



MDD-T1/^{AS} ~~232-B~~ DIV 1/2

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REGULATORY REQUIRED
**DIVISION 1/2
MODIFICATION DESIGN DESCRIPTION
FOR**

NEW TMI-1/2 ^{BY} RADWASTE

DEMINERALIZER SYSTEM

THREE MILE ISLAND UNITS 1 AND 2 ^{BY}

NUCLEAR GENERATING STATIONS

PREPARATION Michael Rose DATE 12/31/92
CONCURRENCE Fred P. Barbieri DATE 12/31/92
APPROVAL John G.P. Barbieri DATE 1/5/93

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| 1 | Incorporated ISR and RTR comments. | <i>Michael R...</i> <i>Fred P. B...</i> | 10/7/93 2/24/93 |
| 2 | Spelling and reference corrections. Added equipment data. Added ALC-P-12 minimum flow protection. Reworded demineralized water use limitation. | <i>Michael R...</i> <i>Spero</i> | 5/25/95 5/25/95 |

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1.0 PURPOSE AND SCOPE

This modification is to:

1. Provide the ability to install a liquid radwaste treatment system in the Chemical Cleaning Building. This system is to be capable of processing miscellaneous waste from TMI-1 and TMI-2 or water from the TMI-1 Condenser. The design requirements for this system are found in Appendix A of this document.
2. Provide the ability to incorporate the two tanks in the OTSG Chemical Cleaning Building (CCB) into the TMI liquid Radwaste System. These tanks are designated as CC-T-1 and CC-T-2.
3. Provide cross connections on Evaporator Condensate Demineralizers WDL-K-3A/B to enable them to be used in series as well as parallel to polish evaporator distillate. The cross connections are to allow either demineralizer to be the lead bed.
4. Provide the ability to use the TMI-2 Processed Water Storage Tanks to store secondary water from the condenser during refueling. The ability to process this water is also to be provided.
5. Provide the ability to receive and process OTSG draindown during refueling.
6. Provide ability to transfer water from the Clean Water Tank in the CCB to:
 - (a): the river for release,
 - (b): the WECST's for release, or
 - (c): the Waste Evaporator Condensate Demineralizers for additional processing
7. Provide ability to transfer water from the WECST's to the CCB for additional storage or processing.

The designations "EPICOR-II Building" and "OTSG Chemical Cleaning Building (CCB)" refer to the same structure at different times in its history.

1.1 Purpose

1.1.1 TMI-1 Radwaste

The TMI-1 Miscellaneous Waste Evaporator is the normal method of liquid radwaste processing at TMI. This modification will reduce the radionuclides (except tritium) released to the river with the evaporator distillate. This modification will also provide the ability to place a treatment system in parallel with the Miscellaneous Waste Evaporator to process the normal liquid radwaste from TMI-1, if required.

1.1.2 TMI-1 Condensate (refueling)

A significant fraction of the liquid activity released by TMI is through the secondary side during refueling. The activity concentration is low due to the large volume associated with secondary side release. This modification will allow the secondary side water to be contained for processing before reuse in the plant or release to the environment. Ultimate release to the environment is important to the plant in that it provides for tritium control.

1.1.3 TMI-1 Condensate (abnormal)

In the event of a primary-to-secondary system leak in excess of that which can be processed by ordinary means, the plant will have to be shut down and the condensate system decontaminated. This modification will allow the condensate system to be processed through a portable treatment system once the condensate temperature is lowered to acceptable levels.

1.1.4 TMI-2 Radwaste

Now that TMI-2 has entered PDMS (Post Defueling Monitored Storage), there should only be minimal rainwater inleakage to be processed. This liquid must be processed, as necessary. Processing should be in equipment located either on the Unit 1 side or in the CCB.

1.2 Scope

The piping around the Evaporator Condensate Demineralizers will be modified to enable either demineralizer to be the lead bed in a series configuration. Currently the beds can only be operated singly or in parallel.

The EPICOR-II system has been removed from the CCB. In its place will be provided the ability to install a rented multi-bed sluicable pressurized demineralizer system or other treatment system. Any demineralizer system will have facilities for a burial liner/HIC to receive spent resin from the demineralizers. It will also have provisions to enable the burial liner/HIC to be dewatered remotely. Shielding will be provided for the demineralizers and spent resin liner/HIC. Controls, power, and monitoring/alarms for building operation are to be moved from the current EPICOR control shack and isolated areas to the office area and/or the mezzanine in the CCB. Controls for a rented demineralizer system will be located in accordance with the needs of the system.

Numerous pipe connections will be required. Some pipe connections and isolations will be made in the TMI-2 Auxiliary Building in order to simplify pipe runs. A pipe connection will be required in the TMI-1 Auxiliary Building between the clean water return line and the pipe leading to the TMI-1 Waste Evaporator Condensate Test Tanks. Three flanges or pipe caps in the TMI-1 Turbine Building will be modified to enable hose connections for Condensate System cleanup.

The two large tanks in the CCB (CC-T-1 and CC-T-2) will be tied into the TMI-1 WDL System to provide surge capacity for offspec and cleaned water.

2.0 REFERENCES

Unless stated otherwise, the latest issue of the Codes and Standards referenced in this MDD shall be the one in effect.

