         6 0.0           7 0.0           8 0.0           9 0.0          10 0.0
        11 0.0          12 0.0          13 0.0          14 0.0          15 0.0
        16 0.0          17 0.0          18 0.0          19 0.0          20 0.0
        21 0.0          22 0.0
    8  '30 MIN FUMIGATION                    ' $ TN=  0.2400E+02
         1 0.0           2 0.0           3 0.0           4 0.0           5 0.0
         6 0.0           7 0.0           8 0.0           9 0.0          10 0.0
        11 0.0          12 0.0          13 0.0          14 0.0          15 0.0
        16 0.0          17 0.0          18 0.0          19 0.0          20 0.0
        21 0.0          22 0.0
    8  '30 MIN FUMIGATION                    ' $ TN=  0.9600E+02
         1 0.0           2 0.0           3 0.0           4 0.0           5 0.0
         6 0.0           7 0.0           8 0.0           9 0.0          10 0.0
        11 0.0          12 0.0          13 0.0          14 0.0          15 0.0
        16 0.0          17 0.0          18 0.0          19 0.0          20 0.0
        21 0.0          22 0.0
    8  '30 MIN FUMIGATION                    ' $ TN=  0.7200E+03
         1 0.0           2 0.0           3 0.0           4 0.0           5 0.0
         6 0.0           7 0.0           8 0.0           9 0.0          10 0.0
        11 0.0          12 0.0          13 0.0          14 0.0          15 0.0
        16 0.0          17 0.0          18 0.0          19 0.0          20 0.0
        21 0.0          22 0.0
3.26E-5 3.05E-12 4.8E-13 1.4E-13 2.7E-14 1.5E-15
1800  5400  21600  57600  259200  2246400
1500.0 3717.0
0.90 1E-15 0.90 1E-15 210000.0 1E-15
100.0  60.0  40.0  1440.0  5760.0
153.948 36.833 15.33  46.0  9.0  4.0  76.974  18.4165 6.0  0.0
ROOFFLUX DOSE TO CONTROL ROOM PERSONNEL DUE TO SHINE THROUGH ROOF
1000.0  1000.0  1000.0  20.0  20.0  20.0  500.0  500.0  -13.58  2.25
+         +         +         +         +         +         +         +
```

ATTACHMENT 13

13/59

ND 00031 92 0075

MC 3-28-93

CONTROL BAY COMPUTATION INPUT DATA
DATE 03/26/93 CORGO START TIME 13:14:16

NUMBER OF ISOTOPES = 22
NUMBER OF AIR INTAKE VALUES = 1
NUMBER OF TIME PERIODS = 6
MULTIPLIER OF INPUT CURIES = 1.0000E+00

TIME PERIODS (SEC)
1800.0 5400.0 21600.0 57600.0 259200.0 2246400.0

TOTAL CURIES RELEASED DURING TIME PERIOD

ISOTOPE							
I	131	122.7	0.0	0.0	0.0	0.0	0.0
I	132	165.2	0.0	0.0	0.0	0.0	0.0
I	[illegible]	290.0	0.0	0.0	0.0	0.0	0.0
I	134	255.6	0.0	0.0	0.0	0.0	0.0
I	135	268.3	0.0	0.0	0.0	0.0	0.0
I*	131	5.4	0.0	0.0	0.0	0.0	0.0
I*	132	7.3	0.0	0.0	0.0	0.0	0.0
I*	133	12.7	0.0	0.0	0.0	0.0	0.0
I*	134	11.2	0.0	0.0	0.0	0.0	0.0
I*	135	11.8	0.0	0.0	0.0	0.0	0.0
KRM	85	2357.0	0.0	0.0	0.0	0.0	0.0
KR	85	89.0	0.0	0.0	0.0	0.0	0.0
KR	87	4057.0	0.0	0.0	0.0	0.0	0.0
KR	88	6297.0	0.0	0.0	0.0	0.0	0.0
KR	89	438.2	0.0	0.0	0.0	0.0	0.0
XEM	131	75.6	0.0	0.0	0.0	0.0	0.0
XEM	133	363.5	0.0	0.0	0.0	0.0	0.0
XE	133	12880.0	0.0	0.0	0.0	0.0	0.0
XEM	135	1336.0	0.0	0.0	0.0	0.0	0.0
XE	135	12450.0	0.0	0.0	0.0	0.0	0.0
XE	137	812.1	0.0	0.0	0.0	0.0	0.0
XE	138	0.0	0.0	0.0	0.0	0.0	0.0

CHI/Q (SEC/CU. METER)
3.26E-05 3.05E-12 4.80E-13 1.40E-13 2.70E-14 1.50E-15

FLOW RATE OF AIR INTAKE (CFM)
1500.0

FILTER EFFICIENCY, ELEMENTAL IODINE, FIRST PASS = 0.90
FILTER EFFICIENCY, ELEMENTAL IODINE, SECOND PASS = 0.00
FILTER EFFICIENCY, ORGANIC IODINE, FIRST PASS = 0.90
FILTER EFFICIENCY, ORGANIC IODINE, SECOND PASS = 0.00
CONTROL ROOM VOLUME (CU. FT.) = 219000.0
FLOW RATE THROUGH ROOM CIRCULATION SYSTEM (CFM) = 0.0

100.0 PERCENT OCCUPANCY BEFORE 1440.0 MIN.

60.0 PERCENT OCCUPANCY BETWEEN 1440.0 AND 5760.0 MIN.
40.0 PERCENT OCCUPANCY AFTER 5760.0 MIN.

SUCCESSIVE TIME PERIODS IN MINUTES
30.0 90.0 360.0 960.0 4320.0 37440.0

AVERAGE CURIE RELEASE RATE CONCENTRATION IN CURIES/CU. METER DURING EACH TIME PERIOD

I	131	2.222E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I	132	2.992E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I	133	5.252E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I	134	4.629E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I	135	4.859E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I*	131	9.771E-08	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I*	132	1.315E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I*	133	2.309E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I*	134	2.034E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I*	135	2.135E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KRM	85	4.269E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR	85	1.612E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR	87	7.348E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR	88	1.140E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR	89	7.936E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XEM	131	1.369E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XEM	133	6.583E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE	133	2.333E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XEM	135	2.420E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE	135	2.255E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE	137	1.471E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE	138	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DATE 03/26/93 TIME 13:14:1

LWDC 3/28/93

LENGTH OF CONTAMINATED VOLUME (X) = 153.95 FT — 46 DIVISIONS
WIDTH OF CONTAMINATED VOLUME (Y) = 36.83 — 9 DIVISIONS
HEIGHT OF CONTAMINATED VOLUME (Z) = 15.33 — 4 DIVISIONS

DOSE POINT COORDINATES: X = 76.97 FT, Y = 18.42 FT, Z = 6.00 FT

SHIELD WALL THICKNESS = 0.000

14/59

ATTACHMENT 13

ND 00031 92 00075 1

OK 3-28-93

THE FOLLOWING VALUES ARE FOR A LEAK RATE OF 1500.00 CFM AND A BYPASS RATE OF****** CFM

ISOTOPE TOTAL CONCENTRATION TIME DURING EACH TIME PERIOD IN CURIE-HR/CU. METER

I	131	2.429E-07	5.172E-07	6.153E-08	7.866E-12	3.261E-22	0.000E+00
I	132	3.130E-07	5.660E-07	4.119E-08	8.681E-13	0.000E+00	0.000E+00
I	133	5.715E-07	1.197E-06	1.355E-07	1.449E-11	3.732E-22	0.000E+00
I	134	4.523E-07	6.469E-07	2.183E-08	2.482E-14	0.000E+00	0.000E+00
I	135	5.232E-07	1.053E-06	1.059E-07	7.371E-12	6.044E-23	0.000E+00
I*	131	1.068E-08	2.274E-08	2.705E-09	3.458E-13	1.434E-23	0.000E+00
I*	132	1.376E-08	2.491E-08	1.810E-09	3.815E-14	0.000E+00	0.000E+00
I*	133	2.513E-08	5.263E-08	5.957E-09	6.370E-13	1.641E-23	0.000E+00
I*	134	1.987E-08	2.842E-08	9.593E-10	1.090E-15	0.000E+00	0.000E+00
I*	135	2.299E-08	4.629E-08	4.653E-09	3.239E-13	2.656E-24	0.000E+00
KRM	85	6.156E-06	1.296E-05	1.117E-06	5.766E-11	2.129E-22	0.000E+00
KR	85	2.378E-07	5.075E-07	6.074E-08	7.933E-12	3.482E-22	0.000E+00
KR	87	1.002E-05	1.608E-05	7.966E-07	3.952E-12	0.000E+00	0.000E+00
KR	88	1.623E-05	3.026E-05	2.409E-06	7.125E-11	0.000E+00	0.000E+00
KR	89	3.503E-07	5.570E-08	1.799E-17	0.000E+00	0.000E+00	0.000E+00
XEM	131	2.019E-07	4.302E-07	5.127E-08	6.600E-12	2.787E-22	0.000E+00
XEM	133	9.693E-07	2.054E-06	2.406E-07	2.909E-11	1.040E-21	0.000E+00
XE	133	3.438E-05	7.315E-05	8.675E-06	1.097E-09	4.411E-20	0.000E+00
XEM	135	2.515E-06	1.829E-06	3.638E-09	5.652E-20	0.000E+00	0.000E+00
XE	135	3.290E-05	6.730E-05	7.098E-06	5.884E-10	7.687E-21	0.000E+00
XE	137	7.442E-07	1.435E-07	1.294E-15	0.000E+00	0.000E+00	0.000E+00
XE	138	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

THE FOLLOWING VALUES ARE FOR A LEAK RATE OF 1500.00 CFM AND A BYPASS RATE OF****** CFM

ISOTOPE TOTAL WHOLE BODY GAMMA DOSE FOR EACH ISOTOPE AND TIME PERIOD

I	131	4.759E-03	1.014E-02	1.206E-03	1.541E-07	6.390E-18	0.000E+00
I	132	3.482E-02	6.304E-02	4.582E-03	9.656E-08	0.000E+00	0.000E+00
I	133	1.588E-02	3.326E-02	3.764E-03	4.025E-07	1.037E-17	0.000E+00
I	134	5.229E-02	7.477E-02	2.524E-03	2.869E-09	0.000E+00	0.000E+00
I	135	3.315E-02	6.673E-02	6.708E-03	4.670E-07	3.829E-18	0.000E+00
I*	131	2.093E-04	4.457E-04	5.302E-05	6.777E-09	2.809E-19	0.000E+00
I*	132	1.530E-03	2.771E-03	2.014E-04	4.243E-09	0.000E+00	0.000E+00
I*	133	6.981E-04	1.462E-03	1.655E-04	1.770E-08	4.558E-19	0.000E+00
I*	134	2.297E-03	3.285E-03	1.109E-04	1.261E-10	0.000E+00	0.000E+00
I*	135	1.457E-03	2.933E-03	2.948E-04	2.052E-08	1.683E-19	0.000E+00
KRM	85	4.931E-02	9.661E-02	8.947E-03	4.618E-07	1.705E-18	0.000E+00
KR	85	2.425E-05	5.174E-05	6.192E-06	8.088E-10	3.550E-20	0.000E+00
KR	87	3.069E-01	4.925E-01	2.440E-02	1.210E-07	0.000E+00	0.000E+00
KR	88	1.125E+00	2.098E+00	1.670E-01	4.939E-06	0.000E+00	0.000E+00
KR	89	2.771E-02	4.406E-03	1.424E-12	0.000E+00	0.000E+00	0.000E+00
XEM	131	1.177E-03	2.508E-03	2.989E-04	3.848E-08	1.625E-18	0.000E+00
XEM	133	.892E-03	1.460E-02	1.710E-03	2.068E-07	7.394E-18	0.000E+00
XE	133	a.338E-01	1.136E+00	1.347E-01	1.702E-05	6.848E-16	0.000E+00
XEM	135	5.313E-02	3.865E-02	7.687E-05	1.194E-15	0.000E+00	0.000E+00
XE	135	4.094E-01	8.375E-01	8.833E-02	7.323E-06	9.566E-17	0.000E+00
XE	137	6.766E-03	1.304E-03	1.176E-11	0.000E+00	0.000E+00	0.000E+00
XE	138	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SUM:		2.667E+00	4.980E+00	4.451E-01	3.129E-05	8.127E-16	0.000E+00

TOTAL WHOLE BODY GAMMA DOSE FROM ALL ISOTOPES DURING POST ACCIDENT PERIOD IS = 8.093E+00 MRADS

THE FOLLOWING VALUES ARE FOR A LEAK RATE OF 1500.00 CFM AND A BYPASS RATE OF****** CFM

ISOTOPE TOTAL WHOLE BODY BETA DOSE FOR EACH ISOTOPE AND TIME PERIOD

I	131	3.917E-02	8.341E-02	9.923E-03	1.268E-06	5.258E-17	0.000E+00
I	132	1.336E-01	2.419E-01	1.758E-02	3.706E-07	0.000E+00	0.000E+00
I	133	1.935E-01	4.053E-01	4.588E-02	4.906E-06	1.264E-16	0.000E+00
I	134	2.291E-01	3.276E-01	1.106E-02	1.257E-08	0.000E+00	0.000E+00
I	135	1.598E-01	3.218E-01	3.234E-02	2.251E-06	1.846E-17	0.000E+00
I*	131	1.722E-03	3.668E-03	4.363E-04	5.577E-08	2.312E-18	0.000E+00
I*	132	5.872E-03	1.063E-02	7.728E-04	1.629E-08	0.000E+00	0.000E+00
I*	133	8.509E-03	1.782E-02	2.017E-03	2.157E-07	5.556E-18	0.000E+00
I*	134	1.007E-02	1.439E-02	4.858E-04	5.523E-10	0.000E+00	0.000E+00
I*	135	7.023E-03	1.414E-02	1.421E-03	9.894E-08	8.112E-19	0.000E+00
KRM	85	1.292E+00	2.532E+00	2.345E-01	1.210E-05	4.469E-17	0.000E+00
KR	85	4.947E-02	1.056E-01	1.263E-02	1.650E-06	7.243E-17	0.000E+00
KR	87	1.101E+01	1.767E+01	8.752E-01	4.342E-06	0.000E+00	0.000E+00
KR	88	5.051E+00	9.420E+00	7.499E-01	2.218E-05	0.000E+00	0.000E+00
KR	89	3.579E-01	5.691E-02	1.838E-11	0.000E+00	0.000E+00	0.000E+00
XEM	131	2.392E-02	5.099E-02	6.077E-03	7.823E-07	3.303E-17	0.000E+00
XEM	133	1.527E-01	3.235E-01	3.790E-02	4.583E-06	1.638E-16	0.000E+00
XE	133	3.864E+00	8.221E+00	9.749E-01	1.232E-04	4.957E-15	0.000E+00
XEM	135	1.983E-01	1.442E-01	2.869E-04	4.457E-15	0.000E+00	0.000E+00
XE	135	8.658E+00	1.769E+01	1.866E+00	1.547E-04	2.021E-15	0.000E+00
XE	137	1.014E+00	1.955E-01	1.763E-09	0.000E+00	0.000E+00	0.000E+00
XE	138	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SUM:		3.245E+01	5.785E+01	4.880E+00	3.328E-04	7.499E-15	0.000E+00

TOTAL WHOLE BODY BETA DOSE FROM ALL ISOTOPES DURING POST ACCIDENT PERIOD IS= 9.519E+01 MRADS

TOTAL WHOLE BODY GAMMA+BETA DOSE FROM ALL ISOTOPES DURING POST ACCIDENT PERIOD IS= 1.033E+02 MRADS

THE FOLLOWING VALUES ARE FOR A LEAK RATE OF 1500.00 CFM AND A BYPASS RATE OF****** CFM

ISOTOPE TOTAL INHALATION DOSE FOR EACH ISOTOPE AND TIME PERIOD

I	131	4.496E+02	9.562E+02	1.138E+02	7.334E-03	4.030E-13	0.000E+00
I	132	2.092E+01	3.788E+01	2.753E+00	2.926E-05	0.000E+00	0.000E+00
I	133	2.856E+02	5.981E+02	6.770E+01	3.651E-03	1.247E-13	0.000E+00
I	134	1.413E+01	2.020E+01	6.819E-01	3.909E-07	0.000E+00	0.000E+00
I	135	8.105E+01	1.632E+02	1.640E+01	5.758E-04	6.260E-15	0.000E+00
I*	131	1.974E+01	4.205E+01	5.002E+00	3.225E-04	1.772E-14	0.000E+00
I*	132	9.194E-01	1.665E+00	1.210E-01	1.286E-06	0.000E+00	0.000E+00
I*	133	1.256E+01	2.630E+01	2.976E+00	1.605E-04	5.481E-15	0.000E+00
I*	134	6.206E-01	8.876E-01	2.996E-02	1.717E-08	0.000E+00	0.000E+00
I*	135	3.562E+00	7.170E+00	7.207E-01	2.530E-05	2.751E-16	0.000E+00
SUM:		8.881E+02	1.854E+03	2.101E+02	1.210E-02	5.574E-13	0.000E+00

TOTAL VALATION DOSE FROM ALL IODINES DURING POST ACCIDENT

-20c 3/26/93

15/5

* *

THE FOLLOWING DOSES ARE THOSE GIVEN ABOVE BUT INCLUDE OCCUPANCY FACTORS.
THESE FACTORS ARE THE FOLLOWING: 100.00 PERCENT FOR 0 TO 1440. MINUTES;
60.00 PERCENT FOR 1440. TO 5760. MINUTES; AND
40.00 PERCENT AFTER 5760. MINUTES.

ATTACHMENT 13

WHOLE BODY GAMMA DOSE INCLUDING OCCUPANCY FACTOR IS 8.093E+00 MRADS
WHOLE BODY BETA DOSE INCLUDING OCCUPANCY FACTOR IS 9.519E+01 MRADS
INHALATION DOSE TO THYROID INCLUDING OCCUP. FACT. IS 2.952E+03 MRADS

ND 00031 92 00 5

QAC 3-28-93

CONTROL ROOM DOSE FROM DIRECT GAMMA PENETRATION OF WALLS, ROOF OR FLOOR FROM AN EXTERNAL SOURCE

DATE 03/26/93 TIME 13:14:16

DOSE TO CONTROL ROOM PERSONNEL DUE TO SHINE THROUGH ROOF

LENGTH OF CONTAMINATED VOLUME (X) = 1000.00 FT 20 DIVISIONS
WIDTH OF CONTAMINATED VOLUME (Y) = 1000.00 20 DIVISIONS
HEIGHT OF CONTAMINATED VOLUME (Z) = 1000.00 20 DIVISIONS

DOSE POINT COORDINATES: X = 500.00 FT, Y = 500.00 FT, Z = -13.58 FT

SHIELD WALL THICKNESS = 2.250

ISOTOPE		TOTAL WHOLE BODY GAMMA DOSE FOR EACH ISOTOPE AND TIME PERIOD					
I	131	1.464E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I	132	2.246E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I	133	6.464E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I	134	4.779E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I	135	9.754E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I*	131	6.439E-08	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I*	132	9.871E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I*	133	2.842E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I*	134	2.099E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I*	135	4.286E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KRM	85	7.669E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR	85	3.269E-08	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR	87	1.426E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR	88	7.191E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR	89	4.656E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XEM	131	4.302E-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XEM	133	1.332E-09	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE	133	3.107E-13	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XEM	135	9.492E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE	135	3.502E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE	137	1.169E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE	138	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SUM:		9.290E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

WHOLE BODY GAMMA DOSE(CONTINUOUS OCCUPANCY) DUE TO EXTERNAL SOURCE 9.290E-02 MRADS

WHOLE BODY GAMMA DOSE (OCCUPANCY FACTORS INCLUDED) DUE TO EXT. SOURCE 9.290E-02 MRADS

TOTAL PERSONNEL GAMMA DOSE FROM ALL SOURCES PRESENTLY CALCULATED 8.185E+00 MRADS

NOTE: TOTAL IS FOR FIRST VALUE OF CONTROL ROOM AIR FLOW RATE

DATE 03/26/93 COROD END TIME 13:14:26

*** CHATTANOOGA IBM BROADCAST MESSAGES ***
Updated 03/26/93 09:30

******* WEEKEND OUTAGE SCHEDULE ********

IBM Business Complex	No Scheduled Outage
CDC/CXA	Saturday 03/27/93 22:00 - 02:00 Sunday 03/28/93
CDC/CXB	Saturday 03/27/93 22:00 - 02:00 Sunday 03/28/93
Corp. Email Server	Saturday 03/27/93 22:00 - 02:00 Sunday 03/28/93
SUNX2	No Scheduled Outage

**** INSTALLATION OF CICS/ESA 3.3 IN THE CICS ACCEPTANCE REGIONS ****

On Sunday, March 28, 1993, the CICS Acceptance regions will be upgraded to CICS/ESA Version 3.3. The regions will be unavailable from 20:00 to 24:00. Please see ADP Information Center (ADPIC), Major Technical Issues for recently updated technical information on CICS/ESA 3.3.

!!! REMOVAL OF ROSCOE !!!

On March 28, 1993, ROSCOE will be removed from the IBM Business Complex. Customers are reminded to continue with migration of any applications remaining on ROSCOE.

*** END OF BROADCAST ***

ATTACHMENT 13

16/59

ND 00031 92 0075

OK 3-28-93

9JKAMPHOUSE.EDB2FBFN
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ND9275C1 JOB07336
ND9275C1 JOB07336

9JKAMPHOUSE.EDB2FBFN
9JKAMPHOUSE.EDB2FBFN

ACCT# 264363
ACCT# 264363

ORIGIN INTERNAL READER
ORIGIN INTERNAL READER

START DATE 26 MAR 93.085
START TIME 13.13.23

STOP DATE 26 MAR 93.085
STOP TIME 13.13.37

XEQ TIME 00.00.14

XEQ NODE CHAGP

PRINTER 631
STOP TIME 13.23.14
PRINT DATE 26 MAR 93.085

56 CARDS READ
0 CARDS PUNCHED
435 LINES PRINTED

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ND 00031 92 [illegible]
ND 00031 92 0075

ATTACHMENT 13
JK 3.28.93

9JKAMPHOUSE.EDB2FBFN
9JKAMPHOUSE.EDB2FBFN

ND9275C1 JOB07336
ND9275C1 JOB07336

9JKAMPHOUSE.EDB2FBFN
9JKAMPHOUSE.EDB2FBFN

ACCT# 264363
ACCT# 264363

ORIGIN INTERNAL READER
ORIGIN INTERNAL READER

START DATE 26 MAR 93.085
START TIME 13.13.23

STOP DATE 26 MAR 93.085
STOP TIME 13.13.37

XEQ TIME 00.00.14

XEQ NODE CHAGP

PRINTER 631
STOP TIME 13.23.14
PRINT DATE 26 MAR 93.085

56 CARDS READ
0 CARDS PUNCHED
435 LINES PRINTED

9JKAMPHOUSE.EDB2FBFN
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NN         NN  DDDDDDDDD      9999999999    2222222222   777777777777  555555555555   CCCCCCCCCC        11
NNN        NN  DDDDDDDDDD   999999999999  222222222222  77777777777   555555555555  CCCCCCCCCCCC      111
NNNN       NN  DD       DD  99        99  22        22  77       77   55            CC        CC    1111
NN NN      NN  DD       DD  99        99            22          77    55            CC                11
NN  NN     NN  DD       DD  99        99            22         77     55            CC                11
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NN         N   DDDDDDDDD     9999999999   222222222222        77      55555555555    CCCCCCCCCC   1111111111
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ND9275C1 JOB07292
ND9275C1 JOB07292

9JKAMPHOUSE.EDB2FBFN
9JKAMPHOUSE.EDB2FBFN

ACCT# 264363
ACCT# 264363

ORIGIN INTERNAL READER
ORIGIN INTERNAL READER

START DATE 26 MAR 93.085
START TIME 13.11.37

STOP DATE 26 MAR 93.085
STOP TIME 13.11.50

XEQ TIME 00.00.12

XEQ NODE CHAGP

PRINTER 631
START TIME 13.22.52
PRINT DATE 26 MAR 93.085

56 CARDS READ
0 CARDS PUNCHED
435 LINES PRINTED

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9JKAMPHOUSE.EDB2FBFN
9JKAMPHOUSE.EDB2FBFN

ND9275C1 JOB07292
ND9275C1 JOB07292

9JKAMPHOUSE.EDB2FBFN
9JKAMPHOUSE.EDB2FBFN

ACCT# 264363
ACCT# 264363

ORIGIN INTERNAL READER
ORIGIN INTERNAL READER

START DATE 26 MAR 93.085
START TIME 13.11.37

STOP DATE 26 MAR 93.085
STOP TIME 13.11.50

XEQ TIME 00.00.12

XEQ NODE CHAGP

PRINTER 631
START TIME 13.22.52
PRINT DATE 26 MAR 93.085

56 CARDS READ
0 CARDS PUNCHED
435 LINES PRINTED

ATTACHMENT 13

ND 00031 92 0075

JC 3-28-93

LDC 3/28/93

18/59

9JKAMPHOUSE.EDB2FBFN
9JKAMPHOUSE.EDB2FBFN

9JKAMPHOUSE.EDB2FBFN
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IAT6140 JOB ORIGIN FROM GROUP=GROUP322, DSP=IR , DEVICE=INTRDR  , 000
IRR010I  USERID IDKDQ     IS ASSIGNED TO THIS JOB.
13:11:37 IAT4401  LOCATE FOR STEP=QACHECK  DD=STEPLIB  DSN=APB.NEN.PS264460.PGMLIB
13:11:37 IAT4402 UNIT=3380     ,VOL(S)=USGM15
13:11:37 IAT4401  LOCATE FOR STEP=GO       DD=STEPLIB  DSN=APB.NEN.PS264460.PGMLIB
13:11:37 IAT4402 UNIT=3380     ,VOL(S)=USGM15
13:11:37 IAT4401  LOCATE FOR STEP=GO       DD=FT11F001 DSN=APB.NEN.WZ264460.ISOTOPE.ELEVEN
13:11:37 IAT4402 UNIT=3380     ,VOL(S)=USGS22
13:11:37 IAT4401  LOCATE FOR STEP=GO       DD=FT12F001 DSN=APB.NEN.WZ264460.ISOTOPE.TWELVE
13:11:37 IAT4402 UNIT=3380     ,VOL(S)=USGS22
13:11:37 IAT5110 JOB ND9275C1 (JOB07292) USES      D SOFT83
13:11:37 IAT5110 JOB ND9275C1 (JOB07292) USES      D USGM15
13:11:37 IAT5110 JOB ND9275C1 (JOB07292) USES      D SOFT85
13:11:37 IAT5110 JOB ND9275C1 (JOB07292) USES      D USGS22
13:11:37 IAT5210 JOB JS3CATLG (JOB07292) SYSM      USING D SOFT83 ON 727
13:11:37 IAT5210 JOB STEPLIB  (JOB07292) SYSM      USING D USGM15 ON 27A
13:11:37 IAT5210 JOB JS3CATLG (JOB07292) SYSM      USING D SOFT85 ON 730
13:11:37 IAT5210 JOB FT11F001 (JOB07292) SYSM      USING D USGS22 ON 777
13:11:37 IAT2000 JOB ND9275C1 (JOB07292) SELECTED SYSM      GRP=SBATCH
13:11:37  TVA30262 720  LIMITED TIME CLASS IS IN EFFECT....
13:11:37  ICH70001I IDKDQ    LAST ACCESS AT 13:11:37 ON FRIDAY, MARCH 26, 1993
13:11:37  IEF403I ND9275C1 - STARTED - TIME=13.11.37
13:11:38  BLM51A  ***BLOCKSIZE CHANGE, OLD=03990, NEW=23476, ND9275C1/VFYLKDT */IDRLIST /K.SM264360.FT06.OUTPUT.G6446V00
13:11:38 IAT5110 JOB ND9275C1 (JOB07292) USES      D USGM15
13:11:39  TVA002I ND9275C1 USGM15 27A BC=05376   EXCP=00000176 DDN=SYS00001
13:11:39  TVA002I ND9275C1 USGS29 728 BC=00256   EXCP=00000001 DDN=IDRLIST
13:11:39  TVA002I ND9275C1 USGM15 27A BC=00000   EXCP=00000004 DDN=STEPLIB
13:11:40  TVA002I ND9275C1            VIO       EXCP=00000002 DDN=FT16F001
13:11:40  TVA002I ND9275C1 USGS22 777 BC=00000   EXCP=00000000 DDN=FT11F001
13:11:40  TVA002I ND9275C1 USGS22 777 BC=00000   EXCP=00000008 DDN=FT12F001
13:11:47  TVA002I ND9275C1 USGS22 777 BC=00000   EXCP=00000044 DDN=FT12F001
13:11:47  TVA002I ND9275C1 USGS22 777 BC=00000   EXCP=00002109 DDN=FT11F001
13:11:47  TVA002I ND9275C1            VIO       EXCP=00000005 DDN=FT16F001
13:11:48  TVA002I ND9275C1 USGS29 728 BC=00768   EXCP=00000002 DDN=FT06F001
13:11:48  TVA002I ND9275C1 USGM15 27A BC=00000   EXCP=00000029 DDN=STEPLIB
13:11:48  TVA002I ND9275C1 USGS29 728 BC=01024   EXCP=00000004 DDN=SYSUT1
13:11:50  IEF404I ND9275C1 - ENDED - TIME=13.11.49
```

