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2202-3.2
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THREE MILE ISLAND NUCLEAR STATION UNIT #2 EMERGENCY PROCEDURE 2202-3.2 FLOOD

Table of Effective Pages

Page	Date	Revision	Page	Date	Revision	Page	Date	Revision
1.0	05/27/77	0	26.0			51.0		
2.0	05/27/77	0	27.0			52.0		
3.0	05/27/77	0	28.0			53.0		
4.0	05/27/77	0	29.0			54.0		
5.0	09/08/77	1	30.0			55.0		
6.0	05/27/77	0	31.0			56.0		
7.0	01/05/78	2	32.0			57.0		
8.0	05/27/77	0	33.0			58.0		
9.0	05/27/77	0	34.0			59.0		
10.0	05/27/77	0	35.0			60.0		
11.0	05/27/77	0	36.0			61.0		
12.0	05/27/77	0	37.0			62.0		
13.0	05/27/77	0	38.0			63.0		
14.0	05/27/77	0	39.0			64.0		
15.0	05/27/77	0	40.0			65.0		
16.0	05/27/77	0	41.0			66.0		
17.0	05/27/77	0	42.0			67.0		
18.0	05/27/77	0	43.0			68.0		
19.0	05/27/77	0	44.0			69.0		
20.0	05/27/77	0	45.0			70.0		
21.0	05/27/77	0	46.0			71.0		
22.0			47.0			72.0		
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Unit 1 Staff Recommends Approval

Approval NA Date
Cognizant Dept. Head

Unit 2 Staff Recommends Approval

Approval NA Date
Cognizant Dept. Head

Unit 1 PORC Recommends Approval

NA Date
Chairman of PORC

Unit 2 PORC Recommends Approval

J. F. Helbrech Date 1-5-78
Chairman of PORC

Unit 1 Superintendent Approval

NA Date

Unit 2 Superintendent Approval

J. F. Helbrech Date 1/5/78

Manager Generation Quality Assurance Approval

NA Date

THREE MILE ISLAND NUCLEAR STATION
UNIT #2 EMERGENCY PROCEDURE 2202-3.2

FLOOD

Table of Contents

<u>SECTION</u>	<u>PAGE</u>
1.0 <u>REFERENCES</u>	2.0
1.1 F.S.A.R.	2.0
1.2 Federal - State River Forecast Center	2.0
2.0 <u>BASIS FOR IMPLEMENTING THE FLOOD PROTECTION PROCEDURE</u>	2.0
2.1 Federal - State River Forecast Center Initial Contact	2.0
2.2 Updated Forecasts	2.0
2.3 Procedural Action Basis	2.0
3.0 <u>FLOOD PROTECTION PROCEDURE</u>	3.0
3.1 Southeast Drainage Culvert	3.0
3.2 Alert	3.0
3.3 Emergency Closure	4.0
3.4 Shut Down Alert	4.0
3.5 Shut Down	6.0
4.0 <u>POST FLOOD PROCEDURE</u>	7.0
4.1 River Receding	7.0
4.2 Southeast Drainage Culvert	7.0
Appendix:	
I. Flood Gate Location Plan	8.0
II. Sump and Floor Drain Check List	9.0
III. Procedure for checking River Water Intake Structures for Sediment Accumulation.	20.0
IV. River Water Elevation Vs. Flow Table	21.0

THREE MILE ISLAND NUCLEAR STATION
UNIT #2 EMERGENCY PROCEDURE 2202-3.2

FLOOD

1.0 REFERENCES

1.1 FSAR; Volume I, Chapter 2, Site Characteristics, Section 2.4.2
Floods.

1.2 Federal - State River Forecast Center

National Weather Service

228 Walnut Street

Box 1185

Harrisburg, Pa. 17108

PHONE: 717-782-3901

717-782-3488

717-782-2256 (unlisted)

If phone communications are out the Forecast Center may be reached through the Met-Ed Dispatcher and the Civil Defense system by radio.

