

TMI DOCUMENTS

DOCUMENT NO: TM-467

COPY MADE ON 5/18/79 OF DOCUMENT PROVIDED BY
METROPOLITAN EDISON COMPANY.

WRM
Wilda R. Mullinix, NRC

7906140403

TRAINING PROGRAM ADMINISTRATIVE FORM

23A

1. LESSON/COURSE: RAD EMERGENCY DRILL - GAS RELEASE - UNIT 1

2. LOCATION: TMI

3. PERSONNEL ATTENDING: (PLEASE PRINT):

NAME	EMPLOYEE NO. 4 8	NAME	EMPLOYEE NO. 4 8
<u>G. MILLER</u>	<u>06244</u>	<u>R. BOOHER</u>	<u>05489</u>
<u>J. O'HANLON</u>	<u>06001</u>	<u>R. BOYER</u>	<u>04737</u>
<u>G. KUNDER</u>	<u>04578</u>	<u>T. GOODLAWAGE</u>	<u>04662</u>
<u>J. LOGAN</u>	<u>06652</u>	<u>M. KENDIG</u>	<u>04868</u>
<u>J. SEELINGER</u>	<u>06213</u>	<u>J. TAYLOR</u>	<u>06373</u>
<u>M. ROSS</u>	<u>04680</u>	<u>W. BUSANSKY</u>	<u>06364</u>
<u>J. FLOYD</u>	<u>03842</u>	<u>R. DURIEL</u>	<u>06246</u>
<u>D. SHOULIN</u>	<u>05956</u>	<u>T. MULLEAVY</u>	<u>06243</u>
<u>N. HERNEISEY</u>	<u>01722</u>	<u>P. VELEZ</u>	<u>05462</u>
<u>H. MITCHELL</u>	<u>05990</u>	<u>R. MCCANN</u>	<u>02917</u>
<u>R. MEHLER</u>	<u>04222</u>	<u>T. THOMPSON</u>	<u>06064</u>
<u>R. PARNELL</u>	<u>06125</u>	<u>T. LEACH</u>	<u>06086</u>
<u>K. HOYT</u>	<u>05498</u>	<u>J. HIPPLE</u>	<u>05504</u>

COMPLETION DATE

MO	DAY	YR
10	23	78

CATALOG NUMBER

FILE NO.				LESSON ID
CAT	TYPE	SUBJECT		
15	G	2223		25
14	S	10001		

TOTAL COURSE DURATION

HOURS
00.025

4. LECTURE HOURS _____ OTHER HOURS 2.5 EXPLAIN DRILL & CRITIQUE

5. ENTER THE PREFIX FOR THE APPROPRIATE MODE:

MODE PREFIX
DRL

CORRESPONDENCE	PREFIX (CCS)	REVIEWER	PREFIX (HVR)
FILM	(FLM)	SCHOOL	(SCH)
LECTURE	(LEC)	SEMINAR	(SEM)
OJT	(OJT)	VIDEOTAPE	(VTP)
ORIGINATOR	(OCR)		

COMMENT: RAD EMER DRL - U1 GAS REL

7 105
GPF 0007.003
Rev 3

6. METHOD OF EVALUATION (Check at least one)

A. WRITTEN TEST _____ (Attach copy of answers, and graded tests)

B. ORAL QUESTIONING SPOT CHECK _____

C. QUIZ _____ (Attach questions and answers)

D. OTHER _____ (Explain):

7. INSTRUCTOR/TRAINEE'S EVALUATION (This section must be filled in)

(Based on your method of evaluation briefly describe the effectiveness of the training)

J. A. M. ... 11/10/78
INSTRUCTOR/TRAINEE'S SIGNATURE DATE

8. SIGNATURE OF SUPERVISOR OF TRAINING/TRAINING COORDINATOR _____ DATE _____

ATTACH LESSON OUTLINE/ITEMS COVERED

TRAINING PROGRAM ADMINISTRATIVE FORM

1
2
3
2.A

1. LESSON/COURSE: P.A.D. EMERGENCY DRILL - GAS RELEASE - UNIT 1

2. LOCATION: TMI

3. PERSONNEL ATTENDING: (PLEASE PRINT):

NAME	EMPLOYEE NO. 4 8	NAME	EMPLOYEE NO. 4 8
<u>H. FURST</u>	<u>02263</u>		<u>0, , , ,</u>
<u>M. GARNER</u>	<u>16112</u>		<u>0, , , ,</u>
<u>R. EVANS</u>	<u>04814</u>		<u>0, , , ,</u>
<u>D. KEESLER</u>	<u>06004</u>		<u>0, , , ,</u>
<u>G. TILLEY</u>	<u>06137</u>		<u>0, , , ,</u>
<u>L. LANDRY</u>	<u>06588</u>		<u>0, , , ,</u>
<u>F. M' CORMICK</u>	<u>06169</u>		<u>0, , , ,</u>
<u>E. ORWIG</u>	<u>06405</u>		<u>0, , , ,</u>
<u>N. BROWN</u>	<u>05318</u>		<u>0, , , ,</u>
<u>J. DEMAN</u>	<u>06138</u>		<u>0, , , ,</u>
	<u>0, , , ,</u>		<u>0, , , ,</u>
	<u>0, , , ,</u>		<u>0, , , ,</u>
	<u>0, , , ,</u>		<u>0, , , ,</u>

COMPLETION DATE

MO	DAY	YR
9	14	
<u>10</u>	<u>23</u>	<u>78</u>

CATALOG NUMBER

FILE NO.		LESSON ID
CAT	TYPE SUBJECT	
15	'2223	26
<u>14510001</u>		

TOTAL COURSE DURATION

HOURS
27 31
<u>0,0,0,2,5</u>

4. LECTURE HOURS — OTHER HOURS 2.5 EXPLAIN DRILL & CRITIQUE

5. ENTER THE PREFIX FOR THE APPROPRIATE MODE:

MODE PREFIX
32 34
<u>DRL</u>

CORRESPONDENCE (CCS)	REVIEWER (HVR)	<u>197 107</u>
FILM (FLM)	SCHOOL (SCH)	
LECTURE (LEC)	SEMINAR (SEM)	
OJT (OJT)	VIDEOTAPE (VTP)	
ORIGINATOR (OGR)		

GPF0007.003

Rev 3

35 COMMENT 37
P.A.D. EMER. DRL - U.I. GAS. REL.

6. METHOD OF EVALUATION (Check at least one)

A. WRITTEN TEST _____ (Attach copy of answers, and graded tests)

B. ORAL QUESTIONING SPOT CHECK _____

C. QUIZ _____ (Attach questions and answers)

D. OTHER _____ (Explain):

7. INSTRUCTOR/TRAINEE'S EVALUATION (This section must be filled in)

(Based on your method of evaluation briefly describe the effectiveness of the training)

RA Mc L... 11/15/78
INSTRUCTOR/TRAINEE'S SIGNATURE DATE

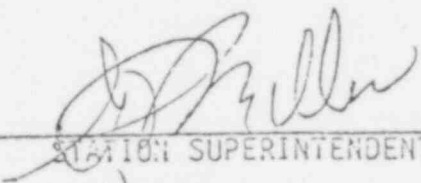
8. SIGNATURE OF SUPERVISOR OF TRAINING/TRAINING COORDINATOR _____ DATE _____

ATTACH LESSON OUTLINE/ITEMS COVERED

ENCLOSURE #3

PERMISSION TO CONDUCT A
RADIATION EMERGENCY DRILL

I hereby authorize the Supervisor of Training to conduct a Radiation Emergency
Drill on 10/23/78 as ~~outline in the attached Scenario.~~
@ ~ 1300



STATION SUPERINTENDENT OR DESIGNATE
10/78

DATE

ENCLOSURE #1

Date: 10/23/78

RADIATION EMERGENCY DRILL
OBSERVER ASSIGNMENT SHEET

AREA OF RESPONSIBILITY

OBSERVER

- | | |
|------------------------------------|--------------------------------|
| 1. Emergency Control Center (ECC) | 1. <u>N. BROWN / L. LANDRY</u> |
| 2. Emergency Control Station (ECS) | 2. <u>J. DEMAN</u> |
| 3. Emergency Repair Party | 3. <u>E. ORWIG</u> |
| 4. Accountability | 4. <u>R. HAF-BIN</u> |
| 5. On-Site Monitoring Team | 5. <u>D. McCONNELL</u> |
| 6. Off-Site Monitoring Team | 6. <u>W. SHUMAKER</u> |
| 7. Communications (local) | 7. <u>L. LANDRY / J. DEMAN</u> |
| 8. Communications (off-site) | 8. <u>L. LANDRY</u> |

ACTION ITEMS

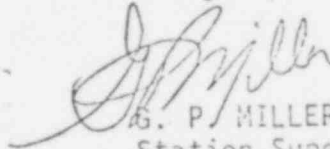
1. Check Page System Units for proper operation.
Ensure Merge-Isolate Switch Procedure is correct. D. Shovlin

2. Ensure all operations personnel know where to
report and their responsibilities during an
emergency. M. Ross
J. Floyd

3. Need additional status board in Control Room.
Emergency Kit Air Sampler replaced. R. Dubiel
Change to Emergency Plan for new telephone
numbers.



L. J. LANDRY
Emergency Drill Coordinator



G. P. MILLER
Station Superintendent

LJL/GPM:dws

INITIAL CONDITIONS

UNIT AT 100% POWER
RCS DEGAS IN PROGRESS (LAST 2 DAYS)
RCS TOTAL GAS - 70 CC/KG
RCS ACTIVITY - 110 μ Ci/CC
(DOSE EQUIVALENT I-131 - 20 μ Ci/CC)
RCBT 'A' FILL PER 1104-47A STARTED

METEOROLOGICAL CONDITIONS

WIND SPEED \rightarrow 2 MPH
WIND INDICATOR \rightarrow 218° DEGREES
WIND RANGE \rightarrow 55° DEGREES
VERTICAL TEMPERATURE DIFFERENCE \rightarrow -.5°F

T=0

197 112

RM-A-8

PARTICULATE $\rightarrow 1 \times 10^3$ cpm/min

IODINE $\rightarrow 5 \times 10^2$ cpm/min

GAS $\rightarrow 5 \times 10^3$ cpm (alert)

T=2

RM-A-7

GAS $\rightarrow 5 \times 10^2$ cpm

T=2

117 113

t=4

RM-A-8

PARTICULATE → > 1×10^6 cpm/min (high)

IODINE → > 1×10^6 cpm/min (high)

GAS → > 1×10^6 cpm (high)

T=4

t=19

RM-A-8

PARTICULATE →

10^2 ^{> 10^6} cpm/min

IODINE →

50 cpm/min

GAS →

1×10^3 cpm

T = ~~17~~
197 114

A.O.

INITIAL CONDITIONS

UNIT AT 100% POWER

DEGAS IN PROGRESS

WDG P 1A RUNNING IN AUTO

WDG T 1A SELECTED FOR 'FILL' (75 PSIG)

WDG T 1B & 1C AT 30 PSIG

RCBT 'A' FILL FROM RECLAIMED WATER
STARTED - WASTE GAS TANK PRESSURE (1104-47A)

RECORDER MARKED.

WDG-P-1A RUNNING
IN "AUTO"

WDG-T-1A SELECTED
FOR "FILL"

T=1

A.O. 97 145

WASTE GAS DEGRY TANKS PRESSURE



RM-A-7

5×10^2

CPM

T=1
A.O.

UNIT I RADIATION EMERGENCY DRILL SCENARIO

OBJECTIVES

1. To determine the cause of the accident, terminate the release, and place the plant in a safe condition.
2. To exercise the Radiation Emergency Plan.
3. To exercise the on-site and off-site communications associated with a radiation emergency.
4. To evaluate the site personnel accountability procedures.
5. To evaluate the ability to use isopleths in calculating downwind doses.
6. To evaluate the ability to deploy emergency teams and to communicate with them.
7. To coordinate the Pennsylvania State Radiation Emergency Plan drill with this drill.

SCOPE

1. Reactor coolant system gas concentration is 70 cc/kg, and has been high for several days. The normal degassification procedure is in progress, with MU-V-13 (the makeup tank vent) open to the low pressure waste gas vent header.
2. The "A" reactor coolant bleed tank is being filled from the reclaimed water system per 1104-47A.
3. Waste gas decay tank "A" (WDG-T-1A) is in service, receiving compressed gases from the waste gas compressors. Tank pressure is indicating 75 psig and has been since before starting to fill the "A" reactor coolant bleed tank.
4. Waste gas decay tank "A" instrumentation isolated by common isolation valve (PT 420, PS 420A, PS 420B, PS 420C).
5. Waste gas compressor operation causes WDG-V-36 (WDG-T-1A relief valve) to lift at 85 psig actuation tank pressure, discharging gas to the relief valve vent header and out the station vent.
6. Significant quantities of I-131 and noble gases are released to the atmosphere since WDG-T-1A contains its Tech. Spec. limit of 8800 curies, and WDG-V-36 does not reseal for 15 minutes. (Actual WDG-T-1A pressure at 60 psig, indicated pressure at 75 psig.)

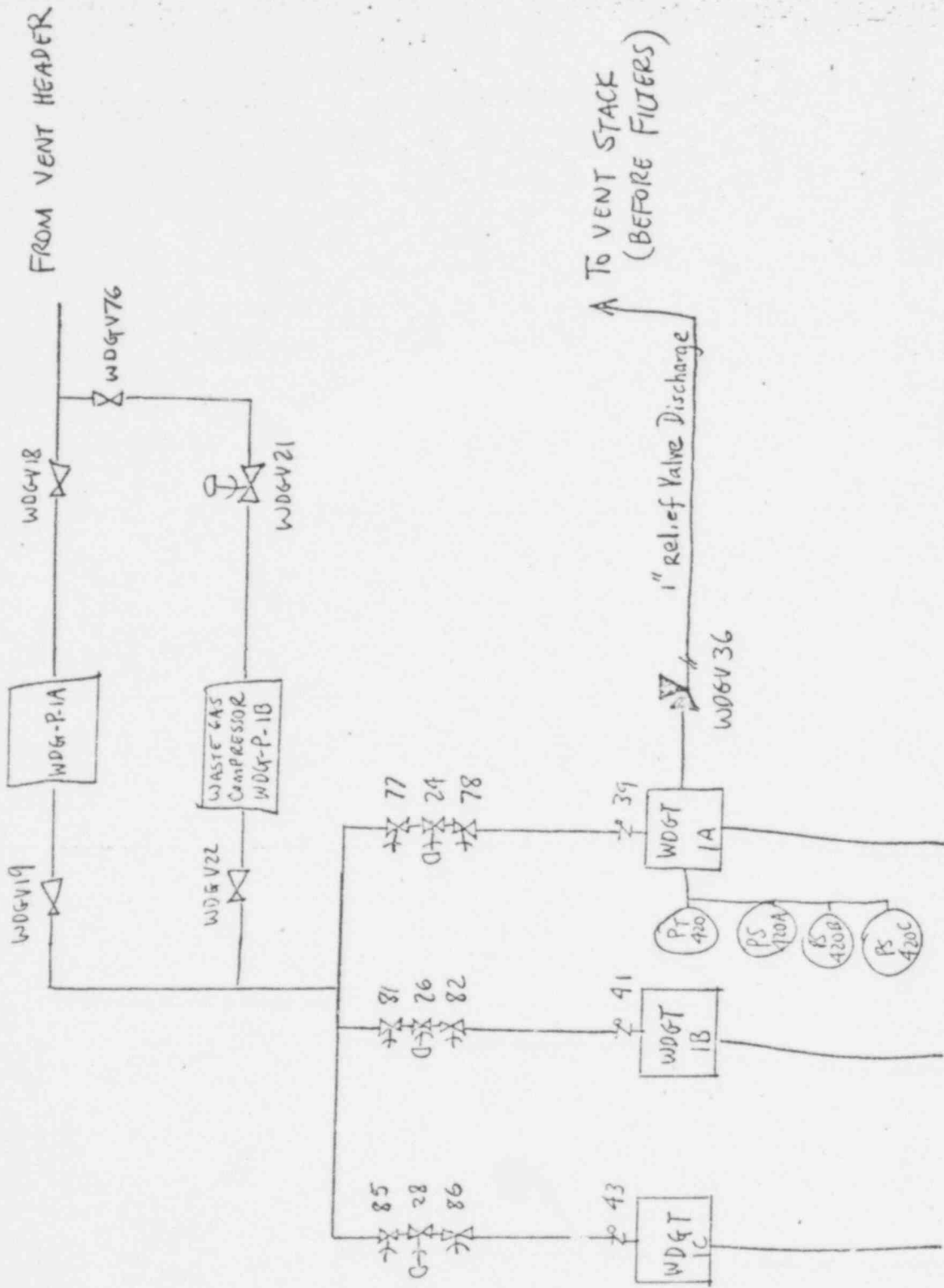
INITIAL CONDITIONS

1. Unit I is at 100% power.
2. Reactor coolant system activity (15 minute degassed) is 110 uCi/cc (Dose equivalent I-131 is 20 uCi/cc).
3. Reactor Coolant System degassification has been in progress for last 2 days (MU-T-1 vented to low pressure vent header through MU-V-13) Reactor Coolant System total gas at 70 cc/Kg.
4. No gas or liquid releases are in progress.
5. Meteorological conditions:
Wind speed _____ mph, Wind direction Indicator 218° degrees,
Wind range 55° degrees, Vertical temp. difference -0.5 °F.

SEQUENCE OF EVENTS

Time in
Minutes

- T=0 1. Reclaimed water being added to "A" RCBT per 1104-47A.
(Waste Gas Decay Tank's pressure recorder marked.)
- T=0 2. Reactor coolant system degassification is in progress to lower reactor coolant system total gas concentration (presently 70 cc/kg) MU-T-1 is vented to the low pressure vent header via MU-V-13.
- T=1 3. Waste gas decay tank pressure recorder indicates the following pressures:
WDG-T-1A 75 psig
WDG-T-1B 80 psig
WDG-T-1C 80 psig
- T=1 4. WDG-T-1A is in service, WDG-P-1A running (auto) WDG-P-1B off (standby).
- T=1 5. Waste gas effluent monitor RMA7 indicates 100 cpm (background).
- T=2 6. Station vent monitor RMA8 increasing
Particulate 1000 cpm/min
Iodine 500 cpm/min
Gas 5E3 cpm (alert alarm)
- T=4 7. RMA 8
Particulate > 1E6 cpm/min High Alarm
Iodine > 1E6 cpm/min High Alarm
Gas > 1E3 cpm High Alarm
(All interlocks function).
- T=19 8. RMA8 decreasing
Particulate 100 cpm/min
Iodine 50 cpm/min
Gas 1E3 cpm
- ~~T= 9. Meteorological Conditions
Wind Speed _____ mph, Wind Direction _____ degrees,
Wind Range _____ degrees, Vertical Temperature Difference _____ degrees~~



TO VENT STACK
(BEFORE FILTERS)

197 119

MEMO FROM: LEN LANDRY

SEZ	GEZ		NE01		NE11		NE21		NE31		No. of
	R	I	R	I	R	I	R	I	R	I	
0.2R/hr	3E-6	—	—	—	—	—	—	—	—	—	—
0.2R/hr	1E-7	0.1R/hr	—	—	—	—	—	—	—	—	—
0.1R/hr	2E-8	0.08R/hr	0.08R/hr	1E-10	—	—	—	—	—	—	—
0.01R/hr	Bkg	0.05R/hr	0.050	Bkg	0.01R/hr	Bkg	—	—	—	—	—
—	—	1/100'0	0.020'0	—	0.01R/hr	—	0.01R/hr	—	—	—	—
—	—	—	10'0	—	0.05R/hr	—	0.010	—	500'0	—	—
—	—	—	—	—	0.01R/hr	—	0.005	—	100'0	—	100'0

ATTACHMENT NOT FILMED

ANO. 7906140403

NO. OF PAGES 27

DUPLICATE: ALREADY ENTERED INTO SYSTEM
UNDER ANO. _____

ILLEGIBLE: HARD COPY AT:

PDR

CF

OTHER _____

TRAINING PROGRAM ADMINISTRATIVE FORM

3
Z.A

1. LESSON/COURSE: RAD EMERGENCY DRILL - LIQUID RELEASE - UNIT 2

2. LOCATION: TMI

3. PERSONNEL ATTENDING: (PLEASE PRINT):

NAME	EMPLOYEE NO. 4 8	NAME	EMPLOYEE NO. 4 8
J. Chwastyle	045100	M. Demmy	056222
W. Conaway	058622	E. Renner	047514
C. Well	064114		011111
J. Kidwell	061772		011111
J. Logan	065522		011111
T. Iljies	051416		011111
R. VanStry	063911		011111
M. Beers	054044		011111
L. Landry	065888		011111
K. Myers	061811		011111
M. Sanowsky	056117		011111
E. Dubiel	062416		011111
W. Sawyer	064213		011111

COMPLETION DATE

MO	DAY	YR
9		14
10	25	78

CATALOG NUMBER

FILE NO.				LESSON ID
C	T	Y	S	
15		22	23	25
14	510001			

TOTAL COURSE DURATION

HOURS
27 31
00.02.5

4. LECTURE HOURS _____ OTHER HOURS 2.5 EXPLAIN DRILL & CRITIQUE

5. ENTER THE PREFIX FOR THE APPROPRIATE MODE:

MOET	PREFIX
32	34
DRIL	

CORRESPONDENCE	(CCS)	REVIEWER	(RVR)
FILM	(FLM)	SCHOOL	(SCH)
LECTURE	(LEC)	SEMINAR	(SEM)
OJT	(OJT)	VIDEOTAPE	(VTP)
ORIGIATOR	(OGR)		

35	COMMENT	39
	RAD EMER DRILL - U2 LIQ REL	

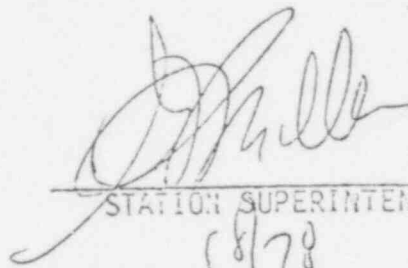
7 122
GPF007.003
REV 3
CD-320 1-78

ENCLOSURE #3

PERMISSION TO CONDUCT A
RADIATION EMERGENCY DRILL

I hereby authorize the Supervisor of Training to conduct a Radiation Emergency
Drill on 10/25/78 as ~~outline in the attached~~ Scenario.

@ 2 2000



STATION SUPERINTENDENT OR DESIGNATE

10/25/78

DATE

197 124

ENCLOSURE #1

Date: 10/25/78

RADIATION EMERGENCY DRILL
OBSERVER ASSIGNMENT SHEET

AREA OF RESPONSIBILITY

OBSERVER

- | | |
|------------------------------------|-----------------------------------|
| 1. Emergency Control Center (ECC) | 1. <u>L. LANDRY / R. VAN STEY</u> |
| 2. Emergency Control Station (ECS) | 2. <u>R. DURIEL</u> |
| 3. Emergency Repair Party | 3. <u>N/A</u> |
| 4. Accountability | 4. <u>N/A</u> |
| 5. On-Site Monitoring Team | 5. <u>N/A</u> |
| 6. Off-Site Monitoring Team | 6. <u>D. MCCONNELL</u> |
| 7. Communications (local) | 7. <u>LANDRY / DURIEL</u> |
| 8. Communications (off-site) | 8. <u>N/A</u> |
| 9. <u>L. > PANEL</u> | 9. <u>M. BEERS</u> |

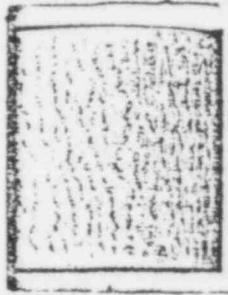
197 125

RW Panel
T=0

COMMENCE RELEASE

FROM 'B' CONDENSATE
TEST
TANK

WDLV 93B loaded to 45 gpm



RW Panel
T=1

WDL-R-1311 READING:

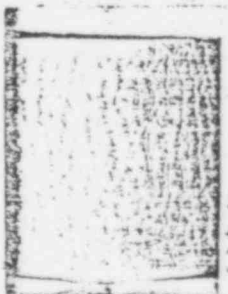
200 cpm

RW Panel
T=4

WDL-99

CLOSED

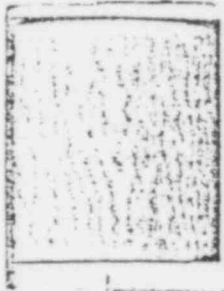
RML-7- 400 cpm



RML-7

Unit I CR
T=2

ALERT - 1000 cpm



UNIT I CR
t=3

RML7 High Alarm

1×10^6 cpm

UNIT II CR
T=2

RML7

1000 cpm



UNIT II CR

t=3

RML7

1×10^6 cpm

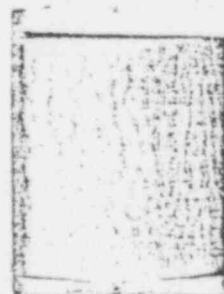


UNIT II CR

t=4

WDLV 99 CLOSED

RML7 400 cpm



UNIT II RADIATION EMERGENCY DRILL SCENARIO
LIQUID RELEASE

OBJECTIVES

1. To determine the cause of the accident
2. To terminate the release.
3. To test procedures for calculation of downstream doses.
4. To test procedures for notification of downstream uses of water.

SCOPE

A sequence of events occurs in which an unsampled condensate test tank is inadvertently released to the MDCT effluent. The situation is complicated by the fact that the sample pump for WDL-R-1311 has tripped due to thermal overload. The operators will not be alerted to the problem until RH-L-7 reaches a high alarm.

WDL-T-9B

INITIAL CONDITIONS

1. Unit II is at 100% power.
2. A liquid release is in progress.
3. Reactor coolant evaporator is shutdown for maintenance.

SEQUENCE OF EVENTS

- T=0 Liquid release begins.
T=2 RH-L-7 at alert setpoint.
T=3 RH-L-7 at high alarm, ~~WDL-V-99 shuts.~~
T=4 WDLV-99 shuts

FROM HP

1. Paperwork to perform a release from the "A" condensate test tank.
 - a) Use max release rate.
 - b) Use min. dilution flow.
 - c) Use very low activity in "A" Tank.
2. Paperwork to support 10 curies in "B" tank
 - a) "B" tank will accidentally be released instead of "A" tank.
3. Expected levels of samples taken downstream following a 4-minute release from the 10 c "B" tank at max. release rate and min. dilution. (Assume river flow at 1 MPH)
4. Expected reading of WDL-R-1311 if sample pump has tripped before release commences (somewhere around normal background).

UNIT II RADIATION EMERGENCY DRILL SCENARIO
LIQUID RELEASE

OBJECTIVES

1. To determine the cause of the accident
2. To terminate the release.
3. To test procedures for calculation of downstream doses.
4. To test procedures for notification of downstream uses of water.

SCOPE

A sequence of events occurs in which an unsampled condensate test tank is inadvertently released to the MDCT effluent. The situation is complicated by the fact that the sample pump for WDL-R-1311 has tripped due to thermal overload. The operators will not be alerted to the problem until RM-L-7 reaches a high alarm.

WDL-T-9B

INITIAL CONDITIONS

1. Unit II is at 100% power.
2. A liquid release is in progress.
3. Reactor coolant evaporator is shutdown for maintenance.

SEQUENCE OF EVENTS

- T=0 Liquid release begins.
T=2 RM-L-7 at alert setpoint.
T=3 RM-L-7 at high alarm, ~~WDL-V-99 shuts.~~
T=4 WDLV-99 shuts

STAFF

1. Paperwork to perform a release from the "A" condensate test tank.
 - a) Use max release rate.
 - b) Use min. dilution flow.
 - c) Use very low activity in "A" Tank.
2. Paperwork to support 10 curies in "B" tank
 - a) "B" tank will accidentally be released instead of "A" tank.
3. Expected levels of samples taken downstream following a 4-minute release from the 10 c "B" tank at max. release rate and min. dilution. (Assume river flow at 1 MPH)
4. Expected reading of WDL-R-1311 if sample pump has tripped before release commences (somewhere around normal background).

DATA SHEET 4

Liquid Release Calculations

Expected Average Concentration at Downstream Points

1. Avg. Conc. at Discharge (From RM-L7) $\frac{6.14 \times 10^{-1} \mu\text{Ci}}{\text{ml}}$
2. Effluent Flow (From FR-146) 50000 GPM
3. Constant 2.33×10^{-3}
4. Multiply 1x2x3 1.63
5. River Flow (From Table I) 15000 CFS
- *6. Divide 4÷5 $1.08 \times 10^{-1} \frac{\mu\text{Ci}}{\text{ml}}$

Expected Maximum Concentration at Downstream Points

1. Max. Conc. at Discharge (From RM-L7) $\frac{\mu\text{Ci}}{\text{ml}}$
2. Effluent Flow (From FR-146) GPM
3. Constant 2.33×10^{-3}
4. Multiply 1x2x3 _____
5. River Flow (From Table I) CFS
- *6. Divide 4÷5 $\frac{\mu\text{Ci}}{\text{ml}}$

*If downstream concentrations are greater than $1 \times 10^{-6} \frac{\mu\text{Ci}}{\text{ml}}$ downstream users must be notified to curtail.

Time for Plume To Reach Downstream Users

1. Point Location $\frac{\text{WATTSVILLE}}{\text{WATER}} \text{ supply}$
2. Distance to Point (See Table II) $\frac{16.75 \text{ miles}}{5 \text{ miles}}$
3. River Velocity (See Table I) $\frac{0.9 \text{ mph}}{.9 \text{ mph}}$
4. Divide 2 ÷ 3 $\frac{18 \text{ hrs}}{5.5 \text{ hrs}}$

24 Hour Average Concentration Unrestricted Areas

1. Avg. Conc. Discharged (RM-L7) $\frac{10^{-2} \mu\text{Ci}}{\text{ml}}$
2. Duration of Release 3 min
3. Constant 6.95×10^{-4}
4. Multiply 1x2x3 20.85×10^{-6}
5. MPC_w** $\frac{3 \times 10^{-8} \mu\text{Ci}}{\text{ml}}$
- ***6. Divide 4 ÷ 5 6.95×10^{-2}

** Weighted MPC_w for isotopes released. If unknown, use $3 \times 10^{-8} \frac{\mu\text{Ci}}{\text{ml}}$

***If G exceeds 5000, immediate notification of NRC is required.

If G exceeds 500, 24-hour notification of NRC is required. 197 131

ATTACHMENT NOT FILMED

ANO. 7906140403

NO. OF PAGES 10

DUPLICATE: ALREADY ENTERED INTO SYSTEM
UNDER ANO. _____

ILLEGIBLE: HARD COPY AT:

PDR

CF

OTHER _____

TRAINING PROGRAM ADMINISTRATIVE FORM

2
A

1. LESSON/COURSE: RAD EMERG DRILL - OTSG TUBE RUP - UNIT 1

2. LOCATION: TMI

3. PERSONNEL ATTENDING: (PLEASE PRINT):

NAME	EMPLOYEE NO. 4 B	NAME	EMPLOYEE NO. 4 B
<u>E. MATINCHECK</u>	<u>05612</u>	<u>L. WRIGHT</u>	<u>05491</u>
<u>R. JOHNSON</u>	<u>06624</u>	<u>K. BRIAN</u>	<u>04173</u>
<u>D. WILT</u>	<u>06626</u>	<u>J. PEARCE</u>	<u>06738</u>
<u>B. KELLER</u>	<u>05591</u>	<u>G. KUNDE</u>	<u>04578</u>
<u>D. JAMES</u>	<u>05460</u>	<u>E. SHOWALTER</u>	<u>06225</u>
<u>M. COLEMAN</u>	<u>06082</u>	<u>H. CRAWFORD</u>	<u>06512</u>
<u>D. SPATH</u>	<u>06151</u>	<u>C. RANDOLPH</u>	<u>06019</u>
<u>G. HITZ</u>	<u>04747</u>	<u>J. SEELINGER</u>	<u>06213</u>
<u>C. MILLER</u>	<u>04636</u>	<u>J. LOGAN</u>	<u>06652</u>
<u>N. MONSON</u>	<u>05106</u>	<u>R. KOHL</u>	<u>05474</u>
<u>A. MILLER</u>	<u>05873</u>	<u>W. WENTLING</u>	<u>05835</u>
<u>D. OLSON</u>	<u>05479</u>	<u>D. McGETTRICK</u>	<u>06227</u>
<u>M. BAYNARD</u>	<u>05388</u>	<u>H. TENNIS</u>	<u>05994</u>

COMPLETION DATE

MO	DAY	YR
10	27	78

CATALOG NUMBER

FILE NO.				LESSON ID
CAT	TYPE	SUBJECT		
14	510	001		

TOTAL COURSE DURATION

HOURS
0.025

4. LECTURE HOURS _____ OTHER HOURS 2.5 EXPLAIN 1 HR - DRILL / 1.5 HR - CRITIQUE

5. ENTER THE PREFIX FOR THE APPROPRIATE MODE:

MODE PREFIX
DBL

CORRESPONDENCE (CCS) PREFIX (HVR)
 FILM (FLM) SCHOOL (SCH) 97 133
 LECTURE (LEC) SEMINAR (SEM)
 OUT (OJT) VIDEOTAPE (VTP) GPF0007.003
 ORIGINATOR (OGR)

35 COMMENT 37
RAD, EMER, DBL - U, 1, OTSG, T, R.

REV 3

6. METHOD OF EVALUATION (Check at least one)

WRITTEN TEST _____ (Attach copy of answers, and graded tests)

8. ORAL QUESTIONING SPOT CHECK _____

C. QUIZ _____ (Attach questions and answers)

D. OTHER _____ (Explain):

7. INSTRUCTOR/TRAINEE'S EVALUATION (This section must be filled in)
(Based on your method of evaluation briefly describe the effectiveness of this training)

J. A. McLean 11/10/78
INSTRUCTOR/TRAINEE'S SIGNATURE DATE

8. SIGNATURE OF SUPERVISOR OF TRAINING/TRAINING COORDINATOR _____ DATE _____

ATTACH LESSON OUTLINE/ITEMS COVERED

TRAINING PROGRAM ADMINISTRATIVE FORM

2.2.A

1. LESSON/COURSE: RAD. EMERG. DRILL - OTSG TUBE RUPTURE - UNIT 1

2. LOCATION: TMI

3. PERSONNEL ATTENDING: (PLEASE PRINT):

NAME	EMPLOYEE NO. 4 8	NAME	EMPLOYEE NO. 4 8
<u>D. SHOUKIN</u>	<u>05956</u>	<u>J. O'HANLON</u>	<u>06001</u>
<u>J. FLOYD</u>	<u>03842</u>	<u>M. ROSS</u>	<u>04680</u>
<u>R. BARLEY</u>	<u>06248</u>	<u>T. MULLEAVY</u>	<u>06243</u>
<u>S. PORTER (CONSULTANT)</u>	<u>01111</u>	<u>P. VELEZ</u>	<u>05462</u>
<u>M. BEERS</u>	<u>05404</u>	<u>R. DUBIEL</u>	<u>06246</u>
<u>B. GOOD (READING)</u>	<u>01111</u>	<u>R. HATCHISON</u>	<u>05867</u>
<u>R. VAN STREY</u>	<u>06391</u>	<u>P. CHALECKI</u>	<u>06077</u>
<u>N. BROWN</u>	<u>05318</u>	<u>R. BOEHMER</u>	<u>05133</u>
<u>E. ORWIG</u>	<u>06405</u>	<u>D. WOODDELL</u>	<u>06135</u>
<u>F. HUWE</u>	<u>06403</u>	<u>D. A. SMITH</u>	<u>06410</u>
<u>L. LANDRY</u>	<u>06588</u>	<u>J. MANOSKY</u>	<u>04915</u>
<u>A. MCCONNELL</u>	<u>06825</u>	<u>R. LIGHTNER</u>	<u>05893</u>
<u>W. SWIMAKER</u>	<u>06653</u>	<u>G. PIERCE</u>	<u>06627</u>

COMPLETION DATE

MO	DAY	YR
10	27	78

CATALOG NUMBER

FILE NO.			LESSON ID
CAT	TYPE	SUBJECT	
15		22 23	26
14510	00.1		

TOTAL COURSE DURATION

HOURS
27 31
000.25

4. LECTURE HOURS _____ OTHER HOURS 2.5 EXPLAIN DRILL & CRITIQUE

5. ENTER THE PREFIX FOR THE APPROPRIATE MODE:

MODE PREFIX
22 34
DRL

CORRESPONDENCE (CCS) PREFIX (CCS)
 FILM (FLM) PREFIX (FLM)
 LECTURE (LEC) PREFIX (LEC)
 OJT (OJT) PREFIX (OJT)
 ORIGINATOR (OGH) PREFIX (OGH)

REVIEWER (RV) 197 135
 SCHOOL (SCH)
 SEMINAR (SEM)
 VIDEOTAPE (VTP) GPF0007.003

35	COMMENT	39
	<u>RAD. EMER. DRILL - U1, OTSG, T.R.</u>	

6. METHOD OF EVALUATION (Check at least one)

A. WRITTEN TEST _____ (Attach copy of answers, and graded tests)

B. ORAL QUESTIONING SPOT CHECK _____

C. QUIZ _____ (Attach questions and answers)

D. OTHER _____ (Explain):

7. INSTRUCTOR/TRAINEE'S EVALUATION (This section must be filled in)

(Based on your method of evaluation briefly describe the effectiveness of the training)

f. a. m. [signature] 11/10/78
INSTRUCTOR/TRAINEE'S SIGNATURE DATE

8. SIGNATURE OF SUPERVISOR OF TRAINING/TRAINING COORDINATOR _____ DATE _____

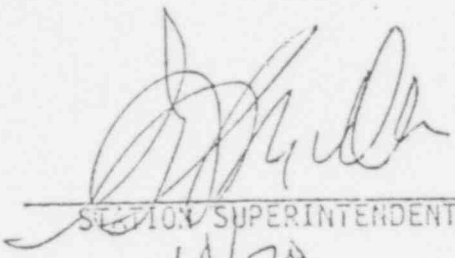
ATTACH LESSON OUTLINE/ITEMS COVERED

ENCLOSURE #3

PERMISSION TO CONDUCT A
RADIATION EMERGENCY DRILL

I hereby authorize the Supervisor of Training to conduct a Radiation Emergency
Drill on 10/27/78 as outline in the attached Scenario.

@ ~ 1300



SECTION SUPERINTENDENT OR DESIGNATE
10/78

DATE

Scenario For TMI Unit I Practice Drill of
STEAM GENERATOR RUPTURE WITH SOME FAILED FUEL - GENERAL EMERGENCY

Reference: Radiation Emergency Procedures 1670.2, 1670.3, 1670.4, 1670.7

OBJECTIVES

1. To determine the cause of the accident, terminate the release, and place plant in safe condition.
2. To exercise the radiation emergency plan.
3. To exercise the communications on-site and off-site associated with a Radiation Emergency.
4. To evaluate the site personnel accountability procedures.
5. To evaluate the ability to use isopleths in calculating downwind doses.
6. To evaluate the ability to deploy emergency teams and to communicate with them.
7. To coordinate to Pennsylvania State Radiation Emergency Plan drill with this drill.

SCOPE

Simultaneous rupture of several steam generator tubes occurs during a 10% fuel element failure. The drill moves from a reactor trip to a turbine main steam safety valve release to a safety injection situation. The main steam safety valves to not reseal and the primary coolant radioactivity is discharged to the environment for ~~1 hour~~ 30 MIN or more via an unmonitored release point.

INITIAL CONDITIONS

1. TMI Unit I is operating at 100% power.
2. 10% Fuel Element Failure. I equiv = 19 uCi/cc
3. History of steam generator leakage.
4. Wind 348° at 3 MPH, Wind Range 25°.

SEQUENCE OF EVENTS

Time in
Minutes

- T=0 1. Rapid pressure decrease below 1500 lbs., reactor and turbine trip, followed by the safety injection.
- T=0 2. The control room annunciator shows the following alarms:
 a) Condenser vacuum pumps discharge, RMS alarms.
 b) Reactor Coolant low pressure alarm.
 c) Pressurizer low level alarm.
 d) Steam generator relief valves lift.
- T=0 3. Condenser vacuum pump monitor RM-A5 in high alarm, 10^5 c/m. ~~OFF SCALE~~
- T=4 4. B S/G Relief Valves Reseat
- ~~T=5 5. Aux. Building Purge Air Monitor RM-A6-Particulate = 10^5 c/m HIGH ALARM
 Iodine = 10^5 c/m HIGH ALARM
 Gas = 10^6 c/m HIGH ALARM~~
- ~~T=12-6. Station Vent RM-A8-Particulate = 10^4 c/m HIGH ALARM
 Iodine = 3×10^4 c/m NO ALARM
 Gas = 10^2 c/m HIGH ALARM~~
- ~~T=15 7. RM-A5 OFF SCALE~~
- ~~T=45 8. Evacuate EGS~~

197 138

t	SE415		GE647		S01		S31		S41		SSI	
	γ	I	γ	I	γ	I	γ	I	γ	I	γ	I
X												
1	800	1E-4	—	—	—	—	—	—	—	—	—	—
7	800	1E-4	800	1E-4	—	—	—	—	—	—	—	—
17	800	1E-4	800	1E-4	500	5E-5	—	—	—	—	—	—
27	800	1E-4	800	1E-4	500	5E-5	—	—	—	—	—	—
37	200	1E-5	800	1E-4	500	5E-5	—	—	—	—	—	—
47	50	1E-6	180	1E-6	500	5E-5	—	—	—	—	—	—
52	20	1E-7	10	1E-7	100	1E-6	—	—	—	—	—	—
62	10	1E-8	10	1E-8	20	1E-7	300	1E-5	—	—	—	—
77	10		10		10	1E-8	300	1E-5	—	—	—	—
90	10		10				300	1E-5	—	—	—	—
92	10		10		10		100	1E-6	50	3E-6	—	5E-
117	10		10		10		20	1E-7	50	3E-6	10	5E-
130	10		10		10		10	1E-8	50	1E-6	10	5E-

ALL OTHERS = BK9

7	SSE11		SSE32		SSE52		SSE71		I	I
	Q	I	Q	I	Q	I	Q	I		
X										
37	200	1E-5	—	—	—	—	—	—	—	—
47	200	1E-5	—	—	—	—	—	—	—	—
52	200	1E-5	—	—	—	—	—	—	—	—
62	200	1E-5	500	5E-5	—	—	—	—	—	—
77	50	1E-6	500	5E-5	—	—	—	—	—	—
90	20	1E-7	500	5E-5	500	5E-5	—	—	—	—
92	10	1E-8	100	1E-7	500	5E-5	—	—	—	—
117	—	—	20	1E-8	500	5E-5	—	—	—	—
130	—	—	10	—	100	1E-7	10	5E-7	—	—

ALL OTHERS - BIG

INITIAL CONDITIONS

TMI 1 : OPERATING AT 100% POWER.
RECENT PROBLEMS WITH FAILED
FUEL. I¹³¹ D.E. - 19 μ Ci / CC
FOR LAST 24 HOURS

TMI-2 : IN PROCESS OF HEATING UP. FOLLOWING
AN OUTAGE TO REPAIR THE
MAIN CONDENSOR

T=3

RM-A5

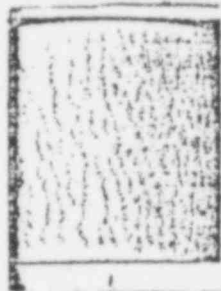
OFF SCALE HIGH

T=0

RM-A5

AT 10^5 CPM

"HIGH ALARM"



INITIAL CONDITIONS

WIND

DIRECTION - 348°

SPEED - 3 MPH

RANGE - 25°



T=30

"A" OTSG PRESSURE - 1010 psig

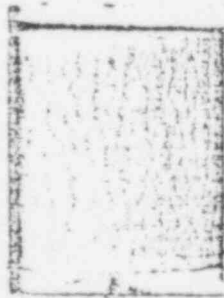
"B" OTSG PRESSURE - 900 psig

ALL MAIN STEAM RELIEF VALVES CLOSED

T=20

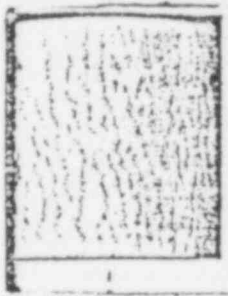
"A" OTSG PRESSURE - 1050 psig

"B" OTSG PRESSURE - 925 psig



T = 5
"A" OTSG PRESSURE - 1070 PSIG

"B" OTSG PRESSURE - 950 PSIG



T = 8

"A" OTSG PRESSURE - 1090 PSIG

"B" OTSG PRESSURE - 1010 PSIG

"B" TURBINE BYPASS VALVES ARE SHUT

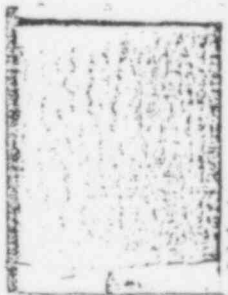
"A" TURBINE BYPASS VALVES ARE OPEN

T = 4

"A" OTSG PRESSURE - 1100 PSIG

"B" OTSG PRESSURE - 1010 PSIG

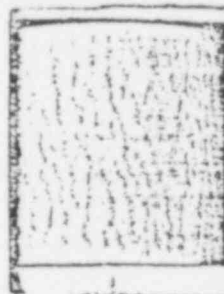
"B" MAIN STEAM RELIEF VALVES RESET



T = 55

RM-A5:

BACK TO 10^5 C/M HIGH ALARM



T = 5

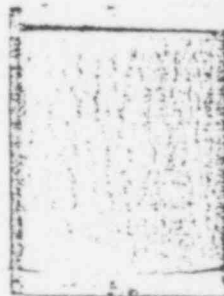
HPR-220

HPR-221A

HPR-222

} High Alarm

HPR-219 High Alert



T=0.

