



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

May 9, 1995

APPLICANT: Tennessee Valley Authority (TVA)

FACILITY: Watts Bar Nuclear Plant, Unit 1

SUBJECT: MEETING SUMMARY - APRIL 27, 1995, MEETING WITH THE TENNESSEE VALLEY AUTHORITY REGARDING FIRE PROTECTION AND CABLE ISSUES (TAC M63648 AND M89109)

REFERENCE: Meeting notice by P. S. Tam, April 13, 1995

On April 27, 1995, NRC and TVA representatives met in the NRC office to discuss several issues regarding cables and fire protection. Enclosure 1 is the list of participants and observers.

TVA provided handout material (Enclosure 2) to outline its presentation regarding damage on cables. TVA stated that damage was discovered in January 1995, and may have been due to three causes shown on Page 3 of the handout. TVA described the techniques, including use of X-ray, to locate the damage, the criteria used to determine when damage must be repaired, and proposed methods to repair damaged cables. The inspection and repair (using special Raychem tapes) efforts cover only cables that are required to meet 10 CFR 50.49, the equipment qualification regulation. TVA stated that all inspections and repairs will be completed before fuel load, that measures will be taken such that the repairs would not invalidate pre-operational tests already performed, and post-implementation retests will be performed as appropriate. The results of the tape qualification will be retained onsite in an equipment qualification binder. TVA stated that cables which have damage but are in mild environments (i.e., non-10 CFR 50.49 cables) are not included in the program.

TVA provided handout material (Enclosure 3) to outline its presentation regarding current fire protection licensing issues. TVA discussed its current initiatives to improve the diversity in Watts Bar's fire water supply and pumping capability. In addition, TVA stated its position with regard to the design of the automatic CO₂ fire suppression system. TVA stated that these systems meet National Fire Protection Association Standard No. 12-1973 (NFPA 12-1973). The staff disputed TVA's position that these systems met NFPA 12-1973 as far as CO₂ soak time for deep-seated fires is concerned. The staff stated that it plans to issue a request for additional information in the near future to delineate its concerns.

In addition, the staff stated its concerns with oil leakage from the reactor coolant pump being drained to the reactor building floor and equipment drain

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sump. This sump, based on level, is automatically pumped to the tritiated drain collection tank. Specifically, the staff is concerned with oil contamination and the ability of the radwaste system to separate out the oil. The staff issued a request for additional information (RAI) regarding these concerns. TVA indicated that they will provide their response to this RAI by June 5, 1995. TVA also provided an overview of their fire protection milestone schedule and target completion dates for the safe shutdown analysis (May 1, 1995), revision of the fire protection report incorporating the safe shutdown analysis descriptions (May 31, 1995), completion of modifications associated with automatic isolation of raw service water and installation of a diesel fire pump (before fuel load).

TVA presented an overview of its Thermo-Lag fire barrier program and its current installation status. TVA is in the process of reducing its reliance on these fire barrier systems. Currently, TVA has reduced the total linear feet of raceway to be protected by these fire barrier systems from 8154 feet to 5843 feet (see Pages 9 and 10 of Enclosure 3). The staff asked how this reduction was being accomplished. TVA stated that this is accomplished by (1) rerouting cables, (2) the addition of the diesel fire pump, which has eliminated the need to protect the cables for one pump within certain fire areas, (3) addition of an alternative power supply to the "D" instrument rack, (4) making limit switch modifications to certain safe shutdown motor-operated valves (per Information Notice 92-18), and (5) integrating the use of a local source range monitor for certain fires which can affect the source range circuits associated with the main control room.

The staff asked how much 3-hour-rated Thermo-Lag materials will be used. TVA stated that about 30 feet would be used.

Original signed by

Peter S. Tam, Senior Project Manager
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-390

- Enclosures:
1. Participants and Observers List
 2. Handout on Cable Cuts
 3. Handout on Fire Protection Issues

cc w/enclosures: See next page

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Region II (J. Jaudon) concurred by e-mail of 5/3/95 PBT

Distribution

Enclosure 1

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Enclosures 1, 2 and 3

Docket File

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LIST OF PARTICIPANTS AND OBSERVERS
MEETING ON FIRE PROTECTION AND CABLE ISSUES
NRC OFFICE, ROCKVILLE, MARYLAND
APRIL 27, 1995