2.0 BASIS FOR IMPLEMENTING THE FLOOD PROTECTION PROCEDURE

2.1 The Federal - State River Forecast Center will call the T.M.I. Station when a 36 hour river flow forecast at Harrisburg indicates 350,000 cfs.

2.2 Following this initial notification, or if it is apparent that the center might have failed to notify the station while a possible major flood may be forming, the River Forecast Center should be contacted to periodically obtain the current forecasts.

2.3 The following forecasts of river flow at Harrisburg form the basis for procedural action to be taken during a flood.

- 2.3.1 A 36-hour forecast of 350,000 cfs or greater will initiate Section 3 of this procedure.
- 2.3.2 If a 36-hour forecast of 640,000 cfs or greater is received, a flood ALERT will be initiated by the Station/Unit Superintendent.
- 2.3.3 If a 36-hour forecast of 940,000 cfs. or greater is received, an EMERGENCY CLOSURE will be called by the Station/Unit Superintendent.
- 2.3.4 If the stage of the River Water Intake Structure of Unit 1 is 301 ft. corresponding to 950,000 cfs river flow the Station/Unit Superintendent will order a SHUT-DOWN ALERT
- 2.3.5 If the river stage reaches elevation 302 ft. corresponding to 1,000,000 cfs river flow, a SHUTDOWN order will be given by the Station/Unit Superintendent.

3.0 FLOOD PROTECTION PROCEDURE

- 3.1 Before the river flow reaches 350,000 cfs, the flap at the southeast drainage culvert should be checked for freedom of operation. Also, the inside stop gate should be readied for closing in case the flap gate does not hold tight when the river level on the outside of the southeast dike is higher than the level on the inside.
- 3.2 Initiate patrol and inspection of the dikes surrounding the site for signs of deterioration such as undermining or excessive seepage. In the event the inspection of the dikes indicates significant dike deterioration and the river flow is greater than 340,000 cfs a shutdown order will be given. Significant deterioration of dike is deemed to mean the design function of the dike has been or may be compromised.

3.3 When a flood ALERT is called, personnel should be called out to perform the following:

3.3.1 Start moving flood panels to placement location, clearing the imbedded bolt holes for the flood panels, and seal the following hatch cover:

<u>Hatch Designation</u>	<u>Location (See Appendix I) Description</u>	<u>No.</u>	<u>Checked</u>
(H-1)	Air Intake Structure	1	_____

3.3.2 Check floor drains and pumps listed in Appendix II to ensure proper operation.

3.3.3 The area in vicinity of the North Bridge will be inspected at least daily for buildup of debris. Any significant buildup of debris will be removed as soon as possible. As conditions deteriorate, the frequency of inspection will be increased, accordingly.

3.3.4 Plastic sheeting and sand bags marked for flood use only will be available at the warehouse to help minimize in leakage to buildings if necessary.

3.3.5 Soundings of the intake screen house floor will be accomplished at least daily to detect sediment accumulation. Soundings will be taken in accordance with Appendix III.

3.4 When an EMERGENCY CLOSURE is announced, the following should be accomplished within a time period of 36 hours.

3.4.1 Call out all available personnel to place flood panels and for plant operations.

3.4.2 Provide for emergency food supplies.

3.4.3 Notify Manager - Generation Operations of the situation.

3.4.4 Install the following flood panels.

<u>Gate Designation</u>	<u>Location (See Appendix I) Description</u>	<u>No.</u>	<u>Checked</u>
(D-1, D-2)	North entrance to Diesel Building at 305 ft. elevation	2	_____
(D-3)	South entrance to Diesel Generator Building at 305 ft. elevation	1	_____
(A-1,A-2)	West entrance at 305 ft elevation to access hatch to tendon Gallery	2	_____
(C-1)	West entrance to the Control Building at 305 ft elevation	1	_____
(C-2)	East entrance to the control Building at 305 ft elevation	1	_____
(C-3)	South entrance to Control Building at 305 ft elevation	1	_____