2DC 3/28/93

19/59

ATTACHMENT 13

ND 00031 92 0075

DX 3-28-93

```
//ND9275C1 JOB 264363,'9JKAMPHOUSE.EDB2FBFN',MSGLEVEL=1,MSGCLASS=T
//*MAIN ORG=LOCAL,CLASS=SB
//PROCLIB DD DSN=APB.NEN.PS264460.PROCLIB,DISP=SHR
//STEP1 EXEC COROD,SOUT='*'
//GO.SYSIN DD *
/*
```

2Dc 3/20/93

ATTACHMENT 13

20/59

ND 00031 92 0075

OK 3-28-93

```
1 //ND9275C1 JOB 264363,'9JKAMPHOUSE.EDB2FBFN',MSGLEVEL=1,MSGCLASS=T
2 //PROCLIB DD DSN=APB.NEN.PS264460.PROCLIB,DISP=SHR
3 //STEP1 EXEC COROD,SOUT='*'
4 XXCOROD   PROC T=5,LIBRARY='APB.NEN.PS264460.PGMLIB',SOUT='*',
  XX              ELEVEN='APB.NEN.WZ264460.ISOTOPE.ELEVEN',
  XX              TWELVE='APB.NEN.WZ264460.ISOTOPE.TWELVE'
5 XXQACHECK EXEC PGM=VFYLRDT,REGION=4096K,TIME=1,
  XX              PARM='/JDATE=9107),PATH=APB.NEN.PS264460.PGMLIB(COROD)
6 XXSTEPLIB  DD  DSN=&LIBRARY,DISP=SHR
  IEF653I SUBSTITUTION JCL - DSN=APB.NEN.PS264460.PGMLIB,DISP=SHR
7 XXPLIDUMP  DD  SYSOUT=&SOUT
  IEF653I SUBSTITUTION JCL - SYSOUT=*
8 XXSYSPRINT DD  SYSOUT=&SOUT
  IEF653I SUBSTITUTION JCL - SYSOUT=*
9 XXIDRLIST  DD  DSN=K.SN264360.FT06.OUTPUT(+1),DISP=(NEW,PASS),
  XX              UNIT=ALLOC,SPACE=(TRK,(20,5),RLSE),
  XX              DCB=(SYS1.MODEL,RECFM=FBA,LRECL=133,BLKSIZE=3990)
10 XXSYSDUMP  DD  SYSOUT=&SOUT
   IEF653I SUBSTITUTION JCL - SYSOUT=*
11 XXGO      EXEC PGM=COROD,TIME=&T
   IEF653I SUBSTITUTION JCL - PGM=COROD,TIME=5
12 XXSTEPLIB  DD  DSN=&LIBRARY,DISP=SHR
   IEF653I SUBSTITUTION JCL - DSN=APB.NEN.PS264460.PGMLIB,DISP=SHR
13 XXFT06F001 DD  DSN=K.SN264360.FT06.OUTPUT(+1),DISP=(MOD,PASS)
14 XXFT11F001 DD  DSN=&ELEVEN,DISP=SHR
   IEF653I SUBSTITUTION JCL - DSN=APB.NEN.WZ264460.ISOTOPE.ELEVEN,DISP=SHR
15 XXFT12F001 DD  DSN=&TWELVE,DISP=SHR
   IEF653I SUBSTITUTION JCL - DSN=APB.NEN.WZ264460.ISOTOPE.TWELVE,DISP=SHR
16 XXFT16F001 DD  UNIT=SYSPL,DCB=(RECFM=FB,LRECL=80,BLKSIZE=3120),
   XX              SPACE=(TRK,(1,1),RLSE)
17 XXSYSUDUMP DD  SYSOUT=&SOUT
   IEF653I SUBSTITUTION JCL - SYSOUT=*
18 XXABNLIGNR DD  SYSOUT=&SOUT
   IEF653I SUBSTITUTION JCL - SYSOUT=*
19 XXFT05F001 DD  UDNAME=SYSIN
20 //GO.SYSIN DD *,DCB=BLKSIZE=80
21 XXPRINT   EXEC PGM=IEBGENER,COND=EVEN
22 XXSYSPRINT DD  SYSOUT=&SOUT
   IEF653I SUBSTITUTION JCL - SYSOUT=*
23 XXSYSUT1   DD  DSN=K.SN264360.FT06.OUTPUT(+1),DISP=(OLD,PASS)
24 XXSYSUT2   DD  SYSOUT=&SOUT
   IEF653I SUBSTITUTION JCL - SYSOUT=*
25 XXSYSIN    DD  DUMMY
26 XXCATALOG EXEC PGM=IEFBR14
27 XXDD1      DD  DSN=K.SN264360.FT06.OUTPUT(+1),DISP=(OLD,CATLG,CATLG)
```

```
                    TIME CLASS IS IN EFFECT....
                    LAST ACCESS AT 13:11:37 ON FRIDAY, MARCH 26, 1993
IEF236I ALLOC. FOR ND9275C1 QACHECK STEP1
IEF237I 27A  ALLOCATED TO STEPLIB
IEF237I JES3 ALLOCATED TO PLIDUMP
IEF237I JES3 ALLOCATED TO SYSPRINT
IGD100I 728 ALLOCATED TO DDNAME IDRLIST  DATACLAS (         )
IEF237I JES3 ALLOCATED TO SYSDUMP
BLM51A  ***BLOCKSIZE CHANGE, OLD=03990, NEW=23476, ND9275C1/VFYLKDT */IDRLIST /K.SN264360.FT06.OUTPUT.G6446V00
IEF237I 27A  ALLOCATED TO SYS00001
TVA002I ND9275C1 USGM15 27A BC=05376   EXCP=00000176 DDN=SYS00001
IEF285I   APB.MEN.PS264460.PGMLIB                    KEPT
IEF285I   VOL SER NOS= USGM15.
TVA002I ND9275C1 USGS29 728 BC=00256   EXCP=00000001 DDN=IDRLIST
TVA002I ND9275C1 USGM15 27A BC=00080   EXCP=00000004 DDN=STEPLIB
IEF142I ND9275C1 QACHECK STEP1 - STEP WAS EXECUTED - COND CODE 0000
IEF285I   APB.MEN.PS264460.PGMLIB                    KEPT
IEF285I   VOL SER NOS= USGM15.
IEF285I   IDKDQ.ND9275C1.JOB07292.D000000A.?         SYSOUT
IEF285I   IDKDQ.ND9275C1.JOB07292.D000000B.?         SYSOUT
IEF285I   K.SN264360.FT06.OUTPUT.G6446V00            PASSED
IEF285I   VOL SER NOS= USGS29.
IEF285I   IDKDQ.ND9275C1.JOB07292.D000000C.?         SYSOUT
********************************************** TVA  JOB/STEP  INFORMATION **********************************************
* STEP NAME  QACHECK                 START TIME  13.11.37.88              STEP CPU   00.00.00.13                        *
* PGM  NAME  VFYLKDT                 STOP TIME   13.11.39.46              JOB  CPU   00.00.00.13                        *
* SERV UNIT        622               ELAP  TIME  00.00.01.58              CONDITION CODE  0000                          *
********************************************** TVA  JOB/STEP  INFORMATION **********************************************
*                                                                EXCP STATISTICS                                        *
*  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT *
*  27A            4    728            1    27A          176                                                              *
* TOTAL EXCP        181       VIO PAGE IN          0       VIO PAGE OUT          0       PAGES SWAPPED IN          0    *
*****************************************************************************************************************
IEF373I STEP /QACHECK / START 93085.1311
IEF374I STEP /QACHECK / STOP  93085.1311 CPU    0MIN 00.13SEC SRB    0MIN 00.01SEC VIRT  4224K SYS   276K EXT       4K SYS    8988K
IEF236I ALLOC. FOR ND9275C1 GO STEP1
IEF237I 27A  ALLOCATED TO STEPLIB
IEF237I 728  ALLOCATED TO FT06F001
IEF237I 777  ALLOCATED TO FT11F001
IEF237I 777  ALLOCATED TO FT12F001
IGD101I SMS ALLOCATED TO DDNAME (FT16F001)
        DSN (SYS93085.T131136.RA000.ND9275C1.R0000001     )
        STORCLAS (SCTEMP) MGMTCLAS (         ) DATACLAS (         )
IEF237I JES3 ALLOCATED TO SYSUDUMP
IEF237I JES3 ALLOCATED TO ABNLIGNR
IEF237I JES3 ALLOCATED TO FT05F001
TVA002I ND9275C1               VIO          EXCP=00000002 DDN=FT16F001
TVA002I ND9275C1 USGS22 777 BC=00000   EXCP=00000000 DDN=FT11F001
TVA002I ND9275C1 USGS22 777 BC=00000   EXCP=00000000 DDN=FT12F001
TVA002I ND9275C1 USGS22 777 BC=00000   EXCP=00000044 DDN=FT12F001
TVA002I ND9275C1 USGS22 777 BC=00000   EXCP=00002109 DDN=FT11F001
TVA002I ND9275C1               VIO          EXCP=00000005 DDN=FT16F001
TVA002I ND9275C1 USGS29 728 BC=00768   EXCP=00000002 DDN=FT06F001
TVA002I ND9275C1 USGM15 27A BC=00080   EXCP=00000029 DDN=STEPLIB
IEF142I ND9275C1 GO STEP1 - STEP WAS EXECUTED - COND CODE 0000
IEF285I   APB.MEN.PS264460.PGMLIB                    KEPT
IEF285I   VOL SER NOS= USGM15.
IEF285I   K.SN264360.FT06.OUTPUT.G6446V00            PASSED
IEF285I   VOL SER NOS= USGS29.



IEF285I   APB.MEN.WZ264460.ISOTOPE.ELEVEN            KEPT
IEF285I   VOL SER NOS= USGS22.
IEF285I   APB.MEN.WZ264460.ISOTOPE.TWELVE            KEPT
IEF285I   VOL SER NOS= USGS22.
IGD105I SYS93085.T131136.RA000.ND9275C1.R0000001     DELETED,   DDNAME=FT16F001
IEF285I   IDKDQ.ND9275C1.JOB07292.D000000D.?         SYSOUT
IEF285I   IDKDQ.ND9275C1.JOB07292.D000000E.?         SYSOUT
IEF285I   IDKDQ.ND9275C1.JOB07292.D0000009.?         SYSIN
********************************************** TVA  JOB/STEP  INFORMATION **********************************************
* STEP NAME  GO                      START TIME  13.11.39.54              STEP CPU   00.00.01.42                        *
* PGM  NAME  COROD                   STOP TIME   13.11.48.28              JOB  CPU   00.00.01.55                        *
* SERV UNIT      8,790               ELAP  TIME  00.00.08.74              CONDITION CODE  0000                          *
********************************************** TVA  JOB/STEP  INFORMATION **********************************************
*                                                                EXCP STATISTICS                                        *
*  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT *
*  27A           29    728            2    777        2,109    777           44    VIO            5                       *
* TOTAL EXCP      2,189       VIO PAGE IN          0       VIO PAGE OUT          0       PAGES SWAPPED IN          0    *
*****************************************************************************************************************
IEF373I STEP /GO       / START 93085.1311
IEF374I STEP /GO       / STOP  93085.1311 CPU    0MIN 01.42SEC SRB    0MIN 00.23SEC VIRT   396K SYS   300K EXT       8K SYS    8916K
IEF236I ALLOC. FOR ND9275C1 PRINT STEP1
IEF237I JES3 ALLOCATED TO SYSPRINT
IEF237I 728  ALLOCATED TO SYSUT1
IEF237I JES3 ALLOCATED TO SYSUT2
IEF237I DMY  ALLOCATED TO SYSIN
TVA002I ND9275C1 USGS29 728 BC=01024   EXCP=00000004 DDN=SYSUT1
IEF142I ND9275C1 PRINT STEP1 - STEP WAS EXECUTED - COND CODE 0000
IEF285I   IDKDQ.ND9275C1.JOB07292.D000000F.?         SYSOUT
IEF285I   K.SN264360.FT06.OUTPUT.G6446V00            PASSED
IEF285I   VOL SER NOS= USGS29.
IEF285I   IDKDQ.ND9275C1.JOB07292.D0000010.?         SYSOUT
********************************************** TVA  JOB/STEP  INFORMATION **********************************************
* STEP NAME  PRINT                   START TIME  13.11.48.31              STEP CPU   00.00.00.05                        *
* PGM  NAME  IEBGENER                STOP TIME   13.11.49.29              JOB  CPU   00.00.01.60                        *
* SERV UNIT        171               ELAP  TIME  00.00.00.98              CONDITION CODE  0000                          *
********************************************** TVA  JOB/STEP  INFORMATION **********************************************
*                                                                EXCP STATISTICS                                        *
*  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT *
*  728            4                                                                                                    *
* TOTAL EXCP        4       VIO PAGE IN          0       VIO PAGE OUT          0       PAGES SWAPPED IN          0    *
*****************************************************************************************************************
IEF373I STEP /PRINT    / START 93085.1311
IEF374I STEP /PRINT    / STOP  93085.1311 CPU    0MIN 00.05SEC SRB    0MIN 00.00SEC VIRT   372K SYS   232K EXT       4K SYS    8928K
IEF236I ALLOC. FOR ND9275C1 CATALOG STEP1
IEF237I 728  ALLOCATED TO DD1
IEF142I ND9275C1 CATALOG STEP1 - STEP WAS EXECUTED - COND CODE 0000
IEF285I   K.SN264360.FT06.OUTPUT.G6446V00            CATALOGED
IEF285I   VOL SER NOS= USGS29.
********************************************** TVA  JOB/STEP  INFORMATION **********************************************
* STEP NAME  CATALOG                 START TIME  13.11.49.39              STEP CPU   00.00.00.02                        *
* PGM  NAME  IEFBR14                 STOP TIME   13.11.49.89              JOB  CPU   00.00.01.62                        *
* SERV UNIT         40               ELAP  TIME  00.00.00.50              CONDITION CODE  0000                          *
********************************************** TVA  JOB/STEP  INFORMATION **********************************************
*                                                                EXCP STATISTICS                                        *
*  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT  UNIT    EXCP COUNT *
* TOTAL EXCP        0       VIO PAGE IN          0       VIO PAGE OUT          0       PAGES SWAPPED IN          0    *
*****************************************************************************************************************
```

20c 3/26/93

ATTACHMENT 13

21/5

ND 00031 92 0075

ND 00031 92 0075

3-28-93

-2DC 3/26/93

```
IEF...  STEP /C...  ...OP  93085.1311 CPU     0MIN 00.02SEC SRB     0MIN 00.00SEC VIRT      8K SYS    232K EXT       4K SYS    8896K
********************************************************* TVA  JOB/STEP  INFORMATION **********************************************
* JOB NAME ND9275C1  PROGRAMMER 9.JKAMPHOUSE.EDB2FBFN  START DATE 03/26/93     START TIME 13.11.37.68  CONDITION CODE  0000          *
* JOB NUMB JOB07292  ACCT DATA   264363    :STEPLIB      STOP  DATE 03/26/93     STOP  TIME 13.11.49.90  CPU TIME  00.00.01.62        *
* JOB CLASS  SB                        MVS SP3.1.3  REL 03 .8                  ELAP  TIME 00.00.12.02  SERVICE UNITS      9,623 SYSM*
********************************************************* TVA  JOB/STEP  INFORMATION **********************************************
IEF375I  JOB /ND9275C1/ START 93085.1311
IEF376I  JOB /ND9275C1/ STOP  93085.1311 CPU     0MIN 01.62SEC SRB     0MIN 00.24SEC
```

ATTACHMENT 13

22/59

ND 00031 92 0075 '