<u>Name</u>	<u>Affiliation</u>
Raul R. Baron	TVA/Watts Bar
Carl Berlinger	NRC/NRR/Electrical Engineering Branch
Anna Burrows	Member of the Public
Frederick Burrows	NRC/NRR/Electrical Engineering Branch
Ann Dummer	NRC/NRR/Plant Systems Branch
Walt L. Elliott	TVA/Watts Bar
Paul Gunter	Nuclear Information Resource Service
Frederick Hebdon	NRC/NRR/Project Directorate II-4
Conrad McCracken	NRC/NRR/Plant Systems Branch
George Hubbard	NRC/NRR/Plant Systems Branch
Ed Kleeh	NRC/NRR
Roger Huston	TVA/Rockville Office
Johns P. Jaudon	NRC/Region II/Division of Reactor Projects
D. A. Johnson	TVA/Watts Bar
Ed Kleeh	NRC/NRR
Jim Lazevnick	NRC/NRR/Electrical Engineering Branch
Pat Madden	NRC/NRR/Plant Systems Branch
Barbara Martocci	TVA/Watts Bar
Conrad McCracken	NRC/NRR/Plant Systems Branch
Mark O. Medford	TVA Corporate Office
R. G. Mende	TVA Watts Bar
Jon R. Rupert	TVA/Watts Bar
Bruce Schofield	TVA/Watts Bar
Peter Tam	NRC/NRR/Project Directorate II-4
Glenn Walton	NRC/Watts Bar Senior Resident Inspector
Steve West	NRC/NRR/Plant Systems Branch

AGENDA

**TVA/NRC TECHNICAL MEETING
WBN CABLE ISSUES/RING CUTS
APRIL 27, 1995**

- **OPENING REMARKS** **J. R. RUPERT**
- **CABLE DAMAGE ISSUE** **W. L. ELLIOTT**
- **REPAIR TECHNIQUE** **W. L. ELLIOTT**
- **CLOSING REMARKS** **J. R. RUPERT**

Enclosure 2

OPENING REMARKS

- **DISCUSS RECENT CABLE DAMAGE ISSUES**
- **SUMMARIZE CORRECTIVE ACTIONS**
- **DISCUSS REPAIR TECHNIQUE**

CABLE DAMAGE ISSUE

- **RING CUT DAMAGE DISCOVERED BY TVA**
- **REPORTED UNDER 10 CFR 50.55(e) (CDR 95-02)**
- **CAUSES**
 - **Did not correct previously existing damage**
 - **Misinterpretation of cable damage criteria**
 - **Inadequate procedures**
- **EXTENSIVE CORRECTIVE ACTIONS**

CABLE DAMAGE ISSUE (CONTINUED)

- **TRAINED INSPECTION PERSONNEL**

- **EXTENSIVE INSPECTIONS**
 - **Environmentally qualified cable (i.e., 10 CFR 50.49)**

 - **Containment penetrations, and end devices, splices, junction boxes, MOVs, solenoid valves, motors, radiation monitors, etc.**

 - **X-Ray**

 - **Inspections complete**
 - **Thermo-Lag applications - May 1995**

 - **Non Thermo-Lag applications - September 1995**

CABLE DAMAGE ISSUE (CONTINUED)

- **RESULTS**

- **End Device Related Insulation Damage**

- **Insulation damage - approximately 8% (166)**
- **Cable (MTR) problems - approximately 3.5% (73)**
- **Raychem problems - approximately 33**

- **Containment Penetration Related Insulation Damage (4 Penetrations)**

- **Insulation damage - approximately 9% (102)**
- **Few Raychem problems**

REPAIR TECHNIQUE

- **RAYCHEM SHRINK TAPE**

- **PRELIMINARY QUALIFICATION TEST RESULTS FAVORABLE**

- **FORMAL QUALIFICATION TESTING IN PROGRESS**
 - **5-year qualification - complete in June 1995**

 - **20 & 40-year qualification - complete in September 1995**

CLOSING REMARKS

- **THOROUGH CORRECTIVE ACTIONS**
 - **Training**
 - **Inspections**

- **TECHNICALLY SOUND SOLUTION**

AGENDA

TVA/NRC TECHNICAL MEETING WBN FIRE PROTECTION PROGRAM APRIL 27, 1995

- OPENING REMARKS J. R. RUPERT
- CARBON DIOXIDE SUPPRESSION SYSTEMS W. L. ELLIOTT
- REACTOR COOLANT PUMP
OIL COLLECTION SYSTEM W. L. ELLIOTT
- FIRE PROTECTION MILESTONES W. L. ELLIOTT
- HARDWARE COMPLETION SCHEDULE W. L. ELLIOTT
- CLOSING REMARKS J. R. RUPERT