3.4.5 Install door seal at the following Location:

<u>Seal Designation</u>	<u>Location (See Appendix XI) Description</u>	<u>No.</u>	<u>Checked</u>
S-1	Auxiliary Building shield door northeast corner at 305 ft elevation	1	_____

3.4.6 Verify closure of water tight doors at the following location:

<u>Door Designation</u>	<u>Location (See Appendix I) Description</u>	<u>No.</u>	<u>Checked</u>
(W-1, W-2, W-3)	Bulkhead doors on north wall of Turbine Building at 291 ft elevation.	3	_____ _____ _____

- 3.4.7 Increase makeup water to all storage tanks as much as possible and fill all outdoor tanks to at least elevation 312 to help prevent floatation in case of site flooding, i.e. - all tanks greater 7' level (305' grade).
- 3.4.8 Check and fill fuel storage tanks.
- 3.4.9 Arrange for an alternate supply of diesel fuel oil as follows:
 - a. Attach a hose from the top of the Fuel Handling to the Unit 2 fuel oil fill connection.
 - b. Procure 4 or more tanks of approximately 275 gallon capacity and capable of being slung under a helicopter.
 - c. Contact Keystone Helicopter, 215-644-4430, or Carson Helicopter, 215-249-3535. Either can supply a helicopter capable of lifting 3,500 lbs. Carson also has helicopter capable of lifting loads up to 8,000 lbs.
 - d. Arrange for a local, non-flooded fuel oil supply.
 - e. Arrange for the helicopter to set tanks down on the fuel handling building roof.
 - f. Remove the air ventilation grills, but not the fire dampers, in the air ducts between the Storage tank room and the Unit II diesel Room. This will allow entry into the Diesel Storage Tank Room during flooded conditions.
- 3.5 If a SHUTDOWN ALERT is called, preparations should be made to shut down the plant as required and notify executive level personnel of the situation.
- 3.6 If a SHUTDOWN is ordered, the following should be done:

3.6.1 The Station should be placed in HOT SHUTDOWN within the time frame specified in technical specifications section 3.7.6.1 and be in cold shutdown conditions as soon as possible in accordance with 2102-3.1. (Unit Shutdown), and 2102-3.2 (Unit cooldown).

3.6.2 Shutdown unnecessary systems as Unit Conditions will allow.

3.6.3 De-energize any non-essential electrical busses subject to flooding below 311' per 2107-1.1, BOP Electrical System.

NOTE: The above steps will place most all of the secondary plant systems which are non-essential in a shutdown condition. Pumps, motors, etc, can be moved or lifted to higher positions to preclude water damage as time permits.

The plant will be in a cold shutdown with all required nuclear safety related systems operable and protected from inundation.