2.1 (Deleted)

2.2 Regulatory Guides

2.2.1 Regulatory Guide (R.G.) 8.8, "Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations will be as Low as is Reasonably Achievable"

2.2.2 R.G. 1.143, "Design Guidance for Radioactive Waste Management Systems, Structures and Components Installed in Light-Water-Cooled Nuclear Power Plants", Revision 1, 1979

2.3 Industry Standards

2.3.1 ANSI B31.1, "American Standard Code for Power Piping", 1967 Edition

2.3.2 USAS B31.7, Draft February 1968 Edition

2.3.3 ASME, Section VIII

2.4 GPUN Standards

2.4.1 GPUN Plan No. 1000-PLN-7200.01, GPUNC Operational Quality Assurance Plan for Three Mile Island Unit 1 and Oyster Creek

2.4.2 GPUN Specification SP-1101-41-003, Installation of Electrical Equipment-Three Mile Island Nuclear Station, Unit 1

2.4.3 GPUN Specification SP-9000-44-001, "Instrument and Control Installation"

2.5 GPUN Documents

2.5.1 SD-3526-004, TMI-2 System Description for Auxiliary Building Emergency Liquid Clean-up System (EPICOR-II), Rev 10, July 1992

2.5.2 ES-001, "GPUN Engineering Classifications"

2.5.3 ES-004, "Human Engineering Guide"

3.0 FUNCTIONS

3.1 The new configuration will enable processing for release, consistent with the ALARA concept:

3.1.1 Water from the TMI-1 Miscellaneous Waste Storage Tank (WDL-T-2)

- 3.1.2 Water from the TMI-2 Miscellaneous Waste Holdup Tank (2-WDL-T-2)
- 3.1.3 Water from the TMI-1 Condenser
- 3.1.4 Water from OTSG outage draindown
- 3.2 The new configuration will enable processing to the extent required for reuse:
 - 3.2.1 Water from the TMI-1 Condenser
 - 3.2.2 Water from OTSG outage draindown

4.0 DESIGN REQUIREMENTS

4.1 Process Requirements: Radwaste Processing System in CCB

- 4.1.1 Demineralized water must be supplied to the CCB from TMI-1 at rates up to 15 gpm and pressure of 80+/-20 psig.
- 4.1.2 Air must be supplied to the CCB from TMI-1 at rates up to 80 SCFM and 100+/-10 psig. The current designation of the air lines in the EPICOR Building is "service air". The actual air supply is "Instrument Air" from TMI-1.
- 4.1.3 Radioisotope discharge from the system will be such as to stay within the annual radiological dose to the public imposed by 10CFR50, Appendix I (Reference 2.1.3).
- 4.1.4 The system has the capability to reprocess water that is outside the quality suitable for discharge to the Susquehanna River.
- 4.1.5 Radwaste Feed Through Miscellaneous Waste Evaporator

The normal flow path for liquid miscellaneous waste will be from the Miscellaneous Waste Storage Tank, through the Miscellaneous Waste Evaporator, through the Evaporator Condensate Demineralizers, and to the Waste Evaporator Condensate Storage Tanks for release to the river. This path will be maintained as long as the evaporator-demineralizer combination can process the input flow.

4.1.6 Radwaste Feed to Temporary Treatment System

This flowpath will only be used if the liquid radwaste cannot, or should not, be processed through the Miscellaneous Waste Evaporator. Radwaste feed can be supplied to a rented Treatment System from the TMI-1 Miscellaneous Waste Storage Tank (1-WDL-T-2), the TMI-2 Miscellaneous Waste Holdup Tank, the PWST System, the TMI-1 Turbine Building Sump, and the TMI-1 Main Condenser. Feedwater to the system is shown on Drawings 1E-232-21-001, Sheets 1 and 3.

4.1.6.1 "Normal" Feed

If a temporary treatment unit is used, the normal feed to the System from both TMI-1 and TMI-2 is displayed on Drawing 3E-232-21-001, Sheet 3. Liquid radwaste from the TMI-1 Miscellaneous Waste Storage Tank (1-WDL-T-2) would be pumped by the TMI-1 Miscellaneous Waste Transfer Pumps (1-WDL-P-7A/B) to the Off-Spec Tank in the CCB or to the TMI-2 Miscellaneous Waste Holdup Tank (2-WDL-T-2) where it would mix with any water collected from TMI-2 sumps. From there, the mixture would be pumped to the Radwaste Demineralizer Building by the TMI-2 Miscellaneous Waste Tank Pumps (2-WDL-P-6A/B). These flow path needs can be met by the existing pumps. Part of the original design bases for the 1-WDL-P-7A/B pumps was to be able to transfer water from the TMI-1 Miscellaneous Waste Tank to the TMI-2 Miscellaneous Waste Tank. The 2-WDL-P-6A/B Pumps had previously transferred water from 2-WDL-T-2 to the EPICOR-II System.

4.1.6.2 Plant Shutdown

OTSG draindown would be pumped by the Powdex Sump Pumps to a PWST or to CC-T-1 for processing. Condenser water would be transferred to a PWST for processing before either being released overboard or returned to the plant for reuse.

4.1.6.3 "Abnormal" Feed

Abnormal feed would consist of processing TMI-1 Condensate following a primary-to-secondary leak in excess of that which can safely be processed by the existing TMI-1 Condensate Powdex System. This flowpath is shown on Drawing 3E-232-21-00, Sheet 1. A portable pump connected by hose to the new hose connection off the suction header for the Condensate Pumps (CO-P-1A/B/C) would discharge to the new hose connection on the portion of the 10-inch Chemical Cleaning line that extends to the Demineralizer Building. Untreated water would not be transferred to the PWST's.