JK 3-28-93

DATA SET UTILITY

PAGE 0001

IEB352I WARNING : OUTPUT RECFM/LRECL/BLKSIZE COPIED FROM INPUT

PROCESSING ENDED AT EOD

RDC 3/26/93

ATTACHMENT 13

23/59

ND 00031 92 0075

BK 3-29-93

2DC 3/26/93

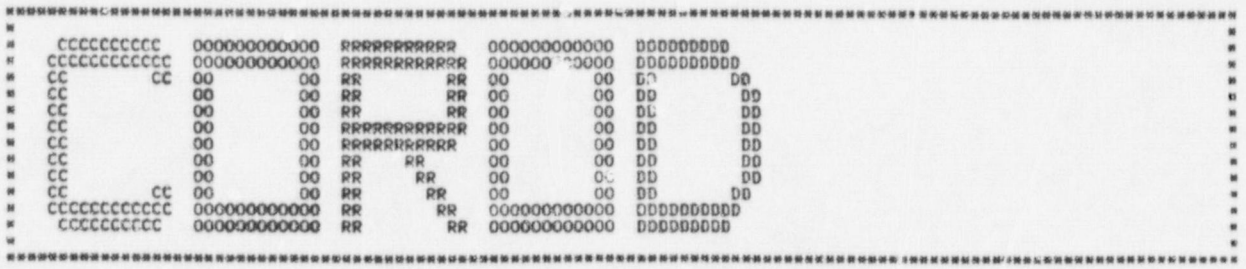
ATTACHMENT D

24/59

WD 00031 92 0075

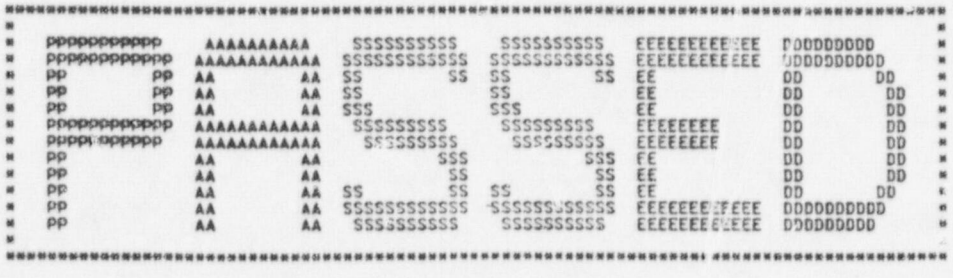
JK 3.28.93

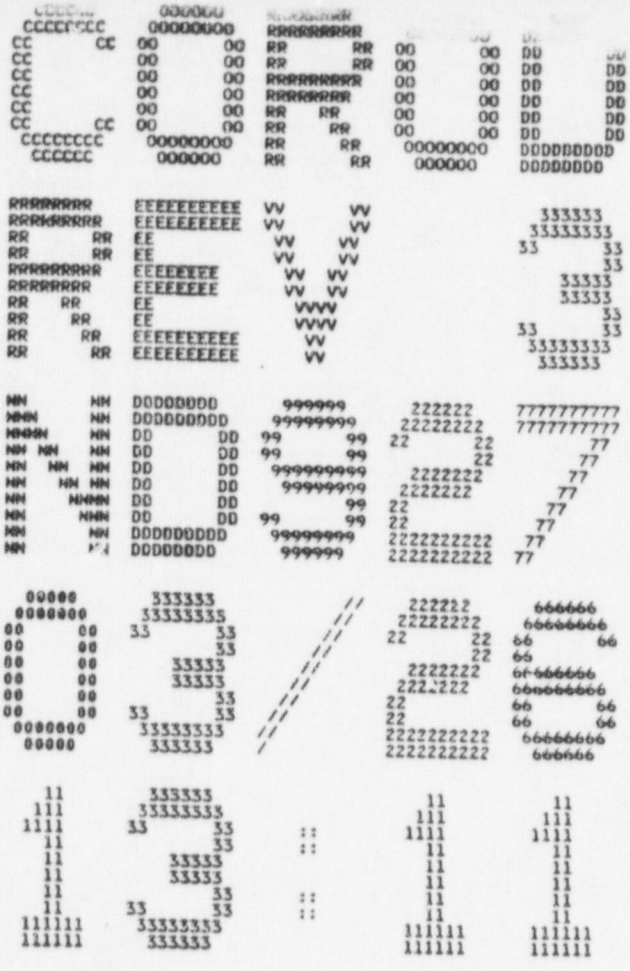
93/03/26 @ 13.11.38.691 LINKAGE EDITOR LOAD MODULE DATE VERIFICATION PAGE 0000



FILE: APB.NEN.PS264460.PGMLIB
MODULE: COROD
LASTLINK: 91/071

QA CHECK RESULTS





ZDC 3/28/93

ATTACHMENT 13

25/59

ND 00031 92 0075

JK 3-28-93

3/28/93

ATTACHMENT 13 26/59

ND 00031 92 00751

NK 3.28.93

REPRODUCTION OF INPUT DATA DECK

```
+         +         +         +         +         +         +         +

NIT= 22   NR= 1   ITP= 6   FACT= 1.0
LOCA DOSE FUMIGATION- ND-Q0031-920075 RS
I 131 I 132 I 133 I 134 I 135
I= 131 I= 132 I= 133 I= 134 I= 135
KRM 85 KR 85 KR 87 KR 88 KR 89
XEM 131 XEM 133 XE 133 XEM 135 XE 135 XE 137 XE 138
    8  '30 MIN FUMIGATION                  * $ TN=  0.5000E+00
         1 1.227E+02     2 1.652E+02     3 2.900E+02     4 2.556E+02     5 2.683E+02
         6 5.395E+00     7 7.260E+00     8 1.275E+01     9 1.123E+01    10 1.179E+01
        11 2.357E+03    12 8.902E+01    13 4.055E+03    14 6.297E+03    15 4.382E+02
        16 7.558E+01    17 3.635E+02    18 1.288E+04    19 1.336E+03    20 1.245E+04
        21 8.121E+02    22 4.865E+03
    8  '30 MIN FUMIGATION                  * $ TN=  0.2000E+01
         1 0.0           2 0.0           3 0.0           4 0.0           5 0.0
         6 0.0           7 0.0           8 0.0           9 0.0          10 0.0
        11 0.0          12 0.0          13 0.0          14 0.0          15 0.0
        16 0.0          17 0.0          18 0.0          19 0.0          20 0.0
        21 0.0          22 0.0
    8  '30 MIN FUMIGATION                  * $ TN=  0.8000E+01
         1 0.0           2 0.0           3 0.0           4 0.0           5 0.0
         6 0.0           7 0.0           8 0.0           9 0.0          10 0.0
        11 0.0          12 0.0          13 0.0          14 0.0          15 0.0
        16 0.0          17 0.0          18 0.0          19 0.0          20 0.0
        21 0.0          22 0.0
    8  '30 MIN FUMIGATION                  * $ TN=  0.2400E+02
         1 0.0           2 0.0           3 0.0           4 0.0           5 0.0
         6 0.0           7 0.0           8 0.0           9 0.0          10 0.0
        11 0.0          12 0.0          13 0.0          14 0.0          15 0.0
        16 0.0          17 0.0          18 0.0          19 0.0          20 0.0
        21 0.0          22 0.0
    8  '30 MIN FUMIGATION                  * $ TN=  0.9600E+02
         1 0.0           2 0.0           3 0.0           4 0.0           5 0.0
         6 0.0           7 0.0           8 0.0           9 0.0          10 0.0
        11 0.0          12 0.0          13 0.0          14 0.0          15 0.0
        16 0.0          17 0.0          18 0.0          19 0.0          20 0.0
        21 0.0          22 0.0
    8  '30 MIN FUMIGATION                  * $ TN=  0.7200E+03
         1 0.0           2 0.0           3 0.0           4 0.0           5 0.0
         6 0.0           7 0.0           8 0.0           9 0.0          10 0.0
        11 0.0          12 0.0          13 0.0          14 0.0          15 0.0
        16 0.0          17 0.0          18 0.0          19 0.0          20 0.0
        21 0.0          22 0.0
3.26E-5 3.85E-12 4.8E-13 1.4E-13 2.7E-14 1.5E-15
1800  5400  21600  57600  259200  2246400
0.0 3717.0
0.90 1E-15 0.90 1E-15 210000.0 1E-15
100.0  60.0  40.0  1440  5760.0
153.948 36.833 15.33  4.0  9.0  4.0  76.974  18.4165 6.0  0.0
ROOFFLUX DOSE TO CONTROL ROOM PERSONNEL DUE TO SHINE THROUGH ROOF
1000.0  1000.0  1000.0  20.0  20.0  20.0  500.0  500.0  -13.58  2.25
+         +         +         +         +         +         +         +
```

LOCA DOSE FUMIGATION- MD-00031-920075 RS

CONTROL BAY COMPUTATION INPUT DATA
DATE 03/26/93 COROD START TIME 13:11:40

ATTACHMENT 13

MD 00031 920075.
DX 3.28.93

NUMBER OF ISOTOPES = 22
NUMBER OF AIR INTAKE VALUES = 1
NUMBER OF TIME PERIODS = 6
MULTIPLIER OF INPUT CURIES = 1.0000E+00

TIME PERIODS (SEC)
1800.0 5400.0 21600.0 57600.0 259200.0 2246400.0

TOTAL CURIES RELEASED DURING TIME PERIOD

ISOTOPE							
I	131	122.7	0.0	0.0	0.0	0.0	0.0
I	132	165.2	0.0	0.0	0.0	0.0	0.0
I	133	290.0	0.0	0.0	0.0	0.0	0.0
I	134	255.6	0.0	0.0	0.0	0.0	0.0
I	135	268.3	0.0	0.0	0.0	0.0	0.0
I=	131	5.4	0.0	0.0	0.0	0.0	0.0
I=	132	7.3	0.0	0.0	0.0	0.0	0.0
I=	133	12.7	0.0	0.0	0.0	0.0	0.0
I=	134	11.2	0.0	0.0	0.0	0.0	0.0
I=	135	11.8	0.0	0.0	0.0	0.0	0.0
KRM	85	2357.0	0.0	0.0	0.0	0.0	0.0
KR	85	89.0	0.0	0.0	0.0	0.0	0.0
KR	87	4057.0	0.0	0.0	0.0	0.0	0.0
KR	88	6297.0	0.0	0.0	0.0	0.0	0.0
KR	89	438.2	0.0	0.0	0.0	0.0	0.0
XEM	131	75.6	0.0	0.0	0.0	0.0	0.0
XEM	133	363.5	0.0	0.0	0.0	0.0	0.0
XE	133	12880.0	0.0	0.0	0.0	0.0	0.0
XEM	135	1336.0	0.0	0.0	0.0	0.0	0.0
XE	135	12450.0	0.0	0.0	0.0	0.0	0.0
XE	137	812.1	0.0	0.0	0.0	0.0	0.0
XE	138	0.0	0.0	0.0	0.0	0.0	0.0

CHI/Q (SEC/CU. METER)
3.26E-05 3.05E-12 4.80E-13 1.40E-13 2.70E-14 1.50E-15

FLOW RATE OF AIR INTAKE (CFM)
0.0

FILTER EFFICIENCY, ELEMENTAL IODINE, FIRST PASS = 0.90
FILTER EFFICIENCY, ELEMENTAL IODINE, SECOND PASS = 0.00
FILTER EFFICIENCY, ORGANIC IODINE, FIRST PASS = 0.90
FILTER EFFICIENCY, ORGANIC IODINE, SECOND PASS = 0.00
CONTROL ROOM VOLUME (CU. FT.) = 210000.0
FLOW RATE THROUGH ROOM CIRCULATION SYSTEM (CFM) = 0.0

100.0 PERCENT OCCUPANCY BEFORE 1440.0 MIN.

60.0 PERCENT OCCUPANCY BETWEEN 1440.0 AND 5760.0 MIN.
40.0 PERCENT OCCUPANCY AFTER 5760.0 MIN.

SUCCESSIVE TIME PERIODS IN MINUTES
30.0 90.0 360.0 960.0 4320.0 37440.0

AVERAGE CURIE RELEASE RATE CONCENTRATION IN CURIES/CU. METER DURING EACH TIME PERIOD

I	131	2.222E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I	132	2.992E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I	133	5.252E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I	134	4.629E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I	135	4.859E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I=	131	9.771E-08	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I=	132	1.315E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I=	133	2.309E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I=	134	2.034E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I=	135	2.135E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KRM	85	4.269E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR	85	1.612E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR	87	7.348E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR	88	1.140E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR	89	7.936E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XEM	131	1.369E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XEM	133	6.583E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE	133	2.333E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XEM	135	2.420E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE	135	2.255E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE	137	1.471E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE	138	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

CONTROL BAY WHOLE BODY AND INHALATION DOSE

DATE 03/26/93 TIME 13:11:40

2DC 3/26/93

LENGTH OF CONTAMINATED VOLUME (X) = 153.95 FT — 46 DIVISIONS
WIDTH OF CONTAMINATED VOLUME (Y) = 36.83 — 9 DIVISIONS
HEIGHT OF CONTAMINATED VOLUME (Z) = 15.33 — 4 DIVISIONS

DOSE POINT COORDINATES: X = 76.97 FT, Y = 18.42 FT, Z = 6.00 FT

ATTACHMENT 13 28/5

SHIELD WALL THICKNESS = 0.000

THE FOLLOWING VALUES ARE FOR A LEAK RATE OF 0.00 CFM AND A BYPASS RATE OF****** CFM

ISOTOPE TOTAL CONCENTRATION TIME DURING EACH TIME PERIOD IN CURIE-HR/CU. METER

I	131	2.489E-07	6.849E-07	1.733E-07	2.903E-10	1.144E-17	0.000E+00
I	132	3.203E-07	7.341E-07	1.086E-07	2.994E-11	9.645E-21	0.000E+00
I	133	5.856E-07	1.581E-06	3.786E-07	5.305E-10	1.299E-17	0.000E+00
I	134	4.617E-07	8.114E-07	5.372E-08	7.990E-13	0.000E+00	0.000E+00
I	135	5.360E-07	1.384E-06	2.908E-07	2.651E-10	2.066E-18	0.000E+00
I*	131	1.094E-08	3.011E-08	7.620E-09	1.277E-11	5.031E-19	0.000E+00
I*	132	1.408E-08	3.226E-08	4.771E-09	1.316E-12	4.239E-22	0.000E+00
I*	133	2.575E-08	6.953E-08	1.665E-08	2.332E-11	5.711E-19	0.000E+00
I*	134	2.028E-08	3.565E-08	2.360E-09	3.511E-14	0.000E+00	0.000E+00
I*	135	2.355E-08	6.083E-08	1.278E-08	1.165E-11	9.080E-20	0.000E+00
KRM	85	4.673E-06	1.171E-05	2.248E-06	1.519E-09	5.334E-18	0.000E+00
KR	85	1.807E-07	4.983E-07	1.269E-07	2.173E-10	9.066E-18	0.000E+00
KR	87	7.592E-06	1.519E-05	1.498E-06	9.723E-11	6.618E-22	0.000E+00
KR	88	1.231E-05	2.917E-05	4.757E-06	1.841E-09	1.464E-18	0.000E+00
KR	89	2.559E-07	4.212E-08	2.588E-17	0.000E+00	0.000E+00	0.000E+00
XEM	131	1.533E-07	4.222E-07	1.071E-07	1.806E-10	7.252E-18	0.000E+00
XEM	133	7.365E-07	2.014E-06	5.010E-07	7.939E-10	2.698E-17	0.000E+00
XE	133	2.612E-05	7.179E-05	1.810E-05	2.999E-08	1.147E-15	0.000E+00
XEM	135	1.886E-06	1.562E-06	5.921E-09	1.204E-16	0.000E+00	0.000E+00
XE	135	2.498E-05	6.569E-05	1.455E-05	1.580E-08	1.962E-16	0.000E+00
XE	137	5.455E-07	1.096E-07	1.881E-15	0.000E+00	0.000E+00	0.000E+00
XE	138	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

ND 00031 92 0075
BK 3.28 93

THE FOLLOWING VALUES ARE FOR A LEAK RATE OF 0.00 CFM AND A BYPASS RATE OF****** CFM

ISOTOPE TOTAL WHOLE BODY GAMMA DOSE FOR EACH ISOTOPE AND TIME PERIOD

I	131	4.878E-03	1.342E-02	3.396E-03	5.690E-06	2.242E-13	0.000E+00
I	132	3.563E-02	8.166E-02	1.208E-02	3.331E-06	1.073E-15	0.000E+00
I	133	1.627E-02	4.394E-02	1.052E-02	1.474E-05	3.609E-13	0.000E+00
I	134	5.337E-02	9.379E-02	6.210E-03	9.237E-08	0.000E+00	0.000E+00
I	135	3.395E-02	8.769E-02	1.842E-02	1.679E-05	1.309E-13	0.000E+00
I*	131	2.145E-04	5.901E-04	1.493E-04	2.502E-07	9.859E-15	0.000E+00
I*	132	1.566E-03	3.589E-03	5.307E-04	1.464E-07	4.715E-17	0.000E+00
I*	133	7.153E-04	1.932E-03	4.625E-04	6.480E-07	1.587E-14	0.000E+00
I*	134	2.345E-03	4.121E-03	2.729E-04	4.058E-09	0.000E+00	0.000E+00
I*	135	1.492E-03	3.854E-03	8.095E-04	7.379E-07	5.752E-15	0.000E+00
KRM	85	3.743E-02	9.376E-02	1.801E-02	1.217E-05	4.272E-14	0.000E+00
KR	85	1.842E-05	5.080E-05	1.294E-05	2.215E-08	9.243E-16	0.000E+00
KR	87	2.325E-01	4.651E-01	4.586E-02	2.978E-06	2.027E-17	0.000E+00
KR	88	8.535E-01	2.022E+00	3.297E-01	1.276E-04	1.015E-13	0.000E+00
KR	89	2.025E-02	3.332E-03	2.047E-12	0.000E+00	0.000E+00	0.000E+00
XEM	131	8.941E-04	2.462E-03	6.243E-04	1.053E-06	4.228E-14	0.000E+00
XEM	133	5.236E-03	1.432E-02	3.562E-03	5.645E-06	1.918E-13	0.000E+00
XE	133	4.055E-01	1.114E+00	2.815E-01	4.655E-04	1.780E-11	0.000E+00
XEM	135	3.985E-02	3.301E-02	1.251E-04	2.543E-14	0.000E+00	0.000E+00
XE	135	3.109E-01	8.175E-01	1.810E-01	1.966E-04	2.441E-12	0.000E+00
XE	137	4.960E-03	9.967E-04	1.710E-11	0.000E+00	0.000E+00	0.000E+00
XE	138	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SUM:		2.061E+00	4.902E+00	9.129E-01	8.540E-04	2.137E-11	0.000E+00

TOTAL WHOLE BODY GAMMA DOSE FROM ALL ISOTOPES DURING POST ACCIDENT PERIOD IS = 7.877E+00 MRADS

THE FOLLOWING VALUES ARE FOR A LEAK RATE OF 0.00 CFM AND A BYPASS RATE OF****** CFM

ISOTOPE TOTAL WHOLE BODY BETA DOSE FOR EACH ISOTOPE AND TIME PERIOD

I	131	4.014E-02	1.104E-01	2.795E-02	4.682E-05	1.845E-12	0.000E+00
I	132	1.367E-01	3.134E-01	4.634E-02	1.278E-05	4.117E-15	0.000E+00
I	133	1.983E-01	5.355E-01	1.282E-01	1.796E-04	4.399E-12	0.000E+00
I	134	2.338E-01	4.109E-01	2.721E-02	4.047E-07	0.000E+00	0.000E+00
I	135	1.637E-01	4.228E-01	8.881E-02	8.097E-05	6.311E-13	0.000E+00
I*	131	1.765E-03	4.856E-03	1.229E-03	2.059E-06	8.113E-14	0.000E+00
I*	132	6.009E-03	1.377E-02	2.037E-03	5.617E-07	1.809E-16	0.000E+00
I*	133	8.719E-03	2.354E-02	5.638E-03	7.898E-06	1.934E-13	0.000E+00
I*	134	1.027E-02	1.805E-02	1.195E-03	1.778E-08	0.000E+00	0.000E+00
I*	135	7.194E-03	1.858E-02	3.903E-03	3.558E-06	2.773E-14	0.000E+00
KRM	85	9.809E-01	2.457E+00	4.719E-01	3.189E-04	1.120E-12	0.000E+00
KR	85	3.758E-02	1.036E-01	2.640E-02	4.519E-05	1.886E-12	0.000E+00
KR	87	8.341E+00	1.669E+01	1.645E+00	1.068E-04	7.271E-16	0.000E+00
KR	88	3.832E+00	9.080E+00	1.481E+00	5.731E-04	4.555E-13	0.000E+00
KR	89	2.615E-01	4.303E-02	2.644E-11	0.000E+00	0.000E+00	0.000E+00
XEM	131	1.818E-02	5.0[illegible]-02	1.269E-02	2.141E-05	8.595E-13	0.000E+00
XEM	133	1.160E-01	3.1[illegible]-01	7.892E-02	1.251E-04	4.250E-12	0.000E+00
XE	133	2.935E+00	8.06[illegible]+00	2.034E+00	3.370E-03	1.289E-10	0.000E+00
XEM	135	1.487E-01	1.232E-01	4.669E-04	9.490E-14	0.000E+00	0.000E+00
XE	135	6.568E+00	1.727E+01	3.825E+00	4.154E-03	5.158E-11	0.000E+00
XE	137	7.435E-01	1.494E-01	2.563E-09	0.000E+00	0.000E+00	0.000E+00
XE	138	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SUM:		2.479E+01	5.622E+01	9.909E+00	9.049E-03	1.962E-10	0.000E+00

TOTAL WHOLE BODY BETA DOSE FROM ALL ISOTOPES DURING POST ACCIDENT PERIOD IS= 9.093E+01 MRADS

TOTAL WHOLE BODY GAMMA+BETA DOSE FROM ALL ISOTOPES DURING POST ACCIDENT PERIOD IS= 9.881E+01 MRADS

THE FOLLOWING VALUES ARE FOR A LEAK RATE OF 0.00 CFM AND A BYPASS RATE OF****** CFM

ISOTOPE TOTAL INHALATION DOSE FOR EACH ISOTOPE AND TIME PERIOD

I	131	4.602E+02	1.266E+03	3.204E+02	2.707E-01	1.414E-08	0.000E+00
I	132	2.141E+01	4.906E+01	7.256E+00	1.009E-03	4.310E-13	0.000E+00
I	133	2.926E+02	7.902E+02	1.892E+02	1.337E-01	4.340E-09	0.000E+00
I	134	1.442E+01	2.534E+01	1.678E+00	1.258E-05	0.000E+00	0.000E+00
I	135	8.302E+01	2.144E+02	4.504E+01	2.071E-02	2.140E-10	0.000E+00
I*	131	2.023E+01	5.567E+01	1.409E+01	1.190E-02	6.218E-10	0.000E+00
I*	132	9.408E-01	2.156E+00	3.189E-01	4.435E-05	1.894E-14	0.000E+00
I*	133	1.287E+01	3.474E+01	8.318E+00	5.878E-03	1.908E-10	0.000E+00
I*	134	6.335E-01	1.113E+00	7.372E-02	5.529E-07	0.000E+00	0.000E+00
I*	135	3.648E+00	9.422E+00	1.979E+00	9.100E-04	9.404E-12	0.000E+00
SUM:		9.100E+02	2.448E+03	5.884E+02	4.449E-01	1.952E-08	0.000E+00

TOTAL INHALATION DOSE FROM ALL IODINES DURING POST ACCIDENT PERIOD IS= 3.947E+03 MRADS

2DC 3/26/93

* *

THE FOLLOWING DOSES ARE THOSE GIVEN ABOVE BUT INCLUDE OCCUPANCY FACTORS.
THESE FACTORS ARE THE FOLLOWING: 100.00 PERCENT FOR 0 TO 1440. MINUTES;
60.00 PERCENT FOR 1440. TO 5760. MINUTES; AND
40.00 PERCENT AFTER 5760. MINUTES.