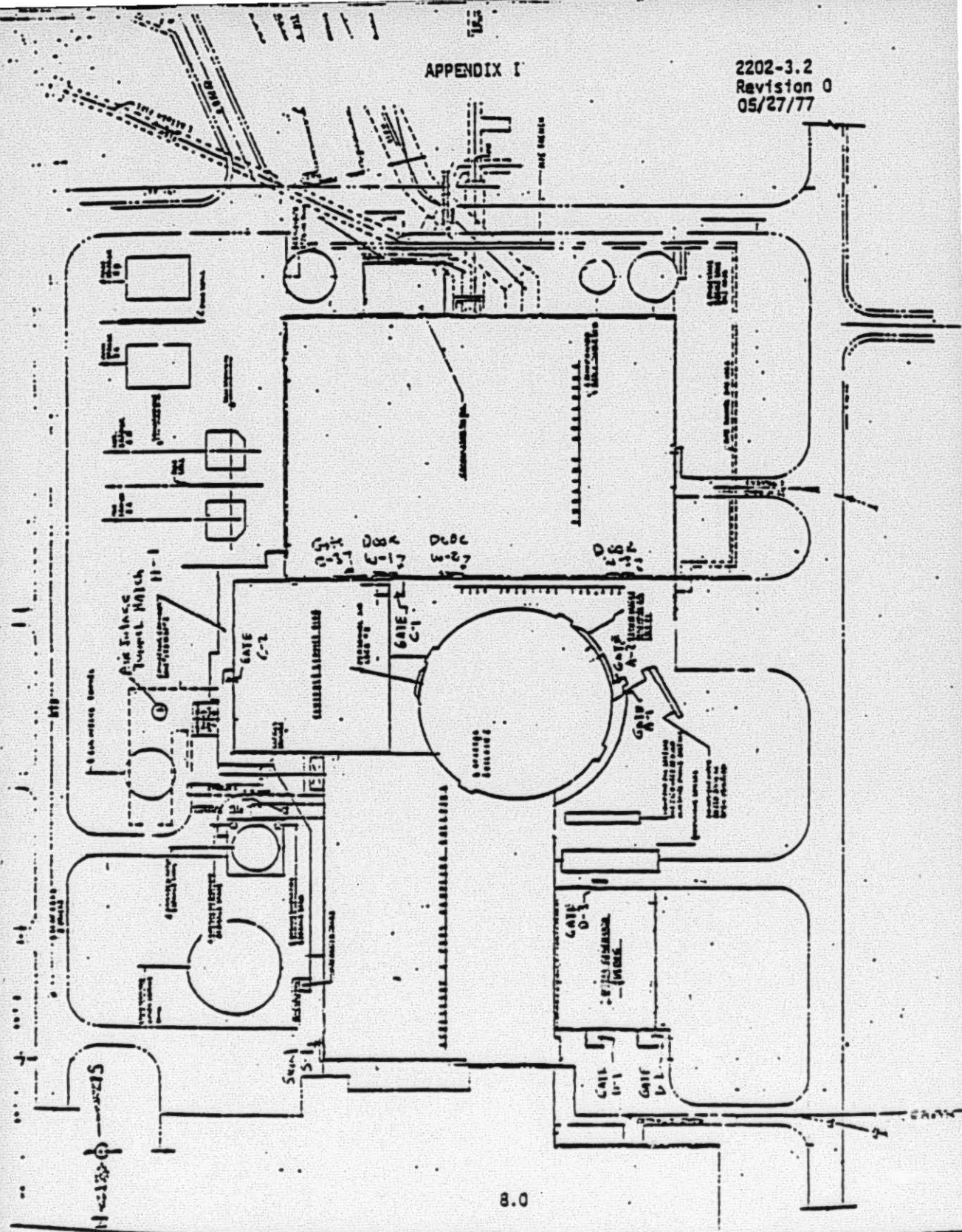
4.0 POST FLOOD PROCEDURE

4.1 As the river recedes, provided that there is no precipitation forecast or the river flow is less than 640,000 cfs, a detailed evaluation of possible plant damage will be made. The Station/Unit Superintendent will make an evaluation as to the recall of personnel, and the method of access to the site (helicopter, boat, car). The Station/Unit Superintendent will make the determination on continued plant operation or return to power if the shutdown order was given, based on findings of detailed evaluation of possible plant damage, review of sounding readings, and Tech. Specs. requirements.

4.2 If the stop gate has been closed during the river rise, it should be opened as the river level on the outside of the southeast culvert opening goes below the level of the water inside the dike.