4.1.7 Air will remain available to the TMI-2 air operated valves associated with the waste transfer.

4.2 Configuration and Essential Features

4.2.1 The Clean Water and Off Specification Water Receiving Tanks are the same as were used for the EPICOR-II system.

4.2.2 The Control Room for the CCB is located in the offices attached to the Building. There is a connecting doorway between the Control Room and the Building so an operator may go from one to the other without exiting the structure.

4.3 Chemical Adjustment

4.3.1 The ability will be provided to chemically adjust CC-T-1 and CC-T-2.

4.4 Interfacing Systems

4.4.1 Radwaste Systems

- 4.4.1.1 TMI-1 Liquid Radwaste System (232)
- 4.4.1.2 TMI-2 Liquid Radwaste System

4.4.2 TMI-1 Condensate System (421)

4.4.3 Steam Generator Chemical Cleaning System (593)

4.4.4 Demineralized Water System (523)

4.4.5 Instrument Air System (852)

4.4.6 Electrical Supply Systems

4.4.7 CCB Building HVAC Systems

4.4.8 TMI-2 Processed Water Storage Tank System

4.5 Structural Requirements

- 4.5.1 The existing EPICOR-II Control Shack shall be abandoned in place after usable equipment is relocated

4.6 Mechanical Requirements

- 4.6.1 The TMI-1 Liquid Radwaste System is classified as N-3. Therefore, pipe fabrication for the modification around the Evaporator Condensate Demineralizers and at interfaces with a rented treatment system will be in accordance with ANSI B31.7 (Reference 2.3.2) rather than ANSI B31.1 (Reference 2.3.1) as promulgated by Regulatory Guide 1.143 (Reference 2.2.2). Piping within vendor supplied skids should be in accordance with ANSI B31.1.

- 4.6.2 New pumps on unprocessed water tanks should be magnetically coupled when solids content is expected to be high.

- 4.6.3 A minimum flow orifice is provided on the recirculation line from ALC-P-12 back to CC-T-1 in order to assure the 50 GPM minimum flow required by ALC-P-12. The orifice is sized for 60 GPM at the shutoff head of the pump (238 ft).

4.7 Electrical Requirements

- 4.7.1 All electrical installation shall be in accordance with the requirements of SP-1101-41-003 (Reference 2.4.2) except where specific site conditions may dictate otherwise. Such conditions will be documented, evaluated, and approved by EP&I.

4.7.2 Electrical power is supplied to the CCB from 750 KVA Unit Substation USS 2-33 located on the mezzanine floor at elevation 305' in the southeast corner of the TMI-2 Turbine Building. 480V power from USS 2-33 is supplied to MCC 2-33A currently located inside the EPICOR-II Control Shack. As part of PDMS, this will be repowered from Unit Substation 2-32 in the Auxiliary Building at elevation 328'. The MCC in the EPICOR shack will have to be relocated to the new CCB control room.

4.7.3 The CCB HVAC system fan and heaters, the transfer pump (ALC-P-5), building sump pump, the 20 ton hoist, agitators/mixers, MOVs, and the new transfer pump are powered from MCC-2-33A. A 480-120/208 VAC, 25 KVA transformer, supplied from MCC 2-33A, supplies all other system electrical loads in the CCB from power panel MP 2-33A. This one-line configuration may remain although the equipment must be moved to the CCB Building.

4.7.4 Existing cable and conduit from the EPICOR Control Shack will be abandoned in place. This includes the cables, tray and conduit runs from the Control Shack to the CCB, as well as any other connections to the Control Shack.

4.7.5 The CCB lighting and HVAC systems will be left intact and not altered by this modification.

4.7.6 New electrical loads in the CCB should consist primarily of an additional transfer pump, ALC-P-12 (460v, 23.8 amps), two chemical transfer pumps (120v, 2 amp estimate each), the new control panel in the office area and a vendor control panel (480v, 3 amp estimate).

4.8 Instrumentation and Control

4.8.1 All instrument and control equipment installation shall be in accordance with SP-9000-44-001 (Reference 2.4.3).

4.8.2 Controls and instrumentation related to monorail operation and building environment shall be moved from the current Control Shack to the office areas attached to the CCB. The new control room will be set up in these offices.

4.8.3 Information on instrumentation and control of a temporary treatment system will be supplied when the contract for the system is bid and let.

4.8.4 The new transfer pump in the CCB will be operated from the CCB Control Room with automatic shutoff on low level in CC-T-1.

4.8.5 The CCB Control Panel is to provide a satellite alarm to the TMI-1 Control room designated separately from any PDMS alarm.

4.9 Environmental Conditions

4.9.1 Atmospheric Conditions in the CCB

4.9.1.1 The highest and lowest recorded outside temperatures in the area are 104 F and -14 F, respectively (Section 2.5.2 of the updated FSAR dated 7/90). The minimum inside temperature for the CCB is to be 40F to provide a margin against freezing. There is no maximum limitation.

4.9.1.2 Humidity may range from 40 percent to 100 percent as determined by atmospheric conditions.

4.9.1.3 The CCB will continue to be serviced by the existing filtered air system currently in effect.

4.9.2 Flood Conditions

4.9.2.1 The CCB is protected from flood by being within the site dike system.

4.9.3 Seismic Conditions

4.9.3.1 According to the Section 1.3.1.7 of the System Description for EPICOR-II (Reference 2.5.1), the CCB has a seismic bathtub. The building, therefore, provides the seismic requirements of Regulatory Guide 1.143.