RAPID RCS PRESSURE DECREASE

1. LOW RCS PRESSURE REACTOR TRIP
2. TURBINE TRIP
3. SAFETY INJECTION INITIATED AT 1500 PSIG RCS PRESSURE
4. PRESSURIZER LEVEL DECREASING

A OTSG PRESSURE 1200 PSIG

B OTS G PRESSURE 1120 PSIG

A & B LEVELS DECREASING WITH RUNBACK [A LEVEL IS HIGHER]

ALL MAIN STEAM RELIEF VALVES ARE OPEN.

1250 Heating up following repair of
Condenser

T = 5

A } 500 mR/hr
B }

C } 100 mR/hr
D }

T = 15

A 250 mR/hr.

B 250 mR/hr

C 250 mR/hr

D 250 mR/hr

10/27/78

Scenario For TMI Unit I Practice Drill of STEAM GENERATOR RUPTURE WITH SOME FAILED FUEL - GENERAL EMERGENCY

Reference: Radiation Emergency Procedures 1670.2, 1670.3, 1670.4, 1670.7

OBJECTIVES

1. To determine the cause of the accident, terminate the release, and place plant in safe condition.
2. To exercise the radiation emergency plan.
3. To exercise the communications on-site and off-site associated with a Radiation Emergency.
4. To evaluate the site personnel accountability procedures.
5. To evaluate the ability to use isopleths in calculating downwind doses.
6. To evaluate the ability to deploy emergency teams and to communicate with them.
7. To coordinate to Pennsylvania State Radiation Emergency Plan drill with this drill.

SCOPE

Simultaneous rupture of several steam generator tubes occurs during a 10% fuel element failure. The drill moves from a reactor trip to a turbine main steam safety valve release to a safety injection situation. The main steam safety valves do not reseal and the primary coolant radioactivity is discharged to the environment for 1 hour or more via an unmonitored release point.

INITIAL CONDITIONS

1. TMI Unit I is operating at 100% power.
2. 10% Fuel Element Failure. I equiv = 19 uCi/cc
3. History of steam generator leakage.
4. Wind 348° at 3 MPH, Wind Range 25°.

SEQUENCE OF EVENTS

Time in
Minutes

- T=0 1. Rapid pressure decrease below 1500 lbs., reactor and turbine trip, followed by the safety injection.
- T=0 2. The control room annunciator shows the following alarms:
 a) Condenser vacuum pumps discharge, RMS alarms.
 b) Reactor Coolant low pressure alarm.
 c) Pressurizer low level alarm.
 d) Steam generator relief valves lift.
- T=0 3. Condenser vacuum pump monitor RM-A5 in high alarm, 10^5 c/m OFF-SCALE
- T=4 4. B S/G Relief Valves Reseat
- T=5 ~~5. Aux. Building Purge Air Monitor RM-A6 Particulate = 10^5 c/m HIGH ALARM
 Iodine = 10^5 c/m HIGH ALARM
 Gas = 10^6 c/m HIGH ALARM~~
- T=12 ~~6. Station Vent RM-A8 Particulate = 10^4 c/m HIGH ALARM
 Iodine = 3×10^4 c/m NO-ALARM
 Gas = 10^6 c/m HIGH ALARM~~
- T=15 ~~7. RM-A5 OFF-SCALE~~
- T=45 ~~8. Evacuate EGS~~

127 147

ATTACHMENT NOT FILMED

ANO. 7906140403

NO. OF PAGES 6

DUPLICATE: ALREADY ENTERED INTO SYSTEM
UNDER ANO. _____

ILLEGIBLE: HARD COPY AT:

PDIK

CF

OTHER _____

log-1062

UNIT I - OTSG RUPTURE

1/27/71

t	5E445		GE647		501		5E1		541		501	
	Q	I	Q	I	Q	I	Q	I	Q	I	Q	I
X												
1	800	1E-4	—	—	—	—	—	—	—	—	—	—
7	800	1E-4	800	1E-4	—	—	—	—	—	—	—	—
17	800	1E-4	800	1E-4	500	5E-5	—	—	—	—	—	—
27	800	1E-4	800	1E-4	500	5E-5	—	—	—	—	—	—
37	200	1E-5	800	1E-4	500	5E-5	—	—	—	—	—	—
47	50	1E-6	180	1E-6	500	5E-5	—	—	—	—	—	—
52	20	1E-7	10	1E-7	100	1E-6	—	—	—	—	—	—
62	10	1E-8	10	1E-8	20	1E-7	300	1E-5	—	—	—	—
77	10		10		10	1E-8	300	1E-5	—	—	—	—
90	10		10				300	1E-5	—	—	—	—
92	10		10		10		100	1E-6	3E-6	3E-6	—	—
117	10		10		10		20	1E-7	3E-6	3E-6	10	5E-7
130	10		10		10		10	1E-8	1E-6	1E-6	10	5E-7

ALL OTHERS - BIG

L	SSE11		SSE32		SSE52		SSE71		I	R	I	R
	Q	I	Q	I	Q	I	Q	I				
X												
37	200	1E-5	—	—	—	—	—	—	—	—	—	—
47	200	1E-5	—	—	—	—	—	—	—	—	—	—
52	200	1E-5	—	—	—	—	—	—	—	—	—	—
62	200	1E-5	500	5E-5	—	—	—	—	—	—	—	—
77	50	1E-6	500	5E-5	—	—	—	—	—	—	—	—
90	20	1E-7	500	5E-5	500	5E-5	—	—	—	—	—	—
92	10	1E-8	100	1E-7	500	5E-5	—	—	—	—	—	—
117	—	—	20	1E-8	500	5E-5	—	—	—	—	—	—
130	—	—	10	—	100	1E-7	10	5E-7	—	—	—	—

ALL OTHERS - BKG

ENCLOSURE #1

Date: 10/27/78

RADIATION EMERGENCY DRILL
OBSERVER ASSIGNMENT SHEET

AREA OF RESPONSIBILITY

1. Emergency Control Center (ECC)
2. Emergency Control Station (ECS)
3. Emergency Repair Party
4. Accountability
5. On-Site Monitoring Team
6. Off-Site Monitoring Team
7. Communications (local)
8. Communications (off-site)
9. UNAFFECTED UNIT C.R.

OBSERVER

1. N. BROWN / L. LANDRY / S. PORTER
2. F. Mc LORMICK
3. E. ORWIG
4. R. DAN STRY / R. GOOD
5. D. Mc LONNELL
6. W. SHUMAKER
7. F. Mc LORMICK / N. BROWN
8. N. BROWN / L. LANDRY
F. HUWE

generally GOOD OPS response! to indications followed EP's and procedures

→ missed sounding Rad. Emer alarm for Site Emerg.

Real response time vague because of

→ Over simulation was used to conserve manpower

→ Some minor difficulties with simulation

Extra crew at controls adds confusion should be minimum especially at console

Use of RM-14 with RMA5 offscale could not get good reading should use another dose rate type instrument.

ATTACHMENT NOT FILMED

ANO. 7906140403

NO. OF PAGES 22

DUPLICATE: ALREADY ENTERED INTO SYSTEM
UNDER ANO. _____

ILLEGIBLE: HARD COPY AT:

PDR

CF

OTHER _____

197-153

→ Unit 2 control Room

1. Page Speakers in control room area not working
2. CRO Eating apple - after announcement of no eating, drinking or smoking
3. Phone communications slow in getting established
4. Good actions in isolating Aux. steam from unit and checking ventilation system
5. Checking of Unit 2 areas to make sure it was not adding to problem was good actions.

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER HuweDATE 10/27/78AREA OF RESPONSIBILITY Unit 2 Control Room

TIME	EVENT	COMMENTS
T-0	Unit 1 called unit 2 about site Emergency	Page announcement not heard in Unit 2 Cont. Roo.
T+1	commenced accountability	
T+1	Unit 2 announced evac. routes on page so as to make sure it was heard.	
T+1	Simulated isolated Aux steam being used for heat up.	Very good
T+5	HPR 220, 221A & 221 in alarm HPR 219 in alert.	
T+7	Ventilation system checked to make sure it was in recirc.	good
T ₁	Page phones between units set	
T+11	CRO Eating apple	unsat
T+15	Maps + isopleths broken out for use	
T+17	Accountability sent out	
T+23	Aux bldg., Fuel Hand. bldg. & Rad. waste checked for abnormal conditions	

97 155

TRAINING PROGRAM ADMINISTRATIVE FORM

12.2.8

1. PROGRAM/COURSE RAD EMERG. DRILL - SPENT FUEL - UNIT 1

2. LOCATION: TMI

3. PERSONNEL ATTENDING: (PLEASE PRINT):

NAME	EMPLOYEE NO.		NAME	EMPLOYEE NO.	
	4	8		4	8
<u>L. LANDRY</u>	<u>06538</u>		<u>D. MCGETTRICK</u>	<u>06227</u>	
<u>F. MCCORMICK</u>	<u>06169</u>		<u>R. HUTCHISON</u>	<u>05867</u>	
<u>R. VAN STRY</u>	<u>06391</u>		<u>M. ROSS</u>	<u>04680</u>	
<u>F. ORWIG</u>	<u>06405</u>		<u>H. CRAWFORD</u>	<u>06512</u>	
<u>M. BEERS</u>	<u>05404</u>		<u>J. FLOYD</u>	<u>03342</u>	
<u>E. FUHRER</u>	<u>05917</u>		<u>P. VELEZ</u>	<u>05462</u>	
<u>C. HUSTED</u>	<u>06149</u>		<u>G. KUNNER</u>	<u>04518</u>	
<u>N. BROWN</u>	<u>05318</u>		<u>H. FARST</u>	<u>04103</u>	
<u>D. MCCONNELL</u>	<u>06825</u>		<u>K. LERO</u>	<u>06105</u>	
<u>R. BARTH (JCP & L)</u>	<u>01111</u>		<u>S. TURNS</u>	<u>06703</u>	
<u>W. SHUMAKER</u>	<u>06653</u>		<u>J. RANDISI</u>	<u>05672</u>	
<u>R. BARLEY</u>	<u>06248</u>		<u>F. HUWE</u>	<u>06403</u>	
<u>R. SUMMERS</u>	<u>05751</u>		<u>V. ORLANDI</u>	<u>06233</u>	

COMPLETION DATE

MO	DAY	YR
10	30	78

CATALOG NUMBER

FILE NO.				LESSON ID
CAT	TYPE	SUBJECT		
15			2223	26
14	S	00.01		

197 156

TOTAL COURSE DURATION

HOURS	
27	31
00.02.7	

4. LECTURE HOURS _____ OTHER HOURS 2.7 EXPLAIN 1-DRILL / 1.7-CRITIQUE

5. ENTER THE PREFIX FOR THE APPROPRIATE MODE:

CORRESPONDENCE	(CCS)	REVIEWER	(RVR)
FILM	(FLM)	SCHOOL	(SCH)
LECTURE	(LEC)	SEMINAR	(SEM)
OJT	(OJT)	VIDEOTAPE	(VTP)
ORIGINATOR	(OGI)		

GPF0007.003-REV3

MO. & PREFIX
DR.L

50	COMMENT	50
	RAD, EMER, DRILL - U1, S.F. P.O.C.L.	

6. METHOD OF EVALUATION (Check at least one)

A. WRITTEN TEST _____ (Attach copy of answers, and graded tests)

B. ORAL QUESTIONING SPOT CHECK _____

C. QUIZ _____ (Attach questions and answers)

D. OTHER _____ (Explain):

7. INSTRUCTOR/TRAINEE'S EVALUATION (This section must be filled in)

(Based on your method of evaluation briefly describe the effectiveness of the training)

LA Mc _____ 11/10/78
INSTRUCTOR/TRAINEE'S SIGNATURE DATE

8. SIGNATURE OF SUPERVISOR OF TRAINING/TRAINING COORDINATOR _____ DATE _____

ATTACH LESSON OUTLINE/ITEMS COVERED

TRAINING PROGRAM ADMINISTRATIVE FORM

1	2
2	2A

1. LESSON COURSE: RAD EMERG. DRILL - SPENT FUZZ - UNIT 1

2. LOCATION: TMI

3. PERSONNEL ATTENDING: (PLEASE PRINT):

NAME	EMPLOYEE NO. 4 8	NAME	EMPLOYEE NO. 4 8
<u>E. FREDERICK</u>	<u>06063</u>	<u>R. EVANS</u>	<u>04814</u>
<u>S. BRANTLEY</u>	<u>06419</u>	<u>T. PYKE</u>	<u>04998</u>
<u>J. MASTERS</u>	<u>06142</u>	<u>C. FAUST</u>	<u>06065</u>
<u>D. MAYHUE</u>	<u>06422</u>	<u>R. GRABY</u>	<u>04755</u>
<u>D. DEITER</u>	<u>04553</u>	<u>L. BUCHER</u>	<u>04716</u>
<u>R. CARL</u>	<u>05897</u>	<u>M. RICHARDS</u>	<u>06631</u>
<u>K. POWELL</u>	<u>06691</u>	<u>D. BUCHTER</u>	<u>06412</u>
<u>G. NAGLE</u>	<u>04089</u>	<u>T. MULLEAHY</u>	<u>06243</u>
<u>K. DEITZ</u>	<u>04830</u>	<u>W. ZEWE</u>	<u>05624</u>
<u>H. TENNIS</u>	<u>05994</u>	<u>R. DUBIEL</u>	<u>06246</u>
<u>D. KINTER</u>	<u>06234</u>	<u>W. BUSANSKY</u>	<u>06364</u>
<u>M. PRATT</u>	<u>06832</u>	<u>J. JONES</u>	<u>06361</u>
<u>M. TOOLE</u>	<u>06008</u>		<u>0111</u>

COMPLETION DATE

MO	DAY	YR
9	14	
<u>10</u>	<u>30</u>	<u>78</u>

CATALOG NUMBER

FILE NO.				LESSON ID
C	T	S	G	
15		22	23	26
<u>14</u>	<u>510</u>	<u>001</u>	<u>111</u>	

197 158

TOTAL COURSE DURATION

HOURS	
27	31
<u>00</u>	<u>27</u>

4. LECTURE HOURS _____ OTHER HOURS 2.7 EXPLAIN 1-DRILL/17-CRITIQUE

5. ENTER THE PREFIX FOR THE APPROPRIATE MODE:

MODE PREFIX
<u>DRL</u>

CORRESPONDENCE	PREFIX (CCS)	REVIEWER	PREFIX (HVR)
FILM	(FLM)	SCHOOL	(SCH)
LECTURE	(LEC)	SEMINAR	(SEM)
OUT	(OUT)	VIDEOTAPE	(VTP)
ORIGINATOR	(OGP)		

COMMENT
<u>RAD. EMER. DRILL - U1. SF. POOL</u>

GPF0007.003

Rev 3

6. METHOD OF EVALUATION (Check at least one)

A. WRITTEN TEST _____ (Attach copy of answers, and graded tests)

B. ORAL QUESTIONING SPOT CHECK _____

C. QUIZ _____ (Attach questions and answers)

D. OTHER _____ (Explain):

7. INSTRUCTOR/TRAINEE'S EVALUATION (This section must be filled in)

(Based on your method of evaluation briefly describe the effectiveness of the training)

James L. ... 11/10/78
INSTRUCTOR/TRAINEE'S SIGNATURE DATE

8. SIGNATURE OF SUPERVISOR OF TRAINING/TRAINING COORDINATOR _____ DATE _____

ATTACH LESSON OUTLINE/ITEMS COVERED

1981
TRAINING PROGRAM ADMINISTRATIVE FORM

1	3
2.2.A	

1. LESSON/COURSE: Emer Drill

2. LOCATION: TML

3. PERSONNEL ATTENDING: (PLEASE PRINT):

NAME	EMPLOYEE NO. 4 8	NAME	EMPLOYEE NO. 4 8
<u>E. Leach</u>	<u>04931</u>		<u>0</u>
<u>A. Erickson</u>	<u>016056</u>		<u>0</u>
<u>M. Gannon</u>	<u>016112</u>		<u>0</u>
_____	_____		<u>0</u>
_____	_____		<u>0</u>
_____	_____		<u>0</u>
<u>R. M. Conn</u>	<u>028117</u>		<u>0</u>
_____	_____		<u>0</u>
<u>V. Newman</u>	<u>05299</u>		<u>0</u>
_____	_____		<u>0</u>
	<u>0</u>		<u>0</u>
	<u>0</u>		<u>0</u>
	<u>0</u>		<u>0</u>

COMPLETION DATE

MO	DAY	YR
9	14	
<u>10</u>	<u>26</u>	<u>78</u>

CATALOG NUMBER

FILE NO.		LESSON ID	
CAT	TYPESUBJECT	27	23 25
15	<u>14510</u>	<u>001</u>	

197 160

TOTAL COURSE DURATION

HOURS	
27	31
<u>27</u>	<u>31</u>

4. LECTURE HOURS _____ OTHER HOURS 1.5 EXPLAIN DRILL

5. ENTER THE PREFIX FOR THE APPROPRIATE MODE.

CORRESPONDENCE (CCS)	REVIEWER (RVR)
FILM (FLM)	SCHOOL (SCH)
LECTURE (LEC)	SEMINAR (SEM)
OUT (OUT)	VIDEOTAPE (VTP)
ORIGINATOR (OGR)	

GPF 0007.003 Rev 3

NO.	DATE
257	

35 COMMENT 32

RA, D, E, M, E, R, D, R, L, - U, I, S, F, P, O, O, L, ,

6. METHOD OF EVALUATION (Check at least one)

A. WRITTEN TEST _____ (Attach copy of answers, and graded tests)

B. ORAL QUESTIONING SPOT CHECK _____

C. QUIZ _____ (Attach questions and answers)

D. OTHER _____ (Explain):

7. INSTRUCTOR/TRAINEE'S EVALUATION (This section must be filled in)

(Based on your method of evaluation briefly describe the effectiveness of the training)

Provided Good OST

INSTRUCTOR/TRAINEE'S SIGNATURE

DATE

B. SIGNATURE OF SUPERVISOR OF TRAINING/TRAINING COORDINATOR

DATE

5/14/79

ATTACH LESSON OUTLINE/ITEMS COVERED

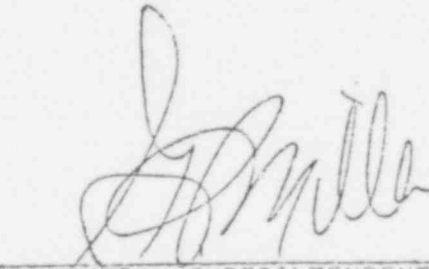
see Neil Scovard

ENCLOSURE #3

PERMISSION TO CONDUCT A
RADIATION EMERGENCY DRILL

I hereby authorize the Supervisor of Training to conduct a Radiation Emergency
Drill on 10/30/78 as outline in the attached Scenario.

(u) ~ 1300



STATION SUPERINTENDENT OR DESIGNATE
10/78

DATE

197 162

SCENARIO FOR TMI UNIT I PRACTICE DRILL
LOSS OF WATER FROM SPENT FUEL POOL WITH FUEL RAISED

OBJECTIVES

1. Exercise station radiation emergency procedures.
2. Exercise communication systems.
3. Evaluate ability of staff to evaluate situation and direct safe recovery.
4. Evaluate staff ability to utilize monitoring equipment and procedures.

SCOPE

While relocating spent fuel in the spent fuel pool the bridge operator rams the fuel mast into the gate between the A and B pool causing failure of gate seals. The fuel in the mast is stuck and the water rushes from the A to the B pool leaving the raised fuel exposed and the water level over the spent fuel reduced.

INITIAL CONDITIONS

1. TMI Unit II operating at 40% power making liquid release.
2. TMI Unit I operating 100% power two weeks after refueling.
3. The fuel handling building door is open with a tractor trailer in building being loaded with packaged waste.
4. Fuel from recent refueling is being relocated in spent fuel pool.
5. QC is inspecting work on fuel racks in empty pool.
6. Wind speed _____, direction _____, range _____.

CONTROL ROOM INDICATIONS

- T=0 Low Level Alarm-Spent Fuel Pool "A"
T=1 RMG-9 Alert - Spent Fuel Bridge Monitor
T=2 Zero Flow on running spent fuel pump - pump tripped.
T=4 RMG-9 Alarm
T=5 RMA-4 Alert Fuel Handling Building Monitor

FUEL HANDLING BUILDING INDICATIONS

- T=0 Bridge operator rams gate → pool level dropping 2 feet per minute; fuel assembly stuck in mast.
T=4 RMA 13 alert/RMG-9 alarm
T=5 RMA 13 alarm

HEALTH PHYSICS INPUT

1. Assuming fuel in mast has been out of core for 2 weeks calculated reading on RMG-9 and general area as level drops in spent fuel pool at 2 ft/minute down to a level of 12 ft. above fuel rack top.
2. Calculate stay times in area of bridge assuming approx. 7 minutes for water level to equalize between the two pools.
3. Determine extent of airborne problem assuming pool starts steaming shortly after cooling is lost.

ENCLOSURE #1

Date: 10-30-78

RADIATION EMERGENCY DRILL
OBSERVER ASSIGNMENT SHEET

AREA OF RESPONSIBILITY

1. Emergency Control Center (ECC)
2. Emergency Control Station (ECS)
3. Emergency Repair Party
4. Accountability
5. On-Site Monitoring Team
6. Off-Site Monitoring Team
7. Communications (local)
8. Communications (off-site)

OBSERVER

1. N. BROWN / C. HUSTED
2. F. M'CORMICK / L. LADDY
3. E. ORWIG
4. E. FUHRER / R. VANSTREY
5. D. M'CONNELL
6. W. SHUMAKER
7. BROWN / M'CORMICK
8. L. LADDY

Control Room

T=0

Low Level Alarm
Spent Fuel Pool "A"

I Control Room

T=2

Zero flow on running spent fuel
cooling pump — running pump
tripped

197 165

"METEOROLOGICAL CONDITIONS"

WIND SPEED \rightarrow 0 MPH

WIND DIRECTION \rightarrow Oscillating DEGREES

WIND RANGE \rightarrow between 0° - 180° DEGREES

VERTICAL TEMPERATURE DIFFERENCE \rightarrow $+2^{\circ}$ F

$T=0$

I Control room

T = 1

RMG - 9

Alarm

(and increasing)

T = 2

UNIT 1

RM G 2

RM G 3

RM G 4

RM G 10

RM G 11

HIGH ALARM

(and increasing)

T = 3

UNIT 1

RM-G-9 - OFF SCALE

(>10⁷ mR/hr)

T=4

UNIT 1

RM G 2

RM G 3

RM G 4

RM G 10

RM G 11

10^5 mR/hr

Control Room

T=5

RMA-4 (P, I, G)

Alert

197-168

T = 6

I Control Room

RMA 4 - Alarm (P, I, g)
(HIGH)

RMA 8 - Alarm (P, I, g)
(HIGH)

T = 10

UNIT 1

RMA 1 (P, I, G) } ALERT & HIGH ALARM
RMA 6 (P, I, G) }

A6 → 5×10^5 CPM (P, I, G)

A1 → 5×10^5 CPM (P, I, G)

T=12

UNIT 1

RMAI (5) 100CPM

ECS

Info - do not hang

T=2

HAND & FOOT MONITOR

PORTAL MONITOR

ALARM

ALARMS FROM LAB AREA
RM 6-2 / RM 6-3

(T=4 62/93 105mR/hr)

if evacuate through Model Room

MONITOR HPR 218 - alarming

and level is $>10R/hr$ ($>104mR/hr @ T=3$)

197 170

$t = 5$ on \rightarrow

SE8 & 9 - 1R/hr

GE9 - 250mR/hr

$t = 10$ on \rightarrow

I - 10^{-3} μ li/cc

Vicinity of Fuel Handling Bldg.

197 171

T=1

RMG-9

Alarm & Increasing

RMA 13

Alert

T=0

INITIAL CONDITIONS

Fuel from recent refueling being relocated in "A" fuel pool

The bridge was rammed into the gate causing seal failure. Level in the "A" pool is dropping at 2'/minute. There is a fuel assembly in the mast and it is stuck. There is a ~~AO~~ operator in the B pool inspecting

T=2

UNIT 2

HPR 215

HPR 218

HPR 232

HPR 233

HIGH ALARM

and increasing

T=3

UNIT 2

HPR 215

HPR 218

HPR 232

HPR 233

OFF SCALE

(>10⁴ mR/hr)

T=5

UNIT 2

HPR 219
HPR 221 A
HPR 221 B
HPR 222
HPR 228

} ALERT ALARM
(and increasing)
(P, I, G)

T=6

UNIT 2

HPR 219
HPR 221 A
HPR 221 B
HPR 222
HPR 228

} HIGH ALARM
(P, I, G)

(all channels read 3×10^5 CPM)

ATTACHMENT NOT FILMED

ANO. 7906140403

NO. OF PAGES 8

DUPLICATE: ALREADY ENTERED INTO SYSTEM
UNDER ANO. _____

ILLEGIBLE: HARD COPY AT:

PDR

CF

OTHER _____

197 175

UNIT II CONTROL ROOM:

GENERAL - GOOD JOB

1. VERIFIED VENTILATION RESPONDED AS IT SHOULD
2. MADE USE OF PROCEDURES
3. QUICK TO STOP THEIR LIQUID RELEASE
4. QUICK TO EVACUATE AUX BLDG / FUEL HANDLING BLDG.

PROBLEM AREAS

1. EVACUATED PEOPLE ON THE PRIMARY SIDE THROUGH THE HIGH RADIATION AREA
2. COULD NOT ESTABLISH COMMUNICATIONS ON HEADSET
3. ONE CRO DID NOT SEEM FAMILIAR WITH ETS

EAST SIDE OF UNIT II

1. EVERYONE AT UNIT II SOUTH ASSEMBLY AREA WAS OUTSIDE STANDING IN HIGH RADIATION / HIGH AIRBORNE ACTIVITY AREA
2. H.P. TECH WITH EMERGENCY REPAIR PARTY WAS CONCERNED ABOUT KEEPING PEOPLE OUT OF THE HIGH RADIATION ARE - GOOD
3. EMERGENCY REPAIR PARTY WENT WITHOUT ANY MEANS OF COMMUNICATIONS WITH ECS.

RADIATION EMERGENCY DRILL
OBSERVER CRITIQUE SHEETOBSERVER E.W. ORWIGDATE OCTOBER 30, 1978AREA OF RESPONSIBILITY UNIT II CONTROL ROOM / REPAIR PARTY

TIME	EVENT	COMMENTS
T=0	STARTED DRILL	UNIT I TOLD UNIT II TO STOP FH OPERATIONS ??
T=2	UNIT II ALARMS SIMULATED ON RMS	BARELY HEARD UNIT I ANNOUNCEMENT
T=4	UNIT II TERMINATED THEIR RELEASE	
T=6	VERIFIED VENTILATION RESPONSES TO RMS ALARMS	
T=8	EVAQUATED UNIT II AUX BLDG TO UNIT I AUX BLDG	WENT THROUGH HIGH RADIATION AREA
T=10	HEADPHONE PROBLEMS	HAD A PROBLEM COMMUNICATING WITH HEADPHONES
T=12	ECG ESTABLISHED IN U-II C.R.	
T=25	WENT WITH EMERG. REPAIR PARTY	
T=30	SOUTH ASSEMBLY AREA	EVERYONE WAS OUTSIDE STANDING AROUND.
T=35	7 GUARDS IN UNIT II SECURITY TRAILER	
T=38	EVAQUATION SIMULATED	
T=47	GENERAL EMERGENCY DECLARED	

197 177

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER R. VANSTROY

DATE

10/30/78

AREA OF RESPONSIBILITY

Accountability (Audit room)

TIME	EVENT	COMMENTS
T=0 (1250)	START DRILL	Page in Aud. doesn't work
T=5	1 st people arrive	Security not here yet
T=6	Security arrives (3 people)	Aud. muster begins
T=6 1/2	Two AD's mustered here	Why not at ECS?
T=10	Aud. muster complete	
T=12	N. GATE lap arrived	used N. gate lap as muster record - good idea!
T=16	List #1 from N. assembly area	
T=21	List #2 N. ASS, LIST #1 South	
T=25	List #3 North	South complete (reported)
T=27	I.P.	Lists arriving slow - due to names + badge no. muster is slow due to double recording (list → sheet = N. gate lap)
T=29	Unit II list arrives & ECS	
T=47	FP. Obviously Unit I.C.P. list is missing.	They should call C.R.!
T=50	I let the people go	
T=53	1 st Act Done	SD missing did not report it!
T=55	1 st List to C.R.	

197 178

MetEd / GRU	DATE	PROJECT NAME	C/M NO.
	SCALE		W.R. NO.
MADE	ENGIN.	Factory Accountability	

T=8 Assembly Lists picked up from North + South Gate

T=8-20 ^{partial} Lists picked up from North + South Assembly Areas
 Going past Fuel Building Door at least 6 times

T=20 Fuel lists turned in for ^{north and south} assembly areas

Comments: No one initially took responsibility to start the list at the south assembly area.

Conflict between sec and non security as to whose responsibility generation of the list was

197 179

Excessive exposure to on accountability personnel going north/south between the assembly areas.

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

Page 1 of 1

OBSERVER D.K. McConnellDATE 10-30-78AREA OF RESPONSIBILITY ON-SITE Monitoring ^{DEPT} Person

TIME	EVENT	COMMENTS
T=0 12:50 hrs.	EMERGENCY DRILL	Schedule START Time
T-2	DRILL ANNOUNCEMENT	PA system
T-3	ALARM SOUNDED	
T-5	MASTER LIST STARTED	IN ECS BY BOB MCG
T-8	EVACUATION OF ECS	AS DIRECTED BY ECS SUPERVISOR
T-12	REPORTED TO UNIT #2	CONTROL ROOM
T-20	went to 281 AUX. Bldg for reading, IN-HOUSE TEAM RELEASED FROM THE CONTROL RM.	Called BACK TO CONTROL RM. & LEFT AREA
T-25	RETURNED TO CONTROL RM.	Awaiting instruction
T-42	ANNOUNCEMENT TO EVACUATE SITE	PA system
T-45	GENERAL EMERGENCY DECLARED	ALARM SOUNDED
T-50	ONE MAN RELEASED TO WAREHOUSE FOR AIR SAMPLE	got AIR sampler from Unit #2 HP LH & STARTED TO WAREHOUSE
T-60	DRILL TERMINATED	got to warehouse 197 180 + didn't get sample due to TERMINATION.

(OVER FOR SUMMARY)

Summary

NOT ENOUGH OBSERVERS FOR THE TEAMS THAT WERE DISPATCHED. I WENT TO THE 281 LEVEL OF Aux Bldg. FOR A READING WITH A 3 MAN PARTY. WE GOT THE READING & CALL IT INTO THE CONTROL ROOM & THEN WENT BACK TO THE CONTROL ROOM. ALL ON-SITE & OFF-SITE TEAMS WERE DISPATCHED WHEN ~~WE~~ WE GOT BACK. STAYED IN CONTROL ROOM UNTIL ASK TO GET A ^(AIR SAMPLE) READING @ WAREHOUSE (ONE-MAN) @ T-50. DIDN'T GET AIR SAMPLE @ WAREHOUSE AS DRILL WAS TERMINATED WHEN ^{HE} ARRIVED. SECURITY GUARD NOTED THAT ALOT OF PEOPLE WERE COMPLAINING ABOUT THE TIME THEY HAD TO WAIT OUTSIDE UNTIL DRILL WAS OVER, & WERE GETTING VERY IMPATIENT FOR THE DRILL TO BE OVER.

THE MAN THAT WAS TOLD TO GO TO THE WAREHOUSE FOR A AIR SAMPLE COMMENTED THAT THE ON-SITE TEAM COULD OF GOT THAT SAMPLE. AS WE WENT OUT OF THE SECURITY Bldg. THE ON & OFF SITE TEAMS WERE SITTING INSIDE VEHICLES AWAITING INSTRUCTION, BUT WASN'T DOING NOTHING @ THAT TIME & EITHER COULD OF GOT THE SAMPLE. AT THE WAREHOUSE.

ENCLOSURE #2

RADIATION EMERGENCY DRILL
OBSERVER CRITIQUE SHEET

OBSERVER W.E. SHUMAKER

DATE 10/30/78

AREA OF RESPONSIBILITY OFF-SITE TEAM

TIME	EVENT	COMMENTS
T ₀ = 12:50		
T ₊₃ = 1 st ANNOUNCEMENT		
T ₊₄ = WARNING BUZZER		
T ₊₆ = 2 nd ANNOUNCEMENT		
T ₊₉ = EVACUATE UNIT 1 ECS	REPORT TO UNIT 2 CONT ROOM.	
T ₊₁₉ = OFF-SITE TEAM BRAVO PICKED (NO WALK-TALKIES.)		
T ₊₂₂ = OFF SITE TEAM TOLD TO JOIN ON SITE TEAM @ SECURITY		
T ₊₂₅ = LEFT CONT. RM. UNIT 2		
T _{+27.5} = SEC. @ CONSOLE - No RAD (CORONA PLASMA) NO KEYS TO VEHICLE -		
T _{+30.5} = KITS SELECTED - NOT CHECKED - (NO INVERTER PICKED UP)		
T ₊₃₂ = LEFT SEC. BLDG. (NO CONTACT W/ ON SITE TEAM)		
T _{+34.5} = CHECKED OUT KITS IN SCOUT, (NO ELECT. CHECK ON AIR SAMPLER)		
T ₊₃₅ = MAN SENT BACK TO SEC. BLDG. FOR INVERTER.		
T ₊₃₇ = STILL NO WHERE TO GO, (DID NOT CALL ECS FOR INSTRUCTIONS)		
T ₊₅₃ = ON SITE TEAM DROVE UP & ASKED THRU FENCE IF I HAD A SET OF READINGS, (THEY HAVE NO OBSERVER.)		
T _{+59.5} = RADIO CHECK FROM EOS.		
T ₊₆₂ = DRILL TERMINATED		

T+9 - THE ANNOUNCEMENT TO EVACUATE UNIT 1 ECS & TO PROCEED TO UNIT 2 CONT. RM. WAS RECEIVED AND COMPLETED ONCE IN CONT. RM. #2 THE ON SITE TEAM WAS SELECTED THERE WERE NO WALKIE-TALKIES AVAILABLE AND UNTIL THE TEAM FOUND OUT WHERE TO GET THEM, A GOOD 4 MINUTES LAPSED, ALSO THE TEAM DID NOT KNOW WHERE TO GET KEYS TO A VEHICLE.

AT T+22 TEAM BRAVO WAS TOLD TO JOIN TEAM ALPHA. (ON SITE TEAM), WHICH NEVER OCCURED.

AT T+25.5 TEAM BRAVO LEFT UNIT 2 CONT. RM. AND TRIED TO GET WALKIE-TALKIES & VEHICLE KEYS @ GUARD CONSOLE. FINALLY A SECURITY SGT. GAVE THEM A WALKIE-TALKIE, WHICH WAS TRADED LATER FOR ANOTHER.

KITS WERE SELECTED BUT NO INVERTER. GOT KEYS FOR VEHICLE FROM AN OPERATOR AND KITS WERE CHECKED IN VEHICLE. NOTE: NO ELECT. CHECK ON AIR SAMPLER WAS MADE. ALSO AT THIS TIME ONE TEAM MEMBER WENT BACK INTO SECURITY CENTER FOR AN INVERTER.

THE BALANCE OF THE DRILL WAS SPENT SITTING IN THE VEHICLE OUTSIDE OF THE SECURITY BLDG WITH ONE RADIO CHECK REQUESTED BY ECS @ T+58.5.

AT T+53 THE ON SITE TEAM ASKED THRU THE FENCE FOR A SET OF READINGS WHICH WE DIDN'T HAVE.

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER

Beers

DATE

10/30/78

AREA OF RESPONSIBILITY _____

TIME	EVENT	COMMENTS
1300	Fuel Pool Incident	No communications at Green Bldg Word of mouth to muster.
1310	North Hall	People in computer room not aware of drill
1320	Site Evac	Site Evacuation started.
1335	Gen. emergency	GE declared
1337	Rad Chem Techs	Call out move Techs.
1350	Accountability	

TRAINING PROGRAM ADMINISTRATIVE FORM

1
2 2 A

1. LESSON/COURSE: RAD EMERG. DRILL - UNIT 2 MHA

2. LOCATION: TMI

3. PERSONNEL ATTENDING: (PLEASE PRINT):

NAME	EMPLOYEE NO. 4 8	NAME	EMPLOYEE NO. 4 8
<u>J. BRUMMER</u>	<u>061175</u>	<u>R. EVANS</u>	<u>04814</u>
<u>R. MCCANN</u>	<u>029117</u>	<u>J. HIPPLE</u>	<u>055014</u>
<u>T. DAVIS</u>	<u>05469</u>	<u>E. REIDER</u>	<u>04931</u>
<u>V. HEILMAN</u>	<u>05799</u>	<u>K. HARNER</u>	<u>06090</u>
<u>W. DEIMLER</u>	<u>05834</u>		<u>0, , , ,</u>
<u>J. DEMAN</u>	<u>06138</u>		<u>0, , , ,</u>
<u>M. GABNER</u>	<u>06112</u>		<u>0, , , ,</u>
<u>B. SMITH</u>	<u>02958</u>		<u>0, , , ,</u>
<u>R. BOOHER</u>	<u>05489</u>		<u>0, , , ,</u>
<u>H. HARTMAN</u>	<u>06097</u>		<u>0, , , ,</u>
<u>C. GUTHRIE</u>	<u>05455</u>		<u>0, , , ,</u>
<u>J. BLESSING</u>	<u>06420</u>		<u>0, , , ,</u>
<u>D. ZETER</u>	<u>05651</u>		<u>0, , , ,</u>

COMPLETION DATE

MO	DAY	YR
11	02	78

CATALOG NUMBER

FILE NO.				LESSON ID		
C	A	T	G	T	S	I
15				22	23	26
14	5	10	001			

197 185

TOTAL COURSE DURATION

HOURS	
27	31
0,0,0,2,0	

4. LECTURE HOURS _____ OTHER HOURS 2.0 EXPLAIN 1-DRILL / 1-CRITIQUE

5. ENTER THE PREFIX FOR THE APPROPRIATE MODE:

MODE PREFIX
32 34
<u>DRL</u>

CORRESPONDENCE	REVIEWER
(CCS)	(RVR)
(FLM)	(SCH)
(LEC)	(SEM)
(OJT)	(VTP)
(OGR)	

35 COMMENT _____ 59
RAD, EMER, DRL, -, U, 2, MHA, , , ,

GPF0007.003 Rev 3

6. METHOD OF EVALUATION (Check at least one)

A. WRITTEN TEST _____ (Attach copy of answers, and graded test)

B. ORAL QUESTIONING SPOT CHECK _____

C. QUIZ _____ (Attach questions and answers)

D. OTHER _____ (Explain):

7. INSTRUCTOR/TRAINEE'S EVALUATION (This section must be filled in)

(Based on your method of evaluation briefly describe the effectiveness of the training)

F. G. M. [Signature]

INSTRUCTOR/TRAINEE'S SIGNATURE

11/10/78

DATE

8. SIGNATURE OF SUPERVISOR OF TRAINING/TRAINING COORDINATOR _____

DATE _____

ATTACH LESSON OUTLINE/ITEMS COVERED

197 186

TRAINING PROGRAM ADMINISTRATIVE FORM

2.2.A

1. LESSON/COURSE: RAD EMERG. DRILL - UNIT 2 MHA

2. LOCATION: TMI

3. PERSONNEL ATTENDING: (PLEASE PRINT):

NAME	EMPLOYEE NO. 4 8	NAME	EMPLOYEE NO. 4 8
<u>L. LANDRY</u>	<u>06588</u>	<u>J. FLOYD</u>	<u>03842</u>
<u>F. McWORMICK</u>	<u>06169</u>	<u>J. LOGAN</u>	<u>06652</u>
<u>R. VAN STRY</u>	<u>06391</u>	<u>W. BUSANSEY</u>	<u>06364</u>
<u>D. BOLTZ</u>	<u>04506</u>	<u>J. STACY (RESIDING)</u>	<u>01111</u>
<u>N. BROWN</u>	<u>05318</u>	<u>DURIEL</u>	<u>06246</u>
<u>E. ORWIG</u>	<u>06405</u>	<u>T. MULLANEY</u>	<u>06243</u>
<u>C. HUSTED</u>	<u>06149</u>	<u>P. VELEZ</u>	<u>05462</u>
<u>M. BEERS</u>	<u>05104</u>	<u>F. HUWE</u>	<u>06403</u>
<u>W. SHUMAKER</u>	<u>06653</u>	<u>T. MORCK</u>	<u>06281</u>
<u>D. McCONNELL</u>	<u>06825</u>	<u>V. ORLANDI</u>	<u>06233</u>
<u>E. FUHRER</u>	<u>05917</u>	<u>D. McGETTRICK</u>	<u>06227</u>
<u>G. KUNDER</u>	<u>04578</u>	<u>H. CRAWFORD</u>	<u>06512</u>
<u>J. SEELINGER</u>	<u>06213</u>	<u>M. BENSON</u>	<u>06184</u>

COMPLETION DATE

MO	DAY	YR
9	14	
<u>11</u>	<u>02</u>	<u>78</u>

CATALOG NUMBER

FILE NO.				LESSON ID		
	C	T	S			
15				22	23	26
<u>145</u>	<u>10</u>	<u>00</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>

197 187

TOTAL COURSE DURATION

HOURS	
27	31
<u>00</u>	<u>02</u>

4. LECTURE HOURS _____ OTHER HOURS 2.0 EXPLAIN 1-DRILL / 1-CRITIQUE

5. ENTER THE PREFIX FOR THE APPROPRIATE MODE:

MODE PREFIX
<u>DRL</u>

CORRESPONDENCE	PREFIX (CCS)	REVIEWER	PREFIX (RVR)
FILM	(FLM)	SCHOOL	(SCH)
LECTURE	(LEC)	SEMINAR	(SEM)
OJT	(OJT)	VIDEOTAPE	(VTP)
ORIGINATOR	(OGR)		

35	COMMENT	59
	<u>RAD EMERG DRILL - UNIT 2 MHA</u>	

GPF0007.003

Rev 3

6. METHOD OF EVALUATION (Check at least one)

A. WRITTEN TEST _____ (Attach copy of answers, and graded tests)

B. ORAL QUESTIONING SPOT CHECK _____

C. QUIZ _____ (Attach questions and answers)

D. OTHER _____ (Explain):

7. INSTRUCTOR/TRAINEE'S EVALUATION (This section must be filled in)
(Based on your method of evaluation briefly describe the effectiveness of the training)

R. M. ... 11/10/78
INSTRUCTOR/TRAINEE'S SIGNATURE DATE

B. SIGNATURE OF SUPERVISOR OF TRAINING/TRAINING COORDINATOR _____ DATE _____

ATTACH LESSON OUTLINE/ITEMS COVERED

ENCLOSURE #3

PERMISSION TO CONDUCT A
RADIATION EMERGENCY DRILL

I hereby authorize the Supervisor of Training to conduct a Radiation Emergency
Drill on 11/2/78 as ~~outline in the attached Scenario.~~

@ ~ 1300



STATION SUPERINTENDENT OR DESIGNATE

11/2/78

DATE

OBJECTIVES

1. To test the response of Unit 2 Operations Staff to an incredible Maximum Hypothetical Accident which occurs within a one minute time interval.
2. To test the ability and speed of Unit 2 staff to utilize the contingency dose calculations and make the necessary off-site calls and other communications.

SCOPE

A Case I LOCA with severe core damage and fuel melting with little or no cooling. The containment leaks at the maximum design leak rate.