2202-3.2
Revision 0
05/27/77

2202-3.2
Revision 0
05/27/77



APPENDIX II

SUMP AND FLOOR DRAIN CHECK LIST

<u>Auxiliary Building, 258 ft. elevation</u>	<u>Initials</u>
Floor Drain Locations	
1. South RB Spray Pump Room	_____
2. North RB Spray Pump Room	_____
3. South O.H. Pump Room	_____
4. North O.H. Pump Room	_____
Sumps South RB Spray Pump Room	_____
North RB Spray Pump Room	_____
South OH Pump Room	_____
North OH Pump Room	_____
Sump Pumps WDL-P-17B	_____
WDL-P-17A	_____
WDL-P-16B	_____
WDL-P-16A	_____
<u>Auxiliary Building, 280 ft. elevation</u>	<u>Initials</u>
Floor Drain Locations	
5. Northeast - Bleed Holdup Tank Rooms	
a. Near WDL-T-1A (4)	_____ _____ _____ _____
b. Near WDL-T-1B (2)	_____ _____
c. Near WDL-T-1C (2)	_____ _____

2202-3.2
Revision 0
05/27/77
Initials

Auxiliary Building, 290 ft. elevation

- | | |
|----------------------------------------------------------------------------------|-------|
| 6. Waste disposal liquid valve room | _____ |
| 7. Southeast, East of Reactor Building emergency
cooling booster pump RR-P-1A | _____ |
| 8. West of Reactor Building emergency cooling booster
pump RR-C-1B | _____ |
| 9. Waste Transfer Pump Room | _____ |
| 10. Clean-up demineralizer Room (2) | _____ |
| 11. Hallway outside clean-up demineralizer Room | _____ |
| 12. Reactor Coolant Evaporator Room | _____ |
| 13. Hallway outside Evaporator Room | _____ |
| 14. Evaporator Condensate Tank Room (2) | _____ |
| | _____ |
| 15. Outside Evaporator Condensate Tank Room | _____ |
| 16. South of the Seal Water Pump Unit DW-P-2 | _____ |
| 17. Outside Auxiliary Building Sump Filter Room | _____ |
| 18. Inside Auxiliary Building Sump Filter Room | _____ |
| 19. North-South Main Corridor (3) | _____ |
| | _____ |
| | _____ |
| 20. Spent Resin Storage Tank Room (2) | _____ |

Auxiliary Building, 290 ft elevation

- | | |
|------------------------------------------------|-------|
| 21. Makeup and Purification Pump Room MU-P-1A | _____ |
| 22. Makeup and purification Pump Room MU-P-1B | _____ |
| 23. Makeup and Purification Pump Room MU-P-1C | _____ |
| 24. Southwest corner near instrument rack #459 | _____ |
| Sump - Sump Tank Room, North | _____ |
| Sump Pumps WDL-P-3B | _____ |

WDL-0-3A

2202-3.2
Revision 0
05/27/77
Initials

Auxiliary Building, 305 ft elevation

25. Northwest, Concentrated Liquid Waste Pump Room
Northwest of elevator, around covered hatch (5)
26. Along North Wall (2)
27. Near Motor Control Center 2-21EB
28. Near Motor Control Center 2-11EB
29. At entrance to miscellaneous waste hold-up
Tank Room and near miscellaneous waste tank pumps (4)

Auxiliary Building, 305 ft. elevation

Initials

30. Miscellaneous Waste Hold-Up Tank Room
31. Near Motor Control Center 2-11 EA
32. Near Motor Control Center 2-11E
33. Near Motor Control Center 2-21EA
34. Near Motor Control Center 2-21E
35. Near Nuclear Service Closed Cooling Water Pumps (2)
36. East of Intermediate Coolers
37. Between Intermediate Cooling Filters
38. Near Seal Return Coolers
39. Near Makeup and purification Demineralizer
MU-K-13
40. Near Makeup and purification demineralizer MU-K-1A