OPENING REMARKS

- **PURPOSE**

- **Address staff comments and facilitate review**
- **Provide program readiness milestones**
- **Provide hardware completion milestones**

- **CURRENT INITIATIVES**

- **Diesel driven fire pump**
- **Automatic isolation of raw service water (RSW)**
- **Thermo-Lag reduction**
- **Thermo-Lag 770-1 three-hour electrical raceway fire barriers**

- **DISCUSS INSPECTION READINESS**

CARBON DIOXIDE SUPPRESSION SYSTEMS

- **WBN DESIGNED TO 1973 NFPA CODE**
 - **Concentrations specified**
 - **CO₂ application rates specified**

- **CO₂ SUPPRESSION SYSTEMS ADEQUATE FOR THE HAZARDS THEY ARE PROTECTING**
 - **Type and amount of combustible materials**
 - **Soak times**
 - **Concentration levels**

- **NO REDUNDANT FIRE SAFE SHUTDOWN EQUIPMENT IN AREAS PROTECTED BY CO₂**

- **ONSITE, DEDICATED FIRE FIGHTING UNIT**

- **ACCEPTABLE ONE-TIME TEST RESULTS**

REACTOR COOLANT PUMP OIL COLLECTION SYSTEM

- PREVIOUSLY APPROVED DESIGN
 - WBN Safety Evaluation Report
- ADEQUATELY SIZED COLLECTION BASINS
- REACTOR BUILDING FLOOR AND EQUIPMENT DRAIN SUMP
- SUMP DISCHARGE TO RADWASTE SYSTEM
- FIXED FIRE DETECTION AND SUPPRESSION

FIRE PROTECTION MILESTONES

- **CURRENT FIRE PROTECTION REPORT MAJOR CHANGES - SUBMITTED**
 - **As designed information**
 - **Additional information that is more "user friendly"**
 - **Diesel-driven fire pump and raw service water (RSW) isolation**
 - **Manual actions and cold shutdown repairs**
 - **Updated deviations and evaluations**
 - **Clarified BTP and Appendix R compliance information**
 - **NFPA Code evaluation section**

- **NEXT FIRE PROTECTION REPORT REVISION**
 - **Safe shutdown analysis summary description**
 - **Incorporate results of current initiatives**
 - **Target submittal - May 31, 1995**

FIRE PROTECTION MILESTONES (CONTINUED)

- **SAFE SHUTDOWN ANALYSIS**

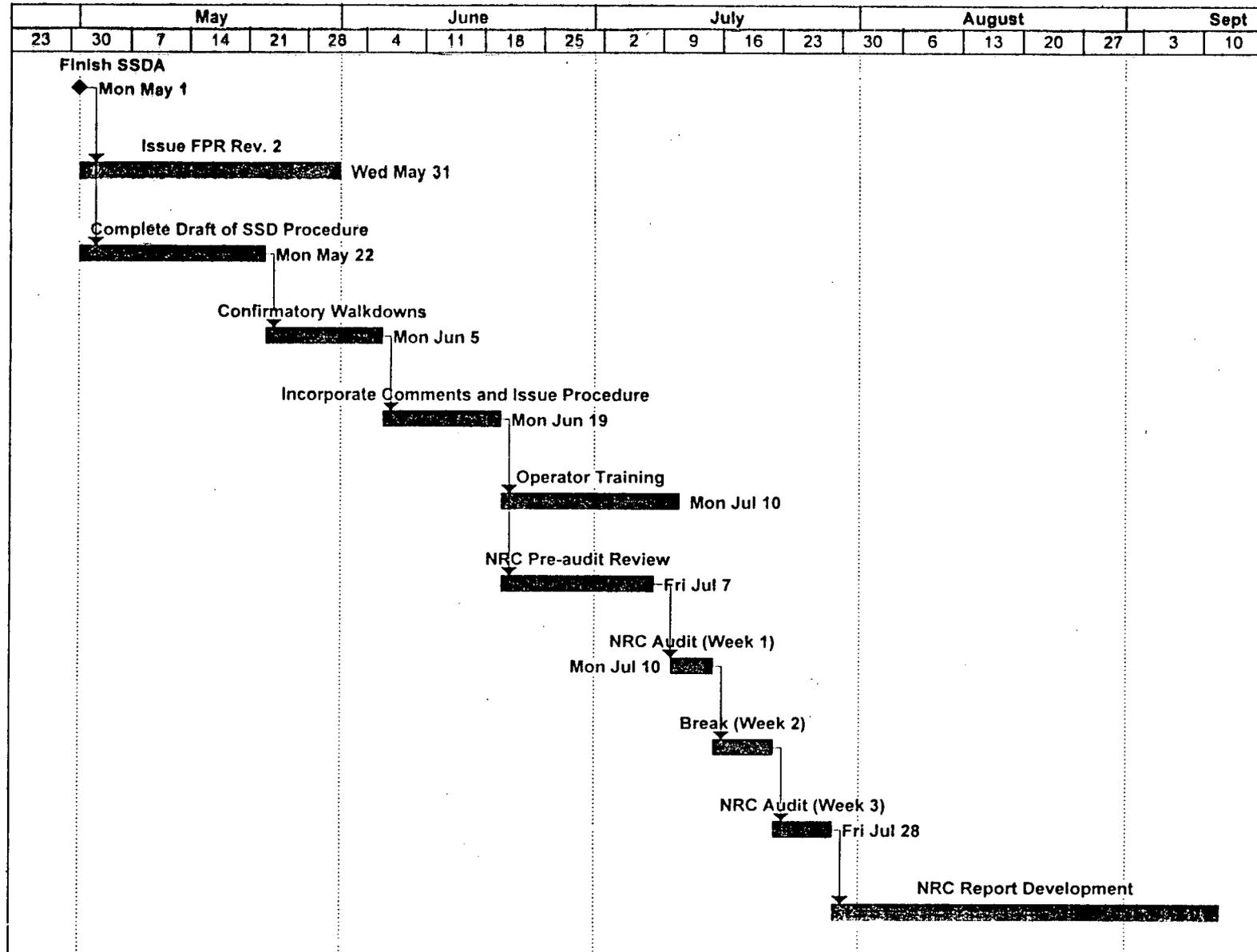
- **Incorporates recent Thermo-Lag reduction efforts**
- **Addresses recently identified issues**
- **Target completion - May 1, 1995**