INITIAL CONDITIONS

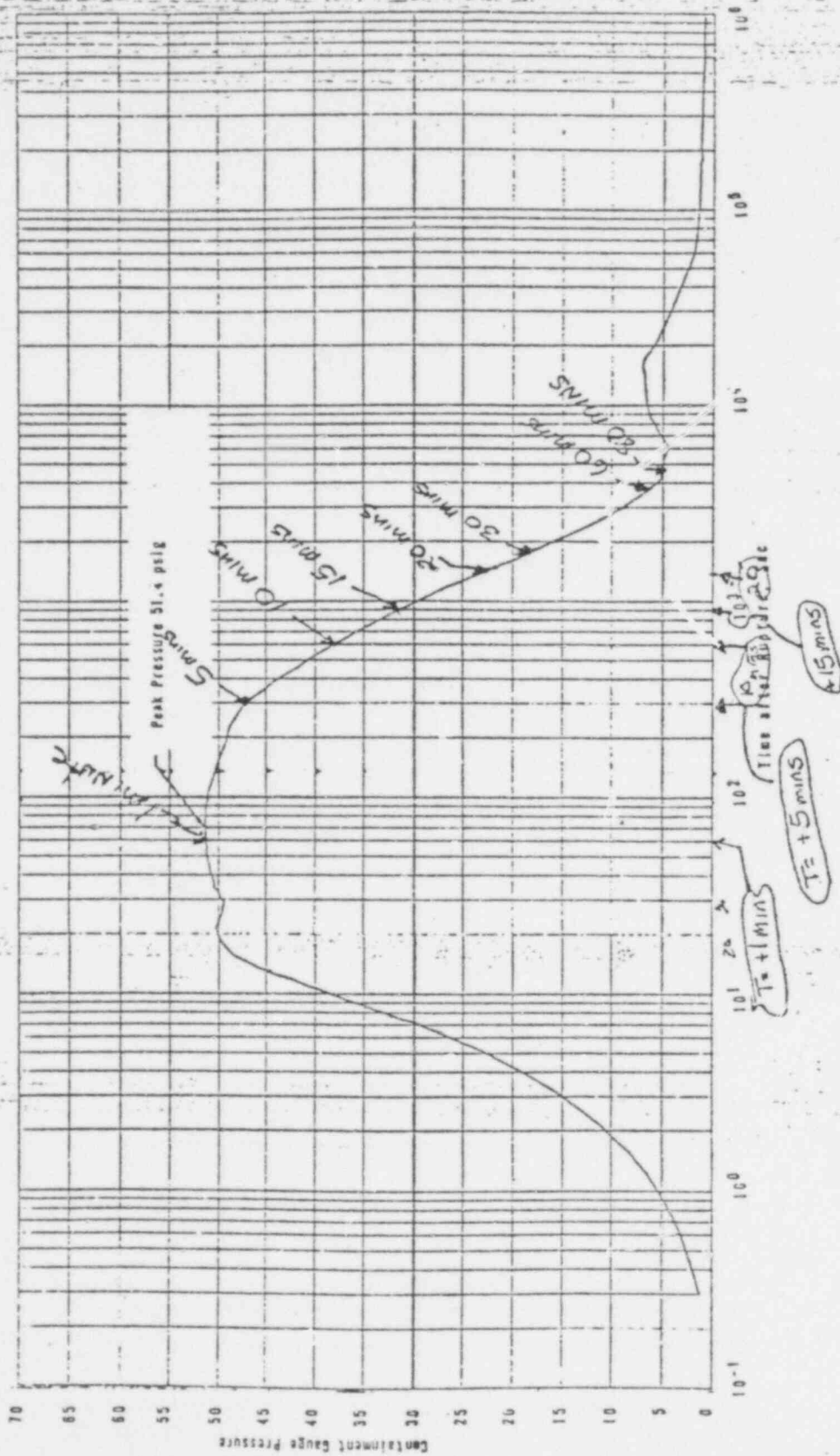
1. TMI Unit 2 is at 100% Power.
2. Reactor Building purge is in progress.
3. A LOCA occurs resulting in severe core damage, fuel melting, and no effective core cooling.
4. Wind speed 3 mph, wind direction 250°, wind range 22°.

SEQUENCE OF EVENTS

- T=0
1. Low RC Press. Alarm
 2. Low-Low RC Press. Alarm
 3. RC Press. Decreasing Rapidly
 4. Reactor Trip Alarm
 5. Turbine Trip Alarm
 6. Pressurizer Low Level Alarm
 7. Safety Injection Actuated A&B
 8. Pressurizer Low-Low Level Alarm
 9. HP-R-214, High Alarm (And Alert Alarm)
 10. High Reactor Building Temperature Alarm
 11. Reactor Building Sump High Level Alarm
 12. Reactor Building High Pressure Alarm
 13. Reactor Building Pressure Increasing
 14. Makeup Tank Level Decreasing Rapidly with Low Level Alarm
 15. Various RMS Alarms
 16. Core Flood Tank Level Alarms
 17. Purge Valves Indicate Shut
 - T=1 → 18. HPR-214 is in High Alarm-148 R/hr.
 19. HPR-209, 210, 211, 212, 213 all off scale
 - T=2 → 20. HPR-219 particulate, iodine, gas all off scale and in high alarm
 21. HP-R-222- P,I,G - Off Scale, High Alarm. vent flows 2-2 to decrease
 22. HP-R-228- P,I,G - Off Scale, High Alarm.
 23. HP-R-205- 1000 mR/hr, High Alarm.
 - T=3 → 24. RH-G-9 at High Alarm.
 25. RH-A-4P - Alert Alarm.
 26. RH-A-4I - increases to Alert Alarm.
 27. RH-A-4G - increases to Alert Alarm.
 28. RH-A-8F,I,G - increasing above background

197 190

- T=3 29. RM-A-13P, I, G - High Alarms - Local.
- T=4 30. RM-A-4P - High Alarm.
I - High Alarm.
G - High Alarm.
- 31. AH-E-10 trips, vent flow down.
- 32. RM-A-8P, I, G - Alert Alarms.
- 33. RM-L-9 increasing to 2x initial cpm - steady.
- 34. RM-G-10 (Aux. Bldg. Ent. 305') High Alarm.
- 35. RM-G-12 (Solid Waste Area) High Alarm.
- 36. RM-A-6P, I, G Alert Alarms.
- T=5 37. RM-A-8P - High Alarm.
I - High Alarm.
G - High Alarm.
- 38. RM-A-6P - High Alarm.
I - High Alarm.
G - High Alarm
- 39. AH-E-11 trips
Vent. flow decreases
RM-A-6P - High Alarm.
I - High Alarm.
G - High Alarm.
- T=13 40. HP-R-204, 5, 6 & 7 - all 500 mR/hr.
- T=15 41. HP-R-222 Port. - Off Scale
Iodine - Off Scale
Gas - 10^4 c/m
- T=60 42. Wind speed 2 mph, wind direction 335°, wind range ~~500~~²⁵⁰.



CONTAINMENT TOTAL PRESSURE AS A FUNCTION OF TIME FOR DBA (5.0 FT² HLB)

THREE MILE ISLAND NUCLEAR STATION UNIT 2



ENCLOSURE #1

Date: 11-2-78

RADIATION EMERGENCY DRILL
OBSERVER ASSIGNMENT SHEET

AREA OF RESPONSIBILITY

OBSERVER

- | | |
|------------------------------------|------------------------------|
| 1. Emergency Control Center (ECC) | 1. <u>BEERZ/BEERS/LAUNDY</u> |
| 2. Emergency Control Station (ECS) | 2. <u>MCCORMICK</u> |
| 3. Emergency Repair Party | 3. <u>N/A</u> |
| 4. Accountability | 4. <u>FUHO TR/HUSTED</u> |
| 5. On-Site Monitoring Team | 5. <u>MCCONNELL</u> |
| 6. Off-Site Monitoring Team | 6. <u>SHUMAKER/UNISTEY</u> |
| 7. Communications (local) | 7. <u>MCCORMICK/LAUNDY</u> |
| 8. Communications (off-site) | 8. <u>BROWN</u> |
| UN AFFECTED UNIT CR. | 9. <u>ORWIG</u> |

197 193

t	SE3 & 4		GE3 & 4		ENE01		ENE11		ENE21		ENE31	
	γ	I	γ	I	γ	I	γ	I	γ	I	γ	I
X												
2	10R/hr	2E-4 $\mu\text{Ci/sec}$										
6		3R/hr	1E-4 $\mu\text{Ci/sec}$									
15			10mR/hr	2E-7 $\mu\text{Ci/sec}$								
18												
30							4R/hr	8E-5				
36												
50									200mR/hr	4E-5 $\mu\text{Ci/sec}$		
75	2R/hr	5E-5	1R/hr	1E-5								
90	500mR/hr	5E-6	250mR/hr	1E-6	Bkg	2E-8						
120	100mR/hr	5E-7	50mR/hr	1E-7	Bkg	3E-8	1R/hr	1E-5				

t	EOI		ESE 01		SE 01		E 11		SSE 01		ESE 11	
	γ	I	γ	I	γ	I	γ	I	γ	I	γ	I
X												
78	200 mR/hr	2E-6										
84			4R/hr	8E-4								
90					80 mR/hr	1.6E-5						
101							800 mR/hr	1.6E-5				
116									8R/hr	1.6E-4		
129											800 mR/hr	1.6E-5

T=0
HPR-214
T=1

4
1.48 x 10⁴ mry/hr
HIGH ALARM
T=1

T=0-1 Hand to CRO U-2

SEQUENCE OF EVENTS

- T=0
1. Low RC Press. Alarm
 2. Low-Low RC Press. Alarm
 3. RC Press. Decreasing Rapidly
 4. Reactor Trip Alarm
 5. Turbine Trip Alarm
 6. Pressurizer Low Level Alarm
 7. Safety Injection Actuated A&B
 8. Pressurizer Low-Low Level Alarm
 9. HP-R-214, High Alarm (And Alert Alarm)
 10. High Reactor Building Temperature Alarm
 11. Reactor Building Sump High Level Alarm
 12. Reactor Building High Pressure Alarm
 13. Reactor Building Pressure Increasing
 14. Makeup Tank Level Decreasing Rapidly with Low Level Alarm
 15. Various RMS Alarms
 16. Core Flood Tank Level Alarms
 17. Purge Valves Indicate Shut

197 196

UNIT 1 - "INITIAL CONDITIONS"

TMI 1 @ 100%

TMI 2 @ 100%

No liquid or gas release discharge

Coolant activity - 2 $\mu\text{Ci/cc}$

$t=0$

Initial Conditions - Unit 2

TMI-2 @ 100% Power

R₁ Bldg. Purge in Progress

Coolant - 12 $\mu\text{Ci/cc}$ (15 min degas)

TMI-1 @ 100% Power

197 197

HP-R-219

P - OFF scale

" "

I

" "

G

T=1

HP-R-214
1.48 x 10⁴ MP/m.

HP-R-209

210

211

212

213

OFF scale

T=1

T=2
HP-R-222

P, I, G = OFF scales

HP-R-228 P I G - " " "

HP-R-205 - 1000 m/hr.

High Alarm

T=13

HP-R-204, 5, 6, 7 A11

500 m/hr

T=15, HP-R-222 P I OFF scale
G = 10⁴ C.I.

T=1

Ventilation Flows

T=1

ALL ^{decreasing} SCFM

SUPPLY FANS off

T=2

T=2

HP-R-222

P, I, G - OFF SCALE, HIGH ALARM

HP-R-228

P, I, G - OFF SCALE, HIGH ALARM

HP-R-205 - 1000 mR/hr, HIGH ALARM

T=2

T=13

1:27

HPR 204, 5, 6 & 7 ALL 500 mR/hr

197 199

1:29

T=15

HPR-222 P - off scale

I - off scale

G - 10^4 c/m

T=1

T=1

HPR-219

P - OFF SCALE - High Alarm

I - OFF SCALE - High Alarm

G - OFF SCALE - High Alarm

197 200

T=1

T=1

T=1

HP-R-209

210

211

212

213

OFF SCALE

High Alarm

T=1

T=0

Wind - 3 MPH

From 250°

Range 22°

2:14

T=60

T=60

Wind - 2 MPH

from 335°

Range ~~25.0~~
25°

UNIT 1 CR

RMA8 (p, I, g) - High Alarm

AHE II trips, Vent flow decreasing

RMA6 (p, I, g) - High Alarm

197 | 202
| t=5

Unit 1 CR

RMA6 (p, I, g) - Alert

RMA4 (p, I, g) - High Alarm

AHE10 trips, Vent flow decreasing

RMA8 (p, I, g) - Alert

RML9 - increasing to 2 times initial reading

RMG10 - High Alarm

RMG12 - High Alarm

$t=4$

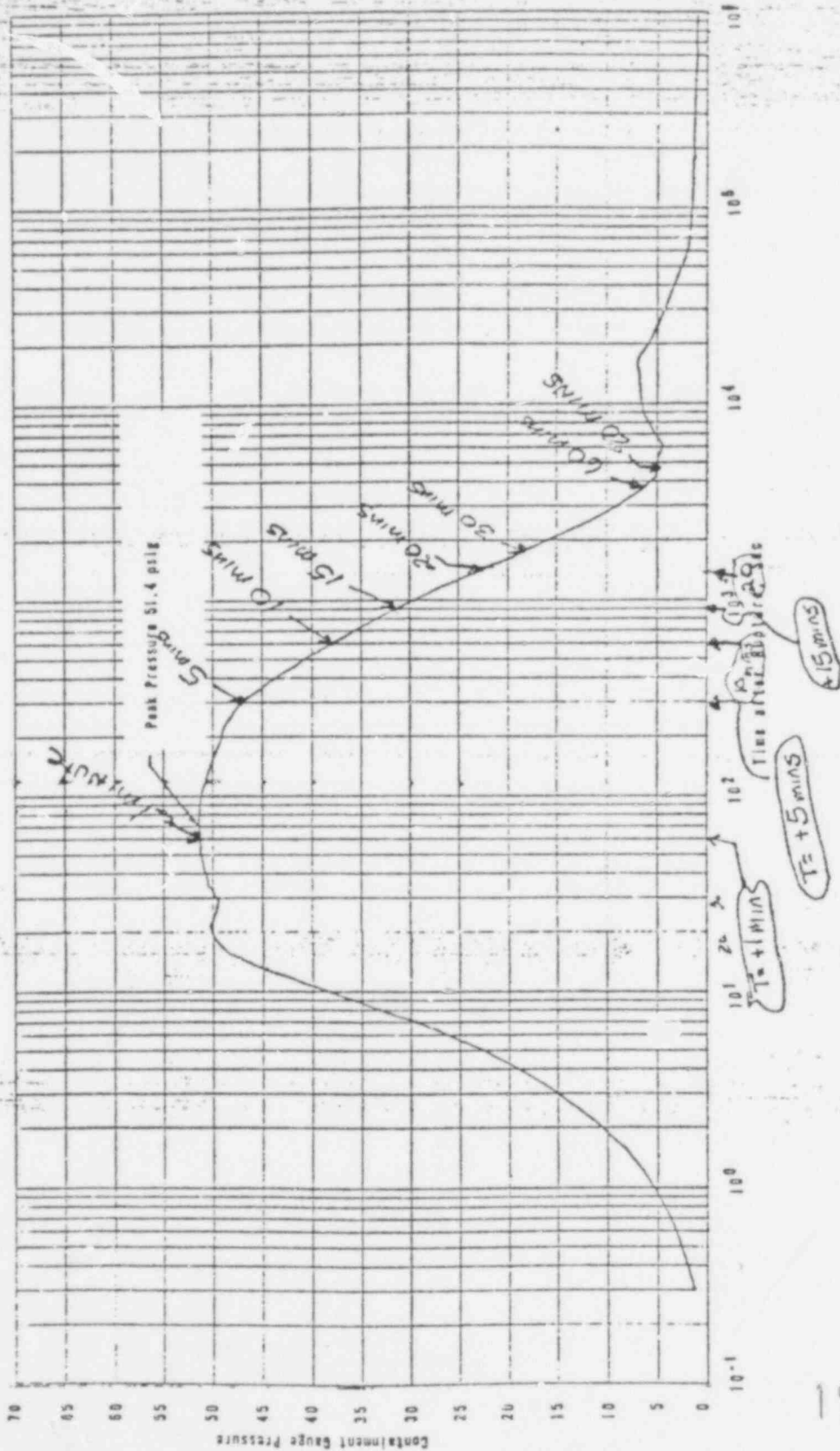
UNIT 1 CR

RMG-9 - High Alarm and rising

~~RMA~~ 4 (p, I, g) - Alert and rising

197 203

$t=3$



197 204

CONTAINMENT TOTAL PRESSURE AS A JUNCTION OF TIME FOR DBA (5.0 FT² H² B)

THREE MILE ISLAND NUCLEAR STATION UNIT 2



FIGURE 6.2-4

Accountability

Gate Lists were picked up promptly from the N+S gates. Muster lists at the assembly areas were started. Numbers without names, names without pages errors occurred. For all lists name number and color of badges have to be put on the muster list.

12 Mel El } Could not be
234 Contractors } accounted for

No one set up an exclusion area in the area of the reactor building

It was at T-45 when a notice was made to keep out of this area.

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER Fuhrer / Husted

DATE _____

AREA OF RESPONSIBILITY Accountability

TIME	EVENT	COMMENTS
T=50	Met Ed List sent to control room Contractor list not complete at end of drill	

pp. 1. of 2.

RADIATION EMERGENCY DRILL
OBSERVER CRITIQUE SHEET

OBSERVER G. E. SHUMAKER

DATE 11-2-78

AREA OF RESPONSIBILITY OFF SITE MON. TEAM

TIME	EVENT	COMMENTS
1315 = T ₀	1ST ANNOUNCEMENT OVER PA.	
T+3	RAD. SIGNAL	
T+4.5 =	GEN. ALERT	
T+9.5	OFF SITE TEAM BRAVO SELECTED	
T+9.5	KITS #3 PICKED	
T+13	KITS CHECKED FOR INVENTORY	AIR SAMPLER NOT CHECKED ELECT.
T+14.5	5 R. AREA TOLD BY ECS TO MOVE TO LOW B.G. AREA.	
T+18	FIVE-01 FROM ECS.	
(T+19)	ARRIVED @ OBSERVATION CTR.	
T+21	INVERT OPER.	
T+27	RADECO OPER. @ 4 CFM	3.5 MIN. FOR SAMPLE
T+28	PULLED RADECO	ECS GIVE NEW LOCATI. BEFORE READINGS CALK
T+31.5	NEW/OLD ENE-11 FROM ECS	READINGS NEAR ASKE FOR OR RADMOD IN.
T+32	YODINE CALLED IN WHITE ENROUTE	
T+38	ARRIVED @ ENE-11	NO COMMUNICATIONS AT ALL
T+42	INV. T RADECO OPER. (5CFM)	4 R/HR. AREA
T+48	AIR SAMPLE OBTAINED	
T+49	LEFT ENE-11 - PROCEEDED E. TO TOP OF HILL (NO COMMUN.)	
T+52	POOR COMMUN. ESTAB. W/ ECS	(NO DIRECTIONS FROM ECS)
T+56	WENT BACK TO GOOD'S CHURCH OR GEYER'S CHURCH ROAD. FOR COMMUN.	
T+57	ENE-21 FROM ECS (NEW LOCATION)	ALSO ALERT BODY COME
T+62	ARRIVED @ ENE-21	
T+63	INV. T RADECO OPER. (5CFM)	(NO H. RATE & ST. IN KIT)
T+67	NO COMMUNICATIONS AIR SAMPLE OBTAINED	

197 207

pp. 2 of 2

ENCLOSURE #2

1670.9
Revision 4
1/16/78

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER _____

DATE _____

AREA OF RESPONSIBILITY _____

TIME	EVENT	COMMENTS
T+68	DRILL TERM. (MOVED AROUND TO ESTABLISH COMMUN

197 208

P.P.1 of ~~CRITIQUE~~
TEAM BRAVO (OUTSIDE MONITORING TEAM) WAS PICKED 9 1/2 HRS
INTO DRILL FROM TO

AT THE SECURITY BUILDING MON. KITS WERE CHECKED FOR
INVENTORY ONLY. (NO ELECT. CHECK ON THE RADECO)

(ENE-01)
AFTER AIR SAMPLE WAS TAKEN AT 1ST CHECK POINT - ECS
ASSIGNED NEW LOCATION BEFORE READINGS WERE ~~TURNED~~
CALLED IN. READINGS WERE CALLED IN ENROUTE TO 2ND.
CHECK POINT. (ENE-11). NO COMMUNICATIONS AT ALL FROM
THIS POINT, & IT WAS A 4 R/HR. AREA. WE TRAVELED ~~BACK~~
~~TO THE 1ST CHECK POINT~~ EAST TO TOP OF HILL TO CALL
IN TO NO AVAIL. CAME BACK THRU 4 R/HR. AREA TO ALMOST
1ST CHECK POINT TO ESTABLISH COMMUNICATIONS, WENT BACK
THRU 4 1/2 HR. AREA AGAIN TO PROCEED TO 3RD. CHECK POINT.
(ENE-21) AGAIN NO COMMUNICATIONS. ~~THIS~~ THIS WAS A
200 HR/HR, ~~AND~~ AND WE WERE READY TO COME BACK THRU
HIGH 4 R/HR AREA TO CALL IN WHEN WE FINALLY
HEARD THE DRILL WAS TEAM.

COMMENT: TEAM BRAVO WAS INSTRUCTED BY ECS TO
CONTINUALLY CALL IN TOTAL DOSAGE READINGS. THIS WAS
IMPOSSIBLE DUE TO FAILURE OF COMMUNICATIONS.

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

Page 1 of 3

OBSERVER D.K. McCONNELLDATE Nov. 2nd, 1978AREA OF RESPONSIBILITY ON-SITE MONITORING TEAM

TIME	EVENT	COMMENTS
T=0 = 1315 hrs.	Drill START TIME	
T-3	Drill ANNOUNCEMENT (PLANT GMG)	PA system
T-5	ALARM Sounded Muster List started in ECS	
T-7	GENERAL EMERGENCY ANNOUNCED	PA system
T-9	ON-SITE TEAM	DISPATCHED FROM ECS WITH WALKIE- TALKIE
T-11	RAD. EMG. & Basequarter & monitoring KIT check @ security Bldg.	AIR sampler checked out OKAY & EVERYTHING WAS CHECKED & FOUND COMPLETE & SATISFIED
T-14	Outside ^{SEC.} Bldg & CALLED IN A READING OF 5 R/HR	ECS told us to go TO LOW BKG AREA & AWAIT FURTHER INSTRUCTIONS
T-16	LEFT AREA IN OPPOSITE DIRECTION OF PLUME	Started monitoring suits for doses received
T-18	Report TO GE-3 FOR READING	instruction BY ECS
T-21	ARRIVED @ GE-3 & DOSE READING OF 3 R/HR GIVEN	ECS INSTR. TO TAKE IN SAMPLE TEAM monitoring itself.

197 21

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

Page 2 of 3

OBSERVER D.K. McConnellDATE Nov. 2nd 1978AREA OF RESPONSIBILITY ON-SITE TEAM

TIME	EVENT	COMMENTS
T-21	AIR SAMPLE BEING TAKEN VERY KNOWLEDGABLE ABOUT EQUIPMENT	AT GE-3 ALL EQUIPMENT USED PROPER
T-26	LEFT AREA TO GO TO ^{LOW} BK ₉ AREA TO READ I ₂	ECS REROUTED TEAM TO SECURITY BLDG. FOR PERSON WITH TELATECTO FOR READINGS HIGHER THAN WE HAD
T-30	ARRIVED BACK @ THE SEC. BLDG. TO PICK UP SOMEONE.	BACK TO A 5R/HR FIELD ?? TEAM MONITORING ITSELF
T-32	PICKED PERSON UP ^{HE} HAD A TELATECTON	LEFT SEC. BLDG AREA WITH NEW PERSON.
T-33	ARRIVED @ LOW BK ₉ AREA	I ₂ READING COUNT STARTED.
T-35	COUNT OF I ₂ COMPLETED	REPORTED 15-4 TO ECS
T-36	REPORTED TO SE-3 FOR ^{DOSE} READING INSTRUCTED BY ECS	TEAM PERSONNEL REPORTED THEIR OWN DOSES READING TOTALS @ SE-3
T-42	INSTR. TO ^{EVACUATE} SEC. BLDG. ANOTHER STOP IN 5R/HR AREA	MAN FROM TEAM MADE THE THE ANNOUNCEMENT @ BLDG, SULIMATED EVACUATION
T-45	LEFT LOW BK ₉ AREA TO GO TO SECURITY BLDG TO PICK UP 2 MORE PEOPLE.	SHOULD OF STAYED @ I ₂ AS THE 2 MEMBER OF CH TEAM WAS SUPPOSE MEET @ SITE TEAM THERE. COMMUNICATION PROBLEM.
T-50	AFTER WE GOT BACK FROM SECURITY BLDG. TEAM MEMBERS WE WERE TO MEET WERE @ I-7 WAITING FOR THE ^{ON-SITE} TEAM.	ON-SITE MEMBERS GOT MORE M/R'S AGAIN NEEDED TOTAL OF 700 M/R PICKED UP APPROX.

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

Page 3 of 3

OBSERVER D. K. M. POWELLDATE Nov 2nd, 1978

AREA OF RESPONSIBILITY

ON-SITE TEAM

TIME	EVENT	COMMENTS
T-60	Drill Termination	
	<u>Summary</u>	
	TEAM ENTERED ^{WENT} INTO 5R/HR. AREA 3 TIMES FOR NEEDLESS ITEMS.	
	<u>1ST</u> TO GET A MAN WITH THE TELATECTOR FOR READINGS WE WERE GETTING WITHOUT IT, AS WE NEVER GOT A READING OVER 5R/HR. & OUR SCALE WAS UP TO 10R/HR. WITH MONITORING EQUIPMENT.	
	<u>2ND</u> RIDE TO SECURITY BLDG. TO ANNOUNCE EVACUATION WHICH COULD OF BEEN DONE BY OTHER COMMUNICATION MEANS.	
	<u>3RD</u> COMMUNICATION MIX UP FROM ECS TO TEAM FOR PICKING UP 2 MORE PEOPLE FROM ANOTHER ^{MONITORING} TEAM WHICH WERE NOT THERE, DUE TO MISUNDERSTANDING OF INSTRUCTIONS.	
	TEAM VERY GOOD ABOUT MONITORING THEIR ^{THEIRSELVES} & KEEPING ACCOUNT OF THEIR DOSES, RECEIVED.	
	TEAM KNOWLEDGABLE ABOUT EQUIPMENT & AREAS OF PLUME & LOW BACKGROUND AREAS.	

97 212

Q

Q

2

13A B

7A GB

1329

→ Insite Time GE - 3

← Time Alpha 1329 5 R/hr outside security Buidt.

→ Offsite ENE 01

→ Dispatch monitor to North Assable Area.

1330 Time Alpha to GE 3

1331 ← Time ~~Alpha~~ awaiting instructions

1333 → Wind range 22° @

→ T₂ HP-222 offscale

→ T₁₅ 21 PI offscale Gas = 104 cm

1334 Team Bravo ~~ENE~~ 01

Repair Party awaiting inst.

→ HP-R-214 1.48×10^4 mR/hr (Att. 100)

→ Monitor dispatched to N. Ac. Area I

1336
1337 ← Team Alpha 1336 3 R/hr GE-3

1340 ← Time Bravo 1339 10 R/hr ENE 01

1341 → ECS backup dose rate GE-3

1343 → Offsite ENE 11

1346 ← Offsite to ENE 11
1257 → further Test to GE-3 for verification

1348 → Based on data probably will not evacuate site
 1349 ← ~~Offsite~~ Onsite 1349 ← 1 m/hr outside Warehouse
 1350 ← Onsite 1349 ← 1 m/hr I-7
 1352 ← ~~Offsite~~ Onsite 1351 I-131 1×10^{-4} u/cc GG-3
 1352 ← Offsite 1352 I-131 2×10^{-7} u/cc ENE-01
 ← Onsite 1354 K₂Har H-5
 ← Security Bulletin eva. to N. Avl
 1355 ← Onsite 1355 exposure 550 mR
 1400 — Ann. High dose rates Unit #2 Pan to
 Unit South Hyp.
 1402 ← 1358 Onsite 650 mR exposure to I-7
 await further instruction
 1404 → Establish communication with Offsite
 get readings faster.
 1405 ← Another fine dispatch to find Offsite
 for with onsite vehicle
 1407 → Confirm 4 R/hr at ENE-01
 ← 4 R/hr at ENE-11 1406
 1410 → Dispatch Offsite ENE-21 watch personnel dosage
 1415 Wind change
 1420 Terminate Drill

~~Y. WERNI 45~~
~~L. HYDRICK 54~~ *home*
~~G. ROCH 57~~
~~G. KUNDEL 58~~
~~G. CONRAN 68~~ *dec*
~~R. NETDIG 71~~ *QC*
~~M. DETMERE 95~~
~~J. SMITH 100~~
~~C. BARGE 121~~ *not busy*
~~J. GROVE 132~~
~~A. BOYD~~
~~P. WEESE 141~~
~~R. CONNER 151~~
~~F. DOUGHERTY 15~~
~~L. EBELLY 163~~
~~FIRNBACH 171~~
~~E. H. AMN 192~~
~~J. HARSII 194~~
~~GUILIVO 201~~
~~P. KEAN 223~~
~~M.A. TRENCH 251~~
~~WENSER 257~~
~~PIKE 274~~
~~RUGENBACH 282~~
~~ST. CLAIR 289~~
~~R. TAYLOR 311~~
~~KLINE 318~~
~~C. WYNN 310~~

MET-LED
 1407

~~T. COFFMAN 348~~
~~J. FAUCI 351~~
~~D. RAY 402~~
~~G. DENN 431~~
~~M. GRIM 472~~
~~KELER 477~~
~~FORNWALT 514~~
~~W. DOUGLAS 531~~
~~BRADY 532~~
~~LINDBERG 541~~
~~DUNLOP 562~~
~~BRITTON 565~~
~~THOMAS 598~~
~~BRADLEY 680~~
~~SNYDER 708~~
~~GARRETT 715~~
~~SEIDERS 764~~
~~TATE 772~~
~~TORRES 78~~
~~HOWELL 78~~
~~WILDEBERGER 800~~

197 215

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER E. ORWIGDATE 11-2-78AREA OF RESPONSIBILITY UNAFFECTED UNIT (ONE) CONTROL ROOM

TIME	EVENT	COMMENTS
T=0	DRILL STARTED	ANNOUNCEMENT BARELY AUDIBLE
T=2	ALARM SOUNDED	HEARD OK
T=3 TO T=5	GAVE CARDS TO SF CONCERNING HIS RMS ALARMS ETC	OPS RESPONSE EXCELLENT
T=7	C.R. PERSONNEL BRIEFED ON CASUALTY	DONE BY SUPV OF OPS.
T=8	EVACUATED A X BLDG	NOTHING SAID ABOUT FH BUILDING
T=10	MUSTER STARTED	
T=12	A FEW NAMES CALLED IN OVER RADIO FOR ACCOUNTABILITY	
T=14	STARTED EMERG. STATUS BOARD UPKEEP	
T=17	DISCUSSED REASON FOR RM-6-9 BACKGROUND DOUBTING	SUPERVISOR OF OPS FIGURED IT OUT BUT ISOLATED LETDOWN COOLANT FIRST.
T=18	CALLED UNIT II FOR WIND SPEED & DIRECTION	HAD SOME PROBLEMS DETERMINING WHAT THE CASE OF LOCA (MHA) WAS. COMMUNICATIONS PROBLEM.
T=23	PREDICTED FIRST SITE BOUNDARY DOSE USING CASE I MHA DATA.	
T=25	DETERMINED SOURCE TERM FROM OFF SITE READINGS	

197 210

RADIATION EMERGENCY DRILL
OBSERVER CRITIQUE SHEETOBSERVER E. ORWIGDATE 11-2-78AREA OF RESPONSIBILITY UNAFFECTED UNIT (ONST) CONTROL ROOM

TIME	EVENT	COMMENTS
T=40	LARGE DIFFERENCE IN OFFSITE READINGS & PREDICTED READINGS	FACTOR OF 10^{13}
T=45	SIMULATED SHUTTING DOWN ALL IN-BUILDING VENTILATION	
T=46	ANNOUNCEMENTS HARDLY CAN BE HEARD.	
T=47	COMPLETED SURVEY OF N. ASSEMBLY AREA	RECOMMENDED SENSING EVERYONE TO N. EXIT
T=48	NON ESSENTIAL PEOPLE SENT BACK TO WORK	
T=55	MISSING PERSONS LIST BROUGHT TO CONTROL ROOM.	CALLED NAMES OVER PAGE - NO ONE ANSWERED WHO WAS CALLED
T=60	HEARD WIND SHIFT	EVERYONE FORGOT WHEN RELEASE STARTED
T=65	DRILL OVER	

197 217

ENCLOSURE #2

RADIATION EMERGENCY DRILL
OBSERVER CRITIQUE SHEET

OBSERVER F. MC LOEMICK

DATE 11-2-78

AREA OF RESPONSIBILITY ECS

TIME	EVENT	COMMENTS
T+3	announcement - Rad. Emerg. clear at first @ ECS - then faded	
4	Now declare site emergency.	← no mention of typerface, main
5.	Various observations - then alarm	people evac. to ECS rail- aux Bldg.
5.	Muster started	
6	Assigning on/off site team memberships	
7	General Emergency in Units declared	
8	Communications established on gray phone can't get thru on M&I	
11	another announcement - can't hear over page in ECS garbled + background noise in ECS	
13	Still no idea what's happening. 1 man - Gray phone line? St. ECC 1 man - M&I to Unit 1 CC	
14	LOCA in Unit 1 K.B.	197 218
15	Muster list sent to and.	
16	First reading from team A	
19	Unit 1 Aux Bldg closed "due to rad emerg"	
22	From ECC - Has team A been dispatched	

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER F. McCORMICKDATE 11-2-78AREA OF RESPONSIBILITY ECS

TIME	EVENT	COMMENTS
Good — 22	Monitor sent to N. Assembly area for dose rate survey	
— 26	first off-site team reading	
— 28	Has the leak been isolated?	
— 30	erroneous readings @ ENE 01	
Good —	send another instrument to team A to verify reading @ C/E 3	
— 40	ECS requests team exposure - 550 mR	
— 40	Security pers. evacuated to N. Cond. 10 R/hr @ H-5	
— 42	trouble believing dose rates. believe release terminated @ 1316 when purge of U-2 F.B. shut off	
—	ECS doesn't seem to have good idea of magnitude.	
— 45	Team A - 650 mR	
Good —	arrangements being made to swap for fresh	197 219
Good — 45	Announcement of excessive dose rates to warn station personnel	
	wrong location given	
	- caught in ECS & relayed to ECC	
	- announcement revised.	

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER F. MCCORMICKDATE 11-2-78AREA OF RESPONSIBILITY ECS

TIME	EVENT	COMMENTS
49	Team C dispatched to using Team A vehicle A now @ warehouse out of plane	ENE II
---	@ sent to warehouse via U-1 aux Bldg.	
52	B back in radio comm. after 7 min absence. Give rdg. @ ENE II - 4 R/hr. are now out of area due to loss of communications.	
57	B → ENE 21.	
58	announcement of those missing from muster - "call Unit 1 CR 1 muster list never sent from ECS w/ names	
63	Wind change.	
65	B → ECS ECS cannot respond U-1 CR picks f tries to comm. w/B	

197 220

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER BeersDATE 11/2/78AREA OF RESPONSIBILITY Unit II CR

TIME	EVENT	COMMENTS
1315	MHA LOCA	Purge off
1317	Site Emery	Had symptoms
1317	J & S. Emery Dir	for G.E.
1320	Mustar	Good comments & direction
1321	Dosimeters	Started in C.R.
1322	Isopleths out	Passed out truck
1326	Comin estab to hel.	
1327	Evacuate Aux Bldg	
1335	County notified by State agencies	
1340	Radio's	s/s office ooc
1415	Wind change.	
1415	Accountability	Too long.

197 221

Communications

November 21, 1986
Drill Comm. Summary

⇒ Page not merged - CRO action 12 minutes to complete
Radio Contact. !

⇒ 3 phone calls (offsites)

Real emergency may not allow this luxury.

(Use of tie line cumbersome)

(27 minutes for all calls)

list should have facility for time call made possible name.

⇒ Confusion with ECS to/from Control room
everything tied together

⇒ location of phones and calculators
needs improvement

⇒ Outside line to use for "Hot line" to state
no good in SS office

⇒ Radio in SS office DOES NOT WORK

⇒ Security interrupted team Radio communication

⇒ Exempt personnel - Control Room - Smoking
(computer personnel)

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER N. Brown

DATE Nov. 2, 1978

AREA OF RESPONSIBILITY Unit 2 Control Room (communications)

TIME	EVENT	COMMENTS
1315 = T0		
+3	announces drill page not merged.	Declared <u>Site Emergency</u>
+4	Seelinger - Director	<u>Unit 1 notified!</u>
+5	- sounded alarm	Let. Disp. radio
+5	ECS comm (m & I) merged for second announcement (General)	Back partially at +15 (not available)
+6	Phone calls started. I Porter.	
+7	ECS comm (page - line 3 Duane) to Mulhearn @ ECS (Down)	
+8	ECS - (m & I)	page merge disabled
+12	radio cont. to Let. Disp. →	
+14	Dubiel - Floyd - Logan B. Smith talk to Seelinger	
	→ (all lines together ??) → (m & I and page)	197 223
	no talker near RMS -	status of monitor
+60	→ 22 missing.	

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER N. Brown

DATE Apr 2, 1978

AREA OF RESPONSIBILITY Unit 2 Control Room (Communications)

TIME	EVENT	COMMENTS
+ 17	→ NRC notified.	only checked off no times
+ 20	NELPIT also started to Backfit times (maybe need space to place time/name on call sheet)	Floyd made some calls. prior to turnover to phone talker
+ 21	→ 3 C. Vers?	(3) all county CD notified prior to 1331!!!
+ 23	→ RMC notified	
+ 27	→ all calls made	* (Recommendation to line open to state!!! state not on today
+ 28	→ Radios in Shift Supervisor's office alt. EC3 - does not pick up Radio communications!!!	Use of tie lines can be some and not on call!!! shut...
+ 29	→ status update over page! Good!! Hot (open) line to state not in good location (SS office) other Emerg. lines - away from action!!	197 224

Team Beaver → communications?

new team → take onsite (alpha) vehicle
to make contact with Beaver

ENE11 4R call in ⇒

↳ no comm.

- Comm @ 1/2 ENE11

Security interrupting Drill comm.

Do not appear to be listening
just talking.

ENCLOSURE #2

RADIATION EMERGENCY DRILL
Unit 2 MHA
OBSERVER CRITIQUE SHEET

OBSERVER D. Britz

DATE Nov. 2, 1978

AREA OF RESPONSIBILITY ECC - OPERATIONS PEOPLE

TIME	EVENT	COMMENTS
T = +1.5	SF WAS informed of LOCA	Response to LOCA by EP, very good. "operating crew..."
T +2.5	SS informed of LOCA	
T + 3	SS Declared Emergency CRO Announced "Site Emerg"	Still not Merged. <u>No ALARM Sounded!</u> Actually into <u>General</u>
T+4	Tech Spt. II in Control Room	
T+4	Siren Sounded by CRO	
+5	Announced General Emergency no Siren	
+5.5	<u>Merged</u> - Re-Announced, with Siren.	
+10	Reannounced in Merge	
+ 11	established Communications with Lab Dispatchers.	
+ 14	Called for U-2 Aux. Bldg EVACUATION due to Rad. Levels ↑	

197 226

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER R. VANSTRYDATE 11/2/78AREA OF RESPONSIBILITY OFF SITE TEAM "C"

TIME	EVENT	COMMENTS
T+50	Team "C" Dispatched	we were directed through the unit I II Aux Bldg to meet with team "A". This resulted in high exposure as we left the Bldg. "A" team was at security inst of warehouse so they were in a SR field while waiting. our trip through the Aux Bldg was needless.

197 227

TRAINING PROGRAM ADMINISTRATIVE FORM

1	3
2	2A

1. LESSON/COURSE: RAD EMERG. DRILL - UNIT 1 MHA

2. LOCATION: TMI

3. PERSONNEL ATTENDING: (PLEASE PRINT):

NAME	EMPLOYEE NO. 4 8	NAME	EMPLOYEE NO. 4 8
C. HUSTED	061149	C. HARTMAN	05258
N. BROWN	053118	W. SHUMAKER	06653
F. McCORMICK	06169	H. CRAWFORD	06512
M. BENSON	06184	W. MARSHALL	06462
E. SHAWALTER	06225	M. ROSS	04680
R. VANSTRY	06391	R. SCHLEHR	06733
L. LANDRY	06588	P. WAGNER	05744
A. KNOCHE	06241	R. WIKE	06543
M. BEERS	05404	H. TENNIS	05994
J. LOGAN	06682	K. DEITZ	04830
D. McCONNELL	06825	G. NAGLE	04089
S. PORTER (CONSULT.)	01111	G. HITZ	04747
J. TAYLOR	06373	P. VELEZ	05462

COMPLETION DATE

MO	DAY	YR
9	14	
11	06	78

CATALOG NUMBER

FILE NO.				LESSON ID
CATG	TYPE	SUBJECT		
15		2223		26
145	10001			

197 228

TOTAL COURSE DURATION

HOURS
27 31
00.025

4. LECTURE HOURS _____ OTHER HOURS 2.5 EXPLAIN 1.2 - DRILL / 1.3 - CRITIQUE

5. ENTER THE PREFIX FOR THE APPROPRIATE MODE:

MODE PREFIX
32 34
DRL

CORRESPONDENCE (CCS)	REVIEWER (RVR)
FILM (FLM)	SCHOOL (SCH)
LECTURE (LEC)	SEMINAR (SEM)
OJT (OJT)	VIDEOTAPE (VTP)
ORIGINATOR (OGR)	

GPF0007.003 Rev 3

35	COMMENT	59
	RAD, EMER, DRL, - , U1, MHA	

6. METHOD OF EVALUATION (Check at least one)

A. WRITTEN TEST _____ (Attach copy of answers and graded results)

B. ORAL QUESTIONING SPOT CHECK _____

C. QUIZ _____ (Attach questions and answers)

D. OTHER _____ (Explain):

7. INSTRUCTOR/TRAINEE'S EVALUATION (This section must be filled in)

(Based on your method of evaluation briefly describe the effectiveness of the training)

Ramond
INSTRUCTOR/TRAINEE'S SIGNATURE

11/10/78
DATE

8. SIGNATURE OF SUPERVISOR OF TRAINING/TRAINING COORDINATOR _____ DATE _____

ATTACH LESSON OUTLINE/ITEMS COVERED

197 229

TRAINING PROGRAM ADMINISTRATIVE FORM

1
2.2.A

1. LESSON/COURSE: RAD - EMERG. DRILL - UNIT 1

2. LOCATION: TMI

3. PERSONNEL ATTENDING: (PLEASE PRINT):

NAME	EMPLOYEE NO. 4 8	NAME	EMPLOYEE NO. 4 8
<u>D. SMITH</u>	<u>064110</u>		<u>0, , , ,</u>
<u>D. JAMES</u>	<u>054610</u>		<u>0, , , ,</u>
<u>G. KUNDER</u>	<u>045718</u>		<u>0, , , ,</u>
<u>R. BARLEY</u>	<u>06248</u>		<u>0, , , ,</u>
<u>V. ORLANDI</u>	<u>06233</u>		<u>0, , , ,</u>
<u>N. MONSON</u>	<u>051016</u>		<u>0, , , ,</u>
<u>T. DAVIS</u>	<u>05469</u>		<u>0, , , ,</u>
<u>J. DUPES</u>	<u>055315</u>		<u>0, , , ,</u>
<u>R. DURIEL</u>	<u>06246</u>		<u>0, , , ,</u>
<u>T. MULLEAVY</u>	<u>06243</u>		<u>0, , , ,</u>
<u>C. HUNTER</u>	<u>04842</u>		<u>0, , , ,</u>
<u>B. GOOD (RDG.)</u>	<u>06821</u>		<u>0, , , ,</u>
<u>J. FLOYD</u>	<u>03842</u>		<u>0, , , ,</u>

COMPLETION DATE

MO	DAY	YR
9	14	
<u>11</u>	<u>06</u>	<u>78</u>

CATALOG NUMBER

FILE NO.				LESSON ID
CAT	TYPE	SUBJECT		
15	22	23	26	
<u>145100</u>	<u>0,0,1</u>			

TOTAL COURSE DURATION

HOURS
27 31
<u>00.02.5</u>

197 230

4. LECTURE HOURS _____ OTHER HOURS 2.5 EXPLAIN 1.2 - DRILL / 1.3 - CRITIQUE

5. ENTER THE PREFIX FOR THE APPROPRIATE MODE:

MODE PREFIX
32 34
<u>DRL</u>

CORRESPONDENCE (CCS)	REVIEWER (RVR)
FILM (FLM)	SCHOOL (SCH)
LECTURE (LEC)	SEMINAR (SEM)
OJT (OJT)	VIDEOTAPE (VTP)
ORIGINATOR (OGR)	

35 COMMENT RAD, EMER, DRL, - U1, MHA 59


GPF0007.003 Rev 3

ENCLOSURE #3

PERMISSION TO CONDUCT A
RADIATION EMERGENCY DRILL

I hereby authorize the Supervisor of Training to conduct a Radiation Emergency
Drill on 11/6/78 as outline in the attached Scenario.