29/89

ATTACHMENT 13

WHOLE BODY GAMMA DOSE INCLUDING OCCUPANCY FACTOR IS 7.877E+00 MRADS
WHOLE BODY BETA DOSE INCLUDING OCCUPANCY FACTOR IS 9.093E+01 MRADS
INHALATION DOSE TO THYROID INCLUDING OCCUP. FACT. IS 3.947E+03 MRADS

ND 00031 92 0075

3.28.93

CONTROL ROOM DOSE FROM DIRECT GAMMA PENETRATION OF WALLS, ROOF OR FLOOR FROM AN EXTERNAL SOURCE

DATE 03/26/93 TIME 13:11:40

DOSE TO CONTROL ROOM PERSONNEL DUE TO SHINE THROUGH ROOF

LENGTH OF CONTAMINATED VOLUME (X) = 1000.00 FT 20 DIVISIONS
WIDTH OF CONTAMINATED VOLUME (Y) = 1000.00 20 DIVISIONS
HEIGHT OF CONTAMINATED VOLUME (Z) = 1000.00 20 DIVISIONS

DOSE POINT COORDINATES: X = 500.00 FT, Y = 500.00 FT, Z = -13.58 FT

SHIELD WALL THICKNESS = 2.250

ISOTOPE		TOTAL WHOLE BODY GAMMA DOSE FOR EACH ISOTOPE AND TIME PERIOD					
I	131	1.464E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I	132	2.246E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I	133	6.464E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I	134	4.779E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I	135	9.754E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I*	131	6.439E-08	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I*	132	9.871E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I*	133	2.842E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I*	134	2.099E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I*	135	4.286E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KRM	85	7.669E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR	85	3.269E-08	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR	87	1.426E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR	88	7.191E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
KR	89	4.656E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XEM	131	4.302E-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XEM	133	1.332E-09	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE	133	3.107E-13	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XEM	135	9.492E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE	135	3.502E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE	137	1.169E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE	138	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SUM:		9.290E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

WHOLE BODY GAMMA DOSE(CONTINUOUS OCCUPANCY) DUE TO EXTERNAL SOURCE 9.290E-02 MRADS

WHOLE BODY GAMMA DOSE (OCCUPANCY FACTORS INCLUDED) DUE TO EXT. SOURCE 9.290E-02 MRADS

TOTAL PERSONNEL GAMMA DOSE FROM ALL SOURCES PRESENTLY CALCULATED 7.970E+00 MRADS

NOTE: TOTAL IS FOR FIRST VALUE OF CONTROL ROOM AIR FLOW RATE

DATE 03/26/93 COROD END TIME 13:11:47

*** CHATTANOOGA IBM BROADCAST MESSAGES ***
Updated 03/26/93 09:30

******* WEEKEND OUTAGE SCHEDULE ********

M Business Complex	No Scheduled Outage
C/CXA	Saturday 03/27/93 22:00 - 02:00 Sunday 03/28/93
C/CXB	Saturday 03/27/93 22:00 - 02:00 Sunday 03/28/93
rp. Email Server	Saturday 03/27/93 22:00 - 02:00 Sunday 03/28/93
UNX2	No Scheduled Outage

*** INSTALLATION OF CICS/ESA 3.3 IN THE CICS ACCEPTANCE REGIONS ****

Sunday, March 28, 1993, the CICS Acceptance regions will be upgraded CICS/ESA Version 3.3. The regions will be unavailable from 20:00 24:00. Please see ADP Information Center (ADPIC), Major Technical sues for recently updated technical information on CICS/ESA 3.3.

!!! REMOVAL OF ROSCOE !!!

March 28, 1993, ROSCOE will be removed from the IBM Business Complex. stomers are reminded to continue with migration of any applications maining on ROSCOE.

*** END OF BROADCAST ***

ZLOC 3/26/93

ATTACHMENT 13

30/5

WD 00031 92 0075

OK 3-28-93

9JKAMPHOUSE.EDB2FBFN
9JKAMPHOUSE.EDB2FBFN

9JKAMPHOUSE.EDB2FBFN
9JKAMPHOUSE.EDB2FBFN

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NN        NN  DDDDDDDDD       9999999999    2222222222   777777777777  555555555555   CCCCCCCCCC      11
NNN       NN  DDDDDDDDDD    999999999999  222222222222   777777777777  555555555555  CCCCCCCCCCCC    111
NNNN      NN  DD       DD   99        99  22        22   77        77  55            CC        CC   1111
NN NN     NN  DD       DD   99        99            22            77   55            CC               11
NN  NN    NN  DD       DD   99        99            22           77    55            CC               11
NN   NN   NN  DD       DD   999999999999           22           77     555555555     CC               11
NN    NN  NN  DD       DD   999999999999          22            77     5555555555    CC               11
NN     NN NN  DD       DD             99         22             77             55    CC               11
NN      NNNN  DD       DD             99        22              77              55   CC               11
NN       NNN  DD       DD   99        99       22               77              55   CC        CC     11
NN        NN  DDDDDDDDDD    999999999999  222222222222          77     555555555555  CCCCCCCCCCCC  1111111111
NN         N  DDDDDDDDD       9999999999  222222222222          77     55555555555    CCCCCCCCCC   1111111111
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ND9275C1 JOB07292
ND9275C1 JOB07292

9JKAMPHOUSE.EDB2FBFN
9JKAMPHOUSE.EDB2FBFN

ACCT# 264363
ACCT# 264363

ORIGIN INTERNAL READER
ORIGIN INTERNAL READER

START DATE 26 MAR 93.085
START TIME 13.11.37

STOP DATE 26 MAR 93.085
STOP TIME 13.11.50

XEQ TIME 00.00.12

XEQ NODE CHAGP

PRINTER 631
STOP TIME 13.23.06
PRINT DATE 26 MAR 93.085

56 CARDS READ
0 CARDS PUNCHED
435 LINES PRINTED

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END   END   CHAGP   END   END
END   END   CHAGP   END   END
END   END   CHAGP   END   END
END   END   CHAGP   END   END
END   END   CHAGP   END   END
END   END   CHAGP   END   END
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END   END   CHAGP   END   END
END   END   CHAGP   END   END
```

ND 00031 92 0075

JK 3-28-93

ATTACHMENT 13

ND9275C1 JOB07292
ND9275C1 JOB07292

9JKAMPHOUSE.EDB2FBFN
9JKAMPHOUSE.EDB2FBFN

ACCT# 264363
ACCT# 264363

ORIGIN INTERNAL READER
ORIGIN INTERNAL READER

START DATE 26 MAR 93.085
START TIME 13.11.37

STOP DATE 26 MAR 93.085
STOP TIME 13.11.50

XEQ TIME 00.00.12

XEQ NODE CHAGP

PRINTER 631
STOP TIME 13.23.06
PRINT DATE 26 MAR 93.085

56 CARDS READ
0 CARDS PUNCHED
435 LINES PRINTED

3/28/93

9JKAMPHOUSE.EDB2FBFN
9JKAMPHOUSE.EDB2FBFN

9JKAMPHOUSE.EDB2FBFN
9JKAMPHOUSE.EDB2FBFN

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9JKAMPHOUSE,EDB2FBFN
9JKAMPHOUSE,EDB2FBFN

9JKAMPHOUSE,EDB2FBFN
9JKAMPHOUSE,EDB2FBFN

```
NN         NN  DDDDDDDDD      9999999999    2222222222     777777777777  555555555555   CCCCCCCCC    3333333333
NNN        NN  DDDDDDDDDD    999999999999  222222222222   77777777777   555555555555  CCCCCCCCCCC  333333333333
NNNN       NN  DD       DD   99        99  22        22   77       77   55            CC        CC 33         33
NN NN      NN  DD       DD   99        99            22          77     55            CC                       33
NN  NN     NN  DD       DD   99        99            22         77      55            CC                       33
NN   NN    NN  DD       DD   999999999999           22         77       555555555     CC                       33
NN    NN   NN  DD       DD   999999999999          22          77       5555555555    CC                   3333
NN     NN  NN  DD       DD             99         22           77               55    CC                   3333
NN      NNNN   DD       DD             99        22            77                55   CC                       33
NN       NNN   DD       DD   99        99       22             77                55   CC                       33
NN        NN   DDDDDDDDDD    999999999999   222222222222       77                55   CC        CC 33         33
NN         N   DDDDDDDDD      9999999999    222222222222       77       555555555555  CCCCCCCCCCC  333333333333
                                                                        55555555555    CCCCCCCCC    3333333333
```

ND9275C3 JOB07377
ND9275C3 JOB07377

9JKAMPHOUSE,EDB2FBFN
9JKAMPHOUSE,EDB2FBFN

ACCT# 264363
ACCT# 264363

ORIGIN INTERNAL READER
ORIGIN INTERNAL READER

START DATE 26 MAR 93.085
START TIME 13.15.40

STOP DATE 26 MAR 93.085
STOP TIME 13.15.51

XEQ TIME 00.00.11

XEQ NODE CHAGP

PRINTER 631
START TIME 13.23.21
PRINT DATE 26 MAR 93.085

56 CARDS READ
0 CARDS PUNCHED
435 LINES PRINTED

```
START START   CHAGP   START START
START START   CHAGP   START START
START START   CHAGP   START START
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START START   CHAGP   START START
```

ND9275C3 JOB07377
ND9275C3 JOB07377

9JKAMPHOUSE,EDB2FBFN
9JKAMPHOUSE,EDB2FBFN

ACCT# 264363
ACCT# 264363

ORIGIN INTERNAL READER
ORIGIN INTERNAL READER

START DATE 26 MAR 93.085
START TIME 13.15.40

STOP DATE 26 MAR 93.085
STOP TIME 13.15.51

XEQ TIME 00.00.11

XEQ NODE CHAGP

PRINTER 631
START TIME 13.23.21
PRINT DATE 26 MAR 93.085

56 CARDS READ
0 CARDS PUNCHED
435 LINES PRINTED

ND 00031 92 0075

ATTACHMENT 13

JK 3.28.93

ZDC 3/28/93

32/59

9JKAMPHOUSE,EDB2FBFN
9JKAMPHOUSE,EDB2FBFN

9JKAMPHOUSE,EDB2FBFN
9JKAMPHOUSE,EDB2FBFN

```
                    IS ASSIGNED TO THIS JOB.
          IAT4401   LOCATE FOR STEP=QACHECK   DD=STEPLIB   DSN=APB.NEN.PS264460.PGMLIB
          IAT4402 UNIT=3380      ,VOL(S)=USGM15
13:15:39  IAT4401   LOCATE FOR STEP=GO        DD=STEPLIB   DSN=APB.NEN.PS264460.PGMLIB
13:15:39  IAT4402 UNIT=3380      ,VOL(S)=USGM15
13:15:39  IAT4401   LOCATE FOR STEP=GO        DD=FT11F001 DSN=APB.NEN.WZ264460.ISOTOPE.ELEVEN
13:15:39  IAT4402 UNIT=3380      ,VOL(S)=USGS22
13:15:39  IAT4401   LOCATE FOR STEP=GO        DD=FT12F001 DSN=APB.NEN.WZ264460.ISOTOPE.TWELVE
13:15:40  IAT4402 UNIT=3380      ,VOL(S)=USGS22
13:15:40  IAT5110 JOB ND9275C3 (JOB07377) USES      D SOFT83
13:15:40  IAT5110 JOB ND9275C3 (JOB07377) USES      D USGM15
13:15:40  IAT5110 JOB ND9275C3 (JOB07377) USES      D SOFT85
13:15:40  IAT5110 JOB ND9275C3 (JOB07377) USES      D USGS22
13:15:40  IAT5210 JOB JS3CATLG (JOB07377) SYSM      USING D SOFT83 ON 727
13:15:40  IAT5210 JOB STEPLIB  (JOB07377) SYSM      USING D USGM15 ON 27A
13:15:40  IAT5210 JOB JS3CATLG (JOB07377) SYSM      USING D SOFT85 ON 730
13:15:40  IAT5210 JOB FT11F001 (JOB07377) SYSM      USING D USGS22 ON 777
13:15:40  IAT2000 JOB ND9275C3 (JOB07377) SELECTED SYSM      GRP=SBATCH
13:15:40   TVA30262 720  LIMITED TIME CLASS IS IN EFFECT....
13:15:40   ICH70001I IDKDQ     LAST ACCESS AT 13:15:40 ON FRIDAY, MARCH 26, 1993
13:15:40   IEF403I ND9275C3 - STARTED - TIME=13.15.40
13:15:41   BLMS1A  ***BLOCKSIZE CHANGE, OLD=03990, NEW=23476, ND9275C3/VFYLKDT */IDRLIST /K.SM264360.FT06.OUTPUT.G6449V00
13:15:41  IAT5110 JOB ND9275C3 (JOB07377) USES      D USGM15
13:15:42   TVA002I ND9275C3 USGM15 27A BC=05376   EXCP=00000176 DDN=SYS00001
13:15:42   TVA002I ND9275C3 USGS24 762 BC=00256   EXCP=00000001 DDN=IDRLIST
13:15:42   TVA002I ND9275C3 USGM15 27A BC=00000   EXCP=00000004 DDN=STEPLIB
13:15:42   TVA002I ND9275C3                VIO    EXCP=00000002 DDN=FT16F001
13:15:43   TVA002I ND9275C3 USGS22 777 BC=00000   EXCP=00000000 DDN=FT11F001
13:15:49   TVA002I ND9275C3 USGS22 777 BC=00000   EXCP=00000000 DDN=FT12F001
13:15:49   TVA002I ND9275C3 USGS22 777 BC=00000   EXCP=00000044 DDN=FT12F001
13:15:49   TVA002I ND9275C3                VIO    EXCP=00002109 DDN=FT11F001
13:15:49   TVA002I ND9275C3 USGS24 762 BC=00768   EXCP=00000005 DDN=FT16F001
13:15:49   TVA002I ND9275C3 USGM15 27A BC=00000   EXCP=00000002 DDN=FT06F001
13:15:50   TVA002I ND9275C3 USGS24 762 BC=01024   EXCP=00000029 DDN=STEPLIB
13:15:52   IEF404I ND9275C3 - ENDED - TIME=13.15.51   EXCP=00000004 DDN=SYSUT1
```

WDC 3/26/93

33/59

ATTACHMENT 13

ND 00031 92 0075

OK 3.28.93

```
//JOBLIB DD DSN=...,DISP=SHR
//PROCLIB DD DSN=APB.NEW.PS264460.PROCLIB,DISP=SHR
//STEP1 EXEC COROD,SOUT='*'
//GO.SYSIN DD *
/*
```