4.9.3.2 Radwaste piping for this system shall either be seismically evaluated and constructed or the lack of inherent seismic protection shall be compensated for by locating the piping in a structure with seismic bathtub or by placing the process pipe in a guard pipe. Allowable deviations to this criterion are:

1. Cleaned processed water return pipe from the Radwaste Processing Unit need not be supported to retain pressure integrity in the event of an earthquake. Reg. Guide 1.143 (Reference 2.2.2) would normally require this. However, Section B of the Reg Guide states that the purpose of the Guide is to "provide reasonable assurance that...radioactive waste management...systems are designed, constructed, installed, and tested of a level commensurate with the need to protect the health and safety of the public and plant operating personnel." Use of non-seismic design is acceptable because the radiological concentration of this liquid is minimal as the water is slated for release to the environment in accordance with plant procedures.
2. The pipe set aside to transport contaminated condensate to the CCB, if necessary, is to be supported as Seismic III on the grounds that it will be rarely, if ever, used and it is to transfer water from the Turbine Building which, itself, is not a seismic structure.

3. Piping for the purpose of transferring condensate to the PWST system will be a combination of existing pipe and some new interconnecting pipe. The existing piping will remain supported as is. New piping will be supported as Seismic III. This is acceptable since the water to be transferred by this piping is currently sent to the river via the Industrial Waste System.

4.9.4 Other Natural Phenomena

- 4.9.4.1 The upper, non seismic, portion of the CCB is not protected against the natural phenomena, as mentioned in 10CFR50, Appendix A (Reference 2.1.2), Criterion 2. This is acceptable in that the temporary radwaste processing system will not perform a Nuclear Safety Related function.

4.9.5 Lighting

- 4.9.5.1 Lighting within the CCB shall be in compliance with the TMI-1 lighting requirements.

4.10 Radiological Conditions

- 4.10.1 All systems are to be operated and maintained in such a manner as to maintain exposures to plant personnel to levels which are "as low as is reasonably achievable", in accordance with the guidelines given in Regulatory Guide 8.8 (Reference 2.2.1). This consideration is not to imply that the maximum possible quantity of radioactivity must be removed from the feed solutions to either the Evaporator Condensate Demineralizers or any rented radwaste treatment system.
- 4.10.2 The liquid radwaste system is assumed to process 550,000 gal/year of liquid radwaste (536,000 gal from TMI-1 and 14,000 gal of rainwater from TMI-2).
- 4.10.3 Radiological discharge concentrations from the system are to assure compliance with the 10CFR50, Appendix I (Reference 2.1.3) requirement that radwaste discharges to the environment be limited such that the "fencepost" individual not receive more than 3 Mr per year.
- 4.10.4 Rad Engineering must determine which, if any, of the CCTV cameras and monitors must be maintained as part of this modification. Those not used shall be abandoned in place. It is acceptable to remove them if it is more convenient.
- 4.10.5 The radiological limitation for water stored in the Processed Water Storage Tanks is limited by TMI Technical Specification 3.22.1.4 to 10 curies, excluding tritium and dissolved or entrained noble gases. This limitation, per the Technical Specification, is for "Outside temporary tank". That would be comparable to these tanks which are outside the radiologically controlled area.

- 4.10.6 The radiological limitation for water transferred from the TMI-1 side to the TMI-2 Miscellaneous Waste Holdup Tank is $1\text{E-}03$ uCi/ml noble gases and $1\text{E-}06$ uCi/ml iodine. This is to limit potential airborne contamination on the TMI-2 side since there is no continuous cleaning of the TMI-2 Auxiliary Building air.

4.11 Thermal Requirements

- 4.11.1 Temperature of liquid sent to the demineralizer beds shall be no greater than 140 degrees F in order to protect the integrity of the ion exchange resin.
- 4.11.2 The components in any rented processing system must be kept above the freezing temperature to keep the liquid contents from solidifying. In order to provide a margin of safety, 40 degrees F is hereby established as the minimum process temperature.

4.12 Materials

- 4.12.1 All metals added by this modification that are wetted by the process solution shall be in accordance with Regulatory Guide 1.143 (Reference 2.2.2).
- 4.12.2 All non-metals added by this modification that are wetted by the process solution shall be compatible with the process solutions.

4.13 Maintenance

- 4.13.1 This modification will require additional maintenance for all new and rented equipment and reevaluation of maintenance procedures for existing and relocated associated equipment.
- 4.13.2 The 20-ton monorail system will require a complete preventative maintenance overhaul to refurbish the unit and to eliminate or reduce the frequency of system cutouts.

4.14 Surveillance and In-Service Inspection

- 4.14.1 Existing procedures for EPICOR-II surveillance and in-service inspection shall be revised to incorporate the modification changes.

4.15 Testing Requirements

- 4.15.1 The new portions of the system shall be initially hydro-tested in accordance with the requirements of Regulatory Guide 1.143 (Reference 2.2.2).
- 4.15.2 Subsequent system integrity testing is not envisioned unless the system boundary is breached. Testing at that time will be determined by the nature of that breach.

4.15.3 All electrical equipment and installation shall be tested in accordance with the requirements of SP-1101-41-003 (Reference 2.4.2) and applicable manufacturer's instructions. This shall include, as a minimum, continuity and insulation tests and complete functional testing of all new and relocated equipment. Included also, as applicable, shall be instrument testing in accordance with SP-9000-44-001 (Reference 2.4.3).