@ ~ 1700



STATION SUPERINTENDENT OR DESIGNATE

11/6/78

DATE

197 232

ENCLOSURE #1

Date: 11-6-78

RADIATION EMERGENCY DRILL
OBSERVER ASSIGNMENT SHEET

AREA OF RESPONSIBILITY

OBSERVER

- | | |
|------------------------------------|----------------------------------|
| 1. Emergency Control Center (ECC) | 1. <u>BEERS / BROWN / LANDRY</u> |
| 2. Emergency Control Station (ECS) | 2. <u>MC CORMICK</u> |
| 3. Emergency Repair Party | 3. <u>N/A</u> |
| 4. Accountability | 4. <u>VAN STAY</u> |
| 5. On-Site Monitoring Team | 5. <u>MC CONNELL / PORTER</u> |
| 6. Off-Site Monitoring Team | 6. <u>SHUMAKER / GOOD</u> |
| 7. Communications (local) | 7. <u>BROWN / MC CORMICK</u> |
| 8. Communications (off-site) | 8. <u>BEERS / BROWN</u> |
| 9. <u>UNIT II CR</u> | 9. <u>HUSTED</u> |

197 233

Practice Drill with Pa. State Participation

OBJECTIVES

1. To test the response of Unit 1 Operations Staff to an incredible Maximum Hypothetical Accident which occurs within a one-minute time interval.
2. To test the ability and speed of Unit 1 staff to utilize the contingency dose calculations and make the necessary off-site calls and other communications including communications of technical data to Pa. B.R.H.
3. To evaluate the ability to deploy both on and off-site emergency teams for both γ and radioiodine monitoring.
4. To test the ability of the site security to perform a rapid and accurate personnel accountability.

SCOPE

A case I LOCA with severe core damage and fuel melting with little or no cooling. The containment leaks at the maximum design leak rate.

INITIAL CONDITIONS

1. TMI Unit 1 is at 100% power.
2. Reactor Building purge is in progress.
3. A LOCA occurs resulting in severe core damage, fuel melting, and no effective core cooling.
4. Wind speed 2 mph, wind direction 180, wind range 20°, vertical temperature difference +0.4°.

SEQUENCE OF EVENTS

- | | | |
|------|--|---------|
| T=0 | <ol style="list-style-type: none"> 1. Low RC press. alarm. 2. Low-Low RC press. alarm. 3. RC press. decreasing rapidly. 4. Reactor trip alarm. 5. Turbine trip alarm. 6. Pressurizer low level alarm. 7. Safety injection actuated A&B. 8. Pressurizer Low-Low Level Alarm. 9. RM-G-8, alert alarm. 10. High reactor building temperature alarm. 11. Reactor building sump high level alarm. 12. Reactor building high pressure alarm. 13. Reactor building pressure increasing. 14. Makeup tank level decreasing rapidly with low level alarm. 15. various RMS alarms. 16. Core flood tank level alarms. 17. Purge valves indicate shut. | 197 234 |
| T=1 | <ol style="list-style-type: none"> 18. RM-G-8 is in high alarm, reading 20 R/hr. 19. RM-G-5, 6 & 7 all reading 10" R/hr. | |
| T=60 | <ol style="list-style-type: none"> 20. RM-A-23.9 particulate iodine, gas all off scale and in high alarm. 21. Wind speed 3 mph, wind direction 140°, wind range 30° vertical temperature difference +0.2°. | |

Drill Date: 11/6/78

Observer Name: _____

Observer Location: Accompany any personnel leaving the Control Room after T=5

Drill Title: Unit 1 MHA - Practice Drill with Pa. State Participation

Information to Provide: Refer to Note 1.

Time Drill Commenced: _____ Time Drill Terminated: _____

Page _____ of _____

OBSERVATIONS, COMMENTS & RECOMMENDATIONS

NOTE: Observations should include the proper and effective use of procedures, equipment, and personnel.

NOTE 1 - There are ultra-high levels of radiogas and radioiodine leakage throughout all Reactor Penetration areas. Any persons going into the Aux. Building or into any areas adjacent to the Unit 1 Reactor Containment Building will be in a radiation area in excess of 50 R/hr at T=5. Keep in mind that the following areas are in excess of 10 R/hr at T=10: Fuel Handling Building, Aux Building Sampling Room, outside the personnel hatches to containment on all elevations.

If any personnel go outside in any direction within 30° of downwind of the Containment Building, use the Note 2 data for γ exposures. Remember the building wake effects will distribute the fission products very rapidly around the site during these low wind velocity and stable meteorological conditions.

NOTE: Use additional pages as necessary

Signature: _____ Title: 197 235

TMI
DRILL OBSERVATION SHEET

Observers Name: _____ Drill Date: 11/6/78

Observers Location: Accompany On-Site (Outside) Survey Team

Drill Title: Unit 1 MHA - Practice Drill with Pa. State Participation

Information to Provide: Note 2 data as appropriate

Assign large doses to Team if Team loiters in any buildings close to Unit 1 Reactor Building. Since large dose rates are involved, be very aware of dose to Team members.

Time Drill Commenced: _____ Time Drill Terminated: _____

OBSERVATIONS, COMMENTS & RECOMMENDATIONS

Page _____ of _____

NOTE: Observations should include the proper and effective use of procedures, equipment, and personnel.

NOTE 2 - Data for the On-Site (Outside) Survey Team

The outside downwind dose (by reading) starting with the closest ground-level point to the Unit 1 vent will be as follows:

By Survey Meter - Distance From Vent (On-Site)

	<u>100'</u>	<u>500'</u>	<u>1000'</u>	<u>2000'</u>
<u>T=10</u>	<u>80 R/hr</u>	<u>14 R/hr</u>	<u>4 R/hr</u>	<u>1600 mR/hr</u>
<u>T=20</u>	<u>160 R/hr</u>	<u>13 R/hr</u>	<u>8 R/hr</u>	<u>3200 mR/hr</u>
<u>T=30</u>	<u>320 R/hr</u>	<u>26 R/hr</u>	<u>12 R/hr</u>	<u>6400 mR/hr</u>

+

End of Drill

NOTE: In sectors directly adjacent to downwind sectors, use γ doses which are the same as the downwind sector. In sectors next to these adjacent sectors, use a factor of 10 less than the downwind sector.

NOTE: Use additional pages as necessary

197 236

Signature: _____

Title: _____

NOTE 3

LOCA (MHA) Calculations for TMI Unit 1 Drill of 11/6/73

If RM-G8=20R/hr, then I=0.33 Ci/sec and Noble Gas=44.4 Ci/sec.

Then, for the Site Boundry in the N direction, utilizing the Off-Site Dose Calculation Sheet:

	<u>Iodine</u>	<u>Noble Gas</u>	<u>units</u>
1) Source Term =	= 0.33	44.4	Ci/sec
2) x/Q	= 1×10^{-3}	1×10^{-3}	sec/M ³
3) #1 x #2	= 3.3×10^{-4}	4.44×10^{-2}	μCi/cc
4) Wind Speed	= 2	2	MPH
5) #3 ÷ #4	= 1.65×10^{-4}	2.22×10^{-2}	μCi/cc
6) Dose Rate	= _____	9	R/hr.
7) Expected Release Duration	= 2	_____	hours
8) Expected Child Thyroid Dose	= 240	_____	Rem

<u>Site</u>	<u>Angle</u>	<u>Child Thyroid dose in R/hr.</u>	<u>Noble Gas R/hr.</u>	<u>Time for Plume To Arrive</u>
N11	0°	30	2.25	50 min.
N21	0°	12	0.9	1 hr. 10 min.
N31	323°	0.84	0.063	1 hr. 40 min.
N41	319°	6	0.45	1 hr. 50 min.
N52	319°	3	0.23	2 hr. 10 min.
N61	310°	0	0	3 hrs.
10 mi radius Center of Harrisburg	320°	3	0.23	3 hrs. 40 min.

GE-3
40°

GE-2
22°

GE-1
0°

SE10
320°

SE2
45°

SE1
0°

Distance Plume Travel (miles)	SE1 0°		SE2 45°		SE10 320°		GE-1 0°		GE-2 22°		GE-3 40°	
	Y R/hr.	I d/m*	Y R/hr.	I d/m	Y R/hr.	I d/m	Y R/hr.	I d/m	Y R/hr.	I d/m	Y R/m	I d/m
0.25	10	1.67x10 ⁷	1	1.67x10 ⁶	1	1.67x10 ⁶	0	0	0	0	0	0
0.5	16	8.35x10 ⁷	1.6	8.35x10 ⁶	1.6	8.35x10 ⁶	5	1.5x10 ⁶	1	1.2x10 ⁶	0.4	5x10 ⁴
1	24	1.67x10 ⁸	2.4	1.67x10 ⁷	2.4	1.67x10 ⁷	20	1.25x10 ⁸	15	1x10 ⁸	1	5x10 ⁵
1.5	30	1.83x10 ⁸	3	1.83x10 ⁷	3	1.83x10 ⁷	25	1.25x10 ⁸	18	1x10 ⁸	2	10 ⁷
2	30	1.83x10 ⁸	3	1.83x10 ⁷	3	1.83x10 ⁷	25	1.25x10 ⁸	18	1x10 ⁸	2	10 ⁷
3	30	1.83x10 ⁸	2	1.67x10 ⁷	10	1.67x10 ⁷	25	1.5x10 ⁸	8	5x10 ⁷	1	5x10 ⁵
4	30	1.83x10 ⁸	1	1.67x10 ⁷	20	5x10 ⁷	25	1.5x10 ⁸	1	3x10 ⁷	0.5	5x10 ³
5	30	1.83x10 ⁸	0.5	1.67x10 ⁷	30	1.67x10 ⁸	25	1.5x10 ⁸	0.4	1.5x10 ⁷	0.2	5x10 ²
7.5	30	1.83x10 ⁸	0.5	1.67x10 ⁷	30	1.67x10 ⁸	25	1.5x10 ⁸	0.3	1.25x10 ⁷	0.1	50
10	30	1.5x10 ⁸	0.5	1.5x10 ⁷	25	1x10 ⁸	20	1x10 ⁸	0.2	1x10 ⁷	0.05	0

NOTE:
Wind from 180° at 2 MPH toward the N for T=0 to T=60
Wind from 140° at 3 MPH toward the NW for T=60 to end of drill.
Adjacent Sectors off-site are a factor of 10 less than the downwind sector.
On-site adjacent sectors are the same as the downwind sector.

*Assumes a 5x10⁵ cc sample. To obtain c/m, divide the d/m listed by: 52.4 for Kit #1
26.0 for Kit #2
27.8 for Kit #3
21.3 for Kit #4

to SAM-2 Conversion Table to obtain Child Thyroid 1 hour Intake Dose.
on, the adult dose is one-half of the Child Thyroid Dose.

97 23

13.1 UNIT 1 RADIATION LEVELS
Practice Drill with Pa. State Participation

Distance Plume Travel (miles)	N11 0°		N21 0°		NW31 323°		NW41 319°		NW52 319°		NW71 310°	
	Y	R/hr. I d/m*	Y	R/hr. I d/m	Y	R/hr. I d/m	Y	R/hr. I d/m	Y	R/hr. I d/m	Y	R/m I d/m
0.25	0	0	0	0	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0
1.5	0	0	0	0	0	0	0	0	0	0	0	0
2	5	5x10 ⁶	0	0	0	0	0	0	0	0	0	0
3	5	5x10 ⁶	1	1.67x10 ⁷	0	0	0	0	0	0	0	0
4	4	4x10 ⁶	1	10	.06	1.67x10 ⁶	0	0	0	0	0	0
5	3	3x10 ⁶	0.6	5x10	.06	1.67x10 ⁶	6	8.35x10 ⁵	See Note 3	0	0	0
7.5	2	2x10 ⁶	0.4	3x10	.06	1.67x10 ⁶	6	8.35x10 ⁵	See Note 3	0	0	0
10	1	10 ⁶	0.2	10 ⁶	.05	1.3x10 ⁶	6	8.35x10 ⁵	See Note 3	0	0	0

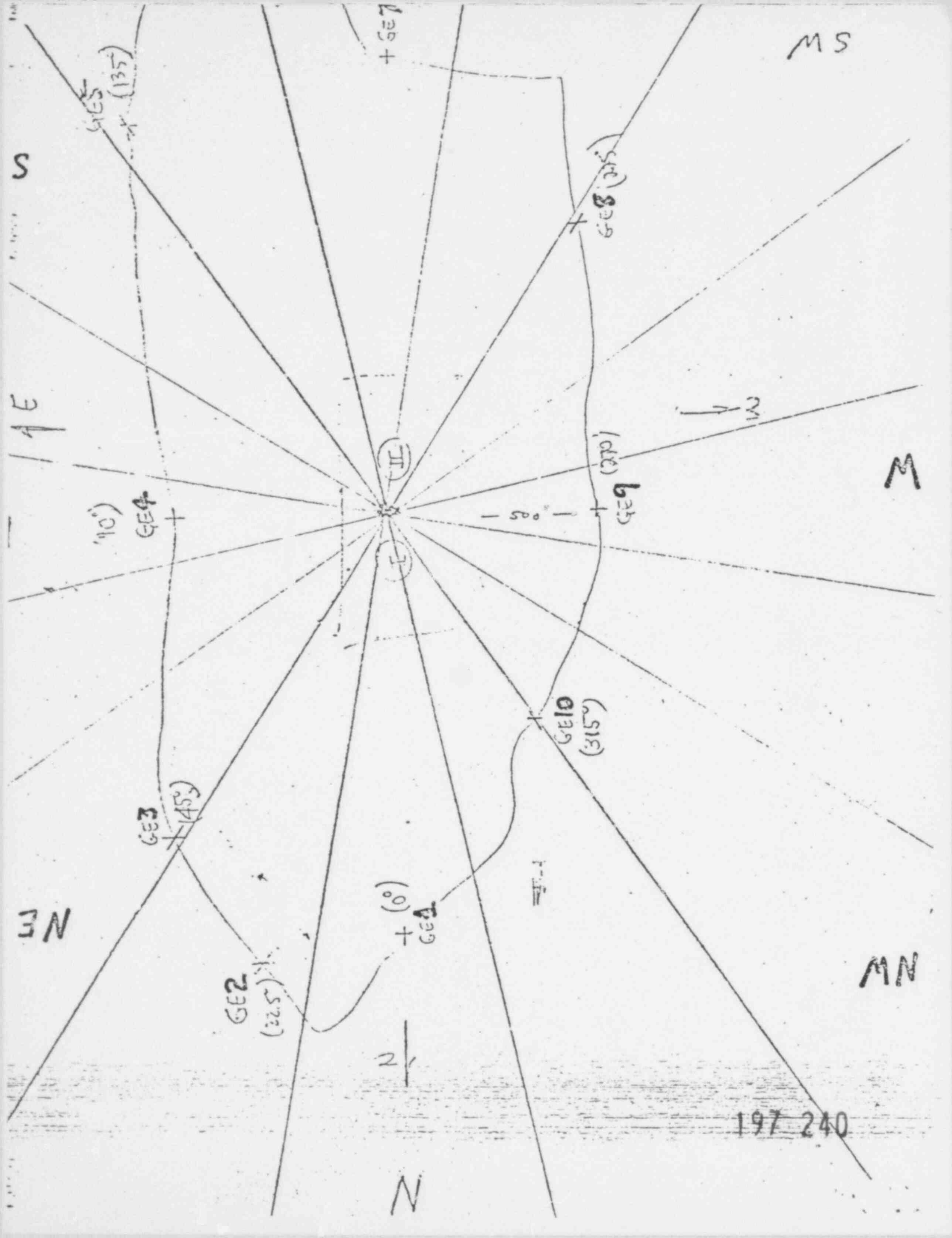
See Note 3

E: I from 180° at 2 MPH toward the N for T=0 to T=60
 I from 140° at 3 MPH toward the NW
 adjacent sectors off-site are a factor of 10 less than the downwind sector.

97 239

Assumes a 5x10⁵ cc sample. To obtain c/m, divide the d/m listed by:
 52.4 for Kit #1
 26.0 for Kit #2
 27.8 for Kit #3
 21.3 for Kit #4

Conversion Table to obtain Child Thyroid 2-hour Intake Dose.



Efficiency of 47%

Area for 0.5-110⁵ sample

M G/cc

Whole T-spread Dose Commitment for a 1 hour exposure

Area	M G/cc	Whole T-spread Dose Commitment for a 1 hour exposure	
1.6 x 10 ⁶	1.67 x 10 ⁷	1.5 x 10 ⁻⁴	100 Rem
0.4 x 10 ⁶	1.26 x 10 ⁶	1.13 x 10 ⁻⁴	35 Rem
1.0 x 10 ⁶	1.0 x 10 ⁸	9.0 x 10 ⁻⁵	60 Rem
3.34 x 10 ⁶	8.35 x 10 ⁷	7.5 x 10 ⁻⁵	50 Rem
2.67 x 10 ⁶	6.67 x 10 ⁷	6 x 10 ⁻⁵	40 Rem
2.0 x 10 ⁶	5.0 x 10 ⁷	4.5 x 10 ⁻⁵	30 Rem
1.67 x 10 ⁶	4.17 x 10 ⁷	3.75 x 10 ⁻⁵	25 Rem
1.33 x 10 ⁶	3.33 x 10 ⁷	3 x 10 ⁻⁵	20 Rem
1.0 x 10 ⁶	2.5 x 10 ⁷	2.3 x 10 ⁻⁵	15 Rem
0.67 x 10 ⁵	1.67 x 10 ⁷	1.5 x 10 ⁻⁵	10 Rem
0.4 x 10 ⁵	1.26 x 10 ⁷	1.13 x 10 ⁻⁵	7.5 Rem
3.34 x 10 ⁵	8.35 x 10 ⁶	7.5 x 10 ⁻⁶	5 Rem
2.67 x 10 ⁵	6.67 x 10 ⁶	6 x 10 ⁻⁶	4 Rem
2.0 x 10 ⁵	5.0 x 10 ⁶	4.5 x 10 ⁻⁶	3 Rem
1.78 x 10 ⁵	4.44 x 10 ⁶	4 x 10 ⁻⁶	2.6 Rem
1.33 x 10 ⁵	3.33 x 10 ⁶	3 x 10 ⁻⁶	2 Rem
1.68 x 10 ⁴	1.67 x 10 ⁶	1.5 x 10 ⁻⁶	1 Rem
1.0 x 10 ⁴	1.15 x 10 ⁶	1.35 x 10 ⁻⁶	0.9 Rem
0.67 x 10 ⁴	1.17 x 10 ⁶	1.05 x 10 ⁻⁶	0.7 Rem
4.0 x 10 ⁴	1.0 x 10 ⁶	9 x 10 ⁻⁷	0.6 Rem
3.34 x 10 ⁴	8.35 x 10 ⁵	7.5 x 10 ⁻⁷	0.5 Rem
2.67 x 10 ⁴	6.67 x 10 ⁵	6 x 10 ⁻⁷	0.4 Rem
2.0 x 10 ⁴	5.0 x 10 ⁵	4.5 x 10 ⁻⁷	0.3 Rem
1.33 x 10 ⁴	3.33 x 10 ⁵	3 x 10 ⁻⁷	0.2 Rem
0.68 x 10 ³	1.67 x 10 ⁵	1.5 x 10 ⁻⁷	0.1 Rem
0.34 x 10 ³	8.35 x 10 ⁴	7.5 x 10 ⁻⁸	0.05 Rem
0.11 x 10 ²	1.67 x 10 ⁴	1.5 x 10 ⁻⁸	0.007 Rem

197 241

5.4.6 Calculation of Whole Body and Thyroid Doses

5.4.6.1 Case I MHA (Minimum Safety Features) WHOLE BODY (Reference Section 15.1.14)

[6 rem/2 hr = maximum at site boundary]

1A. Calculate the x/Q at the downwind exclusion area boundary and at the Low Population Zone boundary.

Downwind Exclusion Area Boundary x/Q _____ sec/m^3 *
 (1Aa)
 Downwind LPZ Boundary x/Q _____ sec/m^3 *
 (1Ab)

1B. To calculate the whole body dose at the exclusion area boundary, multiply the dispersion factor (1Aa) by the dose release factor to obtain a reading in mrem/hour (for the first 2 hour dose only).

<u>at exclusion area boundary</u>	
_____	_____ mrem/hour
(1Aa x/Q)	$\times 4.9 \times 10^5 \frac{\text{hour}}{\text{sec}} \frac{\text{mrem}}{\text{m}^3}$

1C. To calculate the whole body dose at the LPZ boundary, multiply the dispersion factor (1Ab) by the dose release factor to obtain a reading in mrem/hour.

<u>at LPZ boundary</u>	
_____	_____ mrem/hour
(1Ab x/Q)	$\times 4.9 \times 10^5 \frac{\text{hour}}{\text{sec}} \frac{\text{mrem}}{\text{m}^3}$

1D. To calculate the whole body dose at any other location of interest, multiply the dispersion factor (x/Q) by the dose release factor to obtain a reading in mrem/hour.

*If x/Q cannot be rapidly determined, use $6.1 \times 10^{-4} \text{ sec/m}^3$ for the site boundary and 9.6×10^{-5} for the LPZ (Reference Table 6.2-9 of Unit 2 FSAR)

SOURCE RELEASE TERM CALCULATIONS (UNIT 1)

Release Via RM-A8: Unit 1 Aux. & F.H. Bldg. Vent		
Item	Iodine	Noble Gas
1. RM-A8	_____ c/m/m	_____ c/m
2. FR-151	_____ CFM	_____ CFM
3. Constant	3.62×10^{-7}	1.27×10^{-5}
4. #1x2x3	_____ μ Ci/sec	_____ μ Ci/sec
5. #4/10 ⁶	_____ Ci/sec	_____ Ci/sec

Release Via RM-A9: Unit 1 Stack Monitor		
Item	Iodine	Noble Gas
1. RM-A9	_____ c/m/m	_____ c/m
2. FR-148	_____ CFM	_____ CFM
3. Constant	3.36×10^{-7}	1.21×10^{-5}
4. #1x2x3	_____ μ Ci/sec	_____ μ Ci/sec
5. #4/10 ⁶	_____ Ci/sec	_____ Ci/sec

Release Via Condenser Vacuum Pump Exhaust		
1. RM-A5	_____ c/m	
2. Constant	1.75×10^{-10} H ³ /sec	
3. #1x2	_____ Ci/sec	

LOCA Calculations: Source Release Term From RM-G8 Readings		
RM-G8* Meter Reading	Iodine (Ci/sec)	Noble Gas (Ci/sec)
20	0.33	44.4
17.5	0.29	36.9
15	0.25	32.8
12.5	0.21	27.7
10	0.17	22.2
8	0.13	17.8
6	0.09	13.3
5	0.08	11.1
4	0.07	8.9
2	0.03	4.4
1	0.02	1.2
0.1	0.002	0.22

*RM-G8 is shielded Rx. Building Dome Monitor. Rx. Building radiation level is 100 times RM-G8 meter readings. The numbers specified in this Table are meter readings.

Calculation of Total Source Release Term		
	Iodine	Noble Gas
1. RM-A8 (5)	_____	_____
2. RM-A9 (5)	_____	_____
3. RM-A5 (3)	_____	_____
4. RM-G8	_____	_____
5. Add 1+2+3+4	_____	_____

197 243

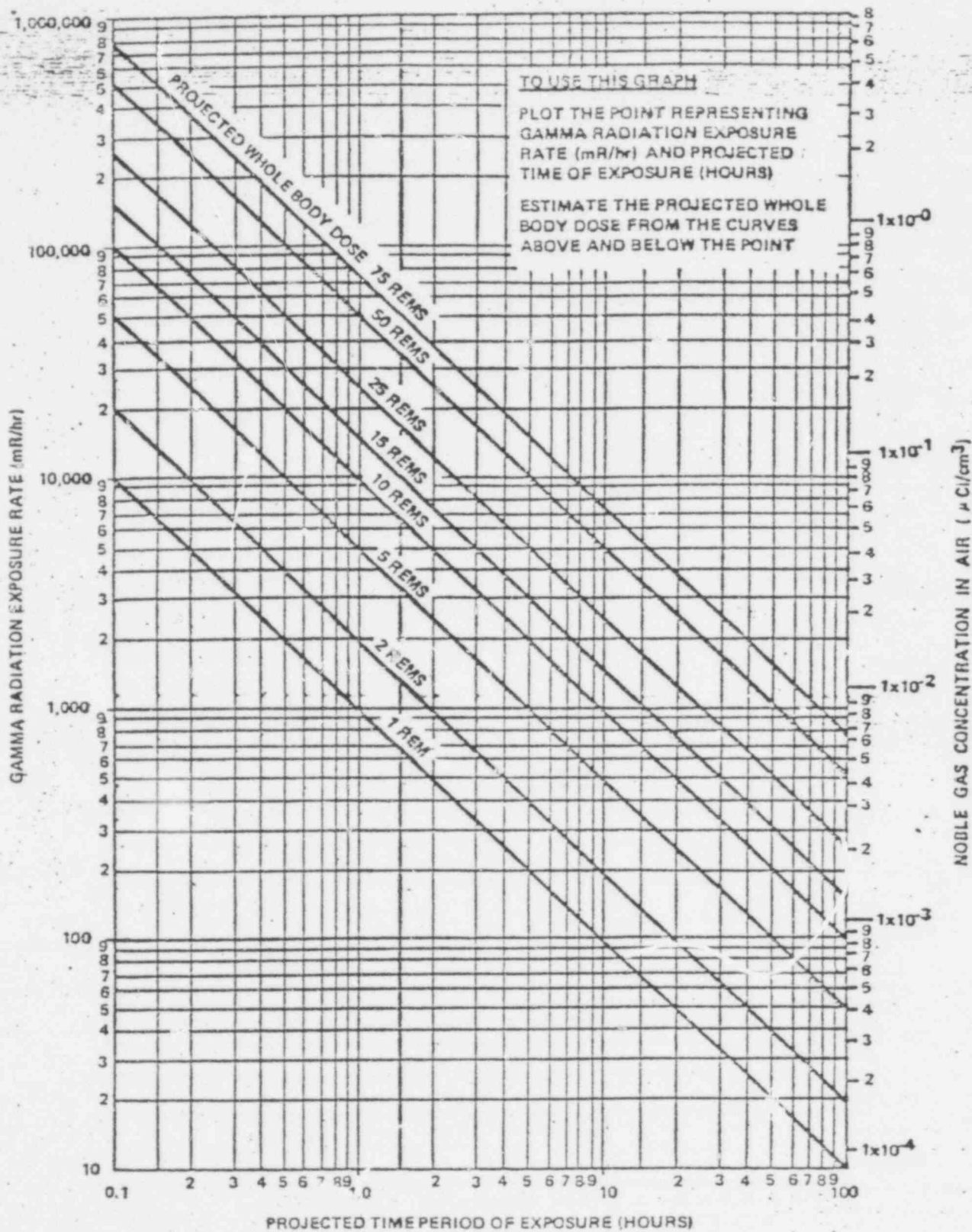
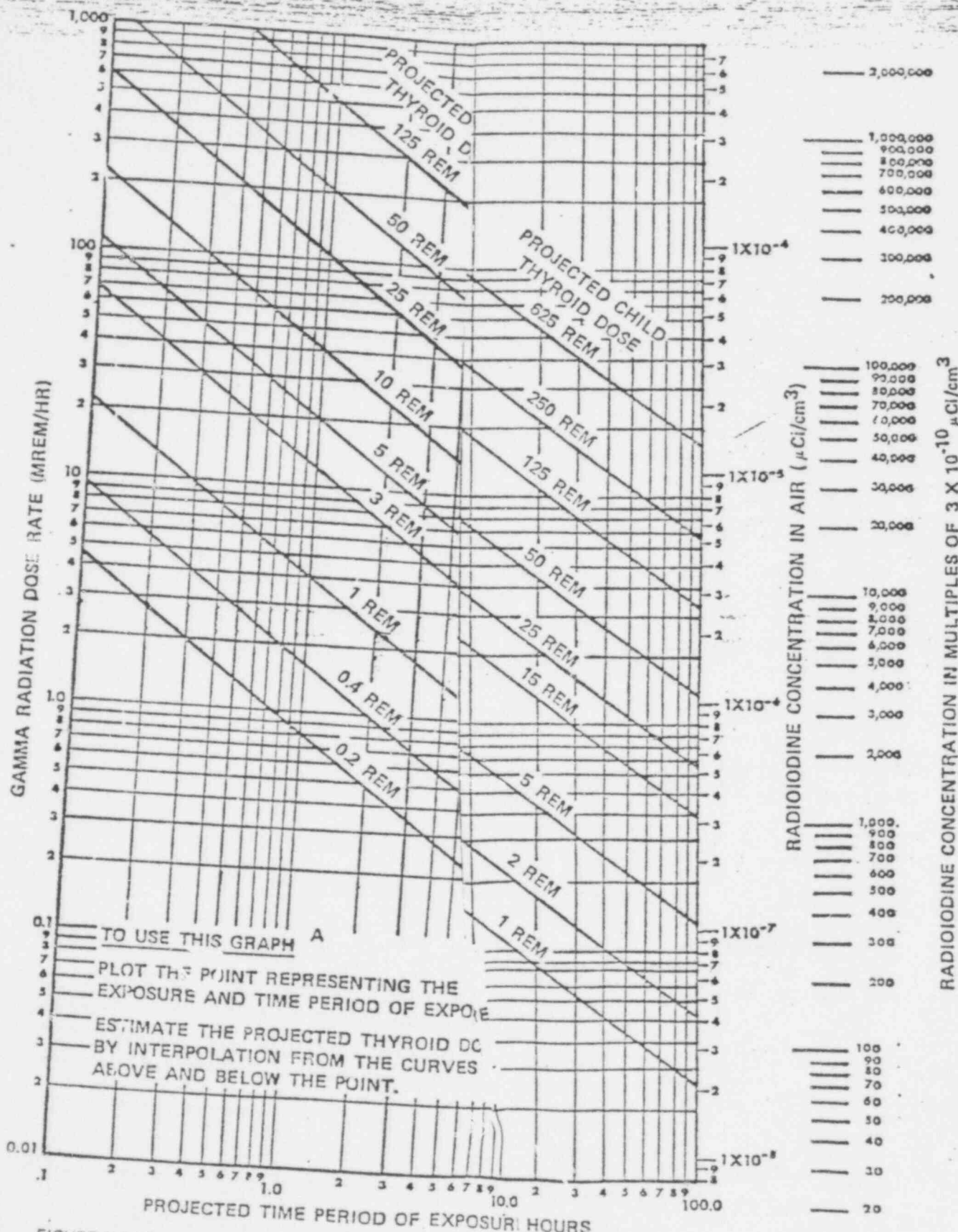


FIGURE 5.1—PROJECTED WHOLE BODY GAMMA DOSE AS A FUNCTION OF GAMMA RADIATION EXPOSURE RATE AND PROJECTED TIME PERIOD OF EXPOSURE



TO USE THIS GRAPH A
 PLOT THE POINT REPRESENTING THE
 EXPOSURE AND TIME PERIOD OF EXPOSURE
 ESTIMATE THE PROJECTED THYROID DOSE
 BY INTERPOLATION FROM THE CURVES
 ABOVE AND BELOW THE POINT.

FIGURE 5.2 PROJECTED THYROID DOSE AS A FUNCTION OF GAMMA RADIATION EXPOSURE RATE AND PROJECTED TIME PERIOD OF EXPOSURE

A. USE OF THIS FIGURE ASSUMES THAT THE RADIOIODINE/NOBGAS ACTIVITY RATIO IS 0.3. IF IT IS KNOWN THAT THE RATIO HAS A LOWER VALUE, THE CORRECTION FACTOR GIVEN IN FIGURE 5.3 SHOULD BE USED.

INITIAL CONDITIONS

UNIT 1 @ 100% Power

Rb Purge in progress

SEQUENCE OF EVENTS

- T=0
1. Low RC press. alarm.
 2. Low-Low RC press. alarm.
 3. RC press. decreasing rapidly.
 4. Reactor trip alarm.
 5. Turbine trip alarm.
 6. Pressurizer low level alarm.
 7. Safety injection actuated A&B.
 8. Pressurizer Low-Low Level Alarm.
 9. RM-G-8, alert alarm.
 10. High reactor building temperature alarm.
 11. Reactor building sump high level alarm.
 12. Reactor building high pressure alarm.
 13. Reactor building pressure increasing.
 14. Makeup tank level decreasing rapidly with low level alarm.
 15. various RMS alarms.
 16. Core flood tank level alarms.
 17. Purge valves indicate shut.

Maggie Reilly
233-4028

$\approx 1 \times 10^{-4}$ sec⁻¹ anything less than will speed 25 Rem
m/hr.

Robert Bress Zap Team planes.
Hermes Daniels RMC - digital WBC
Barbes NRC-PIA
Radiation Management

Use call out list for add people for
monitoring team

Wind shift 16:00 from 140° airport $\frac{1}{2}$ 4 mile N/W
direction

METEOROLOGICAL CONDITIONS

WIND SPEED → 2 MPH

WIND DIRECTION → 180 DEGREES

WIND RANGE → 20 DEGREES

VERTICAL TEMPERATURE DIFFERENCE → +0.4°F

97 247
T=0

"METEOROLOGICAL CONDITIONS"

WIND SPEED → 3 MPH

WIND DIRECTION → 140° DEGREES

WIND RANGE → 30° DEGREES

VERTICAL TEMPERATURE DIFFERENCE → +0.2°F

T = 60

RM-G-5 → $> 10^4$ mR/HR - HIGH ALARM

RM-G-6 → $> 10^4$ mR/HR - HIGH ALARM

RM-G-7 → $> 10^4$ mR/HR - HIGH ALARM

197 248
T = 7

RMG-8

2.0×10^4 mR/hr

IN HIGH ALARM

$t=1$

RM-A-2

PARTICULATE - OFF SCALE - HIGH ALARM

IODINE - OFF SCALE - HIGH ALARM

GAS - OFF SCALE - HIGH ALARM

197 249

$T=Z$

RM-A-9

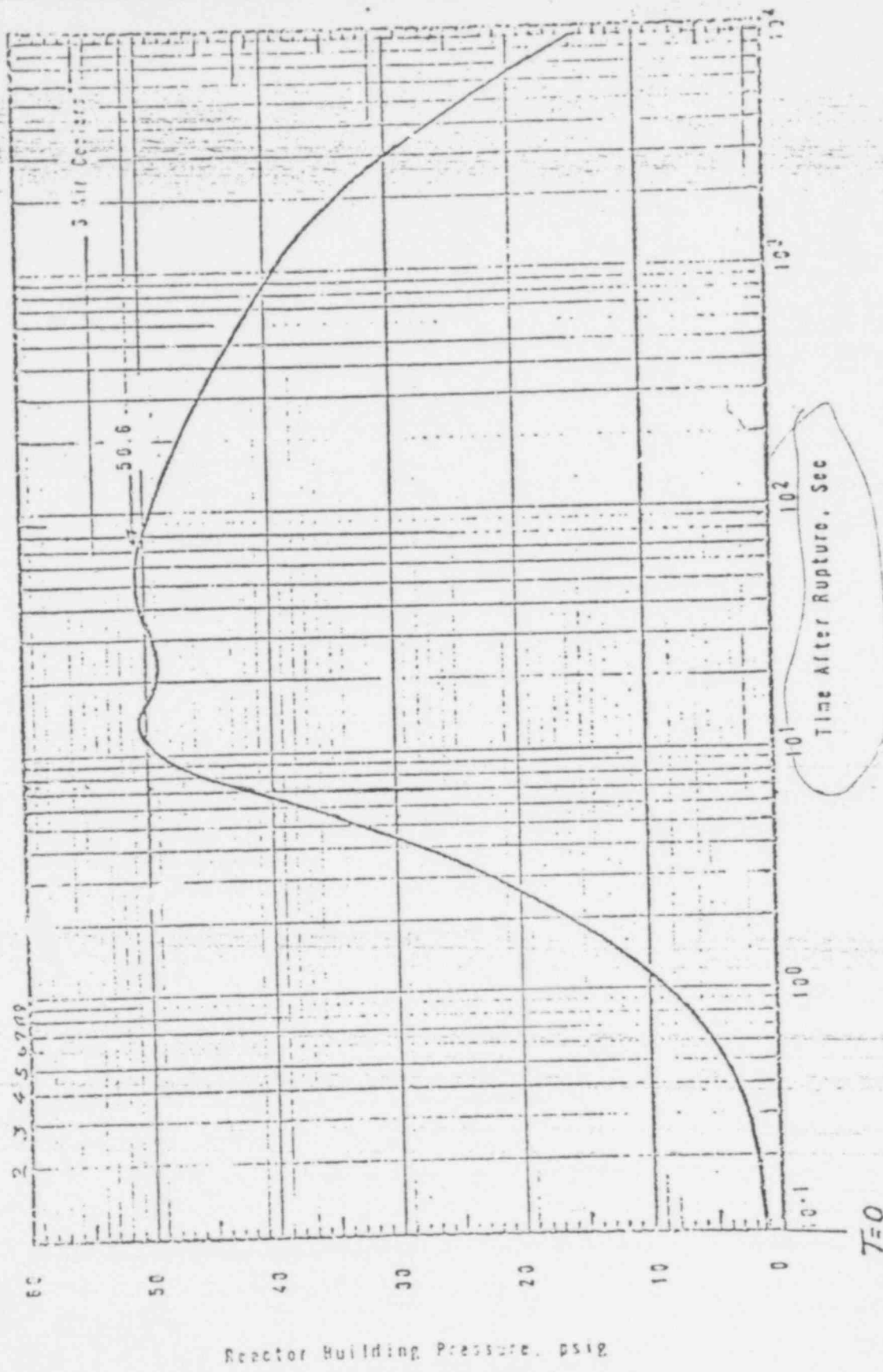
PARTICULATE - OFF SCALE - HIGH ALARM

IODINE - OFF SCALE - HIGH ALARM

GAS - 10^5 CPM - HIGH ALARM

AND DECREASING

T=1



PEACE - BUILDING PRESSURE VERSUS TIME FOR
 THE CASE WITH CONTINUOUS STEAM RELEASE
 FROM REACTOR BUILDING AIR COOLERS
 TIDAL ISLAND NUCLEAR STATION UNIT 1

197 251

[Handwritten signature]

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

page 1

OBSERVER L LANDRY

DATE 11/6/78

AREA OF RESPONSIBILITY

UNIT 1 CR (affected area ECC)

t=0
TIME

Hitz - ED
EVENT

COMMENTS

t=2

Site Emergency

MHA - General

t=4

Status Board started

t=5

Sup of Ops
Sup of Rad/Chem

t=6

Sup of R/C → ECS

t=6

(Status)
G. Miller - ED
Kunder & Faulman

t=7

Ops with phones

t=10

North Assembly area
checked R/hr

197 252

t=12

Evacuation of N.A. → N.W. address

RADIATION EMERGENCY DRILL
OBSERVER CRITIQUE SHEETOBSERVER L. Landry

DATE

11/6/78

AREA OF RESPONSIBILITY

Unit 1 Control Room

TIME	EVENT	COMMENTS
t=16	General Declared	* Scanner on 1-4, 13-15
t=17	Evacuation of Security Bldg	
t=36	Determined Area for evacuation	1 Rem / 2hr thyroid dose $\times 50 \therefore X/g = 1.1E-$
t=38	Evacuated to South Warehouse	* No stop
t=48	Non Ess evacuate via South Gate to South Workdown Area	use South vehicles

197 253

Comments MHA

11/6/78

- ⇒ Long time to evaluate and declare proper emergency (RM-6-8 reading)
- ⇒ No radio contact until +17 min after General Emer, and when tried Radio was off.
- ⇒ Question: availability of speakers outside especially at night when they are on a timer.
- ⇒ Good ⇒ Simulated following procedures and tracking plant response especially reading building pressure.

ENCLOSURE #2

RADIATION EMERGENCY DRILL
OBSERVER CRITIQUE SHEET

OBSERVER A. Brown

DATE 11/6/78

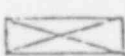
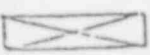
AREA OF RESPONSIBILITY Unit 2 Control Room


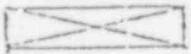
TIME	EVENT	COMMENTS
T. +2	T=0 1505 → site Emer. alarm announcement	G 8 2×10^4 mR/hr Note: → High alarm
	→ should have been General Emergency.	ind 20 R/di times 100 = 2000R
+7	G Miller → Emer. Dir. Sec.	
+10	→ analyzing G 8 → General →	
+15	→ Evac. Security - Search Bldg.	
+16	→ Gen. Emerg. Declared.	
+17	announcement / alarm	
	→ Radio Contact (Radios off)	
+50	→ Site Evac. (Sim) South	(Status of outside speakers after dark?)
+70	Secured from Drill.	Time 1900 hrs

197 255

SOURCE RELEASE TERM CALCULATIONS UNIT 1

Revision 2
1/16/78

Aux & FH	Iodine	Noble Gas
1. RM-A8	c/m/m	c/m
2. FR 151	CFM	
3. Constant	3.62×10^{-7}	
3. Constant		1.27×10^{-5}
4. Mult 1x2x3=	$\frac{\mu\text{Ci}}{\text{sec}}$	$\frac{\mu\text{Ci}}{\text{ec}}$
5. $\frac{4}{10^5} =$	Ci/sec	Ci/sec

Rx Bldg.	Iodine	Noble Gas
1. RM-A9	$\frac{\mu\text{Ci}}{\text{m}^3/\text{hr}}$	$\frac{\mu\text{Ci}}{\text{m}^3/\text{hr}}$
2. FR 148	CFM	CFM
3. Constant	3.36×10^{-7}	
3. Constant		1.21×10^{-5}
4. Mult 1x2x3=	$\frac{\mu\text{Ci}}{\text{sec}}$	$\frac{\mu\text{Ci}}{\text{sec}}$
5. $\frac{4}{10^6} =$	Ci/sec	Ci/sec

Secondary - Condenser Off Gas

1. RM-A5 c/m
2. Constant 1.75×10^{-10}
 M^3/sec
3. Mult 1x2= Ci/sec

Containment Leak Rate 0.2%/24 hr

RM-G3* METER READING	Iodine Ci/sec	Noble Gas Ci/sec
2R/hr	.0006	8.5
4R/hr	.0011	17.5
6R/hr	.0017	26
8R/hr	.0022	35
10R/hr	.0028	44
12R/hr	.0033	53

TOTAL SOURCE TERM

	Iodine	Noble Gas
1. RM-A8 5		
2. RM-A9 5		
3. RM-A5 3		
4. RM-G8	<u>0.33</u>	<u>44.4</u>
5. Add 1+2+3+4=		Ci/sec

*RM-G3 is shielded. Reactor Building radiation level is 100 times RM-G3 meter readings. However, the numbers specified in this table are meter read

Time 1717 Date 11/6/78 Calculations by [Signature] Sheet #1

197 256

OFF-SITE DOSE CALCULATION SHEET

Location N-11Time 1723Wind Direction 180 ~~180~~ 0Wind Speed 2 MPHWind Range 20° Stability Class: Stable; Neutral; UnstableIODINENOBLE GAS

1. Source Term Sheet #1 0.33 Ci/sec
2. X/Q 2.5×10^{-4} Sec/M³
3. Mult 1 x 2 = 5.25×10^{-5} μ Ci/cc
4. Wind Speed 2 MPH
5. Divide 3/4 4.13×10^{-5} μ Ci/cc
6. Dose Rate
(From Figure 1670.4-1)
7. Expected Duration of Release 1 Hours
8. Expected Dose to Child Thyroid 175 Rem
(From Figure 1670.4-2)

- 44.4 Ci/sec
- 2.5×10^{-4} Sec/M³
- 1.11×10^{-2} μ Ci/cc
- 2 MPH
- 5.55×10^{-3} μ Ci/cc
- 6.5 R/hr
- 1 Hours
- < 1 Rem

197 258

Time 1728 Date 11/6/75 Calculations by [Signature] Sheet #2

1/15/78

OFF-SITE DOSE CALCULATION SHEET

Location NNW 21

Time 1800

Wind Direction 140 +180 320

Wind Speed 3 MPH

Wind Range 30° Stability Class: Stable; Neutral; Unstable

IODINE

NOBLE GAS

- 1. Source Term Sheet #1 .030 Ci/sec
- 2. X/Q 1.95 × 10⁻⁴ Sec/M³
- 3. Mult 1 x 2 = 6.3 × 10⁻⁴ μCi/cc
- 4. Wind Speed 3 MPH
- 5. Divide 3/4 2.1 × 10⁻⁶ μCi/cc
- 6. Dose Rate
(From Figure 1670.4-1)
- 7. Expected Duration of Release 2.4 Hours
- 8. Expected Dose to Child Thyroid 6 Rem
(From Figure 1670.4-2)

- 39.1 Ci/sec
- 1.75 × 10⁻⁴ Sec/M³
- 5.95 × 10⁻³ μCi/cc
- 3 MPH
- 1.98 × 10⁻³ μCi/cc
- .25 R/hr
- 2.9 Hours
- 61 Rem

197 259

Time 1815 Date 1/16/78 Calculations by HCC/... Sheet #2

Log

<u>Time</u>	<u>From</u>	<u>To</u>	<u>Message</u>
1709	CR	ECS	Comm. ESTABLISHED
1713	ECS	CR	sending someone up for work
1718	"	"	Team A @ 1718 25 R/hr at H-
1720	"	"	A @ 1721 30 R/hr at H-5
1721 1724			20 R/hr @ No. Area ^{no parking lot}
1724			A @ 1724 5 R/hr at GE1
1724			A 200 mtr dose to A
1723			.04 mtr/hr at ECS
1725			B → N11
			A @ 1726 = 500 mtr dose to warehouse
1733			A @ 1733 = 2.5 rem air samples at GE-1
1733			A @ 1733 20 R/hr @ GE
1737			A @ 1737 2 R/hr at I-
			B @ 1736 at N11 bkgd at N1
1738			evac TMI-1 whse to TMI-2
1738			A @ 3.5 rem
1740			@ 1740 at I-7 25 R/hr
1743			@ 1740 so. assay area p820
1745			B @ 1743 at N11 bkgd p-
1745			TMI-1 whse evac @ 1743
1746			197 260 C outlying B area N11; Vehicle to So. Washdown area

Log

<u>Time</u>	<u>From</u>	<u>To</u>	<u>Message</u>
1751			So Washdown Area dispatched w/ fire truck
1800			B@ 1800 5R/hr A-8 @ NLI I ¹³¹ $4.5 \times 10^{-6} \frac{\mu\text{C}}{\text{cc}}$
1803			
1805			B@ 1805 1.1 Rem dose
1806			A@ 1730 I ¹³¹ $1.4 \text{E}^{-4} \frac{\mu\text{C}}{\text{cc}}$ @ GE-1 (Dubiel to line 2)
1810			Train from No. to So. Stop!