```
1  //ND9275C3 JOB 264363,'9.KAMPHOUSE.EDB2FBFN',MSGLEVEL=1,MSGCLASS=T
2  //PROCLIB DD DSN=APB.NEW.PS264460.PROCLIB,DISP=SHR
3  //STEP1 EXEC COROD,SOUT='*'
4  XXCOROD   PROC T=5,LIBRARY='APB.NEW.PS264460.PGMLIB',SOUT='*',
   XX             ELEVEN='APB.NEW.WZ264460.ISOTOPE.ELEVEN',
   XX             TWELVE='APB.NEW.WZ264460.ISOTOPE.TWELVE'
5  XXQACHECK EXEC PGM=VFYLKDT,REGION=4096K,TIME=1,
   XX             PARM='/JDATE=91071,PATH=APB.NEW.PS264460.PGMLIB(COROD)'
6  XXSTEPLIB  DD  DSN=&LIBRARY,DISP=SHR
   IEF653I SUBSTITUTION JCL - DSN=APB.NEW.PS264460.PGMLIB,DISP=SHR
7  XXPLIDUMP  DD  SYSOUT=&SOUT
   IEF653I SUBSTITUTION JCL - SYSOUT=*
8  XXSYSPRINT DD  SYSOUT=&SOUT
   IEF653I SUBSTITUTION JCL - SYSOUT=*
9  XXIDRLIST  DD  DSN=&.SN264360.FT06.OUTPUT(+1),DISP=(NEW,PASS),
   XX             UNIT=ALLOC,SPACE=(TRK,(20,5),RLSE),
   XX             DCB=(SYS1.MODEL,RECFM=FBA,LRECL=133,BLKSIZE=3990)
10 XXSYSDUMP  DD  SYSOUT=&SOUT
   IEF653I SUBSTITUTION JCL - SYSOUT=*
11 XXGO       EXEC PGM=COROD,TIME=&T
   IEF653I SUBSTITUTION JCL - PGM=COROD,TIME=5
12 XXSTEPLIB  DD  DSN=&LIBRARY,DISP=SHR
   IEF653I SUBSTITUTION JCL - DSN=APB.NEW.PS264460.PGMLIB,DISP=SHR
13 XXFT06F001 DD  DSN=&.SN264360.FT06.OUTPUT(+1),DISP=(MOD,PASS)
14 XXFT11F001 DD  DSN=&ELEVEN,DISP=SHR
   IEF653I SUBSTITUTION JCL - DSN=APB.NEW.WZ264460.ISOTOPE.ELEVEN,DISP=SHR
15 XXFT12F001 DD  DSN=&TWELVE,DISP=SHR
   IEF653I SUBSTITUTION JCL - DSN=APB.NEW.WZ264460.ISOTOPE.TWELVE,DISP=SHR
16 XXFT16F001 DD  UNIT=SYSDA,DCB=(RECFM=FB,LRECL=80,BLKSIZE=5120),
   XX             SPACE=(TRK,(1,1),RLSE)
17 XXSYSUDUMP DD  SYSOUT=&SOUT
   IEF653I SUBSTITUTION JCL - SYSOUT=*
18 XXABNLIGNR DD  SYSOUT=&SOUT
   IEF653I SUBSTITUTION JCL - SYSOUT=*
19 XXFT05F001 DD  DDNAME=SYSIN
20 //GO.SYSIN DD *,DCB=BLKSIZE=80
21 XXPRINT    EXEC PGM=IEBGENER,COND=EVEN
22 XXSYSPRINT DD  SYSOUT=&SOUT
   IEF653I SUBSTITUTION JCL - SYSOUT=*
23 XXSYSUT1   DD  DSN=&.SN264360.FT06.OUTPUT(+1),DISP=(OLD,PASS)
24 XXSYSUT2   DD  SYSOUT=&SOUT
   IEF653I SUBSTITUTION JCL - SYSOUT=*
25 XXSYSIN    DD  DUMMY
26 XXCATALOG EXEC PGM=IEFBR14
27 XXDD1      DD  DSN=&.SN264360.FT06.OUTPUT(+1),DISP=(OLD,CATLG,CATLG)
```

2Dc 3/20/93

ATTACHMENT 13

34/5

ND 00031 92007 5

DC 3-28-93

```
                                    ...AY, MARCH 26, 1993
IEF236I ALLOC.
IEF237I 27A  ALLOCATED TO SIL...
IEF237I JES3 ALLOCATED TO PLIDUMP
IEF237I JES3 ALLOCATED TO SYSPRINT
IGD100I 762 ALLOCATED TO DDNAME IDRLIST  DATACLAS (        )
IEF237I JES3 ALLOCATED TO SYSDUMP
BLMS1A  ***BLOCKSIZE CHANGE, OLD=03990, NEW=23476, ND9275C3/VFYLKDT */IDRLIST /K.SN264360.FT06.OUTPUT.G6449V00
IEF237I 27A  ALLOCATED TO SYS00001
TVA002I ND9275C3 USGM15 27A BC=05376   EXCP=00000176 DDN=SYS00001
IEF285I   APB.MEN.PS264460.PGMLIB                    KEPT
IEF285I   VOL SER NOS= USGM15.
TVA002I ND9275C3 USGS24 762 BC=00256   EXCP=00000001 DDN=IDRLIST
TVA002I ND9275C3 USGM15 27A BC=00000   EXCP=00000004 DDN=STEPLIB
IEF142I ND9275C3 QACHECK STEP1 - STEP WAS EXECUTED - COND CODE 0000
IEF285I   APB.MEN.PS264460.PGMLIB                    KEPT
IEF285I   VOL SER NOS= USGM15.
IEF285I   IDKDQ.ND9275C3.JOB07377.D0000000A.?        SYSOUT
IEF285I   IDKDQ.ND9275C3.JOB07377.D0000000B.?        SYSOUT
IEF285I   K.SN264360.FT06.OUTPUT.G6449V00            PASSED
IEF285I   VOL SER NOS= USGS24.
IEF285I   IDKDQ.ND9275C3.JOB07377.D0000000C.?        SYSOUT
********************************************** TVA  JOB/STEP  INFORMATION **********************************************
* STEP NAME  QACHECK                  START TIME  13.15.40.76              STEP CPU    00.00.00.13                     *
* PGM  NAME  VFYLKDT                  STOP TIME   13.15.42.32              JOB  CPU    00.00.00.13                     *
* SERV UNIT        618                ELAP  TIME  00.00.01.56              CONDITION CODE  0000                        *
************************************************************************************************************************
*                                                                EXCP STATISTICS                                       *
*  UNIT     EXCP COUNT  UNIT     EXCP COUNT  UNIT     EXCP COUNT  UNIT     EXCP COUNT  UNIT     EXCP COUNT  UNIT     EXCP COUNT *
*  27A             4   762             1   27A           176                                                             *
* TOTAL EXCP       181       VIO PAGE IN          0          VIO PAGE OUT          0       PAGES SWAPPED IN          0 *
************************************************************************************************************************
IEF373I STEP /QACHECK / START 93085.1315
IEF374I STEP /QACHECK / STOP  93085.1315 CPU    0MIN 00.13SEC SRB    0MIN 00.01SEC VIRT  4224K SYS   272K EXT       4K SYS    8980K
IEF236I ALLOC. FOR ND9275C3 GO STEP1
IEF237I 27A  ALLOCATED TO STEPLIB
IEF237I 762  ALLOCATED TO FT06F001
IEF237I 777  ALLOCATED TO FT11F001
IEF237I 777  ALLOCATED TO FT12F001
IGD101I SMS ALLOCATED TO DDNAME (FT16F001)
        DSN (SYS93085.T131538.RA000.ND9275C3.R0000001     )
        STORCLAS (SCTEMP) MGMTCLAS (        ) DATACLAS (        )
IEF237I JES3 ALLOCATED TO SYSUDUMP
IEF237I JES3 ALLOCATED TO ABNLIGNR
IEF237I JES3 ALLOCATED TO FT05F001
TVA002I ND9275C3              VIO       EXCP=00000002 DDN=FT16F001
TVA002I ND9275C3 USGS22 777 BC=00000    EXCP=00000000 DDN=FT11F001
TVA002I ND9275C3 USGS22 777 BC=00000    EXCP=00000000 DDN=FT12F001
TVA002I ND9275C3 USGS22 777 BC=00000    EXCP=00000044 DDN=FT12F001
TVA002I ND9275C3 USGS22 777 BC=00000    EXCP=00002109 DDN=FT11F001
TVA002I ND9275C3              VIO       EXCP=00000005 DDN=FT16F001
TVA002I ND9275C3 USGS24 762 BC=00768    EXCP=00000002 DDN=FT06F001
TVA002I ND9275C3 USGM15 27A BC=00000    EXCP=00000029 DDN=STEPLIB
IEF142I ND9275C3 GO STEP1 - STEP WAS EXECUTED - COND CODE 0000
IEF285I   APB.MEN.PS264460.PGMLIB                    KEPT
IEF285I   VOL SER NOS= USGM15.
IEF285I   K.SN264360.FT06.OUTPUT.G6449V00            PASSED
IEF285I   VOL SER NOS= USGS24.


IEF285I   APB.MEN.WZ264460.ISOTOPE.ELEVEN            KEPT
IEF285I   VOL SER NOS= USGS22.
IEF285I   APB.MEN.WZ264460.ISOTOPE.TWELVE            KEPT
IEF285I   VOL SER NOS= USGS22.
IGD105I SYS93085.T131538.RA000.ND9275C3.R0000001      DELETED,   DDNAME=FT16F001
IEF285I   IDKDQ.ND9275C3.JOB07377.D0000000D.?        SYSOUT
IEF285I   IDKDQ.ND9275C3.JOB07377.D0000000E.?        SYSOUT
IEF285I   IDKDQ.ND9275C3.JOB07377.D00000009.?        SYSIN
********************************************** TVA  JOB/STEP  INFORMATION **********************************************
* STEP NAME  GO                       START TIME  13.15.42.36              STEP CPU    00.00.01.38                     *
* PGM  NAME  CORDD                    STOP TIME   13.15.49.58              JOB  CPU    00.00.01.61                     *
* SERV UNIT      8,562                ELAP  TIME  00.00.07.22              CONDITION CODE  0000                        *
************************************************************************************************************************
*                                                                EXCP STATISTICS                                       *
*  UNIT     EXCP COUNT  UNIT     EXCP COUNT  UNIT     EXCP COUNT  UNIT     EXCP COUNT  UNIT     EXCP COUNT  UNIT     EXCP COUNT *
*  27A            29   762             2   777         2,109   777            44   VIO             5                      *
* TOTAL EXCP     2,189       VIO PAGE IN          0          VIO PAGE OUT          0       PAGES SWAPPED IN          0 *
************************************************************************************************************************
IEF373I STEP /GO      / START 93085.1315
IEF374I STEP /GO      / STOP  93085.1315 CPU    0MIN 01.38SEC SRB    0MIN 00.22SEC VIRT   396K SYS   296K EXT       8K SYS    8912K
IEF236I ALLOC. FOR ND9275C3 PRINT STEP1
IEF237I JES3 ALLOCATED TO SYSPRINT
IEF237I 762  ALLOCATED TO SYSUT1
IEF237I JES3 ALLOCATED TO SYSUT2
IEF237I DMY  ALLOCATED TO SYSIN
TVA002I ND9275C3 USGS24 762 BC=01024   EXCP=00000004 DDN=SYSUT1
IEF147I ND9275C3 PRINT STEP1 - STEP WAS EXECUTED - COND CODE 0000
IEF285I   IDKDQ.ND9275C3.JOB07377.D000000F.?         SYSOUT
IEF285I   K.SN264360.FT06.OUTPUT.G6449V00            PASSED
IEF285I   VOL SER NOS= USGS24.
IEF285I   IDKDQ.ND9275C3.JOB07377.D0000010.?         SYSOUT
********************************************** TVA  JOB/STEP  INFORMATION **********************************************
* STEP NAME  PRINT                    START TIME  13.15.49.61              STEP CPU    00.00.00.06                     *
* PGM  NAME  IEBGENER                 STOP TIME   13.15.51.29              JOB  CPU    00.00.01.57                     *
* SERV UNIT        174                ELAP  TIME  00.00.01.68              CONDITION CODE  0000                        *
************************************************************************************************************************
*                                                                EXCP STATISTICS                                       *
*  UNIT     EXCP COUNT  UNIT     EXCP COUNT  UNIT     EXCP COUNT  UNIT     EXCP COUNT  UNIT     EXCP COUNT  UNIT     EXCP COUNT *
*  762              4                                                                                                  *
* TOTAL EXCP         4       VIO PAGE IN          0          VIO PAGE OUT          0       PAGES SWAPPED IN          0 *
************************************************************************************************************************
IEF373I STEP /PRINT   / START 93085.1315
IEF374I STEP /PRINT   / STOP  93085.1315 CPU    0MIN 00.06SEC SRB    0MIN 00.00SEC VIRT   372K SYS   232K EXT       4K SYS    8970K
IEF236I ALLOC. FOR ND9275C3 CATALOG STEP1
IEF237I 762  ALLOCATED TO DD1
IEF142I ND9275C3 CATALOG STEP1 - STEP WAS EXECUTED - COND CODE 0000
IEF285I   K.SN264360.FT06.OUTPUT.G6449V00              CATLGGED
IEF285I   VOL SER NOS= USGS24.
********************************************** TVA  JOB/STEP  INFORMATION **********************************************
* STEP NAME  CATALOG                  START TIME  13.15.51.39              STEP CPU    00.00.00.02                     *
* PGM  NAME  IEFBR14                  STOP TIME   13.15.51.84              JOB  CPU    00.00.01.59                     *
* SERV UNIT        39                 ELAP  TIME  00.00.00.45              CONDITION CODE  0000                        *
************************************************************************************************************************
*                                                                EXCP STATISTICS                                       *
*  UNIT     EXCP COUNT  UNIT     EXCP COUNT  UNIT     EXCP COUNT  UNIT     EXCP COUNT  UNIT     EXCP COUNT  UNIT     EXCP COUNT *
* TOTAL EXCP         0       VIO PAGE IN          0          VIO PAGE OUT          0       PAGES SWAPPED IN          0 *
************************************************************************************************************************
```

ATTACHMENT 13

35/5

ND 00031 920075

MC 3-28-93