- **SAFE SHUTDOWN PROCEDURE**

- **Approximately 80% complete**
- **Verify and validate operator manual actions, emergency lighting, manual action performance times, staffing levels, etc.**
- **Make available approximately 2-3 weeks before inspection**

FIRE PROTECTION MILESTONES (CONTINUED)

TARGET SCHEDULE



FIRE PROTECTION MILESTONES (CONTINUED)

- **FIRE PROTECTION PROCEDURES**
 - **Being made available to Region II inspector as they become available**

- **FIRE PROTECTION INSPECTION READINESS**
 - **Design finalized**
 - **Safe shutdown procedure completed**
 - **Minimum three of five shift crews trained**
 - **Fire protection program administrative procedures completed**
 - **High pressure fire protection system preoperational testing in progress (excludes RSW isolation and diesel driven fire pump)**
 - **Diesel fire pump and RSW isolation valve installation in progress**
 - **Thermo-Lag reduction field modifications in progress**
 - **Thermo-Lag installation ongoing**

FIRE PROTECTION MILESTONES (CONTINUED)

THERMO-LAG REDUCTION EFFORT RESULTS*

Commodity	Initial Footage	Footage Reduction	Footage Remaining
Conduit	5727	585 (17 JBs)	5142
Cable Tray	2427	1726	701
Total Raceway	8154	2311	5843

SCOPE REDUCTION INITIATIVES*

Reduction Description	Conduit Reduction	Cable Tray Reduction
Cable reroute (34 cables)	130' & 3 JBs	1342'
Diesel fire pump	50'	198'
"D" instrument rack alternate power supply	0	101'
MOV limit switches	0	85'
Local source range monitor	405' & 14 JBs	0

* Note: Approximate values pending final design.

HARDWARE COMPLETION SCHEDULE

- **AUTOMATIC RAW SERVICE WATER (RSW) ISOLATION**
 - **Design issued**
 - **Installation complete - before fuel load**

- **DIESEL FIRE PUMP**
 - **Issue design - May 1995**
 - **Installation complete - before fuel load**

- **THERMO-LAG REDUCTION INITIATIVES**
 - **Issue design - May 1995**
 - **Cable reroutes and circuit modifications complete - before fuel load**