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER BeersDATE 11/16/78

AREA OF RESPONSIBILITY

Unit I Control Room

TIME	EVENT	COMMENTS
1705	LOCA MHA	
1707	Site Emerg Decl	Good time
1710	Meteorogical Cond.	too long - affect
1711	GPM	where evacuate
1713	GPM	In Cont Room
1717	ECS	Emerg Director
1725	Civil Defense	Simulate Evacuat
1725	State Called Back	Security Bldg.
1722	Gen Emerg	Declared
1724	Radio to heb	Comm Estab.
1724	North Aud	People Moved
1735	BRIT	South
1737	Warehouse 2.5R	Evacuating Surv
1740	Call on more H.P.	Area
1743	Accountability	Evacuate South
1751	Accountability est	High Dose
1803	Wind Shift	How check wit
		Process evacuat
		2 people miss
		Moving Teams
		197 262
		197 252
		262

RADIATION EMERGENCY DRILL
OBSERVER CRITIQUE SHEETOBSERVER F. Mc LEMICKDATE 11-6AREA OF RESPONSIBILITY ECS

TIME	EVENT	COMMENTS
<u>T=2</u>	Announcement "Site"	
	- no mention of accountability area outside protected area.	
4	AO's manning phones	
	Begin collecting badges w/new accountability	some unfamiliar
5	Mulleary - good job organizing ECS personnel	
6	Badges on the way to account. station lining up vehicles for teams.	
9	announcement - "Site" Emerg. on-site team gone to GE 1	
11	Rad. Mon requested @ N. Ascent area	
12	Still no comm w/U-2 C.R. switch thrown but no one on CAI phones	
13	first on-site reading 25 R @ search facility	197-253 263 263
16	Simulate evac. of search facility	
* 17	"General" Emerg	

RADIATION EMERGENCY DRILL
OBSERVER CRITIQUE SHEETOBSERVER F. Mc WORMICKDATE 11-6AREA OF RESPONSIBILITY ECS

TIME	EVENT	COMMENTS
18	20 R/h @ N. And	
18	5 R/h @ GE 1	
	accum dose of team X	X - 400 mR
20	team X -	500 mR
	team is @ warehouse	
21	B. dispatched to	N-11
22	Names of pers in delivered to ECS for of doses later.	N. And assignment
	Announcement to evac	N. And.
23	Request dose rate @ warehouse	
24	When team B leaves lock gate & take guard with B already off island - turn around & go back to get him.	
	Wait @ N 11 upon arrival	197 254 197 264
	estimate plane arrival @ ~ 1800	

ENCLOSURE #2

RADIATION EMERGENCY DRILL
OBSERVER CRITIQUE SHEET

OBSERVER F. M. CORNICK

DATE 11-6

AREA OF RESPONSIBILITY ECS

TIME	EVENT	COMMENTS
28	Team A - 2.5 R dose accum. sent to warehouse & monitor rad level upon arrival.	
30	B @ N 11 rad levels @ bldg.	
30	2 R/W @ warehouse	
	simulate evac. U-1 warehouse to U-2 warehouse (?) (good location T-7) take names of 4 times in area	
31	Team A 3.5 R accum exposure.	
37	Team A 5.25 R	
39	A to be replaced C to be dispatched to play leaving w/B	
40	SD MR/HA on vehicle (Team A)	due to contain
	Dispatching of Eng as mon. team.	197-255 outh washdown 197 265

ENCLOSURE #2

RADIATION EMERGENCY DRILL
OBSERVER CRITIQUE SHEET

OBSERVER F. Mc LIPMICK

DATE 11-6

AREA OF RESPONSIBILITY ELS

TIME	EVENT	COMMENTS
	Eng's ¹ briefed on where to go & 0.4 m ² /m. criteria	
48	B - given expected dose readings A-B & I	
	as soon as substantial inc on A-B in - take air sample & evac. to low bkg. to count.	
50	site evac of non-essential <u>South</u> only. transportation provided	
53	people making up readings for So. unshd. area.	
55	first rdg from N-11 5 R/m A-B 4.5 E-6 m ² /m I	131
58	wind shift 140 @ in 30° range speed ↑ to 3 mph	197-256 197 266

RADIATION EMERGENCY DRILL
OBSERVER CRITIQUE SHEET

OBSERVER _____

DATE _____

AREA OF RESPONSIBILITY _____

TIME	EVENT	COMMENTS
60	I ¹³¹ heading from Tean 35 min before request dose equiv. I ¹³¹	x
62	concern shown for @ Hbg. Intntl.	air traffic
67	Train heading South	
67	lost B communication take x's replacement & send North to NNW 21	
68	air airplane over Island heading for Hbg Intntl.	

197-257

197 267

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER VAN STRAYDATE 11/6/78AREA OF RESPONSIBILITY Accountability

TIME	EVENT	COMMENTS
T+2	DRILL START	
T+4	1ST BADGES ARRIVE	Security + OBSERVER
T+7	Security INFORMED THAT DOSIMETERS "OFF-SCALE"	- NO RESPONSE *
T+8	ES! UNIT CIRC BADGES ARRIVE	
T+11	SEC. GUARD SMOKING	- 25 R/HZ ON RADIO AT SEC. CAMPUS - NO RESP
T+13	UNIT II MUSTER BADGES ARRIVE	
T+15	UNIT I C.B. BADGES ARRIVE	
T+16	WAREHOUSE BADGES ARRIVE	- NOTIFIED TO EVACUATE AUDITORIUM TO S. ASSEMBLY AREA
T+18	E. BARNARD STOPPED GUARD FROM SMOKING	
T+21	COMMENT - WHY WAS EVACUATION OF N. AUD SIMULATED - WHY WAS MOVEMENT OF MUSTER " " ?	
T+23	COMMENT - IT APPEARS THAT SECURITY HAD A PREPARED LIST STARTED BEFORE DRILL. THIS SAVED THE TROUBLE OF CHECKING WHO'S IN SITE. CHEAT	
T+25	1ST MUSTER DONE 6 MISSING	- INSIDE VITAL AREA OK
T+32	4 PEOPLE MISSING FROM METED	- CONTRACTOR'S LIST NOT DONE
T+35	2 B2W MISSING	
T+41	1 B2W MISSING - STILL 3 MEL PEOPLE	
T+42	1 MET-ED, 1 GPM MISSING	
T+50	1 MET-ED MISSING (M. KELLER)	
T+51	EVACUATION ORDERED	
T+53	KELLER IS GPM 1	
T+57	100% DONE	

197-258

197 268

RADIATION EMERGENCY DRILL
OBSERVER CRITIQUE SHEET

Page-1

OBSERVER D.K. McConnellDATE Nov. 6th, 1978AREA OF RESPONSIBILITY On Site Monitoring Team

TIME	EVENT	COMMENTS
T-2	Drill ANNOUNCEMENT	VERY Loud OVER PA.
T-3	Bridges start collection	
T-6	ON SITE DISPATCHED	FROM ECS
T-9	Checked All KITS out	
T-11	Readings of 25/R reported	
T-12	Evacuation of security Bldg.	By team leader.
T-14	Left parking lot after Reading of 30/R per hr.	
T-16	Readings of 5/c given @ GE-1	NO SIGN NOT REACH SURE IF @ GE-1
T-23	Started taking Air sample	Had trouble getting Powermeter Hooked-up?
T-25	TEAM EXPOSURE reported to ECS	AS 2 1/2 R & ECS Told To Report TO WAREHOUSE RENT AREA
T-27	LEAVING AREA	going to WAREHOUSE
T-30	Evacuation THE WAREHOUSE 23.0	197 259 197 269 People LEAVING AREA

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

Page 2

OBSERVER D.K.M. PowellDATE 11-6-78AREA OF RESPONSIBILITY On-Site Monitoring Team

TIME	EVENT	COMMENTS
T-37	Left Warehouse Area	Reported To T-7 Coordinate on map
T-40	ARRIVED @ Low Bkg. Area	Reported Personnel Reading of PA TOTAL of 5 1/4/R
T-41	ECS told ^{Team} to stay there	NEW TEAM TO READ AIR SAMPLE @ TRUCK
T-41	Team simulated being RELEAVED.	
	1. ONLY ONE High RANGE DOSIMETER IN THE EQUIPMENT	✓ Taken <u>OKAY</u>
	2. NO CORD for SAM-2 IN THE MONITORING K.T # 2	
	3. Syd Porter was questioning the team to as how to get all the reading & I ² cal. & the Team leader was very knowledgeable as to what to do & in control, & very good with the cal's.	
	4. Team reported Train going by To ECS & AN AIRPLANE ALSO	
	5. Battery in truck had side terminals & they had a hard time hooking up the powermeter.	

197 260
197 270

ENCLOSURE #2

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER S. W. Porter (Daniel McComel)
Unit 2 OC

DATE 11/16/78

AREA OF RESPONSIBILITY On-Site Service Team

T = in 17:05

Dave Ethridge

Team Members

TIME

EVENT

R. J. Keller

COMMENTS

T = 5

7

Report to Security Counsel

12

25 R/hr. inside

14

30 R/hr

15

Self Reading 0-200

0.5 R

25

20 R/hr.

28

2.5 R/hr.

30 R/hr. at N. Edge of Warehouse

Dose = 5.25 R

2) Only 1 hi-range dosimeter in bit #4

1) No 110 AC cord for SAM 2 in bit #2

4) ECS did not request I c/m from ^{on site} Team, ~~at~~

3) Team never knew what the emergency was.

5) No ¹³¹ I data for 1st 50 min. of drill from ^{on site} Team, ~~at~~

197-261

197 271

Practice Drill with Pa. State Participation

OBJECTIVES

1. To test the response of Unit 1 Operations Staff to an incredible Maximum Hypothetical Accident which occurs within a one-minute time interval.
2. To test the ability and speed of Unit 1 staff to utilize the contingency dose calculations and make the necessary off-site calls and other communications including communications of technical data to Pa. B.R.H.
3. To evaluate the ability to deploy both on and off-site emergency teams for both γ and radioiodine monitoring.
4. To test the ability of the site security to perform a rapid and accurate personnel accountability.

SCOPE

A case I LOCA with severe core damage and fuel melting with little or no cooling. The containment leaks at the maximum design leak rate.

INITIAL CONDITIONS

1. TMI Unit 1 is at 100% power.
2. Reactor Building purge is in progress.
3. A LOCA occurs resulting in severe core damage, fuel melting, and no effective core cooling.
4. Wind speed 2 mph, wind direction 180, wind range 20°, vertical temperature difference +0.4°.

SEQUENCE OF EVENTS

- T=0
1. Low RC press. alarm.
 2. Low-Low RC press. alarm.
 3. RC press. decreasing rapidly.
 4. Reactor trip alarm.
 5. Turbine trip alarm.
 6. Pressurizer low level alarm.
 7. Safety injection actuated A&B.
 8. Pressurizer Low-Low Level Alarm.
 9. RM-G-8, alert alarm.
 10. High reactor building temperature alarm.
 11. Reactor building sump high level alarm.
 12. Reactor building high pressure alarm.
 13. Reactor building pressure increasing.
 14. Makeup tank level decreasing rapidly with low level alarm.
 15. various RMS alarms.
 16. Core flood tank level alarms.
 17. Purge valves indicate shut.
- T=1
18. RM-G-8 is in high alarm, reading 20 R/hr.
 19. RM-G-5, 6 & 7 all reading 10" mR/hr.
- T=60
20. RM-A-239 particulate, iodine, gas all off scale and in high alarm.
 21. Wind speed 3 mph, wind direction 140°, wind range 30° vertical temperature difference +0.2°.

197 272

DRILL OBSERVATION SHEET

Drill Date: 11/6/78

Observers Names: _____

Observers Location: Accompany any personnel leaving the Control Room after T=5

Drill Title: Unit 1 MHA - Practice Drill with Pa. State Participation

Information to Provide: Refer to Note 1.

Time Drill Commenced: _____

Time Drill Terminated: _____

OBSERVATIONS, COMMENTS & RECOMMENDATIONS

Page _____ of _____

NOTE: Observations should include the proper and effective use of procedures, equipment, and personnel.

NOTE 1 - There are ultra-high levels of radioogas and radioiodine leakage throughout all Reactor Penetration areas. Any persons going into the Aux. Building or into any areas adjacent to the Unit 1 Reactor Containment Building will be in a radiation area in excess of 50 R/hr at T=5. Keep in mind that the following areas are in excess of 10 R/hr at T=10: Fuel Handling Building, Aux Building Sampling Room, outside the personnel hatches to containment on all elevations.

If any personnel do outside in any direction within 30° of downwind of the Containment Building, use the Note 2 data for γ exposures. Remember the building wake effects will distribute the fission products very rapidly around the site during these low wind velocity and stable meteorological conditions.

197 273

NOTE: Use additional pages as necessary

Signature: _____

Title: _____

TMI
DRILL OBSERVATION SHEET

Observer Name: _____ Drill Date: 11/6/73

Observer Location: Accompany On-Site (Outside) Survey Team

Drill Title: Unit 1 MHA - Practice Drill with Pa. State Participation

Information to Provide: Note 2 data as appropriate

Assign large doses to Team if Team loiters in any buildings close to Unit 1 Reactor Building. Since large dose rates are involved, be very aware of dose to Team members.

Time Drill Commenced: _____ Time Drill Terminated: _____

OBSERVATIONS, COMMENTS & RECOMMENDATIONS Page _____ of _____

NOTE: Observations should include the proper and effective use of procedures, equipment, and personnel.

NOTE 2 - Data for the On-Site (Outside) Survey Team

The outside downwind dose (by reading) starting with the closest ground-level point to the Unit 1 vent will be as follows:

By Survey Meter - Distance From Vent (On-Site)

	100'	500'	1000'	2000'
T=10	80 R/hr	14 R/hr	4 R/h	1600 mR/hr
T=20	160 R/hr	18 R/hr	8 R/hr	3200 mR/hr
T=30	320 R/hr	26 R/hr	12 R/hr	6400 mR/hr

+

End of Drill

NOTE: In sectors directly adjacent to downwind sectors, use γ doses which are the same as the downwind sector. In sectors next to these adjacent sectors, use a factor of 10 less than the downwind sector.

197 274

NOTE: Use additional pages as necessary

Signatures: _____ Titles: _____

NOTE 3

LOCA (MHA) Calculations for TMI Unit 1 Drill of 11/6/78

If RM-G8=20R/hr, then I=0.33 Ci/sec and Noble Gas=44.4 Ci/sec.

Then, for the Site Boundry in the N direction, utilizing the Off-Site Dose Calculation Sheet:

	<u>Iodine</u>	<u>Noble Gas</u>	<u>units</u>
1) Source Term =	= 0.33	44.4	Ci/sec
2) x/Q	= 1×10^{-3}	1×10^{-3}	sec/M ³
3) #1 x #2	= 3.3×10^{-4}	4.44×10^{-2}	µCi/cc
4) Wind Speed	= 2	2	MPH
5) #3 ÷ #4	= 1.65×10^{-4}	2.22×10^{-2}	µCi/cc
6) Dose Rate	= _____	9	R/hr.
7) Expected Release Duration	= 2	_____	hours
8) Expected Child Thyroid Dose	≈ 240	_____	Rem

<u>Site</u>	<u>Angle</u>	<u>Child Thyroid dose in R/hr.</u>	<u>Noble Gas R/hr.</u>	<u>Time for Plume To Arrive</u>
N11	0°	30	2.25	50 min.
N21	0°	12	0.9	1 hr. 10 min.
N31	323°	0.84	0.063	1 hr. 40 min.
N41	319°	6	0.45	1 hr. 50 min.
N52	319°	3	0.23	2 hr. 10 min.
N61	310°	0	0	3 hrs.
10 mi radius Center of Harrisburg	320°	3	0.23	3 hrs. 40 min.

Practice Drill with Pa. State Participation

Distance Plume Travel (miles)	SE1 0°		SE2 45°		SE10 320°		GE-1 0°		GE-2 22°		GE-3 40°	
	γ R/hr.	I d/m*	γ R/hr.	I d/m	γ R/hr.	I d/m	γ R/hr.	I d/m	γ R/hr.	I d/m	γ R/hr.	I d/m
0.25	10	1.67x10 ⁷	1	1.67x10 ⁶	1	1.67x10 ⁶	0	0	0	0	0	0
0.5	16	8.35x10 ⁷	1.6	8.35x10 ⁶	1.6	8.35x10 ⁶	5	1.5x10 ⁶	1	1.2x10 ⁶	0.4	5x10 ⁴
1	24	1.67x10 ⁸	2.4	1.67x10 ⁷	2.4	1.67x10 ⁷	20	1.25x10 ⁸	15	1x10 ⁸	1	5x10 ⁵
1.5	30	1.83x10 ⁸	3	1.83x10 ⁷	3	1.83x10 ⁷	25	1.25x10 ⁸	18	1x10 ⁸	2	10 ⁷
2	30	1.83x10 ⁸	3	1.83x10 ⁷	3	1.83x10 ⁷	25	1.25x10 ⁸	18	1x10 ⁸	2	10 ⁷
3	30	1.83x10 ⁸	2	1.67x10 ⁷	10	1.67x10 ⁷	25	1.5x10 ⁸	8	5x10 ⁷	1	5x10 ⁵
4	30	1.83x10 ⁸	1	1.67x10 ⁷	20	5x10 ⁷	25	1.5x10 ⁸	1	3x10 ⁷	0.5	5x10 ³
5	30	1.83x10 ⁸	0.5	1.67x10 ⁷	30	1.67x10 ⁸	25	1.5x10 ⁸	0.4	1.5x10 ⁷	0.2	5x10 ²
7.5	30	1.83x10 ⁸	0.5	1.67x10 ⁷	30	1.67x10 ⁸	25	1.5x10 ⁸	0.3	1.25x10 ⁷	0.1	50
10	30	1.5x10 ⁸	0.5	1.5x10 ⁷	25	1x10 ⁸	20	1x10 ⁸	0.2	1x10 ⁷	0.05	0

NOTE:
 Wind from 180° at 2 MPH toward the N for T=0 to T=60
 Wind from 140° at 3 MPH toward the NW for T=60 to end of drill.
 Adjacent Sectors off-site are a factor of 10 less than the downwind sector.
 On-site adjacent sectors are the same as the downwind sector.

*Assumes a 5x10⁵ cc sample. To obtain c/m, divide the d/m listed by:
 52.4 for Kit #1
 26.0 for Kit #2
 27.8 for Kit #3
 21.3 for Kit #4

SAM-2 Conversion Table to obtain Child Thyroid 1 hour Intake Dose.
 the adult dose is one-half of the Child Thyroid Dose.

276

Practice Drill with Pa. State Participation

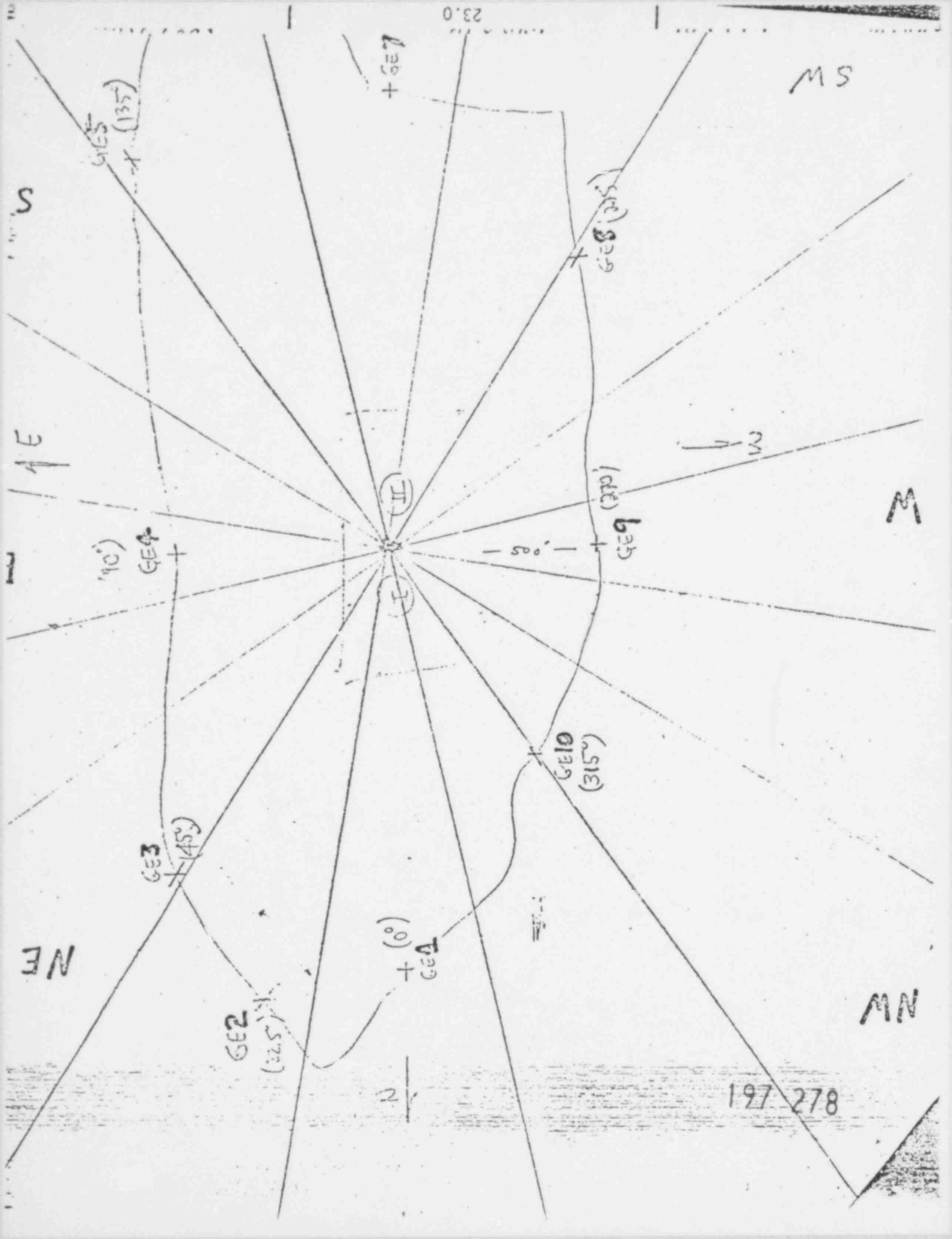
Distance Plume Travel (miles)	N11 0°		N21 0°		NW31 323°		NW41 319°		NW52 319°		NW71 310°	
	γ R/hr.	I d/m*	γ R/hr.	I d/m	γ R/hr.	I d/m	γ R/hr.	I d/m	γ R/hr.	I d/m	γ R/m	I d/m
.5	0.25	0	0	0	0	0	0	0	0	0	0	0
5	0.5	0	0	0	0	0	0	0	0	0	0	0
10	1	0	0	0	0	0	0	0	0	0	0	0
15	1.5	0	0	0	0	0	0	0	0	0	0	0
20	2	5	5x10 ⁶	0	0	0	0	0	0	0	0	0
30	3	5	5x10 ⁶	1	1.67x10 ⁷	0	0	0	0	0	0	0
40	4	4	4x10 ⁶	1	10	.06	1.67x10 ⁶	0	0	0	0	0
50	5	3	3x10 ⁶	0.6	5x10	.06	1.67x10 ⁶	6	8.35x10 ⁵	See Note 3	0	0
60	7.5	2	2x10 ⁶	0.4	3x10	.06	1.67x10 ⁶	6	8.35x10 ⁵	See Note 3	0	0
70	10	1	10 ⁶	0.2	10 ⁶	.05	1.3x10 ⁶	6	8.35x10 ⁵	See Note 3	0	0

NOTE:
 Wind from 180° at 2 MPH toward the N for T=0 to T=60
 Wind from 140° at 3 MPH toward the NW
 Adjacent Sectors off-site are a factor of 10 less than the downwind sector.

277

times a 5x10⁵ cc sample. To obtain c/m, divide the d/m listed by:
 52.4 for Kit #1
 26.0 for Kit #2
 27.8 for Kit #3
 21.3 for Kit #4

Conversion Table to obtain Child Thyroid 1-hour Intake Dose.



2.5×10^6	0.7 m^3 $2.3 \times 10^5 \text{ cc sample}$	$\text{M} \text{ G} / \text{cc}$	for 1 hour exposure
$.65 \times 10^6$	1.67×10^7	1.5×10^{-4}	100 Rem
$.04 \times 10^6$	1.26×10^6	1.13×10^{-4}	35 Rem
$.10 \times 10^6$	1.0×10^5	9.0×10^{-5}	60 Rem
$.34 \times 10^6$	8.35×10^7	7.5×10^{-5}	50 Rem
$.67 \times 10^6$	6.67×10^7	6×10^{-5}	40 Rem
1.0×10^6	5.0×10^7	4.5×10^{-5}	30 Rem
1.67×10^6	4.17×10^7	3.75×10^{-5}	25 Rem
1.33×10^6	3.33×10^7	3×10^{-5}	20 Rem
1.0×10^6	2.5×10^7	2.3×10^{-5}	15 Rem
$.65 \times 10^5$	1.67×10^7	1.5×10^{-5}	10 Rem
$.04 \times 10^5$	1.26×10^7	1.13×10^{-5}	7.5 Rem
$.34 \times 10^5$	8.35×10^6	7.5×10^{-6}	5 Rem
$.67 \times 10^5$	6.67×10^6	6×10^{-6}	4 Rem
1.0×10^5	5.0×10^6	4.5×10^{-6}	3 Rem
1.78×10^5	4.44×10^6	4×10^{-6}	2.6 Rem
1.33×10^5	3.33×10^6	3×10^{-6}	2 Rem
$.65 \times 10^4$	1.67×10^6	1.5×10^{-6}	1 Rem
1.0×10^4	1.15×10^6	1.35×10^{-6}	.9 Rem
$.65 \times 10^4$	1.17×10^6	1.05×10^{-6}	.7 Rem
4.0×10^4	1.0×10^6	9×10^{-7}	.6 Rem
3.34×10^4	8.35×10^5	7.5×10^{-7}	.5 Rem
2.67×10^4	6.67×10^5	6×10^{-7}	.4 Rem
2.0×10^4	5.0×10^5	4.5×10^{-7}	.3 Rem
1.33×10^4	3.33×10^5	3×10^{-7}	.2 Rem
$.65 \times 10^3$	1.67×10^5	1.5×10^{-7}	.19 Rem
3.34×10^3	8.35×10^4	7.5×10^{-8}	.05 Rem
1.1×10^2	1.17×10^4	1.05×10^{-8}	.007 Rem

NE

E

SE

N

SE-2

SE-3

SE-4

SE-1

SE-10

SE-9

SE-8

Plant
Building

Service
Building

Turbine Building

#2 air
Intake

Control
Building

Control
Tower

Auxiliary & Fuel
Handling Building

Reactor
Building
Unit #1

Reactor
Building
Unit #2

Diesel
Generator
Building

Fuel Handling
Building

Auxiliary
Building

Diesel
Generator
Building

LEGEND

○ - Door Location

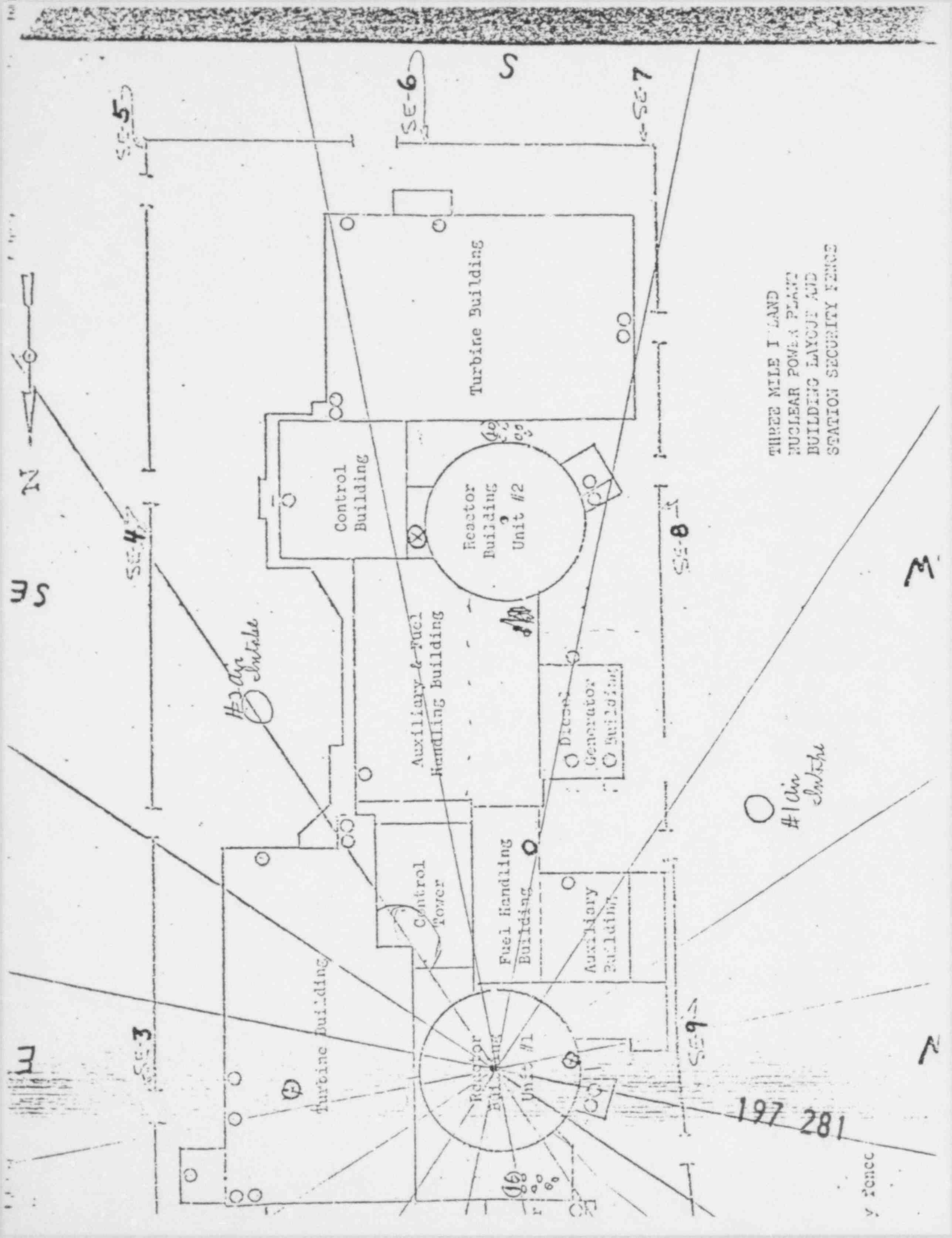
—|— Gate in security fence

#1 air
Intake

THREE MILE
NUCLEAR
BUILDING
STATION

197
280

N



THREE MILE I LAND
 NUCLEAR POWER PLANT
 BUILDING LAYOUT AND
 STATION SECURITY FENCE

Station Security Fence

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER W. E. ShumakerDATE 11-6-78AREA OF RESPONSIBILITY OFF SITE MONT. TEAM

TIME	EVENT	COMMENTS
T₀ = 1705	1ST ANNOUNCEMENT	
T+2 =	Rad. ALERT	
T+3 =	OFF SITE TEAM SELECTED	
T+	TEAM BRAVO'S EQUIP. CHECKED	
77-16	ECS TO BRAVO - GO TO N11	
T+20	LEFT SIMULATED W-HOUSE	
T+21	AT GATE (NO MONITORING)	MON. IS IN BOX. SIMULATED PICKING UP SECURITY GUARD
T+25	AT N11	REPORTED 300 HR/HR EXPOSURE (PTAC)
T+27.5	BRAVO TO TAKE AIR SAMPLES AS SOON AS PLUME ARRIVES	AS SOON AS PLUME
T+48	ORDERS TO MOVE OUT OF PLUME	NO ACTUAL AIR SAMPLE TAKEN
T+56	MOVING - EAST - TO 408 RT. 230 THRU MIDDLE TOWER	TO CONTACT TEAM CHARLIE (NOT DONE)
T+63	NO COMMUNICATIONS W/ ECS	
T+70	INSTRUCTED TO N11W-21 (NEW LOCATION)	
T+71	DRILL TERM.	

197 282

AT 24 MIN'S INTO DRILL TEAM BRAVO ARRIVED @ ^NGATE
WITH INSTRUCTIONS ^{ARRIVING LATER} SA TO SIMULATE PICKING UP A SECURITY
GUARD. THIS WAS DONE.

PROCEEDED TO POSITION N11 & WAITED FOR INSTR.
FROM ECS, WHICH CAME @ T+48. EQUIP. WAS SET UP
& CHECKED FOR OPERABILITY. NO ACTUAL AIR SAMPLE
TAKEN.

AT T+54 TEAM BRAVO GOT ORDERS TO MOVE OUT OF
PLUME. TEAM MOVED SO FAR EAST ^{ON THEIR OWN} THAT COMMUNICATION
WAS COMPLETELY LOST. TILL ^{THE} TEAM ~~WAS~~ GOT BACK
INTO COMM. ^{NNW21} WE FOUND OUT WE WERE SUPPOSED
TO BE @ . THIS WAS @ T+70. WE ACKNOWLEDGE
THE NEW POSITION AND AT THAT TIME WE WERE
TOLD THAT THE DRILL WAS TERMINATED. (T+71)

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER F. A. Good

DATE 1-17

AREA OF RESPONSIBILITY 1st Shift - Training

TIME	EVENT	COMMENTS
T=0 5:05	Drill announcement	announcement RMT set to 100
T= 5:12		
T= 5:25	R11 1st shift	all improvements checked out before drill drill drilling
T= 25	M. Gato	drill to get good on
T= 45		
T= 50	ECS to take air sample read level out of file out of individual	
T= 57	RMT set end of drill	

197 284

POOR ORIGINAL

1/m for
efficiency of 42%

1/m for
a 5.110⁵ sample

1/m for
10⁶/cc

Child Tryptid Dose Committee
for a 1 hour exposure

1/m for efficiency of 42%	1/m for a 5.110 ⁵ sample	1/m for 10 ⁶ /cc	Child Tryptid Dose Committee for a 1 hour exposure
.68 x 10 ⁶	1.67 x 10 ⁶	1.5 x 10 ⁻⁴	100 Rem
.04 x 10 ⁶	1.26 x 10 ⁶	1.13 x 10 ⁻⁴	35 Rem
.0 x 10 ⁶	1.0 x 10 ⁶	9.0 x 10 ⁻⁵	60 Rem
.34 x 10 ⁶	8.35 x 10 ⁷	7.5 x 10 ⁻⁵	50 Rem
.67 x 10 ⁶	6.67 x 10 ⁷	6 x 10 ⁻⁵	40 Rem
1.0 x 10 ⁶	5.0 x 10 ⁷	4.5 x 10 ⁻⁵	30 Rem
.67 x 10 ⁶	4.17 x 10 ⁷	3.75 x 10 ⁻⁵	25 Rem
.33 x 10 ⁶	3.33 x 10 ⁷	3 x 10 ⁻⁵	20 Rem
1.0 x 10 ⁶	2.5 x 10 ⁷	2.3 x 10 ⁻⁵	15 Rem
.68 x 10 ⁵	1.67 x 10 ⁷	1.5 x 10 ⁻⁵	10 Rem
.04 x 10 ⁵	1.26 x 10 ⁷	1.13 x 10 ⁻⁵	7.5 Rem
.34 x 10 ⁵	8.35 x 10 ⁶	7.5 x 10 ⁻⁶	5 Rem
.67 x 10 ⁵	6.67 x 10 ⁶	6 x 10 ⁻⁶	4 Rem
1.0 x 10 ⁵	5.0 x 10 ⁶	4.5 x 10 ⁻⁶	3 Rem
.78 x 10 ⁵	4.44 x 10 ⁶	4 x 10 ⁻⁶	2.6 Rem
.33 x 10 ⁵	3.33 x 10 ⁶	3 x 10 ⁻⁶	2 Rem
.68 x 10 ⁴	1.67 x 10 ⁶	1.5 x 10 ⁻⁶	1 Rem
1.0 x 10 ⁴	1.5 x 10 ⁶	1.35 x 10 ⁻⁶	.9 Rem
.68 x 10 ⁴	1.17 x 10 ⁶	1.05 x 10 ⁻⁶	.7 Rem
1.0 x 10 ⁴	1.0 x 10 ⁶	9 x 10 ⁻⁷	.6 Rem
.34 x 10 ⁴	8.35 x 10 ⁵	7.5 x 10 ⁻⁷	.5 Rem
.67 x 10 ⁴	6.67 x 10 ⁵	6 x 10 ⁻⁷	.4 Rem
1.0 x 10 ⁴	5.0 x 10 ⁵	4.5 x 10 ⁻⁷	.3 Rem
.33 x 10 ⁴	3.33 x 10 ⁵	3 x 10 ⁻⁷	.2 Rem
.68 x 10 ³	1.67 x 10 ⁵	1.5 x 10 ⁻⁷	.197 Rem
.34 x 10 ³	8.35 x 10 ⁴	7.5 x 10 ⁻⁸	.05 Rem

197-285

Practice Drill with Pa. State Participation

OBJECTIVES

1. To test the response of Unit 1 Operations Staff to an incredible Maximum Hypothetical Accident which occurs within a one-minute time interval.
2. To test the ability and speed of Unit 1 staff to utilize the contingency dose calculations and make the necessary off-site calls and other communications including communications of technical data to Pa. B.R.H.
3. To evaluate the ability to deploy both on and off-site emergency teams for both γ and radioiodine monitoring.
4. To test the ability of the site security to perform a rapid and accurate personnel accountability.

SCOPE

A case I LOCA with severe core damage and fuel melting with little or no cooling. The containment leaks at the maximum design leak rate.

INITIAL CONDITIONS

1. TMI Unit 1 is at 100% power.
2. Reactor Building purge is in progress.
3. A LOCA occurs resulting in severe core damage, fuel melting, and no effective core cooling.
4. Wind speed 2 mph, wind direction 180, wind range 20°, vertical temperature difference +0.4°.

SEQUENCE OF EVENTS

- | | |
|------|---|
| T=0 | <ol style="list-style-type: none"> 1. Low RC press. alarm. 2. Low-Low RC press. alarm. 3. RC press. decreasing rapidly. 4. Reactor trip alarm. 5. Turbine trip alarm. 6. Pressurizer low level alarm. 7. Safety injection actuated A&B. 8. Pressurizer Low-Low Level Alarm. 9. RM-G-5 alert alarm. 10. High reactor building temperature alarm. 11. Reactor building sump high level alarm. 12. Reactor building high pressure alarm. 13. Reactor building pressure increasing. 14. Makeup tank level decreasing rapidly with low level alarm. 15. various RMS alarms. 16. Core flood tank level alarms. 17. Purge valves indicate shut. |
| T=1 | <ol style="list-style-type: none"> 18. RM-G-8 is in high alarm, reading 20 R/hr. 19. RM-G-5, 6 & 7 all reading 10 R/hr. |
| T=60 | <ol style="list-style-type: none"> 20. RM-A-239 particulate, iodine, gas all off scale and in high alarm. 21. Wind speed 3 mph, wind direction 140°, wind range 30° vertical temperature difference +0.2°. |

197 286

DRILL OBSERVATION SHEET

Observers Name: _____ Drill Date: 11/6/78

Observers Location: Accompany any personnel leaving the Control Room after T=5

Drill Title: Unit 1 MHA - Practice Drill with Pa. State Participation

Information to Provide: Refer to Note 1.

Time Drill Commenced: _____ Time Drill Terminated: _____

OBSERVATIONS, COMMENTS & RECOMMENDATIONS Page _____ of _____

NOTE: Observations should include the proper and effective use of procedures, equipment, and personnel.

NOTE 1 - There are ultra-high levels of radiogas and radioiodine leakage throughout all Reactor Penetration areas. Any persons going into the Aux. Building or into any areas adjacent to the Unit 1 Reactor Containment Building will be in a radiation area in excess of 50 R/hr at T=5. Keep in mind that the following areas are in excess of 10 R/hr at T=10: Fuel Handling Building, Aux Building Sampling Room, outside the personnel hatches to containment on all elevations.

If any personnel go outside in any direction within 30° of downwind of the Containment Building, use the Note 2 data for γ exposures. Remember the building wake effects will distribute the fission products very rapidly around the site during these low wind velocity and stable meteorological conditions.

NOTE: Use additional pages as necessary.

Signature: _____ Title: 197 287

THI
DRILL OBSERVATION SHEET

Observer Name: _____ Drill Date: 11/6/78

Observer Location: Accompany On-Site (Outside) Survey Team

Drill Title: Unit 1 MHA - Practice Drill with Pa. State Participation

Information to Provide: Note 2 data as appropriate

Assign large doses to Team if Team loiters in any buildings close to Unit 1 Reactor Building. Since large dose rates are involved, be very aware of dose to Team members.

Time Drill Commenced: _____ Time Drill Terminated: _____

OBSERVATIONS, COMMENTS & RECOMMENDATIONS Page _____ of _____

NOTE: Observations should include the proper and effective use of procedures, equipment, and personnel.

NOTE 2 - Data for the On-Site (Outside) Survey Team

The outside downwind dose (by reading) starting with the closest ground-level point to the Unit 1 vent will be as follows:

By Survey Meter - Distance From Vent (On-Site)

	100' 100'	500'	1000'	2000' γ 1000'
T=10	80 R/hr	14 R/hr	4 R/hr	1600 mR/hr
T=20	160 R/hr	13 R/hr	8 R/hr	3200 mR/hr
T=30	320 R/hr	26 R/hr	12 R/hr	6400 mR/hr

End of Drill

NOTE: In sectors directly adjacent to downwind sectors, use γ doses which are the same as the downwind sector. In sectors next to these adjacent sectors, use a factor of 10 less than the downwind sector.

NOTE: Use additional pages as necessary

197 288

Signature: _____ Title: _____

NOTE 3

LOCA (MHA) Calculations for TMI Unit-1 Drill of 11/6/78

If RM-G8=20R/hr, then I=0.33 Ci/sec and Noble Gas=44.4 Ci/sec.

Then, for the Site Boundry in the N direction, utilizing the Off-Site Dose Calculation Sheet:

	<u>Iodine</u>	<u>Noble Gas</u>	<u>units</u>
1) Source Term =	= 0.33	44.4	Ci/sec
2) x/Q	= 1×10^{-3}	1×10^{-3}	sec/M ³
3) #1 x #2	= 3.3×10^{-4}	4.44×10^{-2}	µCi/cc
4) Wind Speed	= 2	2	MPH
5) #3 ÷ #4	= 1.65×10^{-4}	2.22×10^{-2}	µCi/cc
6) Dose Rate	= _____	9	R/hr.
7) Expected Release Duration	= 2	_____	hours
8) Expected Child Thyroid Dose	≈ 240	_____	Rem

<u>Site</u>	<u>Angle</u>	<u>Child Thyroid dose in R/hr.</u>	<u>Noble Gas R/hr.</u>	<u>Time for Plume To Arrive</u>
N11	0°	30	2.25	50 min.
N21	0°	12	0.9	1 hr. 10 min.
N31	320°	0.84	0.063	1 hr. 40 min.
N41	319°	6	0.45	1 hr. 50 min.
N52	319°	3	0.23	2 hr. 10 min.
N61	310°	0	0	3 hrs.
10 mi radius Center of Harrisburg	320°	3	0.23	3 hrs. 40 min.