```
IEF374I STEP /C2... [illegible]                           0MIN 00.00SEC VIRT     8K SYS   232K EXT        4K SYS     8868K
*********************************************  TVA  JOB/STEP  INFORMATION  ****************************************************
* JOB NAME ND9275C3   PROGRAMMER   9JKAMPHOUSE[illegible]BFN  START DATE 03/26/93    START TIME 13.15.40.76  CONDITION CODE  0000     *
* JOB NUMB JOB07377   ACCT DATA    264363    :STEPLIB     STOP  DATE 03/26/93    STOP  TIME 13.15.51.85  CPU TIME  00.00.01.59    *
* JOB CLASS  SB                    MVS SP3.1.3  REL 03 .8                        ELAP  TIME 00.00.11.09  SERVICE UNITS      9,385 SYSM*
*********************************************  TVA  JOB/STEP  INFORMATION  ****************************************************
IEF375I  JOB /ND9275C3/ START 93085.1315
IEF376I  JOB /ND9275C3/ STOP  93085.1315 CPU    0MIN 01.59SEC SRB    0MIN 00.23SEC
```

ATTACHMENT 13

36/59

ND Q0031 92 0075
JJC 3-28-93

IEB352I WARNING : OUTPUT RECFM/LRECL/BLKSIZE COPIED FROM IN
PROCESSING ENDED AT EOD

ZBC 3/26/93

ATTACHMENT 13

37/59

ND 00031 92 0075

DX 3-28-93

2DC 3/26/93

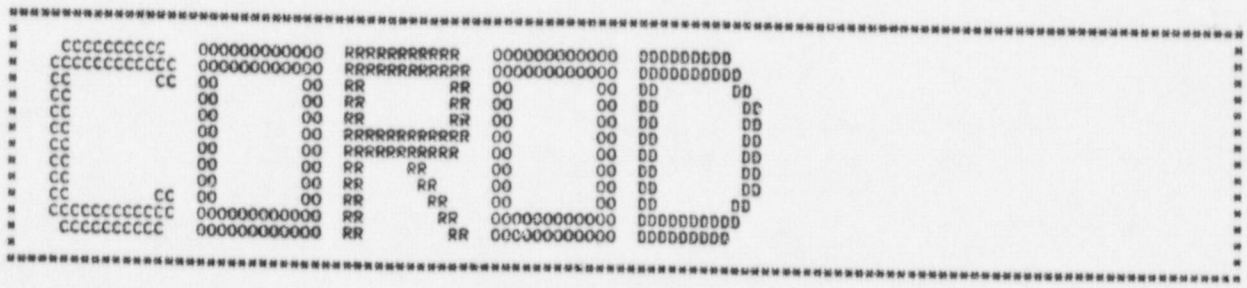
ATTACHMENT 13

38/59

ND 00031 92 0075

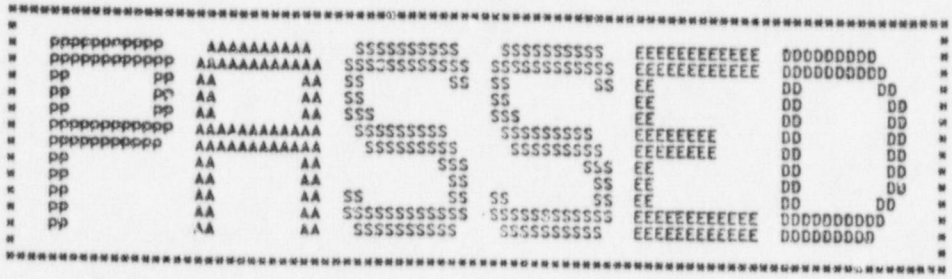
OK 3-28-93

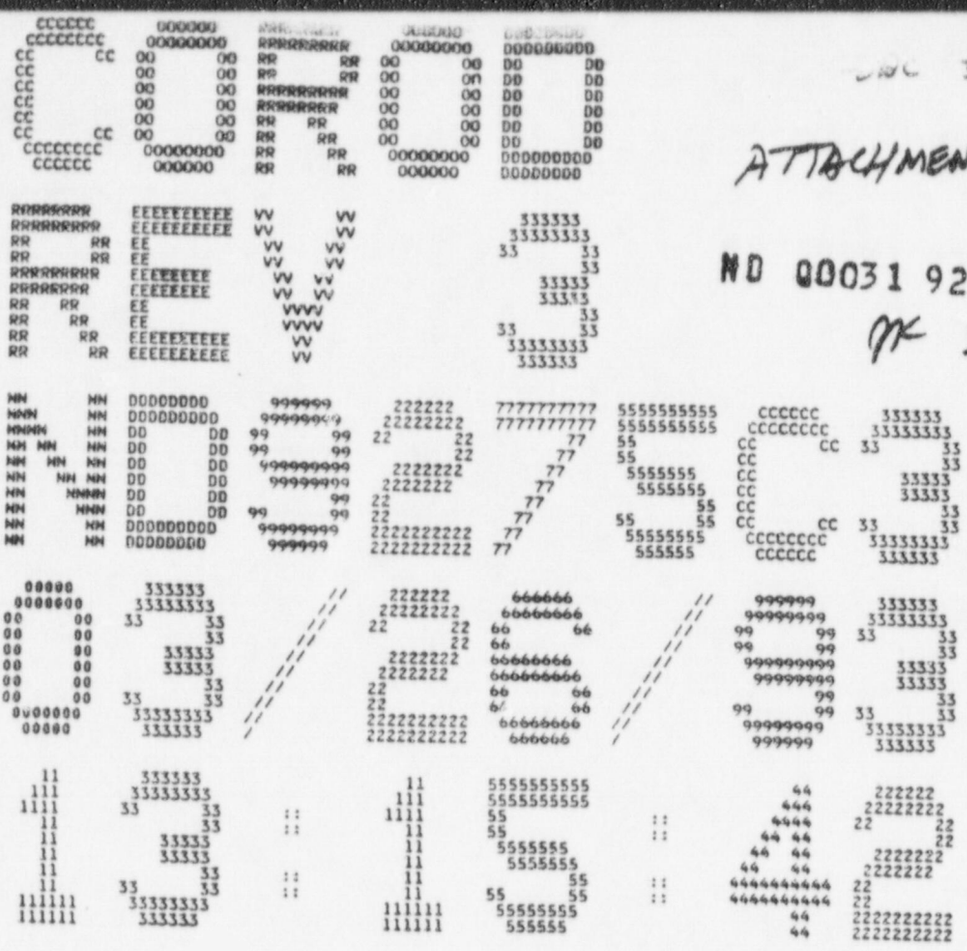
93/03/26 @ 13.15.41.534 LINKAGE EDITOR LOAD MODULE DATE VERIFICATION PAGE 0000



FILE: APB.NEN.PS264460.PGMLIB
MODULE: COROD
LASTLINK: 91/071

QA CHECK RESULTS





3/26/93

ATTACHMENT 13

39/59

ND 00031 92 0075

OK 3-28-93

RDC 3/26/93

ATTACHMENT B

40/59

ND 00031 92 0075

OK 3.28.93

REPRODUCTION OF INPUT DATA DECK