4.15.4 The monorail system will require testing after the refurbishment described in Section 4.13.

4.16 Human Factors

4.16.1 The Human Factors Department shall be involved in the design of the Radwaste Demineralizer Building Control Room with the understanding that the control room location and dimensions are fixed. GPUN Standard ES-004, "Human Engineering Guide" (Reference 2.5.3) shall be followed to the extent reasonable.

4.17 Safety, Health and Security Requirements

4.17.1 Personnel access during system operation and movement of spent resin liners/HICs will be controlled by radcon under standard site procedures which are not in the scope of this modification.

4.17.2 The CCB is located within the RPA (Radiation Protection Area) of the plant. No unique security programs are required.

4.18 Quality Classification

4.18.1 Upon completion of final design, the TMI-1 Quality Classification List must be updated in accordance with Procedure EP-011.

4.19 Quality Assurance

4.19.1 This system will be part of the TMI-1 Liquid Radwaste System. As such, it falls under Regulatory Guide 1.143 (Reference 2.2.2) as amended in Section 2.2 of Appendix A and is considered "Regulatory Required".

4.19.2 This modification must comply with the requirements of the GPUN Operational Quality Assurance Plan (Reference 2.4.1). The QA scope, as defined in Regulatory Guide 1.143 (Reference 2.2.2) is limited to:

1. Design and Procurement Document Control
2. Control of Purchased Material
3. Handling, Storage, and Shipping
4. Construction Inspections
5. Inspection, Test, and Operating Status
6. Identification and Corrective Action for Items of Nonconformance

5.0 DESIGN DESCRIPTION

5.1 Detailed System Description

5.1.1 Equipment Design Features (Note: Not all information is available)

5.1.1.1 Tanks

1. TMI-1 Miscellaneous Waste Storage Tank (WDL-T-2)

Tank Details

| | |
|-------------------------|----------------------------|
| Identification | WDL-T-2 |
| Manufacturer | Pittsburgh DesMoines Steel |
| Capacity | 23,370 gal |
| Installation | Horizontal |
| Outer Diameter & Length | 13'-9 3/4"; 17'-0" tan-tan |
| Shell Material | SS |
| Shell Thickness | 3/8" |
| Design Temperature | 200° F |
| Design Pressure | 25 psig |
| Corrosion Allowance | |
| Design Code | ASME III - Class C |
| Code Stamp | ASME Code |

2. TMI-2 Miscellaneous Waste Hold-Up Tank (2-WDL-T-2)

Tank Details

| | |
|-------------------------|----------------------------|
| Identification | 2-WDL-T-2 |
| Manufacturer | Richmond Engineering Co. |
| Capacity | 19,518 gal. |
| Installation | Horizontal |
| Outer Diameter & Length | 10'-9 1/4"; 32'-4 5/8" |
| Shell Material | SA-240, 304 SS |
| Shell Thickness | 3/8" |
| Design Temperature | 150° F |
| Design Pressure | 20 psig |
| Corrosion Allowance | Zero |
| Design Code | 1968 ASME, Sec III Class 3 |
| Code Stamp | ASME Code |

3. Off-Spec Water Receiving/Batch Tank (CC-T-1)

Tank Details

| | |
|---------------------------|---------------------------|
| Identification | CC-T-1 |
| Manufacturer | Chicago Bridge & Iron Co. |
| Capacity | 85,978 gal. |
| Installation | Vertical |
| Outside Diameter & Length | 21'-10"; 39'-0" |
| Shell Material | 304 SS |
| Shell Thickness | 13/32" to 11/16" |
| Design Temperature | 250° F |
| Design Pressure | Full vacuum to 75 psig |
| Corrosion Allowance | Zero |
| Design Code | |
| Code Stamp | yes |

4. Chemical Addition Tanks

| | |
|---------------------------|-------------|
| Identification | |
| Manufacturer | |
| Capacity | |
| Installation | Vertical |
| Outside Diameter & Length | |
| Shell Material | |
| Shell Thickness | |
| Design Temperature | |
| Design Pressure | Atmospheric |
| Corrosion Allowance | |
| Design Code | |
| Code Stamp | |

5.1.1.2 Pumps

1. TMI-1 Waste Transfer Pumps (WDL-P-7A/B)

Pump Details

| | |
|-------------------------------|---------------|
| Identification | WDL-P-7B |
| Manufacturer | Ingersol Rand |
| Model No. | 1 CORV |
| Type | Centrifugal |
| Standard Material Designation | |
| Rated Speed | 3510 rpm |
| Rated Capacity | 30 gpm |
| Rated Total Dynamic Head | 97 ft |
| Shutoff Head | 106 ft |
| Design Pressure, Casing | |
| Design Temperature | |
| Lubricant | |

Motor Details

| | |
|--------------------|------|
| Manufacturer | |
| Type | |
| Enclosure | |
| Rated Horsepower | 3 HP |
| Speed | |
| Lubricant/Coolant | |
| Power Requirements | |
| Power Source | |

2. TMI-2 Waste Transfer Pumps (WDL-P-6A/B)

Pump Details

| | |
|-------------------------------|------------|
| Identification | WDL-P-6A/B |
| Manufacturer | |
| Model No. | |
| Type | |
| Standard Material Designation | |
| Rated Speed | |
| Rated Capacity | |
| Rated Total Dynamic Head | |
| Shutoff Head | |