197 289

TPI UNIT 1 RADIATION EMERGENCY DRILL - MIA - 11/6/78
Practice Drill with Pa. State Participation

Distance Plume Travel (miles)	N11 0°		N21 0°		NW31 323°		NW41 319°		NE52 319°		NE71 310°	
	γ R/hr.	I d/m*	γ R/hr.	I d/m	γ R/hr.	I d/m	γ R/hr.	I d/m	γ R/hr.	I d/m	γ R/m	I d/m
0.25	0	0	0	0	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0
1.5	0	0	0	0	0	0	0	0	0	0	0	0
2	5	5x10 ⁶	0	0	0	0	0	0	0	0	0	0
3	5	5x10 ⁶	1	1.67x10 ⁷	0	0	0	0	0	0	0	0
4	4	4x10 ⁶	1	10	.06	1.67x10 ⁶	0	0	0	0	0	0
5	3	3x10 ⁶	0.6	5x10	.06	1.67x10 ⁶	6	8.35x10 ⁵	See Note 3	3	0	0
7.5	2	2x10 ⁶	0.4	3x10	.06	1.67x10 ⁶	6	8.35x10 ⁵	See Note 3	3	0	0
10	1	10 ⁶	0.2	10 ⁶	.05	1.3x10 ⁶	6	8.35x10 ⁵	See Note 3	3	See Note 3	See Note 3

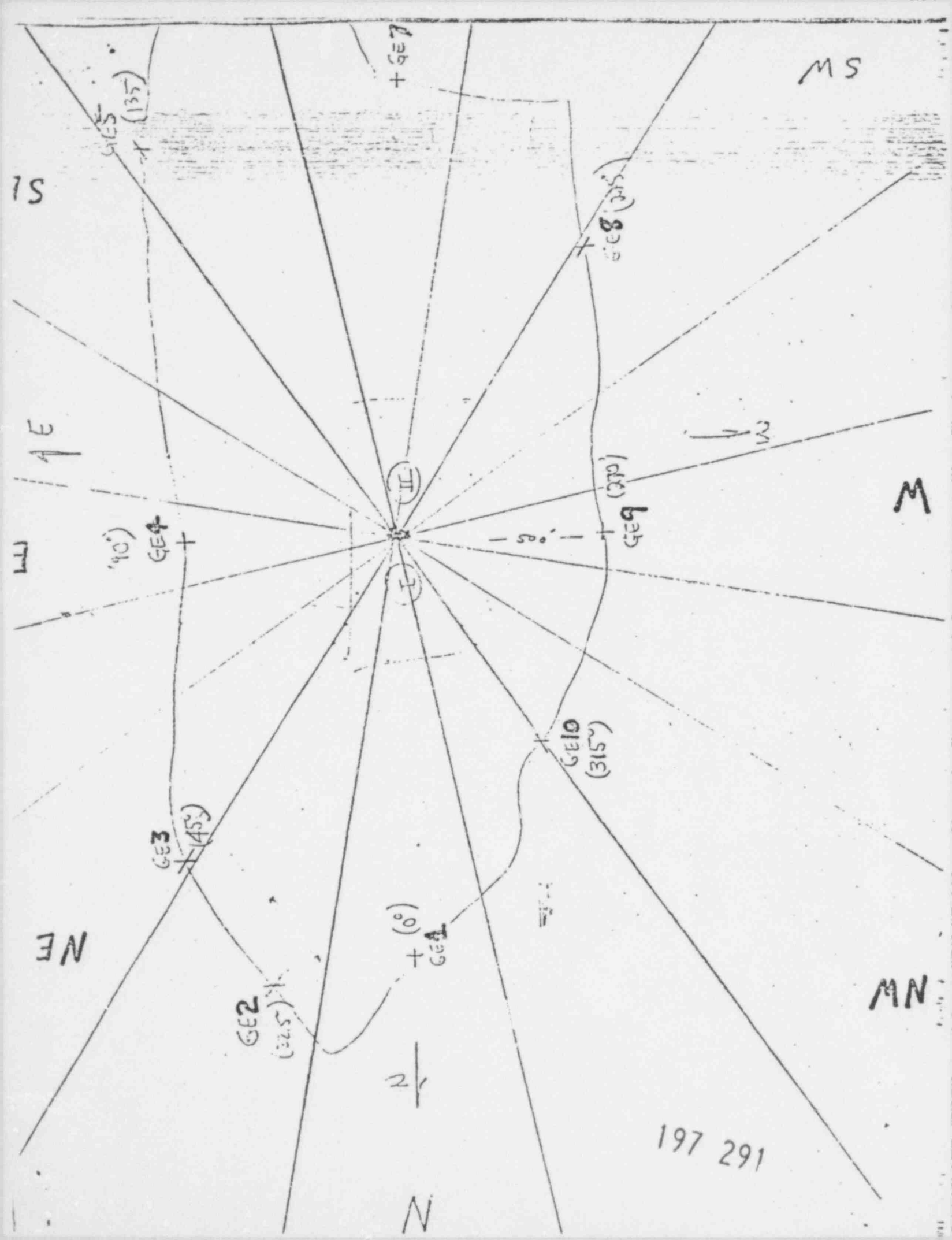
197 290

TE:
 nd from 180° at 2 MPH toward the N for T=0 to T=60
 nd from 140° at 3 MPH toward the NW
 adjacent Sectors off-site are a factor of 10 less than the downwind sector.

Assumes a 5x10⁵ cc sample. To obtain c/m, divide the d/m listed by:
 52.4 for Kit #1
 26.0 for Kit #2
 27.8 for Kit #3
 21.3 for Kit #4

10/1/78
 5/16

... to obtain Child Thyroid 1-hour Intake Dose.



SE

SW

E

M

W

W

NE

NW

N

197 291

TMI UNIT 1 RADIATION EMERGENCY DRILL
Practice Drill with Pa. State Participation

Distance Plume Travel (miles)	SE1 0°		SE2 45°		SE10 320°		GE-1 0°		GE-2 22°		GE-3 40°	
	Y R/hr.	I d/m*	Y R/hr.	I d/m	Y R/hr.	I d/m	Y R/hr.	I d/m	Y R/hr.	I d/m	Y R/m	I d/m
.5	10	1.67x10 ⁷	1	1.67x10 ⁶	1	1.67x10 ⁶	0	0	0	0	0	0
5	16	8.35x10 ⁷	1.6	8.35x10 ⁶	1.6	8.35x10 ⁶	3	1.5x10 ⁶	1	1.2x10 ⁶	0.4	5x10 ⁴
30	24	1.67x10 ⁸	2.4	1.67x10 ⁷	2.4	1.67x10 ⁷	20	1.25x10 ⁸	15	1x10 ⁸	1	5x10 ⁵
45	30	1.83x10 ⁸	3	1.83x10 ⁷	3	1.83x10 ⁷	25	1.25x10 ⁸	18	1x10 ⁸	2	10 ⁷
60	30	1.83x10 ⁸	3	1.83x10 ⁷	3	1.83x10 ⁷	25	1.25x10 ⁸	18	1x10 ⁸	2	10 ⁷
80	30	1.83x10 ⁸	2	1.67x10 ⁷	10	1.67x10 ⁷	25	1.5x10 ⁸	8	5x10 ⁷	1	5x10 ⁵
100	30	1.83x10 ⁸	1	1.67x10 ⁷	20	5x10 ⁷	25	1.5x10 ⁸	1	3x10 ⁷	0.5	5x10 ³
120	30	1.83x10 ⁸	0.5	1.67x10 ⁷	30	1.67x10 ⁸	25	1.5x10 ⁸	0.4	1.5x10 ⁷	0.2	5x10 ²
190	30	1.83x10 ⁸	0.5	1.67x10 ⁷	30	1.67x10 ⁸	25	1.5x10 ⁸	0.3	1.25x10 ⁷	0.1	50
240	30	1.5x10 ⁸	0.5	1.5x10 ⁷	25	1x10 ⁸	20	1x10 ⁸	0.2	1x10 ⁷	0.05	0

NOTE:
Wind from 180° at 2 MPH toward the N for T=0 to T=60
Wind from 140° at 3 MPH toward the NW for T=60 to end of drill.
Adjacent Sectors off-site are a factor of 10 less than the downwind sector.
On-site adjacent sectors are the same as the downwind sector.

*Assumes a 5x10⁵ cc sample. To obtain c/m, divide the d/m listed by:
52.4 for Kit #1
26.0 for Kit #2
27.8 for Kit #3
21.3 for Kit #4

to SAM-2 Conversion Table to obtain Child Thyroid 1 hour Intake Dose.
on, the adult dose is one-half of the Child Thyroid Dose.

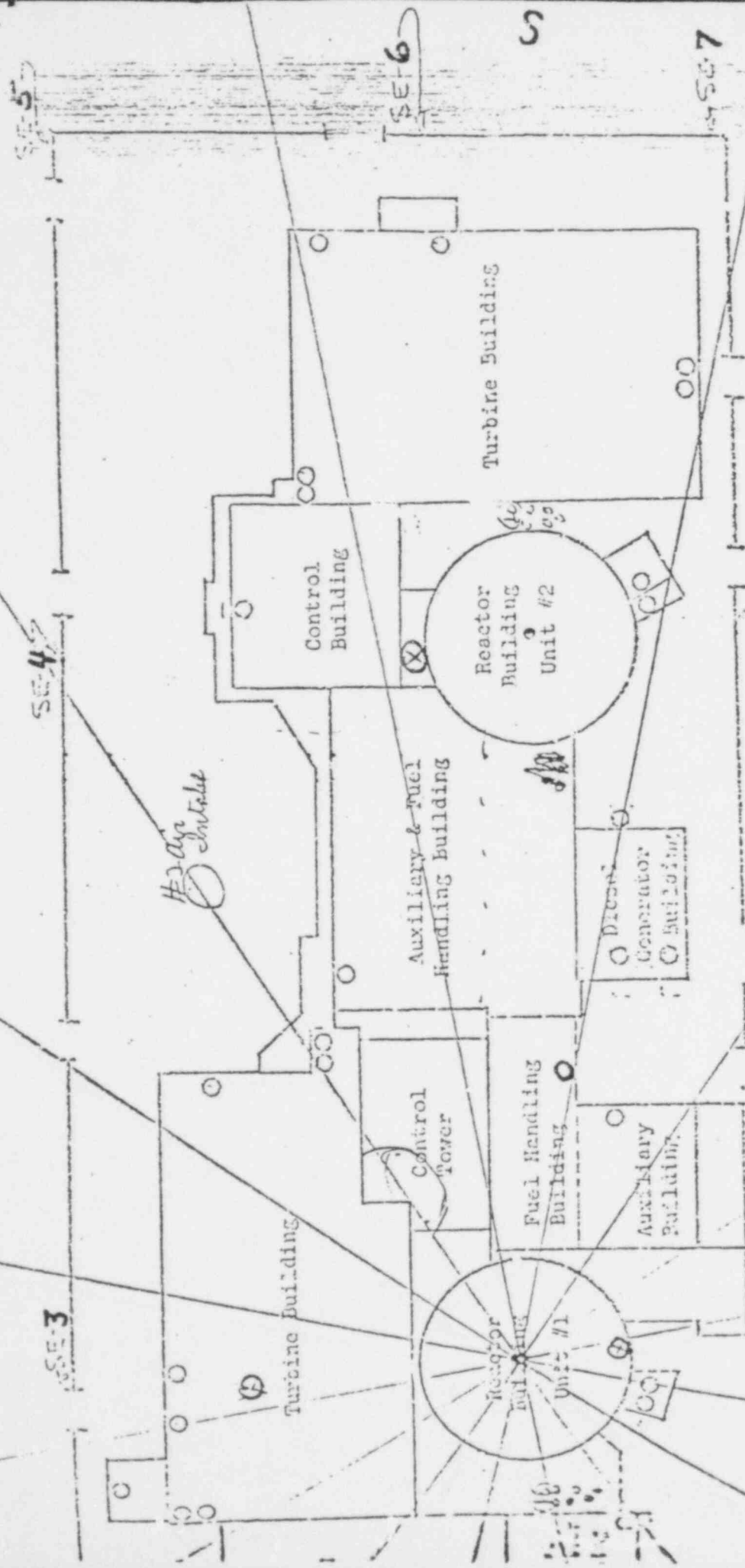
197 292

SW N

W

SE

E



THREE MILE ISLAND
 NUCLEAR POWER PLANT
 BUILDING LAYOUT AND
 STATION SECURITY FENCE

197 293

Station Security Fence

NE

E

SE

N

SE-2

SE-3

SE-4

Security Building

Service Building

Turbine Building

#2 Air Intake

Control Building

SE-1

Diesel Generator Building

Reactor Building Unit #1

Control Tower

Auxiliary & Fuel Handling Building

Reactor Building Unit #2

197 294

Fuel Handling Building

Auxiliary Building

Diesel Generator Building

SE-9

SE-8

SE-10

LEGEND

○ - Door Location

— Gate in security fence

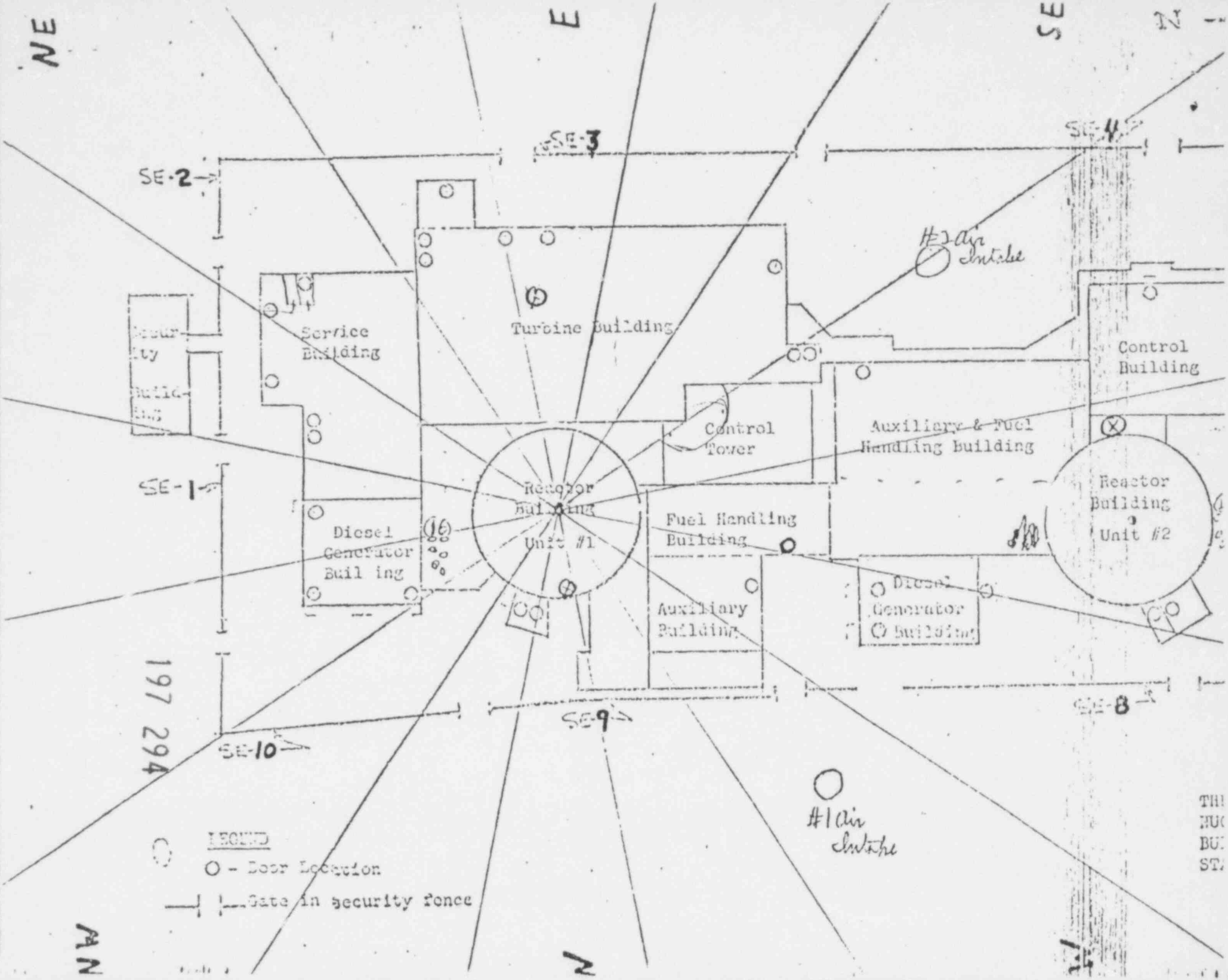
#1 Air Intake

THE
NUC
BU
ST

NW

N

SE



ENCLOSURE #2

RADIATION EMERGENCY DRILL
OBSERVER CRITIQUE SHEET

OBSERVER HUSTED

DATE 11/6/78

AREA OF RESPONSIBILITY U-II Control Room

TIME	EVENT	COMMENTS
T=0	ok	ok
T=4	still no word from U-I	
T=6	discussed release from U-II did not occur	marked charts
T=15	Simulated spec. lig. release U-1 called LOCA	
T=16	Vent on main	
T=18	Bowling calculations	

TRAINING PROGRAM ADMINISTRATIVE FORM

3
22A

1. LESSON/COURSE: RAD EMER DRILL - UNIT 1 OTSG TUBE RUF.

2. LOCATION: TMI

3. PERSONNEL ATTENDING: (PLEASE PRINT):

NAME	EMPLOYEE NO. 4 8	NAME	EMPLOYEE NO. 4 8
J. LOGAN	06688	M. ROSS	04680
J. FLOYD	03842	D. JAMES	05460
G. HITZ	04747	V. ORLANDI	06233
H. CRAWFORD	06512	R. BARLEY	06248
C. HARTMAN	05258	J. DUPES	05535
J. HILBISH	06055	K. BURKHOLDER	04060
K. DEITZ	04830	G. KUNDER	04578
E. SHOWALTER	06225	S. PORTER (CONSULTANT)	01111
G. NAGLE	04989	D. DONALDSON (USNRC)	01111
A. KNOCHE	06241	T. JACKSON (USNRC)	01111
T. MULLEAVY	06243	D. HAVERKAMP (USNRC)	01111
P. VELEZ	05462	J. MCCONNELL	06825
R. MCCANN	02917	N. BROWN	05318

COMPLETION DATE

MO	DAY	YR
11	08	78

CATALOG NUMBER

FILE NO.				LESSON
C	T	Y	S	IF
15		22	23	26
14	510	001		

TOTAL COURSE DURATION

HOURS
00.025

197 296

4. LECTURE HOURS OTHER HOURS 2.5 EXPLAIN 1.5 - DRILL / 1 - CRITIQUE

5. ENTER THE PREFIX FOR THE APPROPRIATE MODE:

MODE PREFIX
DRL

CORRESPONDENCE (CCS)	REVIEWER (RVR)
FILM (FLM)	SCHOOL (SCH)
LECTURE (LEC)	SEMINAR (SEM)
OUT (OUT)	VIDEOTAPE (VTP)
ORIGINATOR (ORR)	

35	COMMENT	59
	RAD, EMER, DRILL - U1, OTSG, T.R.	

GPF 0007.003

Rev 3

TRAINING PROGRAM ADMINISTRATIVE FORM

1	3
2	2A

1. LESSON/COURSE: RAD. EMERG. DRILL - UNIT 1

2. LOCATION: TMI

3. PERSONNEL ATTENDING: (PLEASE PRINT):

NAME	EMPLOYEE NO. 4 8	NAME	EMPLOYEE NO. 4 8
M. BEERS	05404	R. ROEHMER	05133
B. GOOD (RDG.)	06821	N. MONSON	05106
R. VAN STRY	06391	B. KELLER	05591
D. BOLTZ	04506	M. BAYNARD	05388
F. Mc LORMICK	06169	D. SPATH	06151
E. ORWIG	06405	D. WILT	06626
J. TAYLOR	06373	R. JOHNSON	06624
D. SHOVLIN	05956	W. DEIMLER	05834
G. MILLER	06244	V. HEILMAN	05799
R. DUBIEL	06246	J. DONNACHIE	05365
D. REPPERT (RDG.)	01111	T. PYKE	04998
J. MANOSKEY	04915	D. KEESLER	06004
C. MILLER	04636	H. FURST	02263

COMPLETION DATE

MO	DAY	YR
9	14	
11	08	78

CATALOG NUMBER

FILE NO.				LESSON ID	
C	A	T	G	T	S
15				22	23
14510	001				

TOTAL COURSE DURATION

HOURS	
27	31
0,0,0	2,5

4. LECTURE HOURS OTHER HOURS 2.5 EXPLAIN 1.5 - DRILL/97 - 200101E

5. ENTER THE PREFIX FOR THE APPROPRIATE MODE:

MODE PREFIX
32 34

CORRESPONDENCE (CCS)	REVIEWER (RVR)
FILM (FLM)	SCHOOL (SCH)
LECTURE (LEC)	SEMINAR (SEM)
OJT (OJT)	VIDEOTAPE (VTP)
ORIGINATOR (OGI)	

35	COMMENT	39
----	---------	----

GPF0007.003 Rev 3

6. METHOD OF EVALUATION (Check at least one)

A. WRITTEN TEST _____ (Attach copy of answers, and graded tests)

B. ORAL QUESTIONING, SPOT CHECK _____

C. QUIZ _____ (Attach questions and answers)

D. OTHER _____ (Explain):

7. INSTRUCTOR/TRAINEE'S EVALUATION (This section must be filled in)

(Based on your method of evaluation briefly describe the effectiveness of the training)

f. a. m. wil

INSTRUCTOR/TRAINEE'S SIGNATURE

11-10-78

DATE

8. SIGNATURE OF SUPERVISOR OF TRAINING/TRAINING COORDINATOR _____ DATE _____

ATTACH LESSON OUTLINE/ITEMS COVERED

197 299

TRAINING PROGRAM ADMINISTRATIVE FORM

22A

1. LESSON/COURSE: RAD. EMERGENCY DRILL - UNIT 1

2. LOCATION: TMI

3. PERSONNEL ATTENDING: (PLEASE PRINT):

NAME	EMPLOYEE NO. 4 8	NAME	EMPLOYEE NO. 4 8
<u>D. ZEITER</u>	<u>05651</u>		<u>0</u>
<u>T. DAVIS</u>	<u>05469</u>		<u>0</u>
<u>D. ETHRIDGE</u>	<u>06056</u>		<u>0</u>
	<u>0</u>		<u>0</u>
	<u>0</u>		<u>0</u>
	<u>0</u>		<u>0</u>
	<u>0</u>		<u>0</u>
	<u>0</u>		<u>0</u>
	<u>0</u>		<u>0</u>
	<u>0</u>		<u>0</u>
	<u>0</u>		<u>0</u>
	<u>0</u>		<u>0</u>
	<u>0</u>		<u>0</u>
	<u>0</u>		<u>0</u>
	<u>0</u>		<u>0</u>

COMPLETION DATE

MO	DAY	YR
9	14	
<u>11</u>	<u>08</u>	<u>78</u>

CATALOG NUMBER

FILE NO.				LESSON ID
CAT	TYPE	SUBJECT		
15	22	23	26	
<u>145</u>	<u>10</u>	<u>001</u>		

TOTAL COURSE DURATION

HOURS
27 31
<u>0.0025</u>

4. LECTURE HOURS OTHER HOURS 2.5 EXPLAIN 1.5-DRILL / 1-CRITIQUE

5. ENTER THE PREFIX FOR THE APPROPRIATE MODE:

CORRESPONDENCE	(CCS)	REVIEWER	(RVRI)
FILM	(FLM)	SCHOOL	(SCH)
LECTURE	(LEC)	SEMINAR	(SEM)
OJT	(OJT)	VIDEOTAPE	(VTP)
ORIGINATOR	(OGR)		

MODE PREFIX
34
DRL

COMMENT EMER. DRL - U.I. O.T.S.S. T.R.

GPF 0007.003 Rev 3

~~ENCLOSURE - 3~~

PERMISSION TO CONDUCT A
RADIATION EMERGENCY DRILL

I hereby authorize the Supervisor of Training to conduct a Radiation Emergency
Drill on 11/8/78 as ~~outline in the attached Scenario.~~
@ 1700



STATION SUPERINTENDENT OR DESIGNATE

10/28

DATE

197 302

ENCLOSURE #1

Date: 11-8-78

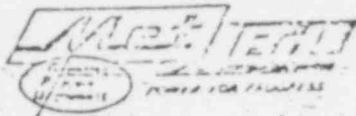
RADIATION EMERGENCY DRILL
OBSERVER ASSIGNMENT SHEET

AREA OF RESPONSIBILITY

OBSERVER

- | | |
|------------------------------------|---------------------------------|
| 1. Emergency Control Center (ECC) | 1. <u>BROWN / LANDRY</u> |
| 2. Emergency Control Station (ECS) | 2. <u>MCCORMICK / MCCONNELL</u> |
| 3. Emergency Repair Party | 3. <u>—</u> |
| 4. Accountability | 4. <u>VAN STRY / FUHRER</u> |
| 5. On-Site Monitoring Team | 5. <u>PORTER / ORWIG</u> |
| 6. Off-Site Monitoring Team | 6. <u>REPPERT / GOOD</u> |
| 7. Communications (local) | 7. <u>LANDRY / BEERS</u> |
| 8. Communications (off-site) | 8. <u>BEERS</u> |
| 9. UNAFFECTED UNIT C.R. | 9. <u>BOLTZ</u> |

197 303



METROPOLITAN EDISON COMPANY A DIVISION OF GENERAL PUBLIC UTILITIES CORPORATION

POST OFFICE BOX 480 MIDDLETOWN, PENNSYLVANIA 17057

TELEPHONE 717-944-4041

THREE MILE ISLAND NUCLEAR STATION

ANNUAL

RADIATION EMERGENCY DRILL

(with Pa. State Participation)

11/8/78

197 304

Scenario For TMI Annual Radiacgency Drill of 11/8/78

UNIT 1 STEAM GENERATOR RUPTURE WITH INITIAL FAILED FUEL - GENERAL EMERGENCY

Reference: Radiation Emergency Procs 70.2, 1670.3, 1670.4, 1670.7

OBJECTIVES:

1. To determine the cause of the accident, terminate the release, and place plant in safe condition.
2. To exercise the radiation emergency procedures.
3. To exercise the communications and off-site associated with a Radiation Emergency.
4. To evaluate the site personnel ability procedures.
5. To evaluate the ability to use models in calculating downwind doses.
6. To evaluate the ability to deploy teams and to communicate with them.
7. To coordinate the Pennsylvania Station Emergency Plan drill with this drill.

SCOPE

Simultaneous rupture of several steam generator tubes occurs during a 5% fuel element failure. The drill moves from a reactor trip to a turbine main steam safety valve release. The main steam valves do not reseal and the primary coolant radioactivity is discharged to the environment for 35 min. or more via an unmonitored release point. The condenser pumps continue to discharge out of the Turbine Building Vent for a total of 10 hours.

INITIAL CONDITIONS

1. TMI Units 1 & 2 are operating at power.

SEQUENCE OF EVENTS

Time in
Minutes

- T=0 (1) Rapid pressure decrease to SIG which causes reactor and turbine trip.
- (2) A S/G is at 1200 PSIG; B is 1120 PSIG.
- T=0 (3) The control room annunciates the following alarms:
a) Condenser vacuum pump failure, RMS alarms
b) Reactor Coolant low pressure alarm.
c) Pressurizer low level
- T=0 (4) Steam generator relief valve.
- T=0 (5) RM-LI (low) is off-scale; RP is 10,000 c/m (high alarm)
- T=1 (6) Condenser vacuum pump monitor in high alarm, reading 5×10^4 c/m.
- T=1 (7) RM-LI(Hi) is 3.6×10^4 c/m (hi)
- T=1 (7a) RM-A5 is OFF SCALE
- T=1 (7b) Wind from 280° at 3MPH to 100° for T=0 to T=60, Neutral meteorology (50° wind range)
- T=60 (7c) Wind from 240° at 2MPH to 60° from T=60 to end of drill,

197 305

Scenario For TMI Annual Radiopency Drill of 11/8/73

SEQUENCE OF EVENTS - Continued

Time in
Minutes

- T=4 (8) B S/G Relief Valves Reseat Pressure is 1010 PSIG, A S/G Pressure is 1120 PSIG
- T=8 (9) A S/G is 1090 PSIG, B S/G PSIG.
(10) Turbine Bldg. steam lines a 500 mR/hr. field in the North Assembly Area.
- T=15 (11) A S/G Pressure is 1070 PSIG is 860 PSIG.
- T=20 (12) A S/G is 1050 PSIG, B S/G) PSIG.
- T=35 (13) Main steam safety valves (Turbine Bldg. release continues)
- T=36 (14) A S/G is 1010 PSIG, B S/G) PSIG.
- T=60 (15) Condenser Vacuum exhaust red.
- T=62 (16) RM-A5 drops to 500 c/m.

IMI UNIT 1 RADIATION EMERGENCY DRILL - STEAM GENERATOR - 11/8/78
 Annual Drill with Pa. State Participation

T= Distance Plume Travel (miles)	SE3 90°		GE4 90°		Closest Resident 98°		E01 or ESE01 95°		E11A 93°		ESE31A 113°		ESE41 116°		ESE51 114°	
	Y R/hr.	I c/m*	Y R/hr.	I c/m	Y R/hr.	I c/m	Y R/hr.	I c/m	Y R/hr.	I c/m	Y R/hr.	I c/m	Y R/hr.	I c/m	Y R/hr.	I c/m
7	5	2x10 ⁵	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	5.5	4x10 ⁵	3	4x10 ⁴	0.8	4x10 ⁴	0	0	0	0	0	0	0	0	0	0
20	6	2x10 ⁶	4	4x10 ⁵	1.3	2x10 ⁵	0.1	4x10 ³	0	0	0	0	0	0	0	0
30	6	2x10 ⁶	4	4x10 ⁵	1.3	2x10 ⁵	0.2	2x10 ⁴	0	0	0	0	0	0	0	0
40	6	2x10 ⁶	4	4x10 ⁵	1.3	2x10 ⁵	0.2	2x10 ⁴	0.08	8x10 ³	0	0	0	0	0	0
60	2	3x10 ⁵	2	2x10 ⁵	1	4x10 ⁴	0.2	2x10 ⁴	0.1	1x10 ⁴	0	0	0	0	0	0
75	1	4x10 ⁵	1	4x10 ⁴	0.8	8x10 ³	0.1	1x10 ⁴	0.1	1x10 ⁴	0	0	0	0	0	0
90	0.8	4x10 ⁴	0.5	2x10 ⁴	0.4	8x10 ³	0.05	2x10 ³	0.01	4x10 ³	0.08	8x10 ³	0	0	0	0
105	0.6	4x10 ⁴	0.4	2x10 ⁴	0.2	8x10 ³	0	40	0	20	0.1	1x10 ⁴	0.05	4x10 ³	0	0
135	0.6	4x10 ⁴	0.4	2x10 ⁴	0.2	8x10 ³	0	0	0	0	0.05	400	0.05	4x10 ³	0.01	80
X/Q in sec/m ³	unknown		unknown		10 ⁻⁴		10 ⁻⁵		5x10 ⁻⁶		5x10 ⁻⁶		2.5x10 ⁻⁵		1x10 ⁻⁷	

NOTE:
 Δ Wind from 280° at 3MPH toward the E (100°) for T=0 to T=60, Neutral meteorology
 Δ Wind from 240° at 2MPH toward the ENE (60°) from T=60 to end of drill, neutral meteorology
 Δ Adjacent Sectors off-site are a factor of 10 less than the downwind sector.
 Δ Assumes a 5x10⁵ cc sample and a 4% detector efficiency for all SAM-2 kits.
 Δ Plume arrives at ESE21 at T=50, the X/Q here is ~5x10⁻⁶ for ~20 min., then diminishes rapidly.

* Refer to SAM-2 Conversion Table to obtain Child Thyroid 1 hour Intake Dose, or use the relationship 6.68x10⁴ c/m³ Child Thyroid Rad (per hour of exposure).

* For inhalation the adult dose is one-half of the Child Thyroid Dose.

Porter-Gertz Consultants, Inc.
 76 RITTENHOUSE PLACE
 AIRDMORE, PA. 19003
 215-486-6303

TMI UNIT 1 RADIATION EMERGENCY DRILL - STEAM GENERATOR

11/8/73

NOTE 1: Dose Calculations (Can be worked backwards by nuclear engineers to obtain source release terms)

$$\text{Given: } \frac{{}^{133}\text{Xe}}{{}^{131}\text{I}} = \frac{80}{1} = \frac{1600}{20}; \therefore \text{Total coolant activity} = 1620 \mu\text{Ci/cc}$$

ratio $\mu\text{Ci/cc}$

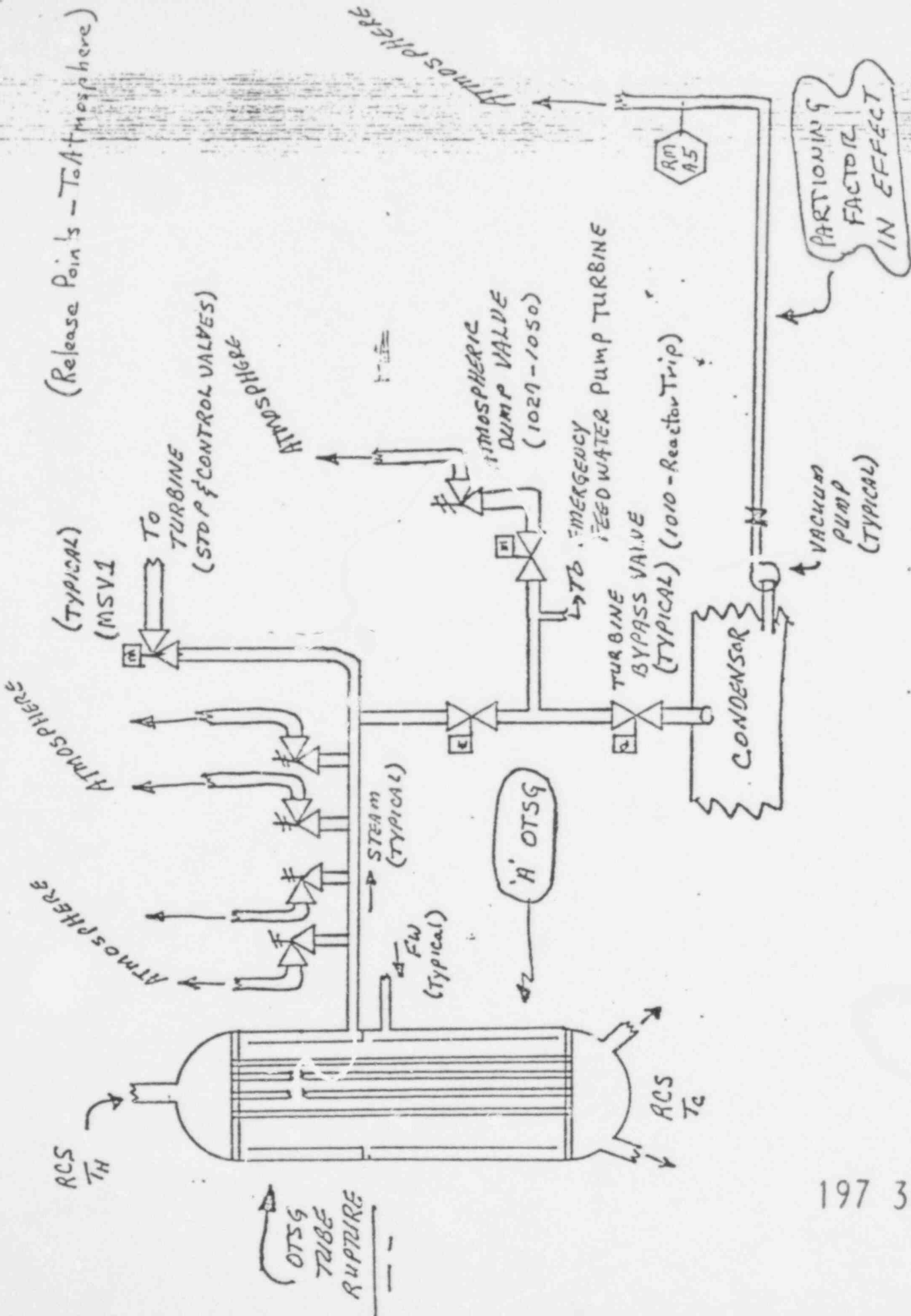
Given the 1 hr. Child Thyroid dose at closest resident is 30 R/hr.; this dose is caused by $4.5 \times 10^{-5} \mu\text{Ci/cc}$ of ${}^{131}\text{I}$. If the noble gas activity is 80 times this, it is $3.6 \times 10^{-3} \mu\text{Ci/cc} = \underline{1.3 \text{ R/hr.}}$ whole body dose from noble gases.

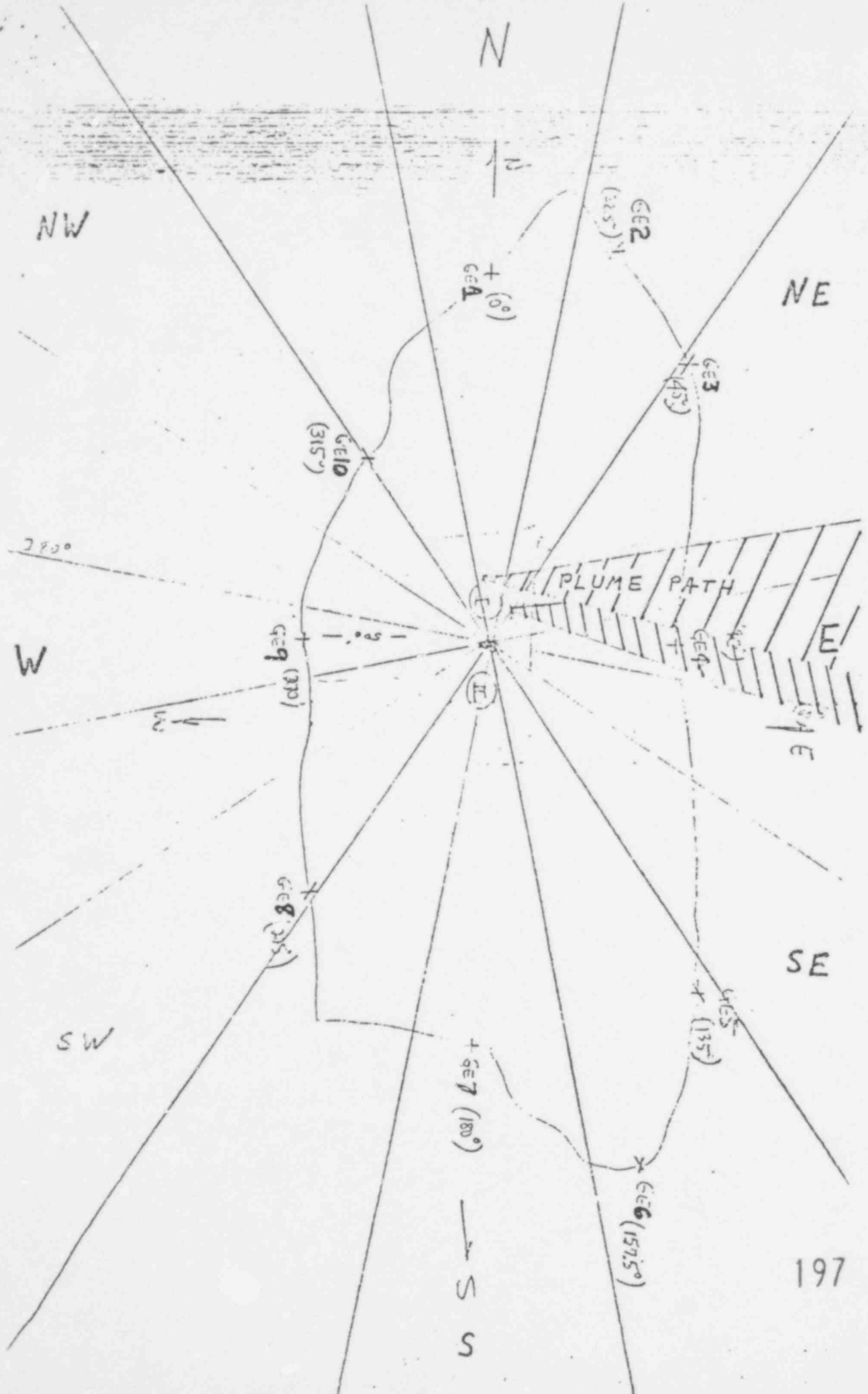
If the coolant is 1620 $\mu\text{Ci/cc}$, and RM-LI (Hi) response is 22.2 c/m/ $\mu\text{Ci/cc}$, then RM-LI (Hi) will read $3.6 \times 10^4 \text{ c/m}$

NOTE 2: Contingency Emergency Dose Calculations (after the ${}^{131}\text{I}$ 20 $\mu\text{Ci/cc}$ data is available)
for Closest Resident

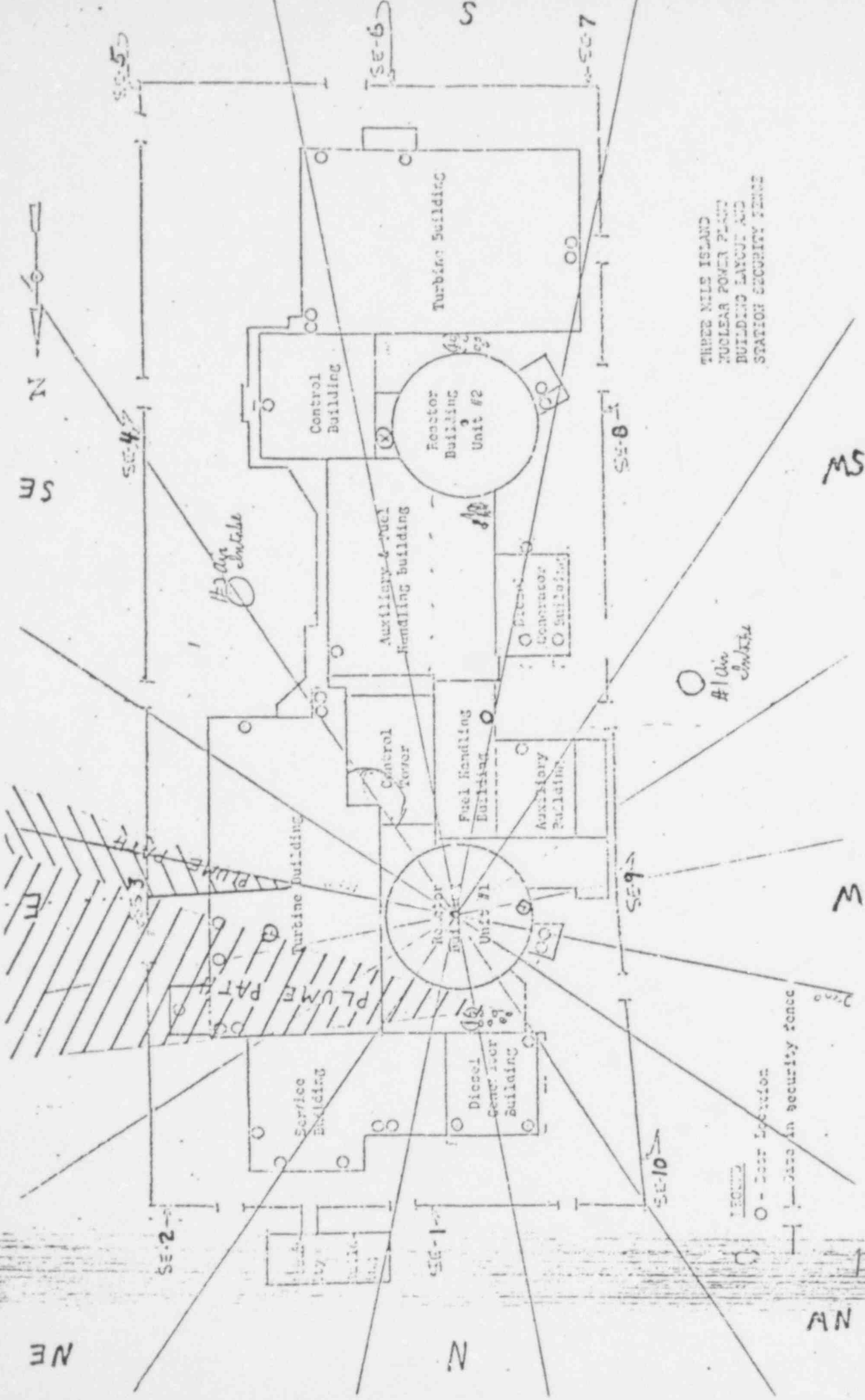
$$\begin{array}{ccccccc} 10^{-4} \times 5.6 \times 10^6 & = & 560 \text{ mR/hr.} & \times & 20 & = & 11,200 \text{ mR/hr.} \text{ Adult Thyroid dose} \\ \downarrow & & \downarrow & & \downarrow & & \text{(or 22 R/hr. to Child Thyroid)} \\ \text{x/Q} & & \text{for } 1 \mu\text{Ci/cc } {}^{131}\text{I} & & 1 \mu\text{Ci/cc} & & \end{array}$$

197 308





197 310



THREE MILE ISLAND
 NUCLEAR POWER PLANT
 BUILDING LAYOUT AND
 STATION SECURITY FENCE

#1 Gate Location

Legend
 Gate in security fence
 Gate Location

197 311

AN

T=0

RMA5 1×10^5 CPM

HIGH ALARM

T=3

RMA5 "OFF SCALE"

197 312

T=4

RML1 (HIGH)

3.6×10^4 CPM

HIGH ALARM

T=0

RML1 (LOW) OFFSCALE

HIGH ALARM

RML1 (HIGH) 10^4 CPM

HIGH ALARM

197 313

METEOROLOGICAL CONDITIONS

WIND INDICATOR = 280°

WIND SPEED = 3 MPH

WIND RANGE = 54°

VERTICAL TEMP. $\Delta T = -0.5^{\circ}$

T=0

METEOROLOGICAL CONDITIONS

WIND INDICATOR = 240°

WIND SPEED = 2 MPH

WIND RANGE = 72°

VERTICAL TEMP. $\Delta T = -0.5^{\circ}$

197 314

T=60

T = 0

RAPID RCS PRESSURE DECREASE

1. Low RCS Pressure - REACTOR TRIP
2. TURBINE TRIP
3. PRESSURIZER LEVEL DECREASING

'A' OTSG PRESSURE 1200 PSIG

'B' OTSG PRESSURE 1200 PSIG

A & B Levels decreasing ('A' Level higher)

ALL MAIN STEAM RELIEF VALVES - OPEN

INITIAL
CONDITIONS

UNIT 1 - 100% FP

T = 34

'A' OTSG PRESSURE - 1010 PSIG

'B' OTSG PRESSURE - 570 PSIG

(ALL MAIN STEAM RELIEF VALVES CLOSED)

T = 20

'A' OTSG PRESSURE - 1050 PSIG

'B' OTSG PRESSURE - 860 PSIG

197 316

T=15

'A' OTSG PRESSURE - 1070 PSIG

'B' OTSG PRESSURE - 860 PSIG

T=8

'A' OTSG PRESSURE - 1090 PSIG

'B' OTSG PRESSURE - 950 PSIG

('B' OTSG - COOLDOWN CONTROL) 97 317

T=4

'A' OTSG PRESSURE - 1120 PSIG

'B' OTSG PRESSURE - 1010 PSIG

('B' MAIN STEAM RELIEF RESET)

Primary Coolant

(5 cc sample = 4.5 in.P./hr) \approx 100% GeLi dead time

after a 10-1 dilution, the GeLi detector system
is down to \sim 70% dead time

\rightarrow 1620 μ Ci/cc 15 min. gross degraded by activity
70 μ Ci/cc 131 I equiv.