```
+         +         +         +         +         +         +         +
NIT= 22   NR= 1   ITP= 6   FACT= 1.0
LOCA BASE OF STACK- ND-00031-920075 RS
I 131 I 132 I 133 I 134 I 135
I= 131 I= 132 I= 133 I= 134 I= 135
KRM 85 KR 85 KR 87 KR 88 KR 89
XEM 131 XEM 133 XE 133 XEM 135 XE 135 XE 137 XE 138
    6  'BASE OF STACK                          ' $ TN=  0.5000E+00
         1 0.0            2 0.0            3 0.0            4 0.0            5 0.0
         6 0.0            7 0.0            8 0.0            9 0.0           10 0.0
        11 0.0           12 0.0           13 0.0           14 0.0           15 0.0
        16 0.0           17 0.0           18 0.0           19 0.0           20 0.0
        21 0.0           22 0.0
    6  'BASE OF STACK                          ' $ TN=  0.2000E+01
         1 2.058E-03      2 1.964E-03      3 4.698E-03      4 1.789E-03      5 4.001E-03
         6 9.045E-05      7 8.634E-05      8 2.065E-04      9 7.862E-05     10 1.759E-04
        11 3.320E-02     12 1.499E-03     13 3.696E-02     14 7.981E-02     15 2.569E-06
        16 1.269E-03     17 6.043E-03     18 2.158E-01     19 8.035E-03     20 1.956E-01
        21 1.299E-05     22 4.989E-03
    6  'BASE OF STACK                          ' $ TN=  0.8000E+01
         1 6.605E-02      2 1.947E-02      3 1.329E-01      4 4.220E-03      5 8.428E-02
         6 2.903E-03      7 8.557E-04      8 5.842E-03      9 1.855E-04     10 3.705E-03
        11 5.737E-01     12 4.885E-02     13 1.682E-01     14 9.695E-01     15 7.377E-14
        16 4.105E-02     17 1.682E-01     18 6.911E+00     19 1.535E-01     20 4.931E+00
        21 9.977E-12     22 3.471E-04
    6  'BASE OF STACK                          ' $ TN=  0.2400E+02
         1 6.419E-01      2 1.244E-02      3 9.235E-01      4 1.446E-04      5 2.785E-01
         6 7.822E-02      7 5.466E-04      8 4.059E-02      9 6.354E-06     10 1.224E-02
        11 1.190E+00     12 4.949E-01     13 2.347E-02     14 9.363E-01     15 0.0
        16 4.068E-01     17 1.680E+00     18 6.654E+01     19 5.258E-01     20 2.445E+01
        21 0.0           22 4.441E-11
    6  'BASE OF STACK                          ' $ TN=  0.9600E+02
         1 7.831E+00      2 2.391E-04      3 3.304E+00      4 1.311E-09      5 1.500E-01
         6 5.462E-01      7 1.051E-05      8 1.452E-01      9 5.765E-11     10 6.591E-03
        11 2.515E-01     12 7.157E+00     13 1.035E-05     14 4.367E-02     15 0.0
        16 5.581E+00     17 1.414E+01     18 7.628E+02     19 3.061E-01     20 2.905E+01
        21 0.0           22 0.0
    6  'BASE OF STACK                          ' $ TN=  0.7200E+03
         1 9.565E+01      2 2.046E-13      3 6.671E-01      4 0.0            5 1.874E-04
         6 4.205E+00      7 8.992E-15      8 2.932E-02      9 0.0           10 8.238E-06
        11 9.320E-06     12 2.479E+02     13 2.675E-22     14 2.133E-09     15 0.0
        16 1.042E+02     17 2.723E+01     18 5.981E+03     19 4.958E-04     20 3.153E-01
        21 0.0           22 0.0
2=8.89E-4 7.3E-4 6.6E-4 5.4E-4 4.0E-4
1800  5400  21600  57600  259200  2246400
0.0 3717.9
0.90 1E-15 0.90 1E-15 210000.0 1E-15
100.0  60.0  40.0  1440.0  5760.0
153.948 36.833 15.33  46.0  9.0  4.0  76.974  18.4165 6.0  0.0
ROOFFLUX DOSE TO CONTROL ROOM PERSONNEL DUE TO SHINE THROUGH ROOF
1000.0  1000.0  1000.0  20.0  20.0  20.0  500.0  500.0  -13.58  2.25
+         +         +         +         +         +         +         +
```

LOCA BASE OF STACK- MD-00031-920075 R5

2QC 3/26/93

ATTACHMENT 13

41/59

CONTROL BAY COMPUTATION INPUT DATA
DATE 03/26/93 COROD START TIME 13:15:42

NUMBER OF ISOTOPES = 22
NUMBER OF AIR INTAKE VALUES = 1
NUMBER OF TIME PERIODS = 6
MULTIPLIER OF INPUT CURIES = 1.0000E+00

MD 00031 92 0075

QA 3.29.93

TIME PERIODS (SEC)
1800.0 5400.0 21600.0 57600.0 259200.0 2246400.0

TOTAL CURIES RELEASED DURING TIME PERIOD

ISOTOPE							
I	131	0.0	0.0	0.1	0.6	7.8	95.6
I	132	0.0	0.0	0.0	0.0	0.0	0.0
I	133	0.0	0.0	0.1	0.9	3.3	0.7
I	134	0.0	0.0	0.0	0.0	0.0	0.0
I	135	0.0	0.0	0.1	0.3	0.1	0.0
I*	131	0.0	0.0	0.0	0.0	0.3	4.2
I*	132	0.0	0.0	0.0	0.0	0.0	0.0
I*	133	0.0	0.0	0.0	0.0	0.1	0.0
I*	134	0.0	0.0	0.0	0.0	0.0	0.0
I*	135	0.0	0.0	0.0	0.0	0.0	0.0
KRM	85	0.0	0.0	0.6	1.2	0.3	0.0
KR	85	0.0	0.0	0.0	0.5	7.2	247.9
KR	87	0.0	0.0	0.2	0.0	0.0	0.0
KR	88	0.0	0.1	1.0	0.9	0.0	0.0
KR	89	0.0	0.0	0.0	0.0	0.0	0.0
XEM	131	0.0	0.0	0.0	0.4	5.4	104.2
XEM	133	0.0	0.0	0.2	1.7	14.1	27.2
XE	133	0.0	0.2	6.9	66.5	762.8	5981.6
XEM	135	0.0	0.0	0.2	0.5	0.3	0.0
XE	135	0.0	0.2	4.9	24.4	29.0	0.3
XE	137	0.0	0.0	0.0	0.0	0.0	0.0
XE	138	0.0	0.0	0.0	0.0	0.0	0.0

CHI/Q (SEC/CU. METER)
8.89E-04 8.89E-04 7.50E-04 6.60E-04 5.40E-04 4.00E-04

FLOW RATE OF AIR INTAKE (CFM)
0.0

FILTER EFFICIENCY, ELEMENTAL IODINE, FIRST PASS = 0.90
FILTER EFFICIENCY, ELEMENTAL IODINE, SECOND PASS = 0.00
FILTER EFFICIENCY, ORGANIC IODINE, FIRST PASS = 0.90
FILTER EFFICIENCY, ORGANIC IODINE, SECOND PASS = 0.00
CONTROL ROOM VOLUME (CU. FT.) = 210000.0
FLOW RATE THROUGH ROOM CIRCULATION SYSTEM (CFM) = 0.0

100.0 PERCENT OCCUPANCY BEFORE 1440.0 MIN.

60.0 PERCENT OCCUPANCY BETWEEN 1440.0 AND 5760.0 MIN.
40.0 PERCENT OCCUPANCY AFTER 5760.0 MIN.

SUCCESSIVE TIME PERIODS IN MINUTES
30.0 90.0 360.0 960.0 4320.0 37440.0

AVERAGE CURIE RELEASE RATE CONCENTRATION IN CURIES/CU. METER DURING EACH TIME PERIOD

I	131	0.000E+00	3.388E-10	2.232E-09	7.355E-09	1.631E-08	1.703E-08
I	132	0.000E+00	3.233E-10	6.580E-10	1.425E-10	4.981E-13	3.643E-23
I	133	0.000E+00	7.734E-10	4.492E-09	1.058E-08	6.883E-09	1.188E-10
I	134	0.000E+00	2.945E-10	1.426E-10	1.657E-12	2.731E-18	0.000E+00
I	135	0.000E+00	6.587E-10	2.846E-09	3.191E-09	3.125E-10	3.337E-14
I*	131	0.000E+00	1.489E-11	9.811E-11	3.234E-10	7.171E-10	7.488E-10
I*	132	0.000E+00	1.421E-11	2.892E-11	6.263E-12	2.190E-14	1.601E-24
I*	133	0.000E+00	3.400E-11	1.974E-10	4.651E-10	3.025E-10	5.221E-12
I*	134	0.000E+00	1.296E-11	6.269E-12	7.281E-14	1.201E-19	0.000E+00
I*	135	0.000E+00	2.896E-11	1.252E-10	1.402E-10	1.373E-11	1.467E-15
KRM	85	0.000E+00	5.466E-09	1.939E-08	1.364E-08	5.277E-10	1.660E-15
KR	85	0.000E+00	2.468E-10	1.651E-09	5.671E-09	1.491E-08	4.414E-08
KR	87	0.000E+00	6.085E-09	5.685E-09	2.689E-10	2.156E-14	4.763E-32
KR	88	0.000E+00	1.314E-08	3.277E-08	1.073E-08	9.098E-11	3.798E-19
KR	89	0.000E+00	4.229E-13	2.493E-21	0.000E+00	0.000E+00	0.000E+00
XEM	131	0.000E+00	2.089E-10	1.387E-09	4.661E-09	1.121E-08	1.855E-08
XEM	133	0.000E+00	9.949E-10	6.360E-09	1.925E-08	2.946E-08	4.849E-09
XE	133	0.000E+00	3.553E-08	2.336E-07	7.624E-07	1.589E-06	1.065E-06
XEM	135	0.000E+00	1.323E-09	5.188E-09	6.025E-09	6.377E-10	8.828E-14
XE	135	0.000E+00	3.220E-08	1.666E-07	2.802E-07	6.052E-08	5.614E-11
XE	137	0.000E+00	2.139E-12	3.372E-19	0.000E+00	0.000E+00	0.000E+00
XE	138	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

CONTROL ... WHOLE BODY AND INHALATION DOSE

DATE 03/26/93 TIME 13:17:02

LENGTH OF CONTAMINATED VOLUME (X) = 153.95 FT — 46 DIVISIONS
WIDTH OF CONTAMINATED VOLUME (Y) = 36.83 — 9 DIVISIONS
HEIGHT OF CONTAMINATED VOLUME (Z) = 15.33 — 4 DIVISIONS

DOSE POINT COORDINATES: X = 76.97 FT, Y = 18.42 FT, Z = 6.00 FT

SHIELD WALL THICKNESS = 0.000

56/59

ATTACHMENT 13

WD 8D031 92 0075
EPC 3/26/93
3-28-93

THE FOLLOWING VALUES ARE FOR A LEAK RATE OF 1500.00 CFM AND A BYPASS RATE OF****** CFM

ISOTOPE TOTAL CONCENTRATION TIME DURING EACH TIME PERIOD IN CURIE-HR/CU. METER

I	131	0.000E+00	2.260E-10	8.949E-09	8.448E-08	8.642E-07	7.858E-06
I	132	0.000E+00	1.952E-10	2.308E-09	1.581E-09	7.081E-11	1.709E-13
I	133	0.000E+00	5.106E-10	1.773E-08	1.199E-07	3.611E-07	5.696E-08
I	134	0.000E+00	1.535E-10	4.447E-10	4.277E-11	3.519E-13	5.799E-19
I	135	0.000E+00	4.244E-10	1.086E-08	3.521E-08	1.683E-08	1.500E-10
I*	131	0.000E+00	9.931E-12	3.933E-10	3.714E-09	3.798E-08	3.455E-07
I*	132	0.000E+00	8.581E-12	1.015E-10	6.947E-11	3.112E-12	7.512E-15
I*	133	0.000E+00	2.244E-11	7.795E-10	5.268E-09	1.587E-08	2.503E-09
I*	134	0.000E+00	6.745E-12	1.955E-11	1.880E-12	1.546E-14	2.550E-20
I*	135	0.000E+00	1.866E-11	4.774E-10	1.547E-09	7.396E-10	6.595E-12
KRM	85	0.000E+00	4.673E-09	9.747E-08	2.008E-07	4.164E-08	2.91[illegible]
KR	85	0.000E+00	2.223E-10	8.946E-09	8.803E-08	1.067E-06	2.752[illegible]05
KR	87	0.000E+00	4.598E-09	2.502E-08	5.099E-09	9.786E-11	7.756E-15
KR	88	0.000E+00	1.090E-08	1.584E-07	1.581E-07	1.087E-08	4.489E-11
KR	89	0.000E+00	6.194E-14	2.970E-15	1.751E-23	0.000E+00	0.000E+00
XEM	131	0.000E+00	1.680E-10	7.508E-09	7.227E-08	8.015E-07	1.155E-05
XEM	133	0.000E+00	8.923E-10	3.423E-08	2.969E-07	2.096E-06	3.016E-06
XE	133	0.000E+00	3.194E-08	1.262E-06	1.180E-05	1.135E-04	6.625E-04
XEM	135	0.000E+00	5.986E-10	1.085E-08	3.457E-08	1.697E-08	7.503E-11
XE	135	0.000E+00	2.827E-08	8.680E-07	4.197E-06	4.280E-06	7.087E-08
XE	137	0.000E+00	5.663E-13	2.090E-14	3.296E-21	0.000E+00	0.000E+00
XE	138	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

THE FOLLOWING VALUES ARE FOR A LEAK RATE OF 1500.00 CFM AND A BYPASS RATE OF****** CFM

ISOTOPE TOTAL WHOLE BODY GAMMA DOSE FOR EACH ISOTOPE AND TIME PERIOD

I	131	0.000E+00	4.428E-06	1.754E-04	1.656E-03	1.693E-02	1.540E-01
I	132	0.000E+00	2.171E-05	2.568E-04	1.758E-04	7.876E-06	1.901E-08
I	133	0.000E+00	1.419E-05	4.927E-04	[illegible]330E-03	1.003E-02	1.582E-03
I	134	0.000E+00	1.774E-05	5.140E-05	4.944E-06	4.067E-08	6.703E-14
I	135	0.000E+00	2.689E-05	6.879E-04	2.231E-03	1.066E-03	9.506E-06
I*	131	0.000E+00	1.946E-07	7.708E-06	7.279E-05	7.443E-04	6.770E-03
I*	132	0.000E+00	9.544E-07	1.128E-05	7.727E-06	3.461E-07	8.355E-10
I*	133	0.000E+00	6.235E-07	2.166E-05	1.464E-04	4.409E-04	6.955E-05
I*	134	0.000E+00	7.797E-07	2.259E-06	2.173E-07	1.787E-09	2.948E-15
I*	135	0.000E+00	1.182E-06	3.024E-05	9.803E-05	4.685E-05	4.177E-07