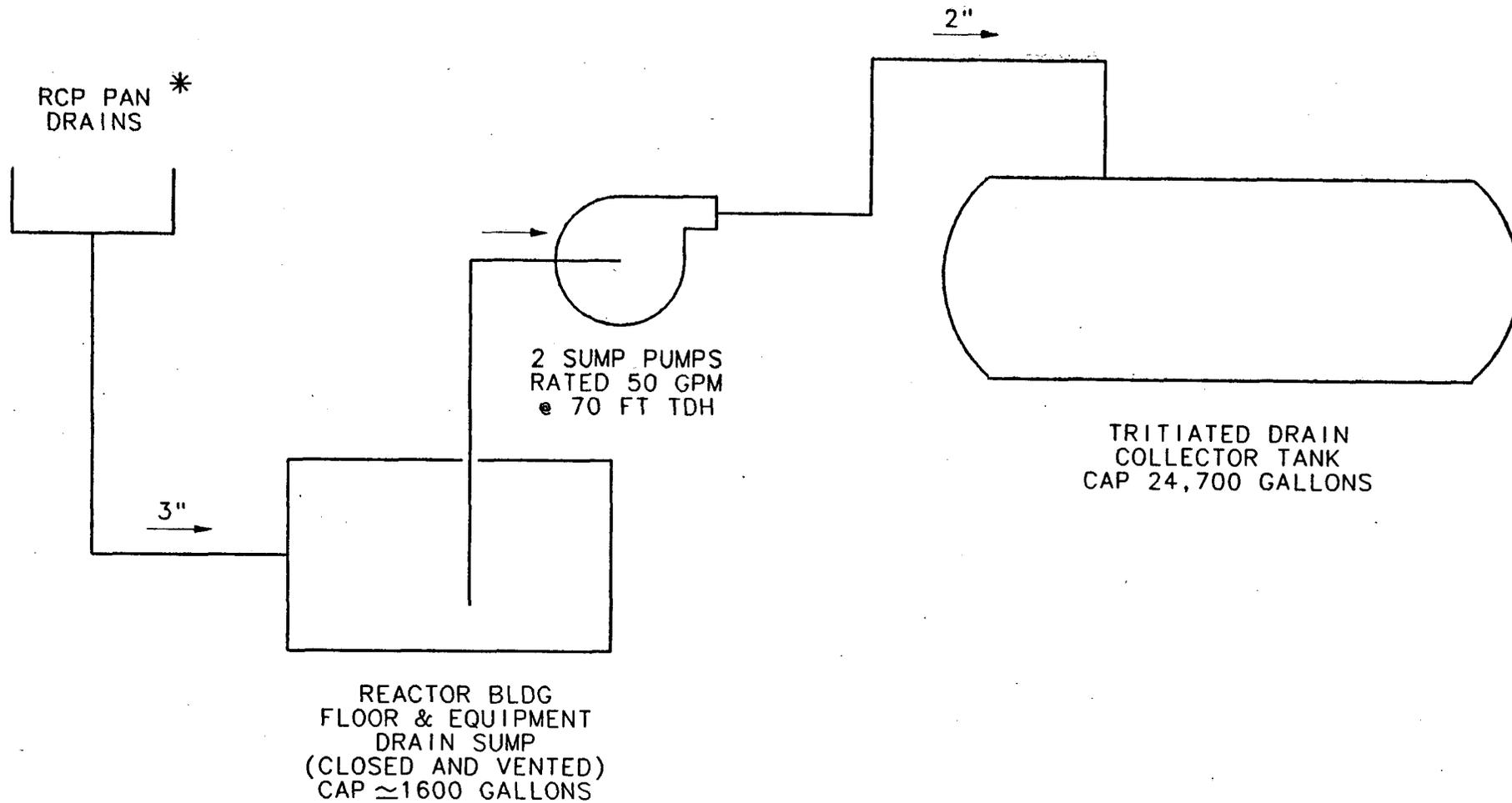
HARDWARE COMPLETION SCHEDULE (CONTINUED)

- **THERMO-LAG 770-1 (THREE-HOUR CONDUIT FIRE BARRIERS)**
 - **Issue design - May 1995**
 - **Fire tests submitted**
 - **Ampacity and materials property testing in progress - test results submitted by early June 1995**
 - **Construction work complete - before fuel load**

- **THERMO-LAG 330-1 (ONE-HOUR ELECTRICAL RACEWAY FIRE BARRIERS)**
 - **Designs issued**
 - **Construction work complete - before fuel load**

CLOSING REMARKS

- **MAJOR ISSUES AND CONCERNS ARE "ON-THE-TABLE"**
- **PROVIDED SCHEDULE**



*
RCP OIL CAP 240 GAL/PUMP
RCP PAN CAP 144 GALLONS(MINIMUM)

REACTOR COOLANT PUMP
OIL COLLECTION SYSTEM

WATTS BAR NUCLEAR PLANT

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