197 318

T=5

A }
B } 10 R/hr

C }
D } 5 R/hr

T=15

A }
B }
C }
D } 7.5 R/hr

197 319

RMAS AREA

7.5 R/hr

$\dot{T} = 15$

POWDEX VESSEL AREA

10 R/hr

INCREASING IR/h EVERY 15 MIN

197 320

T=8

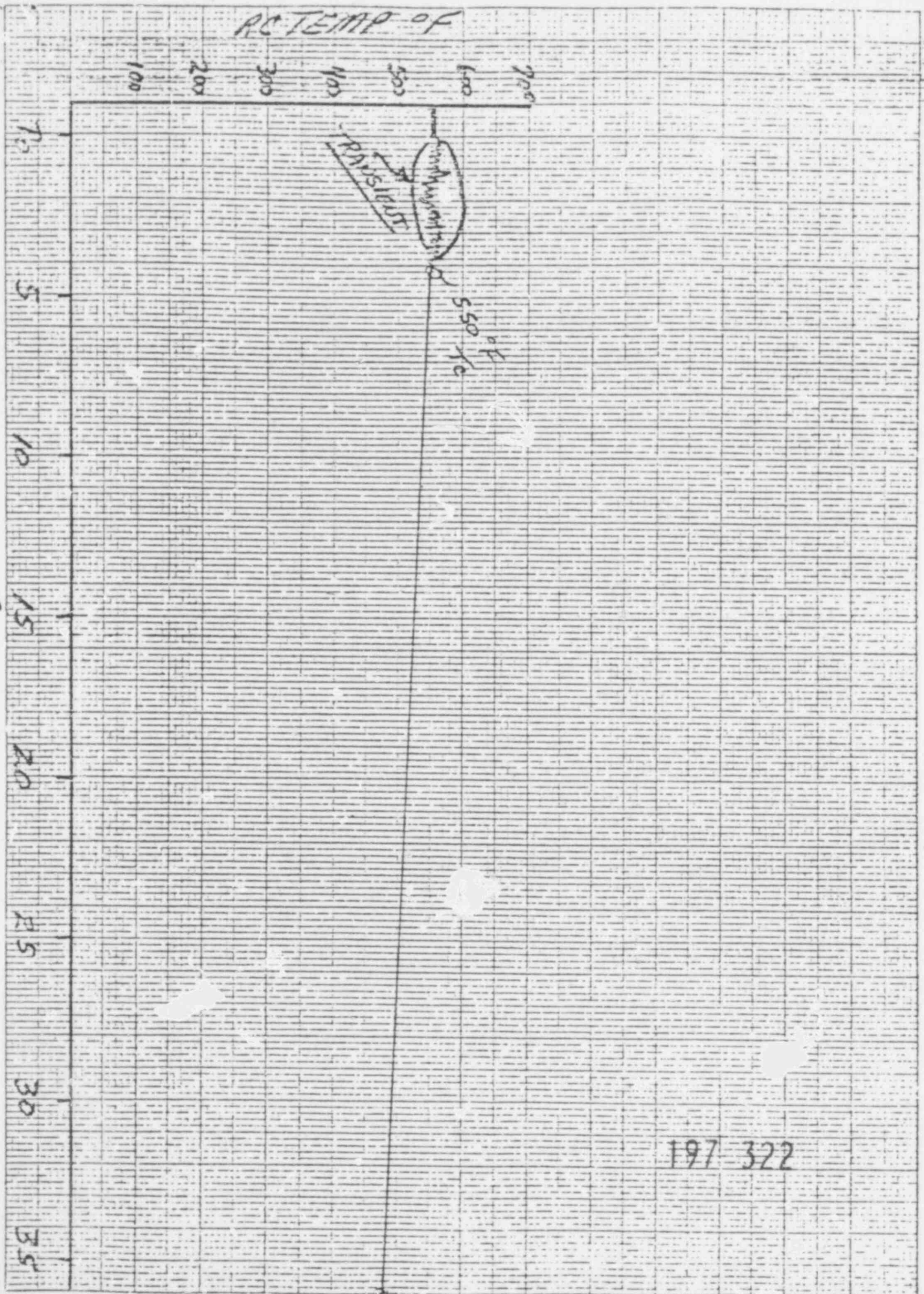
Service Building (Assembly Area) 500 mR/hr

SECURITY Building

10 mR/hr

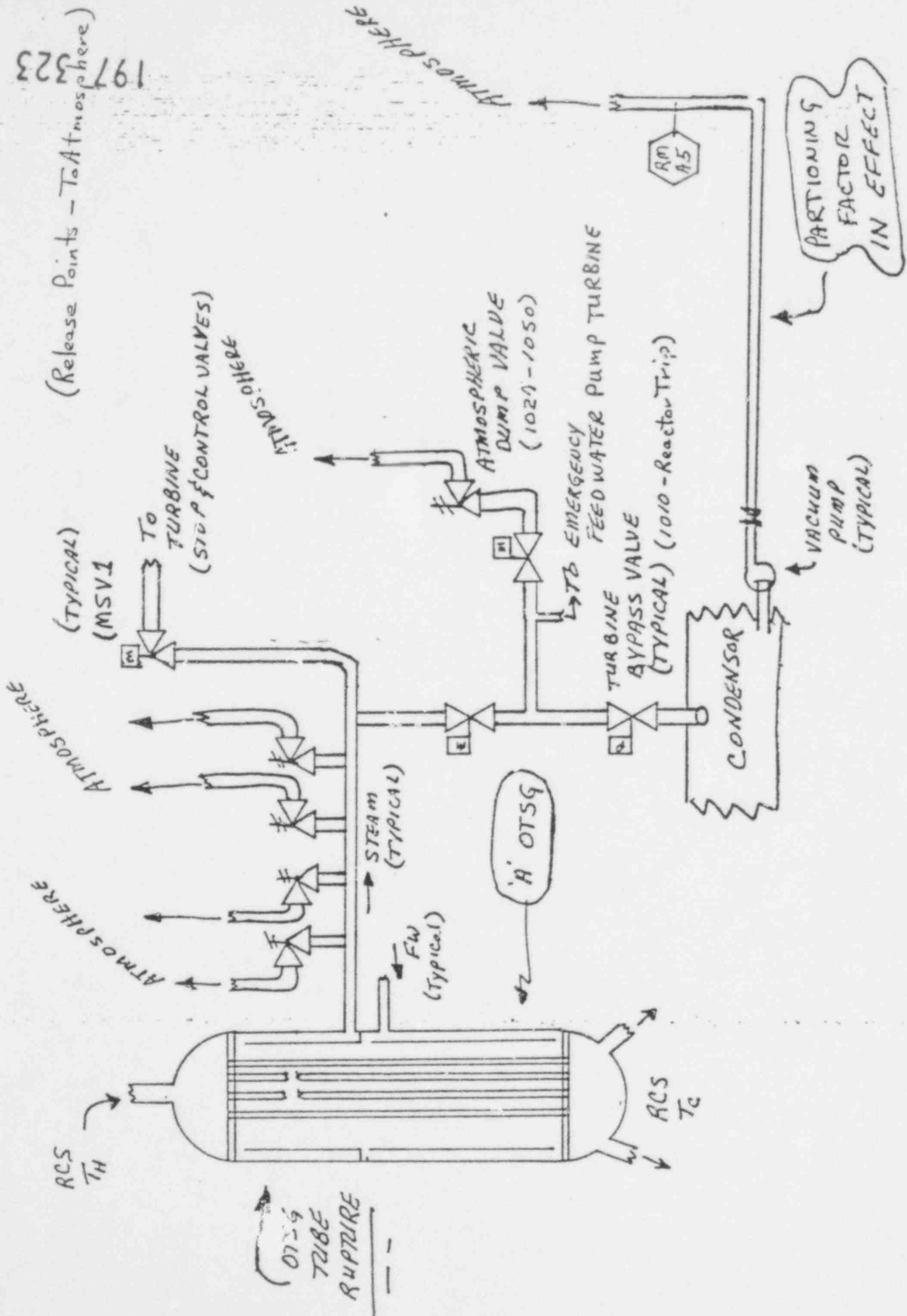
191 321

(MINUTES)



197 322

197323
(Release Points - To Atmosphere)



OTSG
TUBE
RUPTURE

ATMOSPHERE

ATMOSPHERE
ATMOSPHERE
ATMOSPHERE

(TYPICAL)
(MSV1)

To
TURBINE
(STOP & CONTROL VALVES)

ATMOSPHERIC
DUMP VALVE
(1021-1050)

EMERGENCY
FEED WATER PUMP TURBINE

TURBINE
BYPASS VALVE
(TYPICAL) (1010-React or Trip)

CONDENSOR

VACUUM
PUMP
(TYPICAL)

PARTIONING
FACTOR
IN EFFECT

RM
A5

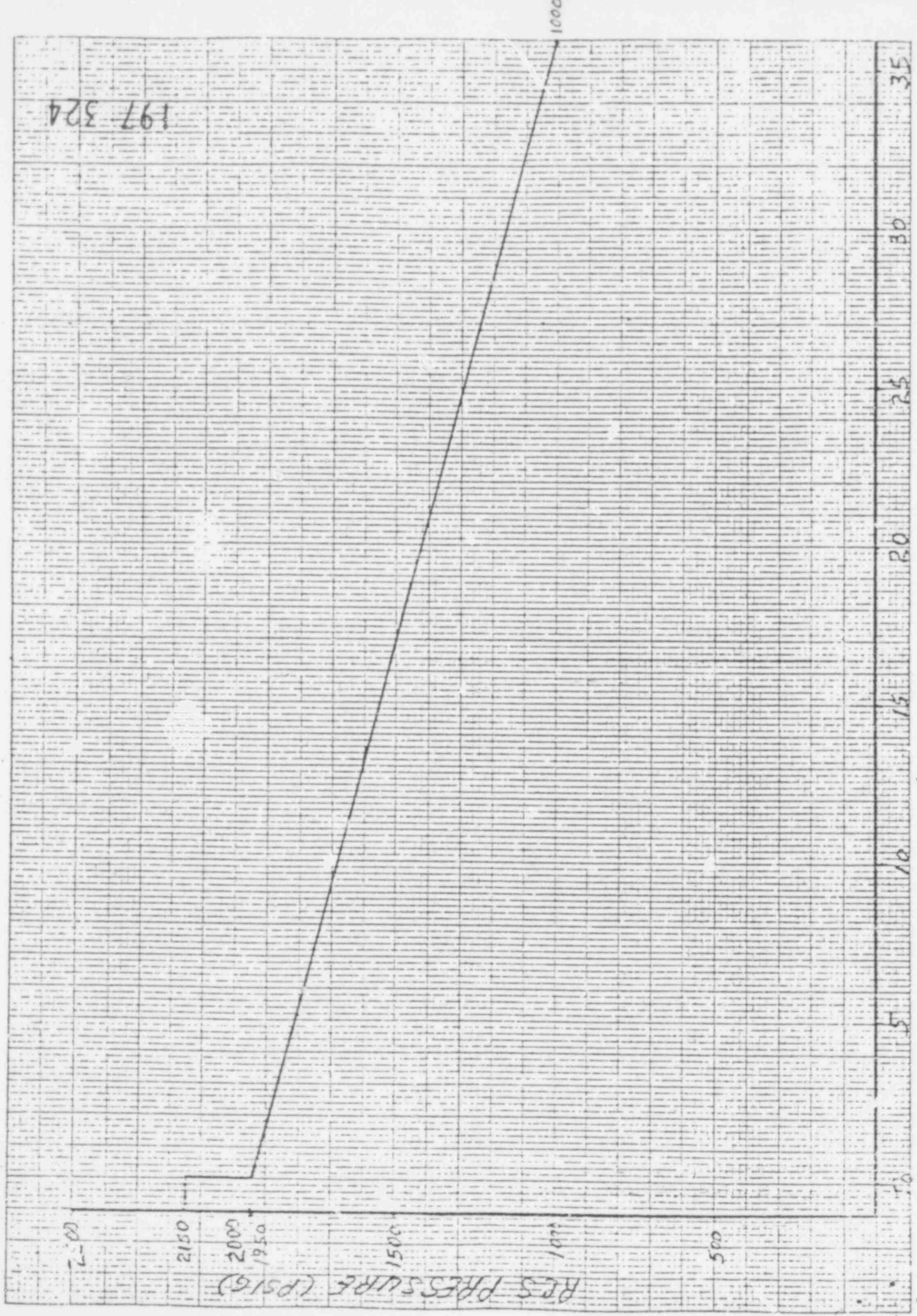
ACS
T_H

ACS
T_C

FW
(Typical)

'A' OTSG

STEAM
(TYPICAL)

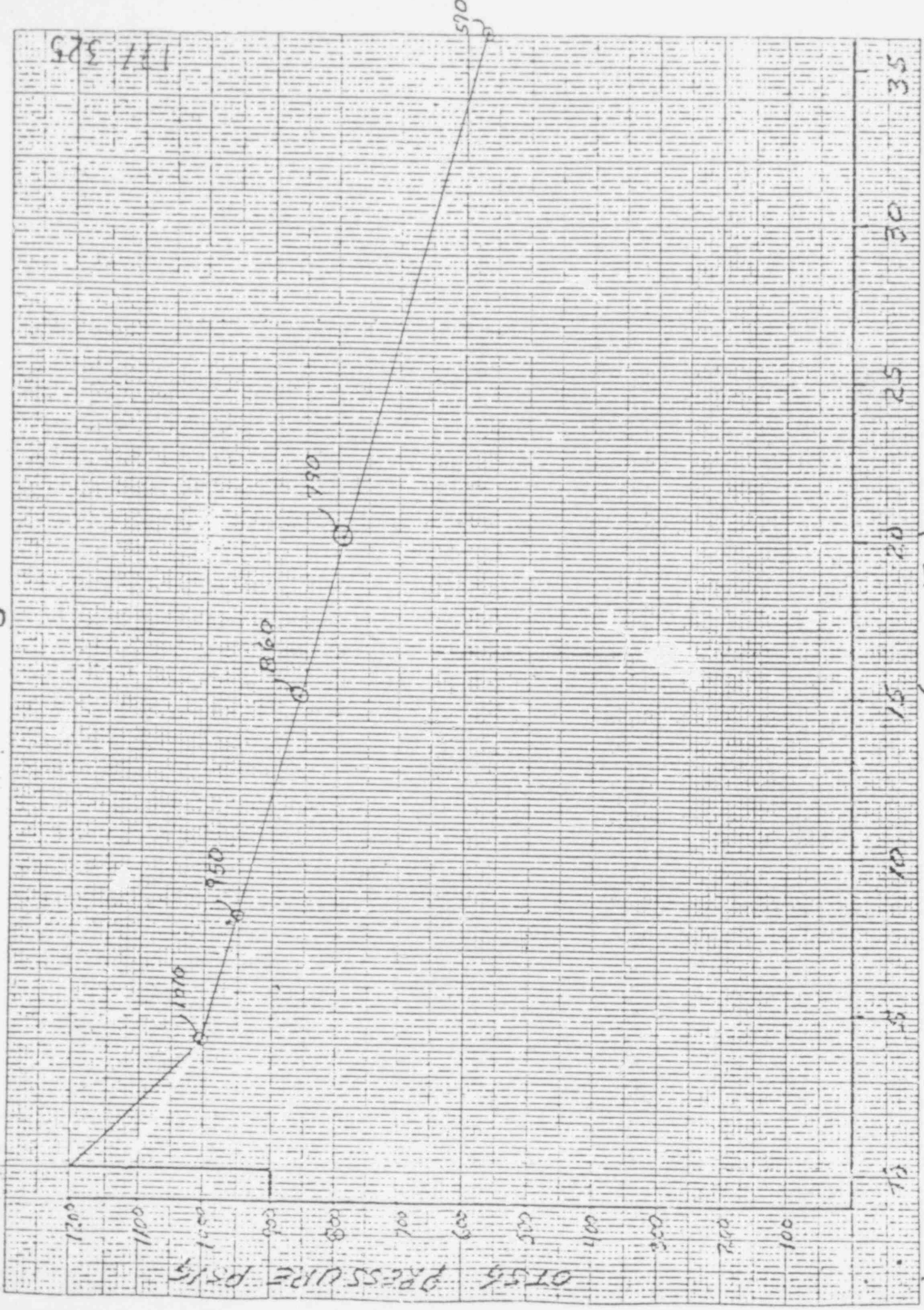


197 324

RES PRESSURE (PSIG)

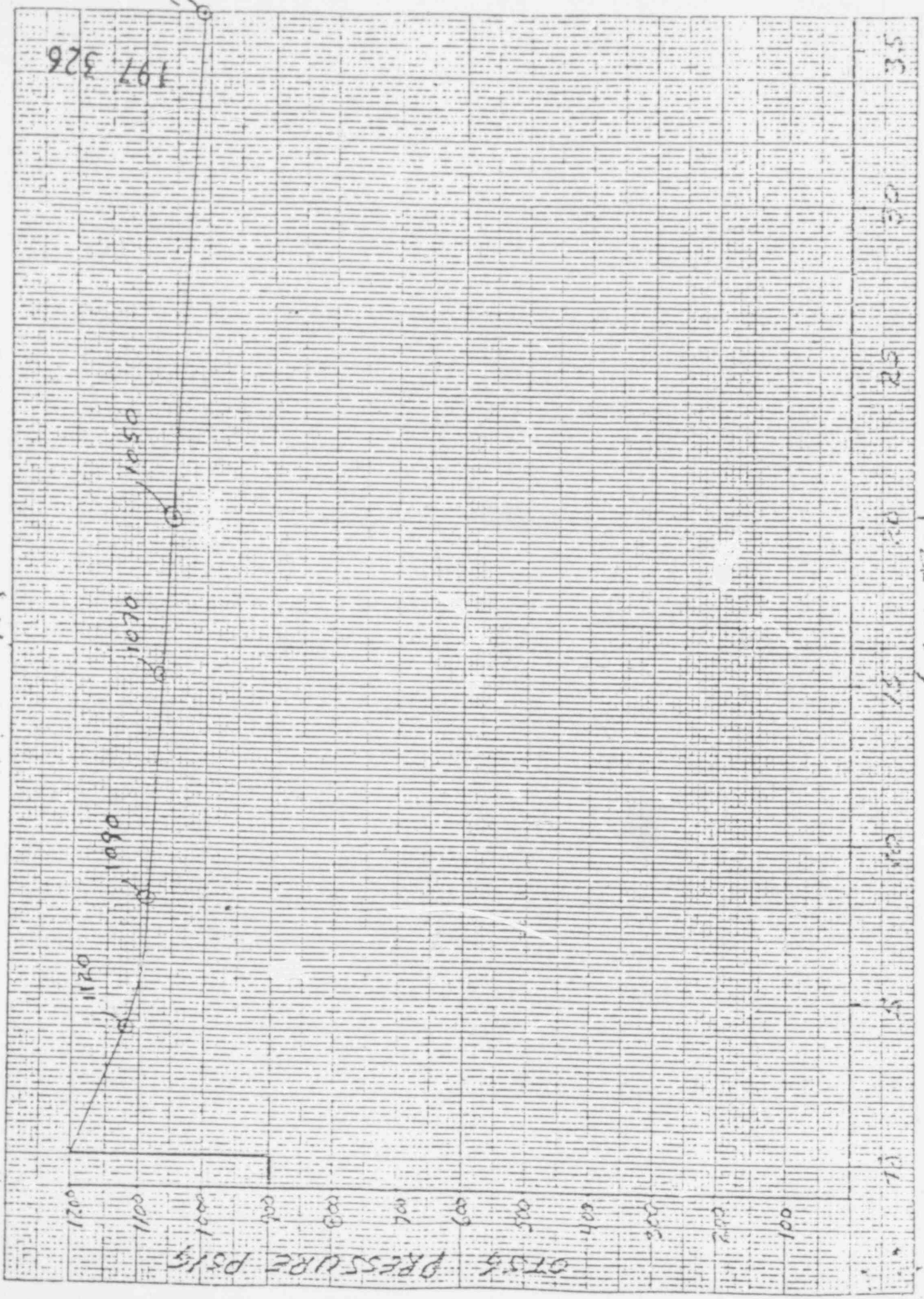
(MINUTES)

'B'



(MINUTES)

'A'



197 326

(MINUTES)

Scenario For TMI Annual Radiation Emergency Drill of 11/8/78

UNIT 1 STEAM GENERATOR RUPTURE WITH SUBSTANTIAL FAILED FUEL - GENERAL EMERGENCY

Reference: Radiation Emergency Procedures 1670.2, 1670.3, 1670.4, 1670.7

OBJECTIVES:

1. To determine the cause of the accident, terminate the release, and place plant in safe condition.
2. To exercise the radiation emergency plan.
3. To exercise the communications on-site and off-site associated with a Radiation Emergency.
4. To evaluate the site personnel accountability procedures.
5. To evaluate the ability to use isopleths in calculating downwind doses.
6. To evaluate the ability to deploy emergency teams and to communicate with them.
7. To coordinate the Pennsylvania State Radiation Emergency Plan drill with this drill.

SCOPE

Simultaneous rupture of several steam generator tubes occurs during a 5% fuel element failure. The drill moves from a reactor trip to a turbine main steam safety valve release. The main steam safety valves do not reseat and the primary coolant radioactivity is discharged to the environment for 35 min. or more via an unmonitored release point. The condenser vacuum pumps continue to discharge out of the Turbine Building Vent for a total of ~10 hours.

INITIAL CONDITIONS

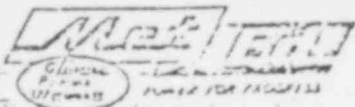
1. TMI Units 1 & 2 are operating at 100% power.

SEQUENCE OF EVENTS

Time in
Minutes

197 327

- T=0 (1) Rapid pressure decrease to ~1950 PSIG which causes reactor and turbine trip.
- (2) A S/G is at 1200 PSIG; B S/G is at 1120 PSIG.
- T=0 (3) The control room annunciator shows the following alarms:
- a) Condenser vacuum pumps discharge, RMS alarms
 - b) Reactor Coolant low pressure alarm.
 - c) Pressurizer low level alarm.
- T=0 (4) Steam generator relief valves lift.
- T=0 (5) RM-LI (low) is off-scale; RM-LI (Hi) is 10,000 c/m (high alarm)
- T=1 (6) Condenser vacuum pump monitor RM-A5 in high alarm, reading 5×10^4 c/m.
- T=1 (7) RM-LI (Hi) is 3.6×10^4 c/m (high alarm)
- T=1 (7a) RM-A5 is OFF SCALE
- T=1 (7b) Wind from 280° at 3MPH toward the E (100°) for T=0 to T=60, Neutral meteorology (50° wind range, $\Delta T = -0.5^\circ$)
- T=60 (7c) Wind from 240° at 2MPH toward the ENE (60°) from T=60 to end of drill, neutral meteorology (50° wind range, $\Delta T = -0.5^\circ$)



METROPOLITAN EDISON COMPANY A DIVISION OF GENERAL PUBLIC UTILITIES CORPORATION

POST OFFICE BOX 480 MIDDLETOWN, PENNSYLVANIA 17057

TELEPHONE 717-944-4041

THREE MILE ISLAND NUCLEAR STATION

ANNUAL

RADIATION EMERGENCY DRILL

(with Pa. State Participation)

11/8/78

197 328

Scenario For TMI Annual Radiation Emergency Drill of 11/8/78

(2)

SEQUENCE OF EVENTS - Continued

Time in
Minutes

- T=4 (8) B S/G Relief Valves Reseat, B S/G Pressure is 1010 PSIG, A S/G Pressure is 1120 PSIG
- T=8 (9) A S/G is 1090 PSIG, B S/G is 950 PSIG.
(10) Turbine Bldg. steam lines create a 500 mR/hr. field in the North Assembly Area.
- T=15 (11) A S/G Pressure is 1070 PSIG, B S/G is 860 PSIG.
- T=20 (12) A S/G is 1050 PSIG, B S/G is 790 PSIG.
- T=35 (13) Main steam safety valves reseat (Turbine Bldg. release continues)
- T=36 (14) A S/G is 1010 PSIG, B S/G is 570 PSIG.
- T=60 (15) Condenser Vacuum exhaust is secured.
- T=62 (16) RM-A5 drops to 500 c/m.

TMI UNIT 1 RADIATION EMERGENCY DRILL - STEAM GENERATOR - 11/8/78
Annual Drill with Pa. State Participation

T*	Distance Plume Travel (miles)	SE3 90°		SE4 90°		Closest Resident 92°		E01 or ESE01 95° 112°		E11 ^A 93°		ESE31 ^A 113°		ESE41 116°		ESE51 114°	
		Y R/hr.	I c/m*	Y R/hr.	I c/m	Y R/hr.	I c/m	Y R/hr.	I c/m	Y R/hr.	I c/m	Y R/hr.	I c/m	Y R/hr.	I c/m	Y R/hr.	I c/m
7	0.3	5	2x10 ⁵	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0.5	5.5	4x10 ⁵	3	4x10 ⁴	0.8	4x10 ⁴	0	0	0	0	0	0	0	0	0	0
20	1.0	6	2x10 ⁶	4	4x10 ⁵	1.3	2x10 ⁵	0.1	4x10 ³	0	0	0	0	0	0	0	0
30	1.5	6	2x10 ⁶	4	4x10 ⁵	1.3	2x10 ⁵	0.2	2x10 ⁴	0	0	0	0	0	0	0	0
40	2.0	6	2x10 ⁶	4	4x10 ⁵	1.3	2x10 ⁵	0.2	2x10 ⁴	0.08	8x10 ³	0	0	0	0	0	0
60	3.0	2	3x10 ⁵	2	2x10 ⁵	1	4x10 ⁴	0.2	2x10 ⁴	0.1	1x10 ⁴	0	0	0	0	0	0
75	3.5	1	4x10 ⁵	1	4x10 ⁴	0.6	8x10 ³	0.1	1x10 ⁴	0.1	1x10 ⁴	0	0	0	0	0	0
90	4.0	0.8	4x10 ⁴	0.5	2x10 ⁴	0.4	8x10 ³	0.05	2x10 ³	0.01	4x10 ³	0.08	8x10 ³	0	0	0	0
105	4.5	0.6	4x10 ⁴	0.4	2x10 ⁴	0.2	8x10 ³	0	40	0	20	0.1	1x10 ⁴	0.05	4x10 ³	0	0
135	5.5	0.6	4x10 ⁴	0.4	2x10 ⁴	0.2	8x10 ³	0	0	0	0	0.05	400	0.05	4x10 ³	0.01	80
X/Q in sec/m ³		unknown		unknown		10 ⁻⁴		10 ⁻⁵		5x10 ⁻⁶		5x10 ⁻⁶		2.5x10 ⁻⁶		1x10 ⁻⁷	

NOTE:

Wind from 280° at 3MPH toward the E (100°) for T=0 to T=60, Neutral meteorology
 Wind from 240° at 2MPH toward the ENE (60°) from T=60 to end of drill, neutral meteorology

Adjacent Sectors off-site are a factor of 10 less than the downwind sector.

*Assumes a 5x10⁵ cc sample and a 4% detector efficiency for all SAM-2 kits.

^APlume arrives at ESE21 at T=50, the X/Q here is ~5x10⁻⁶ for ~20 min., then diminishes rapidly.

*Refer to SAM-2 Conversion Table to obtain Child Thyroid 1 hour Intake Dose, or use the relationship 6.68x10⁴ c/m=1 Child Thyroid Rad (per hour of exposure).

*For Inhalation, the adult dose is one-half of the Child Thyroid Dose.

Porter-Gertz Consultants, Inc.
 76 RITTENHOUSE PLACE
 ARDMORE, PA. 19003
 215 690 8363

197 330

TMI UNIT 1 RADIATION EMERGENCY DRILL - STEAM GENERATOR

11/8/79

NOTE 1: Dose Calculations (Can be worked backwards by nuclear engineers to obtain source release terms)

$$\text{Given: } \frac{{}^{133}\text{Xe}}{{}^{131}\text{I}} = \frac{80}{1} = \frac{1600}{20}; \therefore \text{Total coolant activity} = 1620 \mu\text{Ci/cc}$$

ratio $\mu\text{Ci/cc}$

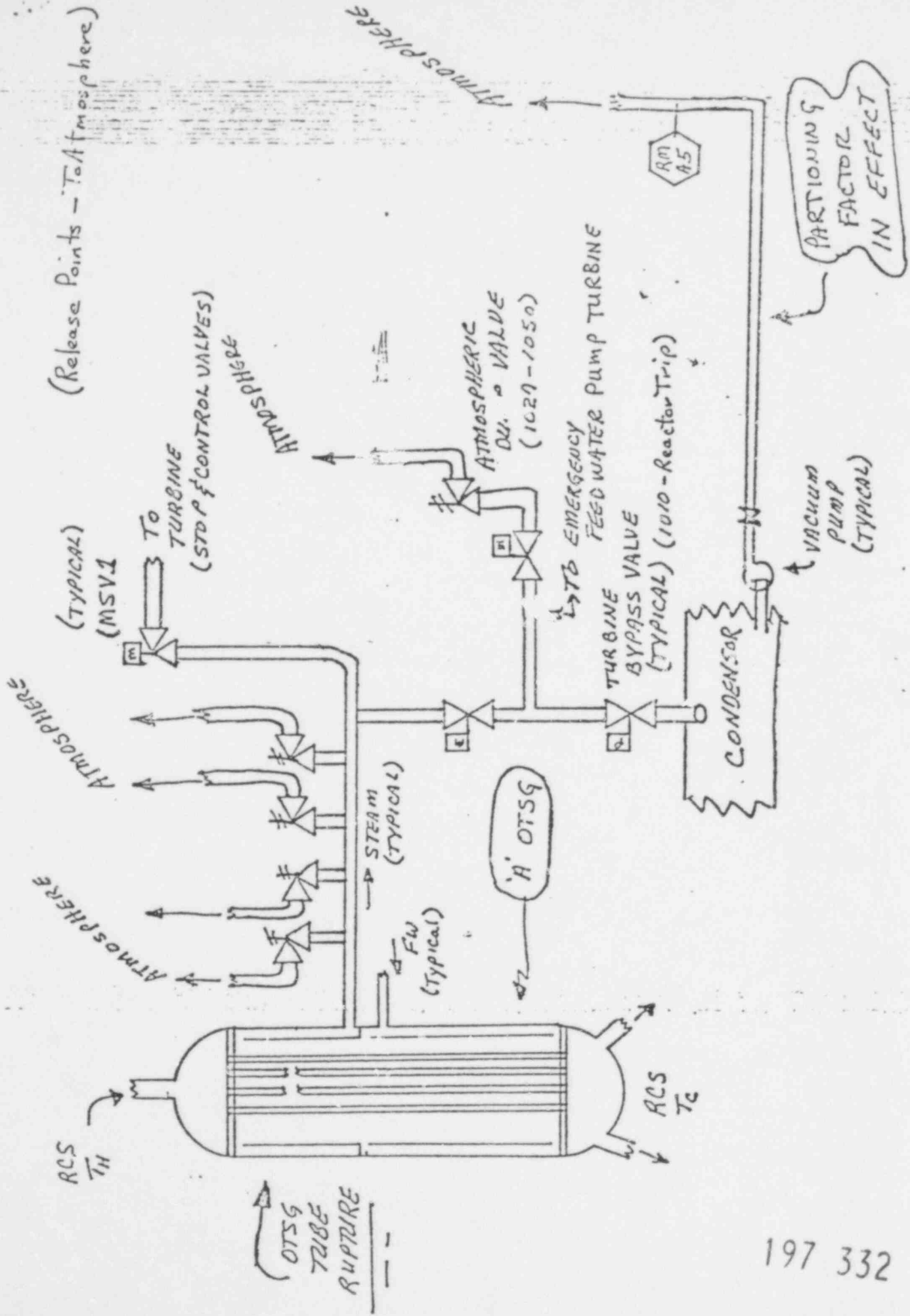
Given the 1 hr. Child Thyroid dose at closest resident is 30 R/hr.; this dose is caused by $4.5 \times 10^{-5} \mu\text{Ci/cc}$ of ${}^{131}\text{I}$. If the noble gas activity is 80 times this, it is $3.6 \times 10^{-3} \mu\text{Ci/cc} = \underline{1.3 \text{ R/hr.}}$ whole body dose from noble gases.

If the coolant is $1620 \mu\text{Ci/cc}$, and RM-LI (Hi) response is $22.2 \text{ c/m}/\mu\text{Ci/cc}$, then RM-LI (Hi) will read $3.6 \times 10^4 \text{ c/m}$

NOTE 2: Contingency Emergency Dose Calculations (after the ${}^{131}\text{I}$ $20 \mu\text{Ci/cc}$ data is available)
for Closest Resident

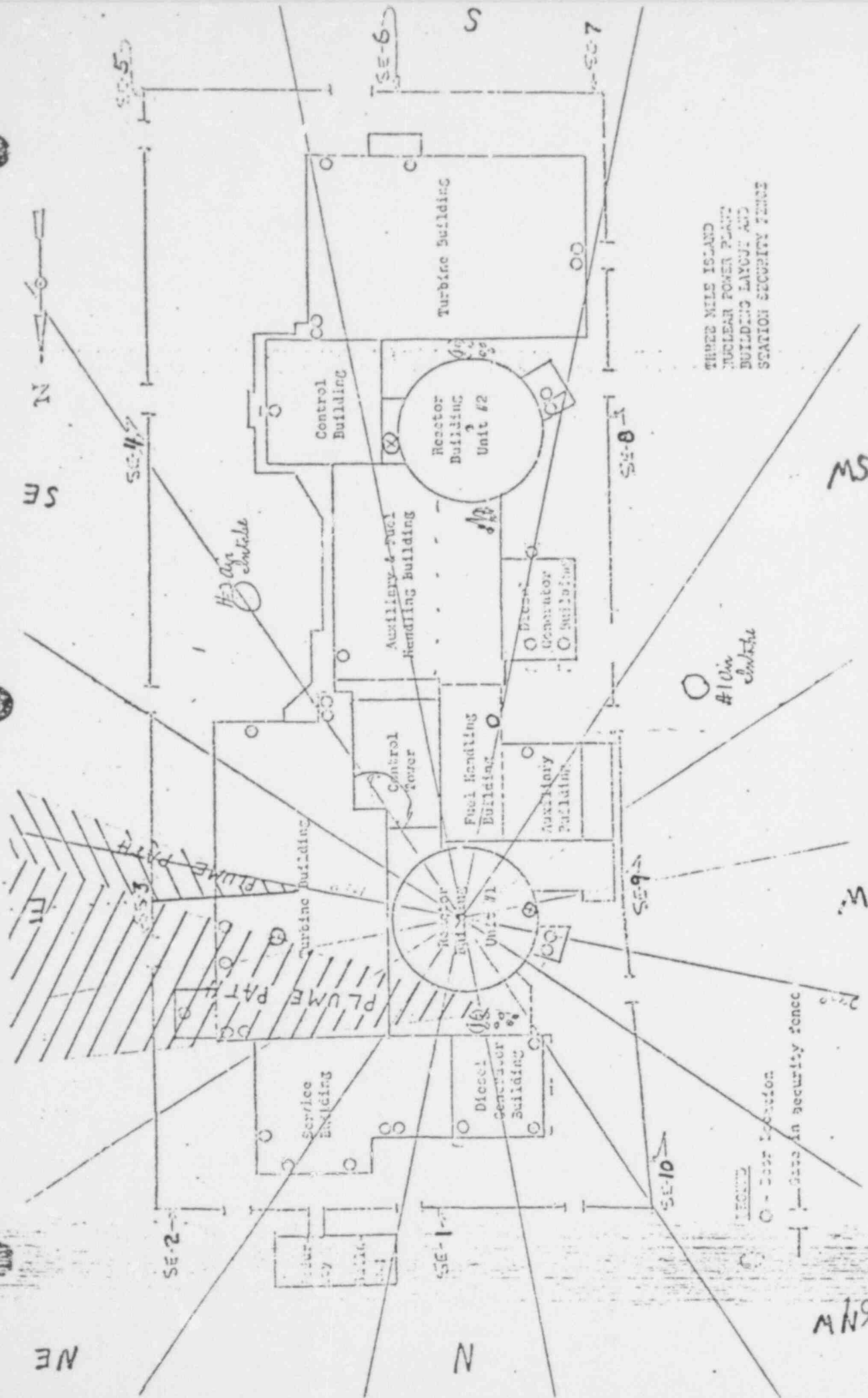
$$\begin{array}{ccccccc} 10^{-4} \times 5.6 \times 10^5 = 560 \text{ mR/hr.} & \times & 20 & = & 11,200 \text{ mR/hr.} & \text{Adult Thyroid dose} \\ \downarrow & & \downarrow & & & \text{(or 22 R/hr. to Child Thyroid)} \\ x/Q & & \text{for } 1 \mu\text{Ci/cc } {}^{131}\text{I} & & \mu\text{Ci/cc} & \end{array}$$

197 331



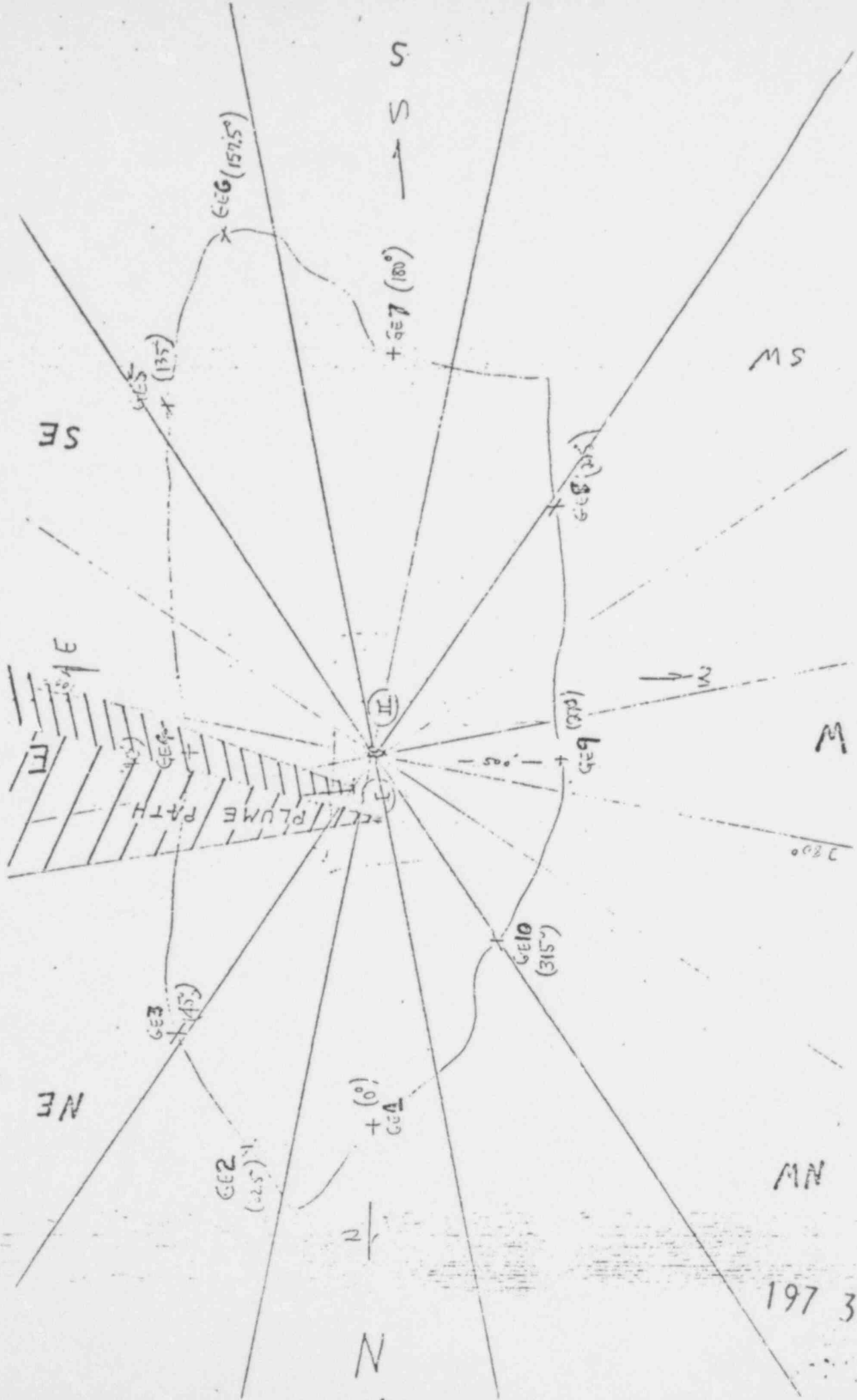
197 332

OTSG
TUBE
RUPTURE



THREE MILE ISLAND
 NUCLEAR POWER PLANT
 BUILDING LAYOUT AND
 STATION SECURITY FENCE

MN97 333



197 334

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER LANDRY

DATE 11/8/78

AREA OF RESPONSIBILITY UNIT I CR - ECC

TIME	EVENT	COMMENTS
t = 1 1/2	SITE DECLARED	
t = 3 1/2	" "	MERGED
t = 8 t = 10 t = 18	Miller - ED Projected Doses for EAB & LPZ Lock in on Ch 1 33.8 MHz (DCCD)	SOONER
t = 23	ESE 01 - 100 R/hr	
t = 26	N. Assembly - 500 R/hr evacuated by ECS GENERAL EMERG. → N. Assembly Area	did not hear announcement → N. Assembly Area
t = 29	cleared N. Assembly Area from	
t = 31	104.4 Ci/area - NG	from E11 2 mg/hr 197 335
t = 38		

t = 33
P. 200 R/hr
RAB 10/15

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER LANDRYDATE 11/8/78AREA OF RESPONSIBILITY UNIT 1 CR - ECC

TIME	EVENT	COMMENTS
t=43 t=60	Total Act Wind shift	$\begin{array}{r} 14 \\ \times 100 \\ \hline 1400 \end{array}$ $\begin{array}{r} 356 \\ \times 20 \\ \hline 7120 \end{array}$

197 336

OFF-SITE DOSE CALCULATION SHEET

Location E 11Time 17 22Wind Direction 280 +180 100Wind Speed 3 MPHWind Range 54° Stability Class: Stable; Neutral; Unstable

	<u>IODINE</u>	<u>NOBLE GAS</u>
1. Source Term Sheet #1	<u> </u> Ci/sec	<u>104.4</u> Ci/sec
2. X/Q	<u> </u> Sec/M ³	<u>5.2 x 10⁻⁶</u> Sec/M ³
3. Mult 1 x 2 =	<u> </u> μ Ci/cc	<u>5.22 x 10⁻⁴</u> μ Ci/cc
4. Wind Speed	<u> </u> MPH	<u>3</u> MPH
5. Divide 3/4	<u> </u> μ Ci/cc	<u>1.74 x 10⁻⁴</u> μ Ci/cc
6. Dose Rate (From Figure 1670.4-1)		<u>20</u> mR/hr
7. Expected Duration of Release	<u> </u> Hours	<u>6</u> Hours
8. Expected Dose to Child Thyroid (From Figure 1670.4-2)	<u> </u> Rem	<u><< 1</u> Rem

Time 1715 Date 11/18/78 Calculations by A. P. [Signature] Sheet # 197 337

OFF-SITE DOSE CALCULATION SHEET

Location Crossing of Fairview Rd + Bayview

Time 1540

Wind Direction 280 +180 100

Wind Speed 3 MPH

Wind Range SW ° Stability Class: Stable; Neutral; Unstable

IODINE

NOBLE GAS

- 1. Source Term Sheet #1 Ci/sec
- 2. X/Q Sec/M³
- 3. Mult 1 x 2 = µCi/cc
- 4. Wind Speed MPH
- 5. Divide 3/4 µCi/cc
- 6. Dose Rate
(From Figure 1670.4-1)
- 7. Expected Duration of Release Hours
- 8. Expected Dose to Child Thyroid Rem
(From Figure 1670.4-2)

- 1044 Ci/sec
- 9 x 10⁻⁶ Sec/M³
- 9.4 x 10⁻³ µCi/cc
- 3 MPH
- 3.1 x 10⁻³ µCi/cc
- 4000 mR/hr
- 6 Hours
- < 1 Rem

Time 1740 Date 11/21/78 Calculations by [Signature] 87-338

OFF-SITE DOSE CALCULATION SHEET

Location AGWAY

Time 1800

Wind Direction 240 +180 (C)

Wind Speed 2 MPH

Wind Range 72 ° Stability Class: Stable; Neutral; Unstable

IODINE

NOBLE GAS

- 1. Source Term Sheet #1 Ci/sec
- 2. X/Q Sec/M³
- 3. Mult 1 x 2 = μCi/cc
- 4. Wind Speed MPH
- 5. Divide 3/4 μCi/cc
- 6. Dose Rate
(From Figure 1670.4-1)
- 7. Expected Duration of Release Hours
- 8. Expected Dose to Child Thyroid Rem
(From Figure 1670.4-2)

- 1044 Ci/sec
- 7.5 x 10⁶ Sec/M³
- .00783 μCi/cc
- 2 MPH
- .00392 μCi/cc
- .4 R/hr
- .6 Hours
- < 1.0 Rem

197 339

Time 1800 Date 11/9/78 Calculations by [Signature] Sheet #2

RADIATION EMERGENCY PROCEDURE 1670.4

4.10.9 Case V Steam Generator Tube Rupture - Thyroid (Iodine) Dose

IA. To calculate the whole body dose at the exclusion area boundary, multiply the dispersion factor (IAa) by the dose release factor to obtain a reading in mrem/hour.

at exclusion area boundary			
10^{-4}	$\times 5.6 \times 10^5$	$\frac{\text{mrem}}{\text{hour}}$	$= 56 \text{ mrem/hour}$
$(IAa \times/Q)^*$		$\frac{\text{sec}}{\text{m}^3}$	

IB. To calculate the whole body dose at the LPZ boundary, multiply the dispersion factor (IAb) by the dose release factor to obtain a reading in mrem/hour.

at LPZ boundary			
2.5×10^{-5}	$\times 5.6 \times 10^5$	$\frac{\text{mrem}}{\text{hour}}$	$= 14 \text{ mrem/hour}$
$(IAb \times/Q)^*$		$\frac{\text{sec}}{\text{m}^3}$	

IC. To calculate the whole body dose at any other location of interest, multiply the dispersion factor (x/Q) by the dose release factor $5.6 \times \frac{\text{mrem/hour}}{\text{sec./m}^3}$ to obtain a reading mrem/hour.