KRM	85	0.000E+00	3.743E-05	7.80[illegible]E-04	1.608E-03	3.335E-04	2.335E-06
KR	85	0.000E+00	2.266E-08	9.120E-07	8.975E-06	1.088E-04	2.806E-03
KR	87	0.000E+00	1.408E-04	7.661E-04	1.561E-04	2.997E-06	2.375E-10
KR	88	0.000E+00	7.554E-04	1.098E-02	1.096E-02	7.532E-04	3.112E-06
KR	89	0.000E+00	4.900E-09	2.350E-10	1.385E-18	0.000E+00	0.000E+00
XEM	131	0.000E+00	1.096E-06	4.377E-05	4.214E-04	4.673E-03	6.736E-02
XEM	133	0.000E+00	6.344E-06	2.434E-04	2.111E-03	1.490E-02	2.144E-02
XE	133	0.000E+00	4.959E-04	1.954E-02	1.832E-01	1.761E+00	1.028E+01
XEM	135	0.000E+00	1.265E-05	2.292E-04	7.304E-04	3.585E-04	1.585E-06
XE	135	0.000E+00	3.518E-04	1.080E-02	5.223E-02	5.326E-02	8.720E-04
XE	137	0.000E+00	3.330E-09	1.900E-10	2.996E-17	0.000E+00	0.000E+00
XE	138	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SUM:		0.000E+00	1.890E-03	4.518E-02	2.592E-01	1.865E+00	1.054E+01

TOTAL WHOLE BODY GAMMA DOSE FROM ALL ISOTOPES DURING POST ACCIDENT PERIOD IS = 1.271E+01 MRADS

THE FOLLOWING VALUES ARE FOR A LEAK RATE OF 1500.00 CFM AND A BYPASS RATE OF****** CFM

ISOTOPE TOTAL WHOLE BODY BETA DOSE FOR EACH ISOTOPE AND TIME PERIOD

I	131	0.000E+00	3.644E-05	1.443E-03	1.362E-02	1.394E-01	1.267E+00
I	132	0.000E+00	8.332E-05	9.854E-04	6.749E-04	3.023E-05	7.295E-08
I	133	0.000E+00	1.729E-04	6.005E-03	4.059E-02	1.223E-01	1.929E-02
I	134	0.000E+00	7.773E-05	2.252E-04	2.166E-05	1.782E-07	2.937E-13
I	135	0.000E+00	1.296E-04	3.317E-03	1.075E-02	5.141E-03	4.583E-05
I*	131	0.000E+00	1.602E-06	6.343E-05	5.990E-04	6.125E-03	5.571E-02
I*	132	0.000E+00	3.663E-06	4.331E-05	2.965E-05	1.328E-06	3.207E-09
I*	133	0.000E+00	7.600E-06	2.640E-04	1.784E-03	5.374E-03	8.477E-04
I*	134	0.000E+00	3.416E-06	9.899E-06	9.520E-07	7.831E-09	1.291E-14
I*	135	0.000E+00	5.699E-06	1.458E-04	4.727E-04	2.259E-04	2.014E-06
KRM	85	0.000E+00	9.809E-04	2.046E-02	4.215E-02	8.740E-03	6.119E-05
KR	85	0.000E+00	4.624E-03	1.861E-03	1.831E-02	2.220E-01	5.725E+00
KR	87	0.000E+00	5.051E-03	2.748E-02	5.602E-03	1.075E-04	8.522E-09
KR	88	0.000E+00	3.392E-03	4.931E-02	4.920E-02	3.382E-03	1.397E-05
KR	89	0.000E+00	6.328E-08	3.035E-09	1.789E-17	0.000E+00	0.000E+00
XEM	131	0.000E+00	2.229E-05	8.898E-04	8.566E-03	9.499E-02	1.369E+00
XEM	133	0.000E+00	1.406E-04	5.392E-03	4.677E-02	3.302E-01	4.751E-01
XE	133	0.000E+00	3.590E-03	1.418E-01	1.326E+00	1.275E+01	7.445E+01
XEM	135	0.000E+00	4.720E-05	8.555E-04	2.726E-03	1.338E-03	5.916E-06
XE	135	0.000E+00	7.433E-03	2.282E-01	1.104E+00	1.125E+00	1.843E-02
XE	137	0.000E+00	4.992E-07	2.849E-08	4.491E-15	0.000E+00	0.000E+00
XE	138	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SUM:		0.000E+00	2.123E-02	4.888E-01	2.672E+00	1.481E+01	8.338E+01

TOTAL WHOLE BODY BETA DOSE FROM ALL ISOTOPES DURING POST ACCIDENT PERIOD IS= 1.014E+02 MRADS

TOTAL WHOLE BODY GAMMA+BETA DOSE FROM ALL ISOTOPES DURING POST ACCIDENT PERIOD IS= 1.141E+02 MRADS

THE FOLLOWING VALUES ARE FOR A LEAK RATE OF 1500.00 CFM AND A BYPASS RATE OF****** CFM

ISOTOPE TOTAL INHALATION DOSE FOR EACH ISOTOPE AND TIME PERIOD

I	131	0.000E+00	4.177E-01	1.655E+01	7.877E+01	1.068E+03	9.714E+03
I	132	0.000E+00	1.304E-02	1.543E-01	5.329E-02	3.164E-03	7.636E-06
I	133	0.000E+00	2.551E-01	8.861E+00	3.020E+01	1.206E+02	1.903E+01
I	134	0.000E+00	4.793E-03	1.389E-02	6.736E-04	7.347E-06	1.211E-11
I	135	0.000E+00	6.574E-02	1.682E+00	2.751E+00	1.743E+00	1.554E-02
I*	131	0.000E+00	1.836E-02	7.272E-01	3.463E+00	4.695E+01	4.270E+02
I*	132	0.000E+00	5.735E-04	6.780E-03	2.341E-03	1.390E-04	3.356E-07
I*	133	0.000E+00	1.121E-02	3.895E-01	1.328E+00	5.301E+00	8.363E-01
I*	134	0.000E+00	2.106E-04	6.104E-04	2.961E-05	3.228E-07	5.324E-13
I*	135	0.000E+00	2.890E-03	7.394E-02	1.209E-01	7.659E-02	6.828E-04
SUM:		0.000E+00	7.897E-01	2.845E+01	1.167E+02	1.243E+03	1.016E+04

TOTAL INHALATION DOSE FROM ALL IODINES DURING POST ACCIDENT PERIOD IS= 1.155E+04 MRADS

57/59

THE FOLLOWING DOSES ARE THOSE GIVEN ABOVE BUT INCLUDE OCCUPANCY FACTORS.
THESE FACTORS ARE THE FOLLOWING: 100.00 PERCENT FOR 0 TO 1440. MINUTES;
60.00 PERCENT FOR 1440. TO 5760. MINUTES; AND
40.00 PERCENT AFTER 5760. MINUTES.

ATTACHMENT 13

WHOLE BODY GAMMA DOSE INCLUDING OCCUPANCY FACTOR IS 5.641E+00 MRADS
WHOLE BODY BETA DOSE INCLUDING OCCUPANCY FACTOR IS 4.542E+01 MRADS
INHALATION DOSE TO THYROID INCLUDING OCCUP. FACT. IS 4.956E+03 MRADS

MD 00031920075
Doc 3/29/93
MK 3-28-93

CONTROL ROOM DOSE FROM DIRECT GAMMA PENETRATION OF WALLS, ROOF OR FLOOR FROM AN EXTERNAL SOURCE

DATE 03/26/93 TIME 13:17:02

DOSE TO CONTROL ROOM PERSONNEL DUE TO SHINE THROUGH ROOF

LENGTH OF CONTAMINATED VOLUME (X) = 1000.00 FT 20 DIVISIONS
WIDTH OF CONTAMINATED VOLUME (Y) = 1000.00 20 DIVISIONS
HEIGHT OF CONTAMINATED VOLUME (Z) = 1000.00 20 DIVISIONS

DOSE POINT COORDINATES: X = 500.00 FT, Y = 500.00 FT, Z = -13.58 FT

SHIELD WALL THICKNESS = 2.250

ISOTOPE		TOTAL WHOLE BODY GAMMA DOSE FOR EACH ISOTOPE AND TIME PERIOD					
I	131	0.000E+00	6.698E-10	1.765E-08	1.551E-07	1.548E-06	1.401E-05
I	132	0.000E+00	7.282E-08	5.978E-07	3.424E-07	5.385E-09	3.413E-18
I	133	0.000E+00	2.856E-08	6.633E-07	4.167E-06	1.220E-05	1.824E-06
I	134	0.000E+00	9.121E-08	1.767E-07	5.473E-09	4.060E-14	0.000E+00
I	135	0.000E+00	3.967E-07	6.861E-06	2.050E-05	9.033E-06	8.560E-09
I*	131	0.000E+00	2.944E-11	7.758E-10	6.819E-09	6.804E-08	6.158E-07
I*	132	0.000E+00	3.201E-09	2.605E-08	1.505E-08	2.367E-10	1.500E-19
I*	133	0.000E+00	1.255E-09	2.916E-08	1.832E-07	5.361E-07	8.019E-08
I*	134	0.000E+00	4.008E-09	7.766E-09	2.405E-10	1.785E-15	0.000E+00
I*	135	0.000E+00	1.744E-08	3.016E-07	9.009E-07	3.969E-07	3.675E-10
KRM	85	0.000E+00	2.946E-10	4.180E-09	7.838E-09	1.365E-09	3.721E-14
KR	85	0.000E+00	1.501E-11	4.017E-10	3.679E-09	4.353E-08	1.117E-06
KR	87	0.000E+00	3.547E-06	1.324E-05	1.670E-06	6.027E-10	1.154E-26
KR	88	0.000E+00	2.485E-05	2.479E-04	2.165E-04	8.261E-06	2.989E-13
KR	89	0.000E+00	7.444E-10	1.755E-17	0.000E+00	0.000E+00	0.000E+00
XEM	131	0.000E+00	1.970E-17	5.233E-16	4.688E-15	5.074E-14	7.278E-13
XEM	133	0.000E+00	6.039E-13	1.544E-11	1.246E-10	8.583E-10	1.224E-09
XE	133	0.000E+00	1.419E-16	3.733E-15	3.249E-14	3.048E-13	1.770E-12
XEM	135	0.000E+00	1.557E-08	2.442E-07	7.563E-07	3.602E-07	4.322E-10
XE	135	0.000E+00	1.500E-08	3.106E-07	1.392E-06	1.353E-06	1.088E-08
XE	137	0.000E+00	5.098E-11	3.215E-17	0.000E+00	0.000E+00	0.000E+00
XE	138	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SUM:		0.000E+00	2.904E-05	2.704E-04	2.466E-04	3.381E-05	1.767E-05

WHOLE BODY GAMMA DOSE(CONTINUOUS OCCUPANCY) DUE TO EXTERNAL SOURCE 5.975E-04 MRADS

WHOLE BODY GAMMA DOSE (OCCUPANCY FACTORS INCLUDED) DUE TO EXT. SOURCE 5.734E-04 MRADS

TOTAL PERSONNEL GAMMA DOSE FROM ALL SOURCES PRESENTLY CALCULATED 5.642E+00 MRADS

NOTE: TOTAL IS FOR FIRST VALUE OF CONTROL ROOM AIR FLOW RATE

DATE 03/26/93 COROD END TIME 13:17:11

*** CHATTANOOGA IBM BROADCAST MESSAGES ***
Updated 03/26/93 09:30

******* WEEKEND OUTAGE SCHEDULE ********

IBM Business Complex	No Scheduled Outage
CDC/CXA	Saturday 03/27/93 22:00 - 02:00 Sunday 03/28/93
CDC/CXB	Saturday 03/27/93 22:00 - 02:00 Sunday 03/28/93
Corp. Email Server	Saturday 03/27/93 22:00 - 02:00 Sunday 03/28/93
CSUNX2	No Scheduled Outage

**** INSTALLATION OF CICS/ESA 3.3 IN THE CICS ACCEPTANCE REGIONS ****

On Sunday, March 28, 1993, the CICS Acceptance regions will be upgraded to CICS/ESA Version 3.3. The regions will be unavailable from 20:00 to 24:00. Please see ADP Information Center (ADPIC), Major Technical Issues for recently updated technical information on CICS/ESA 3.3.

!!! REMOVAL OF ROSCOE !!!

On March 28, 1993, ROSCOE will be removed from the IBM Business Complex. Customers are reminded to continue with migration of any applications remaining on ROSCOE.

*** END OF BROADCAST ***

ATTACHMENT 13

58/59

ND 00031 92 0075
RUSC 3/26/93
JK 3-28-93

9JKAMPHOUSE,EDB2FBFN
9JKAMPHOUSE,EDB2FBFN

9JKAMPHOUSE,EDB2FBFN
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NN        NN  DDDDDDDDD     9999999999     2222222222    777777777777  555555555555   CCCCCCCCCC     3333333333
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NN    NN  NN  DD      DD   999999999999          22         7         5555555555    CC                    3333
NN     NN NN  DD      DD             99        22           77                55    CC                      33
NN      NNNN  DD      DD             99      22             77                55    CC                      33
NN       NNN  DD      DD   99        99    22               77                55    CC        CC  33        33
NN        NN  DDDDDDDDDD   999999999999  222222222222       77        555555555555  CCCCCCCCCCCC  333333333333
NN         N  DDDDDDDDD     9999999999   222222222222       77        55555555555    CCCCCCCCCC     3333333333
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ND9275C3 JOB07403
ND9275C3 JOB07403

9JKAMPHOUSE,EDB2FBFN
9JKAMPHOUSE,EDB2FBFN

ACCT# 264363
ACCT# 264363

ORIGIN INTERNAL READER
ORIGIN INTERNAL READER

START DATE 26 MAR 93.085
START TIME 13.16.09

STOP DATE 26 MAR 93.085
STOP TIME 13.16.22

XEQ TIME 00.00.13

XEQ NODE CHAGP

PRINTER 631
STOP TIME 13.23.36
PRINT DATE 26 MAR 93.085

56 CARDS READ
0 CARDS PUNCHED
435 LINES PRINTED

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ND 00031 92 0075
WOC 3/20/93
3-28-93

ATTACHMENT 13

ND9275C3 JOB07403
ND9275C3 JOB07403

9JKAMPHOUSE,EDB2FBFN
9JKAMPHOUSE,EDB2FBFN

ACCT# 264363
ACCT# 264363

ORIGIN INTERNAL READER
ORIGIN INTERNAL READER

START DATE 26 MAR 93.085
START TIME 13.16.09

STOP DATE 26 MAR 93.085
STOP TIME 13.16.22

XEQ TIME 00.00.13

XEQ NODE CHAGP

PRINTER 631
STOP TIME 13.23.36
PRINT DATE 26 MAR 93.085

56 CARDS READ
0 CARDS PUNCHED
435 LINES PRINTED

59/5

9JKAMPHOUSE,EDB2FBFN
9JKAMPHOUSE,EDB2FBFN
9JKAMPHOUSE,EDB2FBFN
9JKAMPHOUSE,EDB2FBFN