Design Pressure, Casing
Design Temperature
Lubricant

Motor Details

Manufacturer
Type
Enclosure
Rated Horsepower
Speed
Lubricant/Coolant
Power Requirements
Power Source

3. Demineralizer Transfer Pump (ALC-P-5)

Pump Details

| | |
|-------------------------------|---------------------------------------|
| Identification | ALC -P-5 |
| Manufacturer | Ingersol Rand |
| Model No. | 3x2x10 Type HOC, Group 2, ANSI A60 |
| Type | Horizontal Centrifugal |
| Standard Material Designation | Col. DI |
| Rated Speed | 1750 rpm |
| Rated Capacity | 200 gpm |
| Rated Total Dynamic Head | 100' |
| Shutoff Head | 121' |
| Design Pressure, Casing | 200 psig |
| Design Temperature | 110 C |
| Lubricant | SAE 20 or 30 oil |

Motor Details

| | |
|--------------------|------------------------------|
| Manufacturer | Gould Century Elec. Div. |
| Type | F-C |
| Enclosure | TEFC |
| Rated Horsepower | 10 HP |
| Speed | 1700 rpm |
| Lubricant/Coolant | Grease/Air |
| Power Requirements | 480V AC/12.5A, 3 Phase, 60Hz |
| Power Source | MCC 2-33A |

4. Off-Spec Tank Transfer Pump (ALC-P-12)

Pump Details

| | |
|-------------------------------|------------------------|
| Identification | ALC -P-12 |
| Manufacturer | Peerless |
| Model No. | 8196 STP, 1.5 x 3-8 |
| Type | Horizontal Centrifugal |
| Standard Material Designation | 316 SS |
| Rated Speed | 3550 RPM |
| Rated Capacity | 55 GPM 200 GPM |
| Rated Total Dynamic Head | 236 Ft 189 Ft |
| Shutoff Head | 238 Ft |
| Design Pressure, Casing | |
| Design Temperature | |
| Lubricant | |

Motor Details

| | |
|--------------------|--|
| Manufacturer | Emerson |
| Type | D |
| Frame | 254T |
| Rated Horsepower | 20 |
| Speed | 3600 RPM |
| Power Requirements | 460V, 3 PH, 60 HZ |
| Power Source | MCC-2-33A |
| Service Factor | 1.15 |
| Full Load Amp | 23.8 |
| Locked Rotor Amp | 145.5 |
| Torque Rating | 30.1 (rated) 47.9 lb-ft (locked rotor) 71.6 lb-ft (break down) |
| Insulation Class | B |

4. Chemical Addition Transfer Pumps

Pump Details

| | |
|-------------------------------|-----------------------|
| Identification | |
| Manufacturer | |
| Model No. | |
| Type | Positive Displacement |
| Standard Material Designation | |
| Rated Speed | |
| Rated Capacity | |
| Rated Total Dynamic Head | |
| Shutoff Head | |
| Design Pressure, Casing | |
| Design Temperature | |
| Lubricant | |

Motor Details

| |
|--------------------|
| Manufacturer |
| Type |
| Enclosure |
| Rated Horsepower |
| Speed |
| Lubricant/Coolant |
| Power Requirements |
| Power Source |

5.1.1.3 Demineralizers

This information will be supplied later after the contract for this equipment has been bid and awarded.

5.1.1.4 Filters

This information will be supplied later after the contract for this equipment has been bid and awarded.

5.1.1.5 Lifting Systems

1. Monorail Hoist System

| | |
|-----------------|---|
| Manufacturer | Harnischfeger, Inc., P&H |
| Model | #36CS23E |
| Capacity | 20 ton |
| Total Lift | 25'-6" |
| Speed | |
| Hoist | 20 fpm maximum (90% load) |
| | 10 fpm medium |
| | 5 fpm low |
| | 1 fpm creep |
| Trolley | 50 fpm |
| Control | |
| Hoist | Quad - Speed |
| Trolley | Single Speed |
| Power Supply | 460V AC, 3 Phase, 60 Hz |
| Power Source | MCC 2-33A |
| Control Voltage | 110V AC |
| Control Station | Local and remote six pushbutton pendant control; deadman type element control |
| Reeving | Four part single reeved |

5.1.1.6 CCB Building Ventilation System

1. Nameplate Data

| | |
|-------------------|---|
| MSA Filter Unit | ALC-E-H1 |
| Identification | 60KW Chromalox Unit |
| Heaters | 480V AC, 3 Phase, 60 Hz |
| Power | SCCP-080-3480 |
| Catalog Number | J 0-800 F Temp. Controller |
| Type | J 0-800 F High Limit with Manual Reset |
| Fan | Internal Industrial |
| Identification | ALC-E-1 |
| Capacity | 8000 cfm |
| Motor Rating | 30 HP |
| Power | 460V AC, 3 Phase, 60 Hz |
| ID Number | P28G353G-G7-XD |
| Radiation Monitor | Eberline Ping - 2A Off Line Effluent Monitor |
| Readout | 3 Channel: gaseous, particulate, iodine |
| Power | 110 V AC, 1 Phase, 60 Hz |
| Sample movement | Self-contained sample/return pump |

5.1.2 Limitations, Set Points, and Precautions

5.1.2.1 Care must be taken when transferring water from the Clean Water Receiving Tank (CC-T-1) to the Waste Evaporator Condensate Storage Tanks (WDL-T-11A/B) to assure that the Storage Tanks do not overflow.