Auxiliary Building, 305 ft. elevation

Initials

- | | |
|------------------------------------------------------------|-------|
| 30. Miscellaneous Waste Hold-Up Tank Room | _____ |
| 31. Near Motor Control Center 2-11 EA | _____ |
| 32. Near Motor Control Center 2-11 E | _____ |
| 33. Near Motor Control Center 2-21 EA | _____ |
| 34. Near Motor Control Center 2-21 E | _____ |
| 35. Near Nuclear Service Closed Cooling
Water Pumps (2) | _____ |
| 36. East of Intermediate Coolers | _____ |
| 37. Between Intermediate Cooling Filters | _____ |
| 38. Near Seal Return Coolers | _____ |
| 39. Near Makeup and purification demineralizer MU-K-113 | _____ |
| 40. Near Makeup and purification demineralizer MU-K-1A | _____ |
| 41. Near Gas analyzer WDG-G-1 (2) | _____ |
| | _____ |
| 42. Near Make-up filters (2) | _____ |
| | _____ |
| 43. Near Make-up tank | _____ |
| Near Spent Fuel Coolers (2) | _____ |
| | _____ |
| 44. In Spent Fuel Demineralizer Room | _____ |
| 45. In Spent Fuel Filter Room | _____ |

05/27/77
2202-3.2
Revision 0
Initials

Auxiliary Building, 305 Ft Elevation

46. Valve Room, West of the Miscellaneous Waste Hold-up Tank
47. Corridor Outside Spent fuel Demineralizer Room
48. In Deborating Demineralizer, WDL-K-1A Room
49. In Deborating Demineralizer, WDL-K-1B Room
50. In Valve Room South of the deborating demineralizers
51. In Waste Gas Compressor Room (North)
52. In Valve Room Near Waste Gas Compressor (North)
53. In Waste Gas Filter Room
54. In Waste Gas Compressor Room (South)
55. In Valve Room Near Waste Gas Compressor Room (South)
56. In Corridor Outside Drain 55

Service Building 280 Ft Elevation

Floor Drains.

1. Near Service Air Receivers (2)
2. West of Instrument Air Compressor IA-P-1A
3. Near Service Air Receivers
4. West of Service Air Compressors
5. West of Stairwell
6. West of Sump
7. North of Service Building River Water Booster Pumps
8. Near Isolation Valve Water Storage Tank
9. In Contaminated Drain Tank Room

Sump-South Wall

Sump Pumps SD-P-9B

SD-P-9A

Control Building, 280 Ft. Elevation

Initials

Floor Drains

1. Battery Room No. 2
2. Battery Room No. 1
3. DC Switchgear Room No. 2
4. DC Switchgear Room No. 1
5. Cable Tray Area

Control Building Area 282 Ft. Elevation

Initials

6. Northwest Corner, West of Stairway
7. In access area above tandon access
Gallery, North of West Stairway (2)
8. Northeast of Unit Substation 2-44
9. Southeast of Unit Substation 2-44
10. Southwest Corner, near AH-C-58F
11. East of Drain 10.
12. West of Instrument Rack #436
13. East of Control Building Sump
14. East of Drain 13, near AH-E-48B
15. East of Drain 9, Near AH-E-48A

Sump -South Wall

Sump Pump SD-P-3A

SD-P-3B

Diesel Generator Building, 280 Ft. Elevation

Initials

Floor Drains

1. East Room (6)

2. West Room (6)

Sumps - East Room

West Room

Sump Pumps SD-P-10A

SD-P-10B

SD-P-10C

SD-P-10D

Diesel Generator Building, 305 Ft. Elevation

Initials

3. Diesel Fuel Storage Tank Room (2)

4. East-West Corridor on North Side (4)

Diesel Generator Building, 305 Ft. Elevation

Initials

5. Diesel Generator 1B Room (6)

6. Diesel Generator 1A Room (6)

Tendon Access Gallery

Initials

Floor Drain Locations

1. 8 Floor Drains

Sump

Sump Pumps SD-P-13A

SD-P-13B

Air Intake Tunnel

Initials

Floor Drain Locations

None

Sump

Sump Pumps SD-P-11A

SD-P-11B

SD-P-11A

SD-P-11B

Fuel Handling Building, 280 Ft. Level

Initials

Floor Drains

1. South, immediately adjacent the Reactor Building
Wall (2)
2. East Valve Room (4)
3. East Access Corridor (2)
4. West Valve Room (2)
4. West Valve Room (2)
5. Southeast of Chemical Feed Tank RB-T-2
6. Between the Decay Heat Service Coolers (3)
7. Outside Neutralizer Tank Room
8. Inside Neutralizer Tank Room
9. Outside Reclaimed Boric Acid Pump Room
10. Inside Reclaimed Boric Acid Pump Room