*from Step 1A. 4.10.1.1A

197 341

RADIATION EMERGENCY PROCEDURE 1870.4

4.10.8 Case V Steam Generator Tube Rupture - Whole Body Dose

1A. To calculate the thyroid (Iodine) dose at the exclusion area boundary, multiply the dispersion factor (1Aa) by the dose release factor to obtain a reading in mrem/hour (for the first two hours).

at exclusion area boundary			
$\frac{10^{-4}}{(1Aa \ x/\eta)^*}$	$\times 4.2 \times 10^5$	$\frac{\text{mrem}}{\text{hour}} \frac{\text{sec}}{\text{m}^3}$	= <u>4.2</u> mrem/hour

1B. To calculate the thyroid (Iodine) dose at the LPZ boundary, multiply the dispersion factor (1Ab) by the dose release factor to obtain a reading in mrem/hour.

at the LPZ boundary			
$\frac{2.5 \times 10^{-5}}{(1Ab \ x/\eta)^*}$	$\times 4.2 \times 10^5$	$\frac{\text{mrem}}{\text{hour}} \frac{\text{sec}}{\text{m}^3}$	= <u>10.5</u> mrem/hour

1C. To calculate the thyroid (Iodine) dose at any other location of interest, multiply the dispersion factor (x/η) by the dose release factor $4.2 \times 10^5 \frac{\text{mrem/hour}}{\text{sec./m}^3}$ to obtain a reading in mrem/hour.

*from step 4.10.1.1A

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

SUMMARY

OBSERVER

M. Brown

DATE

11/8/78

AREA OF RESPONSIBILITY

Unit 1 Control Room - Operations

Operations responded to
OTSG rupture, Reactor trip, Turbine trip
and Radiation Emerg.

→ missed High R Activity
4 out of 5 - Good

Gen Emer. only on Field data

Emer. Bonated to add to SDM -

too many activities to actually calculate.

Plotted Plant status well

ENCLOSURE #2

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER A. Brown

DATE 11/8/78

AREA OF RESPONSIBILITY Unit 1 Control Room

TIME	EVENT	COMMENTS
+11	RML High alarm <u>High RC Act. Missed</u>	tube rupture turbine trip R/t trip OK
+25	Radio Contact Lb	did not see operators do this
-34	Gen Emer. Declared. OK on actions.	informed by SF done
	SDM → talked about Emer. Board + BWS no time for Calc. insures	SDM

197 344

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

SUMMARY

OBSERVER Mr. LORMICKDATE 11-3AREA OF RESPONSIBILITY ECS

First on-site Rdg. - 1705

T + 20 (5+)

First off site Rdg. - 1708

T + 23 (ESE 01)

Total off-site rdgs. - 9

Total on-site rdgs. - 11 incl. assy. areas
maybe too good - moving too fast to count I samples

Good action organizing ECS

Communications in 5 min.

Teams dispatched @ T+9

ECS surveyed immediately, second survey @ T+10

ECS quick to recognize problem & recommend
letdown sample & monitor powder

Monitor to North Assy Area @ T+14 - slow

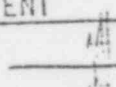
AO to monitor steam lines @ T+4 - too late
did take Teletesta & had hi-range (SR) dosimeterAO's sent to turn off ventilation in turb. bldg.
question wisdom of this, but had hi-range dosimeter
& port. HP unit.Powder dump 17' recommended trapped by powder heap
AOs had Pic-6 @ T+9 345

Concern shown in exposure of all AOs & HP took sent to plant

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER MC LEMICKDATE 11-3AREA OF RESPONSIBILITY ECS

TIME	EVENT	COMMENTS
T=0		
T+1.5	Emerg. Announcement "Site" - Unit 1	
4	take rad readings in ECS HO dispatched - ECS organized	
5	Comm. estab. start status board	
7	Per assigned to teams A-5 off scale	
8	Badges to assemb area	
9	ECS recognized probable failed fuel as result of PM-11. recommend letdown in pile monitor powder	
9	Teams dispatched X → GC-4 ECS inquires if Powder Sump pumps tagged	
10	second survey (AS) - (F497 346	

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER MC CORMICKDATE 11-8AREA OF RESPONSIBILITY ECS

TIME	EVENT	COMMENTS
11	Second announcement still "Site"	
12	↳ to ESE 01	
13	TR on str lines	
14	Monitor to N.A.A. & Powderex	
15	C → ESE 11	
16	ECC orders gross R-T f, 11 ³ on both O ² G's	
17	ECC orders grab samples on MS chain if store than f h/d down	
19	Announcement - "Site" Emergency.	
20	500 MR @ N.A.A. 10 MR @ search facility	
25	AD's sent to turb. to secure ventilation almost w/o rad. inst.	w/dg
26	General Emergency.	

197 347

RAADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER McCORMICKDATE 11-8AREA OF RESPONSIBILITY ECS

TIME	EVENT	COMMENTS
30	Gen Emerg announcement where told to go	
31	Powder 11 R/h. A-5 7.5 R/h Recommend evac area	
32	Announce - evac turb. bldg.	
33	X → IR @ K ₂	
33	AD's return	
36	RC letdown 1620 uCi/cc OTSG	
43	full accountability	
45	B - 80 uR @ ESE11	
45	Ind. waste monitor reports	
48	X - 1.35 R accum exp. send <u>back</u> to GE-4 yes - want to track end of plume.	

197 348

RADIATION EMERGENCY DRILL
OBSERVER CRITIQUE SHEETOBSERVER Mc LEMICKDATE 11-8AREA OF RESPONSIBILITY ECS

TIME	EVENT	COMMENTS
53	fast off-site I 4 E 5 CPM 5.66 ES cc efficiency 47%	
55	communication lost w/B - 45 -- can't raise for 10 min	
55	B calls in. now @ SE-21 90 mR/hr. 1.4 R	
57	Request AD access dose Did have hi range dos - 5R	
60	AD @ Powder did not have hi Range	
63	wind shift	
72	AD @ Powder relieved	
74	Thyroid dose from B	
70	Request cc from calc. 2/D range 197 349	

ENCLOSURE #2

RADIATION-EMERGENCY DRILL
OBSERVER CRITIQUE SHEET

OBSERVER MAC CORMICK

DATE 11-8

AREA OF RESPONSIBILITY ECC


TIME	EVENT	COMMENTS
77	off-site team to A2WAY plant on Rt. 230	
79	ECC wants I counts teams moving too fast to stop & count.	
	"stop where they are & count"	
84	Bidges returned to ECC	
T=75	Bun reading 110 m R/m. Thyroid E E 3 cpm	? 0
90	val of efficiency rec'd for bad rdg.	
91	Plane flying over Island E→W	

TEAM	TIME	READINGS	m/hr or μci/cc	GRID and LOCATION
B	1705	m/hr - 0	0	North gate
A	1705	μci/cc I ₁₃₁ -	0	Search facility
		Particulate -	V	

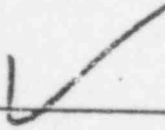
TEAM	TIME	READINGS	m/hr or μci/cc	GRID and LOCATION
A	1707	μci/cc - 5 R/hr		J2
		μci/cc I ₁₃₁ -		
		Particulate -	V	197 351

TEAM	TIME	READINGS	Mr/hr or uci/cc	GRID and LOCATION
A	1719	1.35 R 1 Rem		K 2
		uci/cc I ₁₃₁ -		
		Particulate -		

TEAM	TIME	READINGS	Mr/hr or uci/cc	GRID and LOCATION
A	1735	mr/hr - 1 1.35 R Dose		H 5
		uci/cc I ₁₃₁ -		
		Particulate -		
				197 352

TEAM	TIME	READINGS <small>Mr/hr or uci/cc</small>	GRID and LOCATION
A	1742	mr/hr - 1.4 REM DOSE 5.16 E-5 cc 4.100 CFM I uci/cc I ₁₃₁ - Eff 5356 7.67 Particulate 7.958 E-6	 GE-4



TEAM	TIME	READINGS <small>Mr/hr or uci/cc</small>	GRID and LOCATION
A	1748	mr/hr - 3000 1.5 Rem Dose uci/cc I ₁₃₁ - Particulate - 	GE 4 197 353

TEAM	TIME	READINGS <small>M/hr or μci/cc</small>	GRID and LOCATION
A	1757	meter - 1.85 Rem Exposure μci/cc I131 - 3 Rem/hr Particulate -	G4

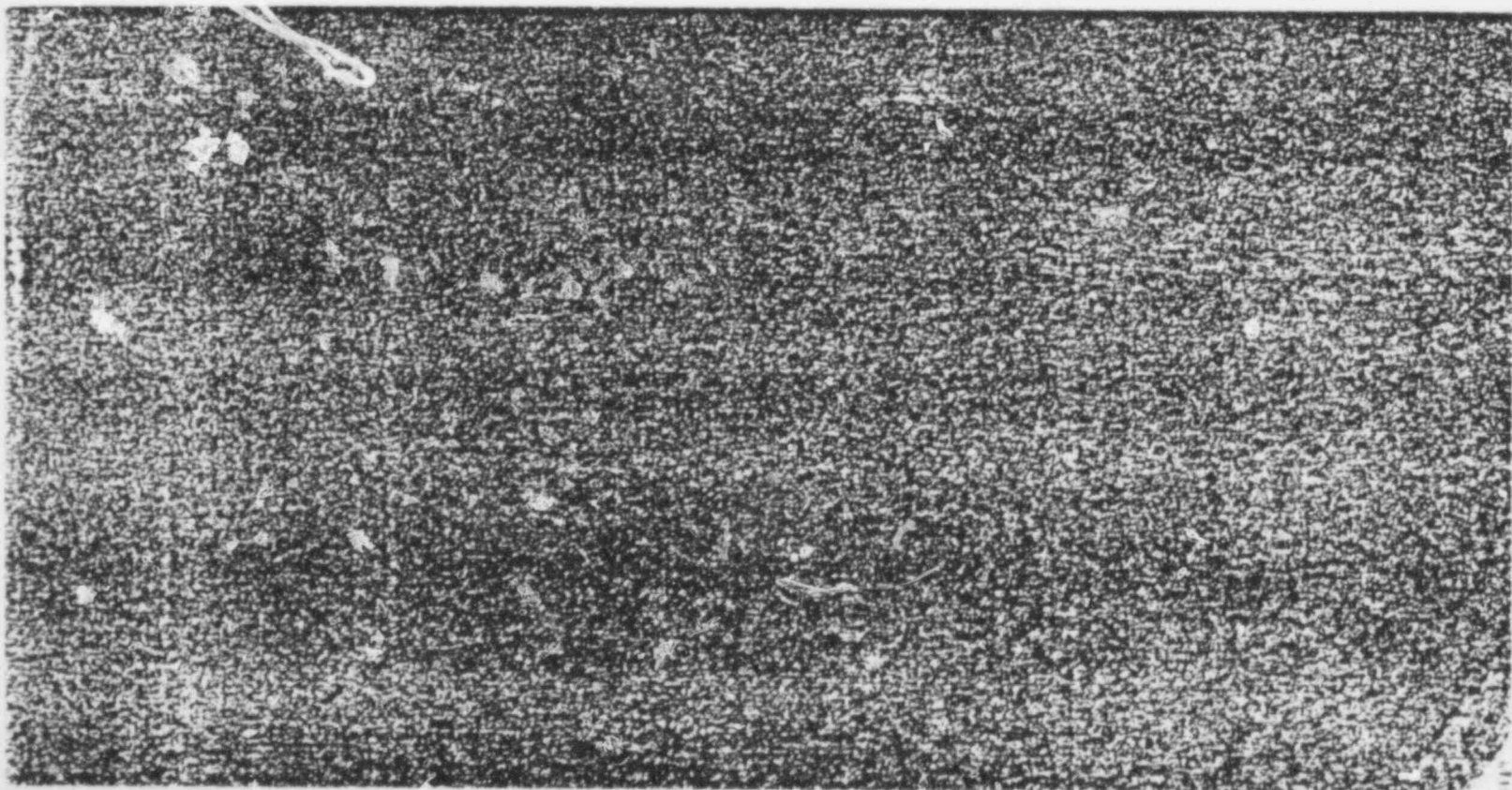
TEAM	TIME	READINGS <small>M/hr or μci/cc</small>	GRID and LOCATION
A	1801	meter - Total Exp. 1.85 Rem 300000 CFM 5.66 ES CC μci/cc I131 - 49 5.97E-6 μci/cc Iodine Particulate -	GE 4


197 354

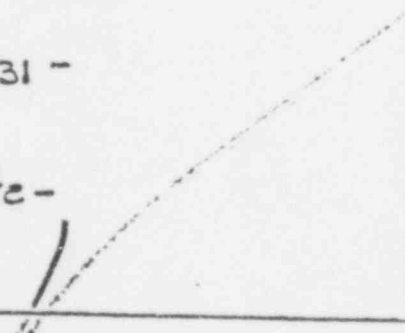
TEAM	TIME	READINGS <small>Mr/hr or uci/cc</small>	GRID and LOCATION
A	1808	mr/hr - 0 uci/cc I ₁₃₁ - Particulate -	South monitoring Area H5

TEAM	TIME	READINGS <small>Mr/hr or uci/cc</small>	GRID and LOCATION
	1812	mr/hr - .05 uci/cc I ₁₃₁ - Particulate -	S. U-2 turbine Bldg 197 355

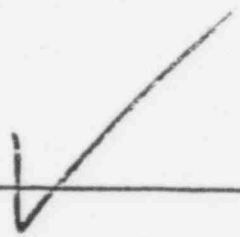
TEAM	TIME	READINGS	m ^r /hr or μci/cc	GRID and LOCATION
	1813	m ^r /hr - 0.5		Unit 2 warehouse
		μci/cc I ₁₃₁ -		
		Particulate -		



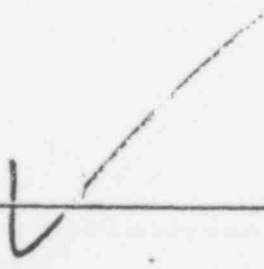
TEAM	TIME	READINGS <small>Mr/hr or uci/cc</small>	GRID and LOCATION
B	1708	Mr/hr - ¹⁰⁰ 500 uci/cc I ₁₃₁ - Particulate - 	E E - 01

TEAM	TIME	READINGS <small>Mr/hr or uci/cc</small>	GRID and LOCATION
L B	1721	Mr/hr - 1.5 200 uci/cc I ₁₃₁ - Particulate - 	Unit 1 warehouse observation center 197 357

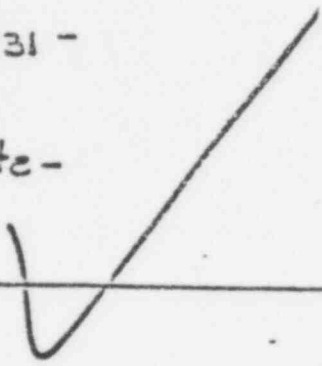
TEAM	TIME	READINGS m ^r /hr or μci/cc	GRID and LOCATION
C	1732	m ^r /hr - 200 μci/cc I ₁₃₁ - Particulate -	E 11 Zion Rd & Beck Rd

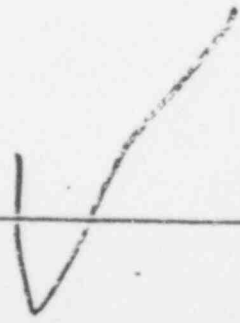


TEAM	TIME	READINGS m ^r /hr or μci/cc	GRID and LOCATION
B	1733	m ^r /hr - 80 μci/cc I ₁₃₁ - Particulate -	ESE 11



197 358

TEAM	TIME	READINGS <small>Mr/hr or uci/cc</small>	GRID and LOCATION
B	1741	mr/hr - 100 uci/cc I ₁₃₁ - Particulate - 	ESE - 21 21

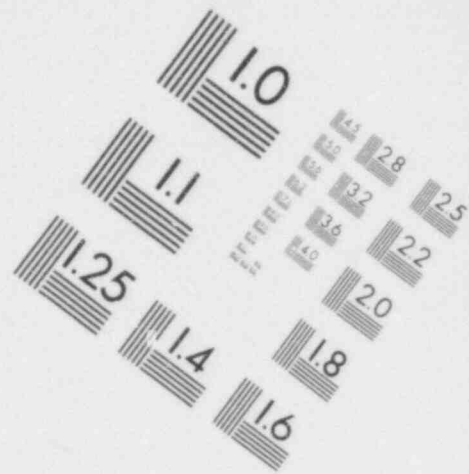
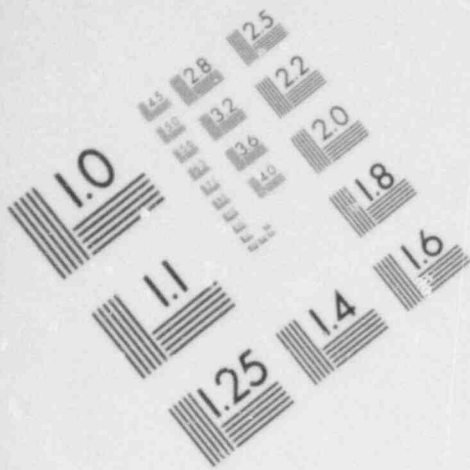
TEAM	TIME	READINGS <small>Mr/hr or uci/cc</small>	GRID and LOCATION
B	1744	mr/hr - 90 uci/cc I ₁₃₁ - Particulate - 	SE 21 ESE 11 197 359

TEAM	TIME	READINGS <small>Mr/hr or uci/cc</small>	GRID & LOCATION
B	1755	Mr/hr - 300 mem dose. uci/cc I ₁₃₁ - Particulate -	Falmouth

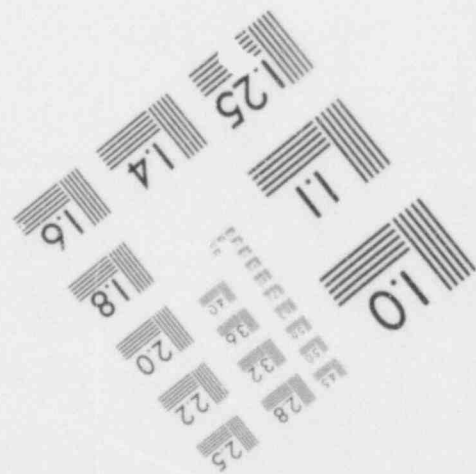
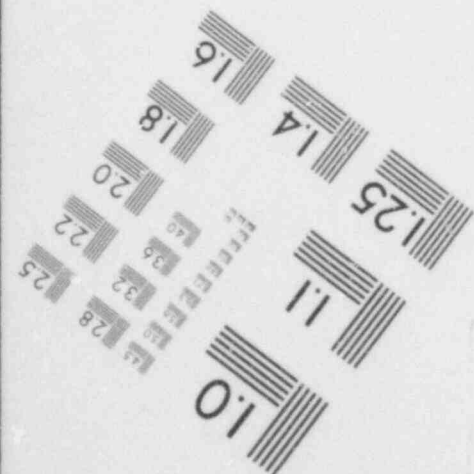
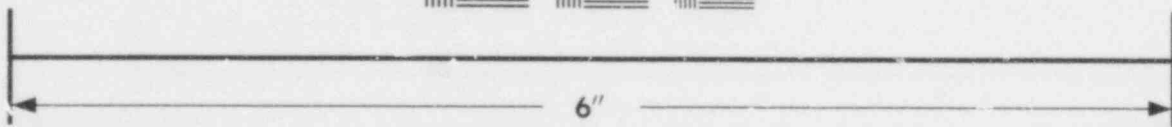


TEAM	TIME	READINGS <small>Mr/hr or uci/cc</small>	GRID and LOCATION
C	1800	Mr/hr - 110 THYROID 8 x 10 ³ cpm uci/cc I ₁₃₁ - Particulate -	E-11

197 360



**IMAGE EVALUATION
TEST TARGET (MT-3)**



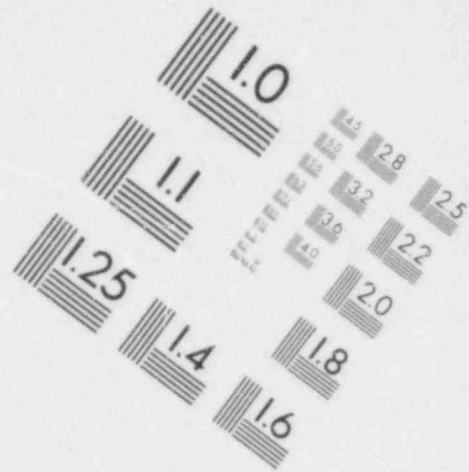
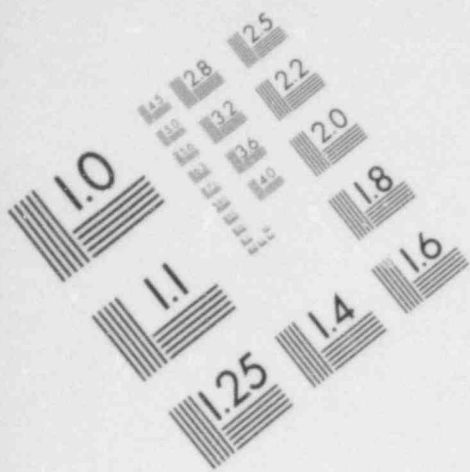
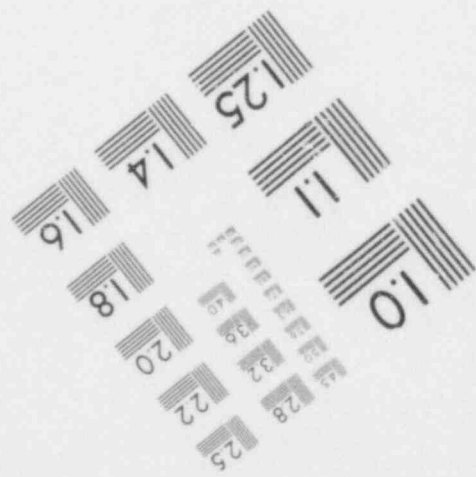
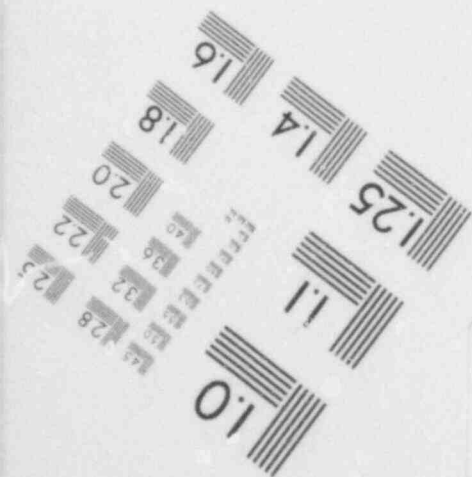
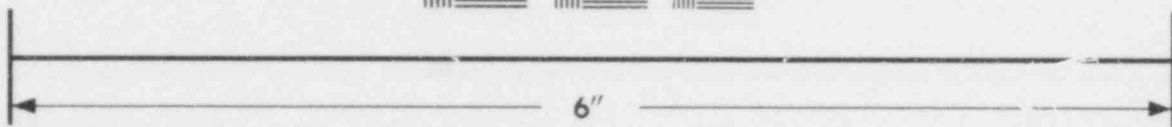


IMAGE EVALUATION
TEST TARGET (MT-3)



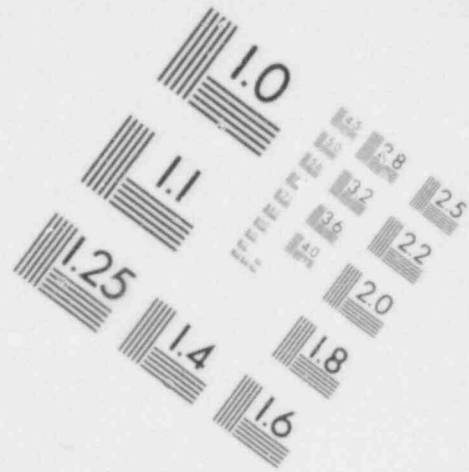
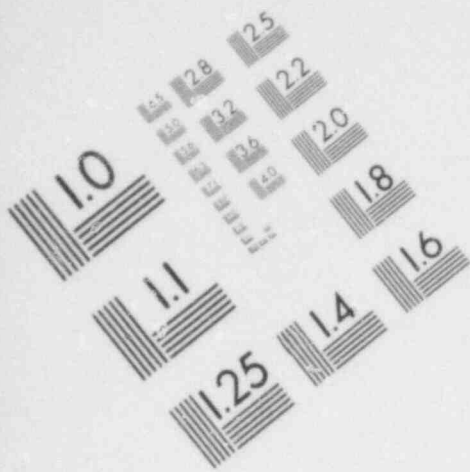
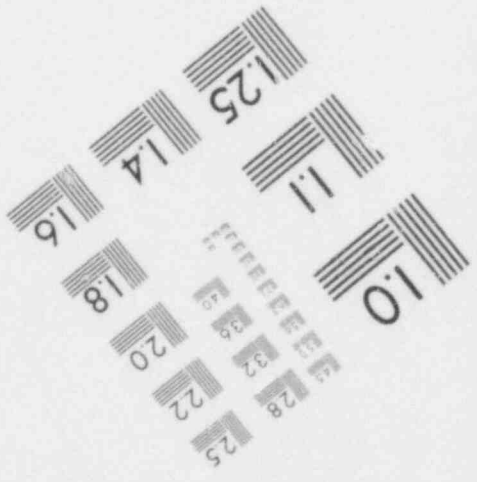
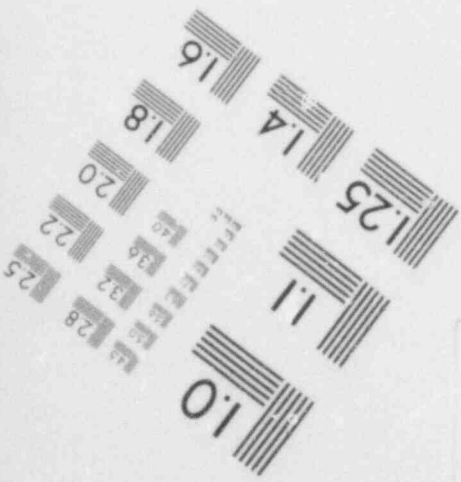
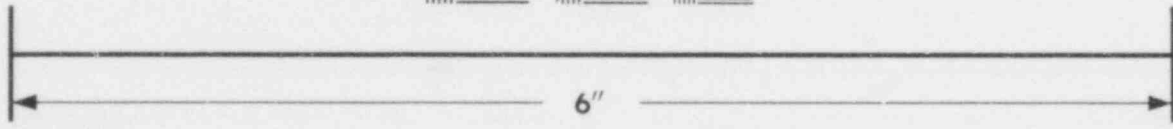
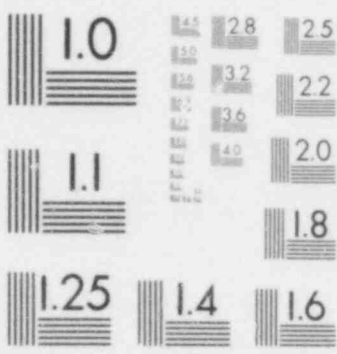
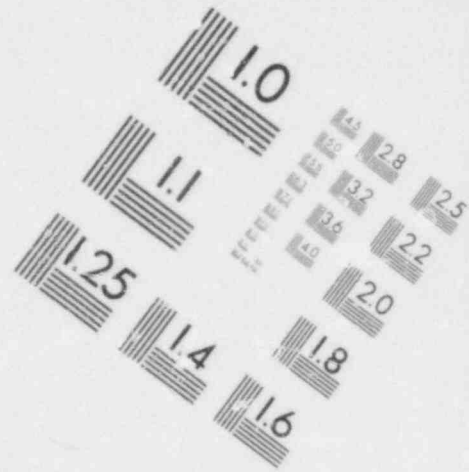
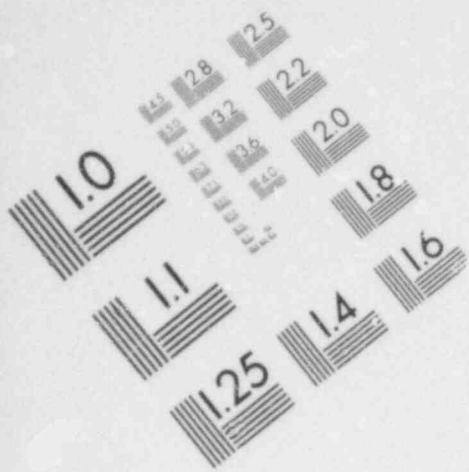
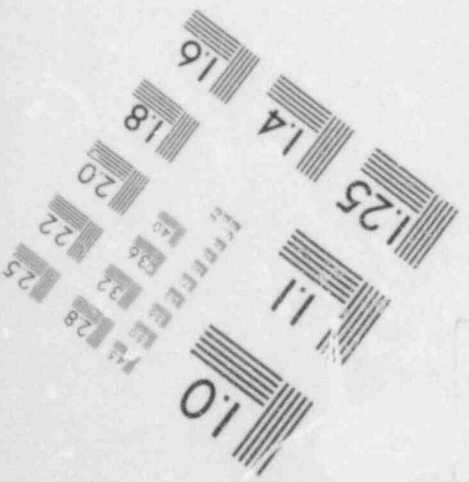
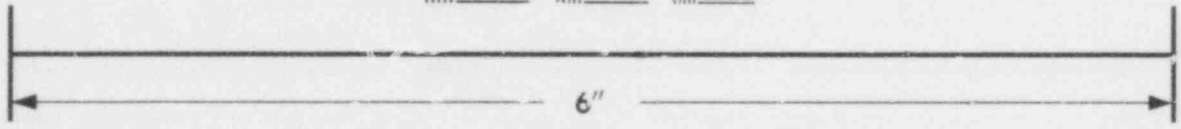
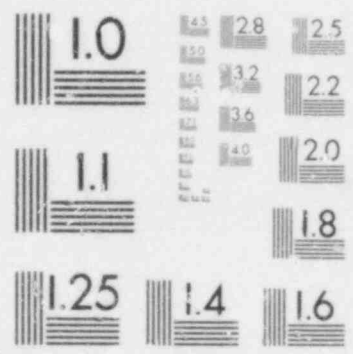


IMAGE EVALUATION
TEST TARGET (MT-3)





**IMAGE EVALUATION
TEST TARGET (MT-3)**



TEAM	TIME	READINGS mR/hr uCi/cc	GRID and LOCATION
B	1815	mR/hr - 0 350 mrem total exposure uCi/cc I ₁₃₁ - Particulate -	ENE 01

198 01

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET
SUMMARY

OBSERVER

D. Balitz

DATE

11/8/78

AREA OF RESPONSIBILITY

Unaffected Unit Control Rm.

Very effective Unit II Gas response. Good communications between Control Rooms. At T=4 Status Board was set up. Secured U-2 Gas Release at T=3. Excellent responsibility.

Excellent backup calculations from Isopaths. Calculations were communicated promptly.

198 002

RADIATION EMERGENCY DRILL
OBSERVER CRITIQUE SHEETOBSERVER D. BoltzDATE 11/8/78AREA OF RESPONSIBILITY Unaffected Unit Control Room

TIME	EVENT	COMMENTS
T=1	Unit II Control Notified of Site Emergency	
T=2	Notification of OTSG Tube Leak.	
	Closed AS-U-23 (Aux Stm Cross tie)	
T=3	Securing U-2 GAS Release	
T=4	Setting up Emerg Status Board	
T=5	U-2 Control Rm Mustering. Recircing Ventilation Isopleths Set up.	
T=9	J. Seelinger in C.R. (Emerg. Director)	
T=15	U-2 Supv. Ops in Control Rm	198 003
T=22	Non essential ventilation off so as not to draw in if wind shifts.	

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

SUMMARY

OBSERVER

Det. W. J. P. [unclear]

DATE

11-8-77

AREA OF RESPONSIBILITY

Monitoring Primary Coolant Piping & HES Alarm

Communications with O&E site teams very bad, lost
team Charlie @ T-75 & NO CLEAR REST-ABLE COMMUNICATIONS
The monitoring of the Primary Coolant Sample was
simulated & the actions were explained by the team
& he seemed very knowledgeable - @ how he would
do this - get his reading & cal's.

198 004

ATTACHMENT NOT FILMED

ANO. 7906140403

NO. OF PAGES 3

DUPLICATE: ALREADY ENTERED INTO SYSTEM
UNDER ANO. _____

ILLEGIBLE: HARD COPY AT:

PDR

CF

OTHER _____

198 005

RADIATION EMERGENCY DRILL
OBSERVER CRITIQUE SHEETOBSERVER R. VANSTRADATE 11/8/78AREA OF RESPONSIBILITY ACCOUNTABILITY

TIME	EVENT	COMMENTS
T = +2	SITE EMERGENCY DECLARED	- MUSTER ORDERD
T +5	N. GATE LOSS ARRIVE	
T +7	N. ASSEMBLY AREA BADGES LARRIS	
T +10	ECS BADGES ARRIVE	
T +12	UNIT I BADGES ARRIVE	
T +16	NO RCT TO MONITOR AREA	- 500 mcr/hr in Auditorium
T+18	GATE #15 BADGES ARRIVE	
T +20	NO STATUS SENT TO ECS	NET
T+21	RAD TEAM MONITORS DID NOT TURN IN BADGES	
T+23	1ST MET-ED ACC. DONE - 3 MISSING ECS NOTIFIED	
T+27	GEN EMERG CALLED - STILL SENDING PEOPLE TO STD W/HR N. AUD.	
T+29	1ST NON-MET-ED ACC DONE @ MISSING ECS INFORMED	
T+36	PAGE: FOR MISSING PEOPLE	198 006
T-37	2 MEC } MISSING 2 CNT. }	

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER R VANSTRADATE 11/8/78AREA OF RESPONSIBILITY ACCOUNTABILITY

TIME	EVENT	COMMENTS
T + 40	ALL MET ED FOUND, 2	CONT MISSING (including Sid & RTR)
T + 41	SID FOUND - 1 MISSING	
T + 42	Acct Done	

Problems:

- 1) Still people LEAVING WITH BADGES
- 2) Admin. ERRORS
- 3) Acct. procedures used by Security

198 007

Accountability

- T=1 Two security vehicles dispatched to pick up accountability lists from the assembly points.
- T=1-23 Two scouts made rounds collecting and turning in accountability lists.
- T=38 Security scout called from Land Waste Bldg to report W Desk and operator.

Accountability was ~~to~~ speeded up by using two scouts.

No word was ever given to security personnel as to what areas of the site may have been hazardous.

EL Luber

11-8-78

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

SUMMARY

OBSERVER

G. W. Porter, Jr.

DATE

11/8/78

AREA OF RESPONSIBILITY

On-Site Monitoring Team

- 1) Team was very slow in counting charcoal sample because of order from ECS to go to grid point H-5 (which is a long drive after leaving plume area)
- 2) Team didn't warmup SAM-2 on battery while traveling out of plume.
- 3) Team did very well overall and was very aware of their own integrated dose.

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

SUMMARY

OBSERVER E. ORWIG

DATE 11-8-78

AREA OF RESPONSIBILITY AO SURVEYS OF POWDEX AND STEAM LINES

1. SURVEY OF STEAM LINES - AO USED TELETECTOR

2. SURVEY OF POWDEX AREA - AO USED PIC-6

3. HP TECH SURVEYED TURBINE BLDG. - REPORTED TO
ECS WHO REPORTED TO ECC - ANNOUNCED
ONCE TO STAY OUT OF TURBINE BLDG. MAYBE
SHOULD HAVE BEEN PERIODICALLY RE-ANNOUNCED
(every 10 min). ~~used~~

RADIATION EMERGENCY DRILL
OBSERVER CRITIQUE SHEET

OBSERVER E. DREWIG

DATE Nov. 8, 1978

AREA OF RESPONSIBILITY SURVEYS OF POWDER AND STEAM LINES

TIME	EVENT	COMMENTS
T=0	STARTED THE DRILL	WAVE
T=9	AD TO SURVEY MS LINES	USED TELETECTOR (GOOD)
T=17	AD TO SURVEY POWDER AREA AND TO START CHANGING THE RESINS	HAD PIC-6 AND WAS MINIMIZING DOSE ACCUMULATION
T=25	HP TECH SURVEY OF TURBINE BUILDING	FOUND HIGH RADIAT LEVELS, WENT TO ECS AND TOLD THE ECS PEOPLE. SHOULD HAVE TOLD ECS BY QUICKER MEANS.

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

SUMMARY

OBSERVER E. A. GoodDATE 4/3/78AREA OF RESPONSIBILITY Offsite Monitoring Team (Team Bravo)

- Problems reading maps
- Loss of communications
- Made phone call to TMI when lost comm. which was good
- SAM-2 didn't work
- monitoring team kept asking for dose reading which was good
- Hooked up converter with truck ~~and~~ engine running --
- Total integrated dose was 350 mrem

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER B.A. Good

DATE 11/9/78

AREA OF RESPONSIBILITY Off Site Monitoring Team

TIME	EVENT	COMMENTS
t = 7	offsite team ESE 01	no one in charge of badges at ECS
t = 20	.05 R/hr	Donachie F & Diemer
(t = 21)	.1 R/hr @ ESE 01 ESE 11 to count	loss of communication
5.600 F5CC	meter to truck on - not working	$.1 \frac{R}{hr} \times \frac{3}{hr} = \frac{.3}{hr}$ $\frac{.3}{.08} = 3.75$ $3.75 \times 100 = 375$
	didn't keep radios to them at all times	$\frac{.3}{.08} = 3.75$ $3.75 \times 100 = 375$
	7 ml/hr must be going further into cloud junction wrap up rd. & Rosner Rd	$95 \overline{) 100} 25.2$ $\frac{100}{20} = 5$ $5 \times 2 = 10$ $100 - 10 = 90$ $90 \div 2 = 45$ $45 \times 2 = 90$ $90 - 90 = 0$ 20
	Saw 2 desert work	100 mrem
	ESE 01 - counting for parts to 23.0 count sample	problems reading meter
		198 013

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

SUMMARY

OBSERVER

Don Project

DATE

11-8-78

AREA OF RESPONSIBILITY

Off site team check

1. Team operated equipment properly &
2. Acted ^{as} ~~sample~~ ^{using} ~~the~~ SAM II
3. Team was concerned with their own experience & checked several times
4. Radio transmission was terrible.
5. Were ahead of plan at ESC-11 30 minutes into drill
6. Obtained readings at E11
7. Did not attempt to use public telephone
8. Sent to agency at E town
9. 150. mrem

198 014

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER Don Reppert

DATE 11-8-78

AREA OF RESPONSIBILITY OFF SITE TEAM

from
barrel

Harrison
Perkel
TIME

TIME	EVENT	COMMENTS
1647	Site Emergency Declared	
1648	ESS Initiated	
1649	Site Emergency Declared TMI-1	
1651	Person sent to take readings in turbine Bldg.	
1653	A team Dispatched	
1704	Left site	
1710	Bridge out must return no Radio com Communications	team reading map to determine new location
1713	no back Sub sample being taken	Decided to take sample + move to location where transmission is better to relay info.
1715	Air sample being taken	4 minutes sample
	Asked about radiation reading concerned about dose	
1719	Sample complete	
1725	transmitted 200 mch	
1727	Arrived at E 11	198 015
1739	Air sample started	198 015

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER

Don Reggent

DATE

11-8-78

AREA OF RESPONSIBILITY

off site team C

TIME	EVENT	COMMENTS
1743	Air sample Comp	Asked about dose
1748	transmitted B, & dose sample/hr	100. mrem
1754	Sample Counted at different location due to communication problem.	Communication & Counter problem.
	8×10^3 $\approx 110. \text{mrem}$	Team had trouble getting Sam 2 to work
1824	Reached Agway	

198 016

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

SUMMARY

OBSERVER ReeseDATE 11/8/77AREA OF RESPONSIBILITY Unit I Control Room

- 1) First announcement - page was not merged. Operator noted mistake and made announcement again.
- 2) Took quite a while to establish communication (7 min)
- 3) Who directed taking holdown samples - seemed late in any primary activity, numbers.

RADIATION EMERGENCY DRILL

OBSERVER CRITIQUE SHEET

OBSERVER BeerDATE 11/8/78AREA OF RESPONSIBILITY Control Room

TIME	EVENT	COMMENTS
1645	OTSG Rupture	
1647	Site Emergency Declared	First announce not changed .
1650	Meter Log Card	
1652	commun Est	could be sooner
1653	GPM Emergency Dir	Very good time
1655	Account for U-F CR,	
1658	off site calls completed	
1710	Gen Emergency.	
1722	bedown sample results	
1727	Full Accountability	Good time
1745	wind change	Missing explicit
1750	notifs BRIF of wind shift	

198 018