6.0 OPERATIONS

6.1 Normal Operations

6.1.1 The instructions for initial fill, startup, normal operation, shutdown, draining, and refilling of the modified Evaporator Condensate Demineralizer subsystem will come from the operations department.

6.1.2 The instructions for initial fill, startup, normal operation, shutdown, draining, and refilling of any rented radwaste processing system will come from the system supplier after the contract for the system has been bid and let.

6.2 Infrequent Operations

The only infrequent operation of the system should be the processing of secondary side condensate. System configuration for this evolution is to be standardized in procedures

6.3 Transient Operations

Transient operations are not expected for this system other than for normal startup and shutdown.

7.0 CASUALTY EVENTS AND RECOVERY

7.1 Casualty Events

7.1.1 Loss of Cooling

There is no process cooling for this system. Therefore, loss of cooling is not considered a casualty event.

7.1.2 System Leakage and Ruptures

With the minor exception of a small section of piping discussed above, the Evaporator Condensate Demineralizer System and any rented demineralizer system are to be housed within the confines of structures that are protected by seismic "bathtubs". The portion of the overall system which involves the PWST system will handle water that currently is released to the river through the Industrial Waste System. Therefore, leaks and ruptures are not an item of concern for the general public.

7.1.3 High Radiation Level

Radiation monitors are to be strategically located within the CCB. Existing alarms on the Control Shack panel shall be moved to the new panel in the CCB.

7.1.4 Fires and Chemical Reactions

Fire detectors are strategically located within the CCB. The fire alarm panel in the Control Shack will be moved to the new CCB Control Room area.

7.1.5 Abnormal Flow

Abnormal flow to any temporary treatment system, whether too rapid or too slow, will be detected by the System control circuitry and will automatically shut down and isolate the System.

7.1.6 Abnormal Chemistry

If feedwater chemistry to any rented radwaste treatment system becomes abnormal enough to endanger system operation, the System is to be secured and the water processed through the Miscellaneous Waste Evaporator.

7.1.7 Unit Trip

Operation of radwaste systems is independent of reactor operation. Therefore, Unit Trip has no effect on operation of any portion of this modification.

7.1.8 System, Component, or Control Malfunction

This factor cannot be evaluated for a rented treatment system until the contract for the system is bid and let.

The modification around the Evaporator Condensate Demineralizers consists of pipe and hand operated valves. The potential for failure is minimal and would be covered in standard operating procedures.

7.1.9 Loss of Voltage

Loss of voltage would cause any rented system to shut down once the voltage becomes such that process control would be jeopardized.

7.2 Design Features to Mitigate Effects of Casualty Events

This factor will be evaluated after the contract for a rented treatment system is bid and let

7.3 Recovery Procedures

Procedures will be required to recover from spills and dewatering difficulties. These procedures will be required to be developed by Operations.

8.0 MAINTENANCE

- 8.1 Preventative maintenance procedures shall be in place for all components including those associated with rented equipment.

APPENDIX A
REQUIREMENTS FOR A RENTED RADWASTE SYSTEM IN THE CCB

1.0 PROCESS REQUIREMENTS:

- 1.1 Feed to the system from TMI-1 Radwaste is assumed to have the following chemical characteristics. These are the average values from samples taken from the TMI-1 Miscellaneous Waste Storage Tank during the period from 1/6/91 to 7/19/92:

| | | |
|---------------|----------|-----------------------|
| Boron: | 347 ppm | (range:35-1526 ppm) |
| Total Solids: | 1782 ppm | (range:100-10957 ppm) |
| Ph: | 8.6 | (range:4.12-11.95) |

- 1.2 The system is limited to demineralized water at rates no greater than 15 gpm and pressure of 80+/-20 psig.
- 1.3 Not require air at rates greater than 80 SCFM and 100+/-10 psig.

2.0 MECHANICAL REQUIREMENTS:

- 2.1 A temporary treatment system will be mounted on skids to the extent practical. This is for convenience and is not a crucial requirement.
- 2.2 A temporary demineralizer system shall be designed and constructed in accordance with Regulatory Guide 1.143 as adjusted and limited by the GPUN Operational QA Plan (Reference 2.4.1). In accordance with Revision 7 of the GPUN Operational QA Plan, hose connections are allowed for temporary connections.
- 2.3 Any temporary treatment package must fit in the area vacated by the EPICOR-II System.
- 2.4 Any temporary treatment system will be located behind shields and underneath the area supported by the Radwaste Demineralizer Building monorail.
- 2.5 Any burial liner/HIC will be located behind a separate shield and underneath the area supported by the same monorail. The liner/HIC will be closer to the barn doors so that when a liner/HIC is removed for burial or storage, it does not have to be transported over the demineralizers.
- 2.6 Any new component or assembly to be installed in the process area of the CCB must:
- 2.6.1 Be liftable by the 20-ton building monorail hoist system;
 - 2.6.2 Fit through the bay doors serviced by the hoist;
 - 2.6.3 Fit through the 170" x 95 1/2" horizontal opening in the grating outside the bay doors.
 - 2.6.4 Satisfy any floor loading limitations for the bottom level of the CCB.