Fuel Handling Building, 305 Ft. Level

Initials

11. Makeup and Purification Valve Room (2)

Fuel Handling Building, 305 Ft. Level

Initials

12. Along East Wall (4)

13. Waste Storage Area (4)

Reactor Building, 282 Ft. Elevation

Initials

Floor Drain Locations

1. Inside O Ring (4)

2. South Side at Re-Drain Tank WD-L-T3

3. Southwest, Near Leakage Transfer Pumps

4. East at Drain 3

5. East, Near Elevator

6. East of Steam Generator West Lay-up Recirc. Pump

7. North, Near Latdown Coolers

8. South at Drain 8.

Sump - North End

Sump Pumps - WDL-P-2A

WDL-P-2B

Reactor Building, 305 Ft. Elevation

Initials

9. In front of elevator
10. North of Elevator
11. Behind Elevator
12. Southwest of Elevator
13. South behind Reactor Building Coolers
14. In front of Reactor Building Coolers, below
Core Flooding Tanks
15. West of 14, Southeast of the Equipment Hatch

Reactor Building, 305 Ft. Elevation

Initials

16. Southeast of West Stairway (2)
17. North of West Stairway, South of Instrument
Mounting R10
18. South of Instrument Mounting R10
19. Northeast Near Instrument Mounting R11
20. South of Drain 19

APPENDIX III

Check of River Water Intake Structure for Sediment Accumulation.

1. Measurements to be taken at openings in front of each bar rake assembly.
2. Measuring device to consist of a Rope measuring 50 feet or longer with a suitable weight, such as a flat weight, attached to the end.
3. Procedure
 - a. Standing on an operating level, lower the weight to the floor of the pump house.
 - b. When the weight is resting on the bottom, take a depth reading using the operating floor as the reference point. Ensure that the rope is taut and straight and that the weight is resting on the bottom.

NOTE: The sediment may be soft so care should be used to note the point at which the weight first detects resistance.

4. Action Required.
 - a. No accumulation (47' on tape) - Clean design condition - no action required.
 - b. 0' - 4' accumulation (47' - 43' on tape) - Base line sediment accumulation no action required.
 - c. 4' - 6' accumulation (43' - 41' on tape) - Increase surveillance to every 2 hours. Pumps should be observed for proper operation.
 - d. 6' or greater accumulation (41' or less on tape) - Inform station Superintendent - Plant should be shut down and cooled down.

APPENDIX IV

2202-3.2
Revision 0
05/27/77

<u>A</u> Gauge Reading Market Street Bridge, Harrisburg (Feet)	<u>B</u> River Elevation at TMI (Feet Above Sea Level)	<u>C</u> River Flow (Cubic Feet) per second)	<u>D</u> River Velocity (MPH)
43	278.7	20,000	.9
5.3	279.5	40,000	1.4
6.2	280.1	60,000	1.7
7.1	280.7	80,000	2.0
8.1	281.3	100,000	2.3
10.4	282.5	150,000	2.6
12.5	283.6	200,000	3.1
14.3	284.9	250,000	3.3
16.1	285.8	300,000	3.5
17.9	287.0	350,000	3.7
19.5	288.1	400,000	3.9
21.2	289.7	450,000	4.1
22.7	291.0	500,000	4.3
24.3	292.6	550,000	4.5
25.6	294.0	600,000	4.7
26.9	295.2	650,000	4.9
28.1	296.1	700,000	5.1
29.3	297.1	750,000	5.3
30.4	298.1	800,000	5.5
31.3	299.1	850,000	5.7
32.0	300.1	900,000	5.9
32.6	301.1	950,000	6.1
33.1	302.0	1,000,000	6.3