3.0 RADIOLOGICAL REQUIREMENTS:

- 3.1 Any temporary treatment system will be based on the following average input concentrations for Co-60, Cs-134, Cs-137, and total beta/gamma. These values are the average of concentrations in the TMI-1 Miscellaneous Waste Storage Tank during the period from 1/16/91 to 7/19/92. All concentrations are in uCi/ml.

Co-60: 6.52 E-05; range:(0.67-21.5)E-05
Cs-134: 7.1 E-04; range:(1.47-26.3)E-04
Cs-137: 1.05 E-03; range:(2.96-13.5)E-04

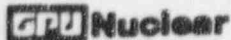
- 3.2 The system will further be based on the following average input concentrations for Ag-110M, Co-57, Co-58, Mn-54, Nb-95, Nb-97, Sb-122, Sb-125, Sr-92, and Zn-95. These values are the average of concentrations in the TMI-1 Miscellaneous Waste Storage Tank during the period from 12/22/91 to 7/19/92. All concentrations are in uCi/ml.

Ag-110M: 1.13 E-04; range:(1.66-30.4)E-05
Co-57: 6.63 E-05; range:(1.3-27.8)E-05
Co-58: 9.02 E-03; range:(0.38-69.8)E-03
Mn-54: 3.79 E-05; range:(1.09-11.4)E-05
Nb-95: 9.72 E-04; range:(one sample)
Nb-97: 8.76 E-05; range:(1.07-34.8)E-05
Sb-122: 5.94 E-05; range:(3.62-8.99)E-05
Sb-125: 1.07 E-04; range:(one sample)
Sr-92: 9.7 E-05; range:(3.06-191.0)E-06
Zn-95: 6.69 E-04; range:(one sample)

- 3.3 Any rented treatment system (including any spent resin Liner/HIC) is to be located behind a shield to protect personnel. Shield thickness is to be such that contact radiation levels on the outside of the shields shall not cause the area to be classified as a "high radiation area" (i.e. it is to be less than 100 Mr/hr) when the demineralizers, etc are fully loaded.

4.0 MAINTENANCE:

- 4.1 The vendor for any rented equipment will be required to provide any special tools or equipment needed to perform preventative or corrective maintenance on the equipment it supplies.



Technical Functions
Safety/Environmental Determination and 50.59 Review
(EP-016)

| | |
|---|--------------------------|
| Unit <u>TMI-1</u> | Page 1 of <u>21</u> |
| Document/Activity Title <u>Shipment of Misc. Waste Evaporator Concentrates</u> | SE Rev. No. <u>1</u> |
| Document No. (if applicable) | Doc. Rev. No. |
| | SE No. <u>115302-052</u> |
| Type of Activity (modification, procedure, test, experiment, or document): <u>Radwaste Shipment</u> | |
| <p>1. Does this document involve any potential non-nuclear environmental concern? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>To answer this question, review the Environmental Determination (ED) form. Any YES answer on the ED form requires an Environmental Impact Assessment by Environmental Controls, per 1000-ADM-4500.03. If in doubt, consult Environmental Controls or Environmental Licensing for assistance. If all answers are NO, further environmental review is not required. In any event, continue with Question 2, below.</p> <p>2. Is this activity/document listed Section I or II of the matrices in Corporate Procedure 1000-ADM-1291.017? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If the answer to question 1 is NO, stop here. This procedure is not applicable and no documentation is required. (If this activity/document is listed in Section IV of 1000-ADM-1291 review on a case-by-case basis to determine applicability.) If the answer is YES, proceed to question 3.</p> <p>3. Is this a new activity/document or a substantive revision to an activity/document? (See Exhibit 2, paragraph 3, this procedure for examples of non-substantive changes.) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If the answer to question 3 is NO, stop here and complete the approval section below. This procedure is not applicable and no documentation is required. If the answer is YES, proceed to answer all remaining questions. These answers become the Safety/Environmental Determination and 50.59 Review.</p> <p>4. Does this activity/document have the potential to adversely affect nuclear safety or safe plant operations? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>5. Does this activity/document require revision of the system/component description in the FSAR or otherwise require revision of the Technical Specifications or any other part of the SAR? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>6. Does the activity/document require revision of any procedural or operating description in the FSAR or otherwise require revision of the Technical Specifications or any other part of the SAR? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>7. Are tests or experiments conducted which are not described in the FSAR, the Technical Specifications or any part of the SAR? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>IF ANY OF THE ANSWERS TO QUESTIONS 4, 5, 6, OR 7 ARE YES, PREPARE A WRITTEN SAFETY EVALUATION FORM.</p> <p>If the answers to 4, 5, 6, and 7 are NO, this precludes the occurrence of an Unreviewed Safety Question or Technical Specifications change. Provide a written statement in the space provided below (use back of sheet if necessary) to support the determination, and list the documents you checked.</p> <p>NO, because: _____</p> <p>Documents checked: _____</p> <p>8. Are the design criteria as outlined in TMI-1 SDD-T1-000 Div. I or OC-SDD-000 Div. I Plant Level Criteria affected by, or do they affect the activity/document? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>If YES, indicate how resolved: _____</p> | |

APPROVALS (print name and sign)

| | | |
|--------------------------------|------------------------------------|--------------------|
| Engineer/Originator | T. M. Dempsey <i>T. M. Dempsey</i> | Date <u>6/3/90</u> |
| Section Manager | B. D. Elam <i>B. D. Elam</i> | Date <u>6/3/90</u> |
| Responsible Technical Reviewer | | Date |
| Other Reviewer(s) | | Date |