PLAN FOR THE PHASED DECOMMISSIONING OF THE

LIQUID RADWASTE SYSTEM

SHOREHAM NUCLEAR POWER STATION

LONG ISLAND POWER AUTHORITY

January 5, 1993

TABLE OF CONTENTS

Plan for The Phased
Decommissioning of the
Shoreham Liquid Radwaste System

I. INTRODUCTION

The Liquid Radwaste System (G11) has been identified in the Decommissioning Plan as a contaminated system which will be dismantled and removed. Per LSNRC-1859, LIPA Response 10, a description of the phased decommissioning of the Liquid Radwaste System was provided. In this response, LIPA stated that 'a phased shutdown methodology has been developed which minimizes the need for temporary equipment". LIPA also stated that "installed plant equipment will be utilized to the maximum extent possible to hold, recirculate, sample and process liquid radioactive waste water. Temporary filtration units or demineralizers will only be used in the event of equipment malfunction or during periods when installed equipment is secured for scheduled maintenance, radiological surveys or other such evolutions". A more comprehensive review of our plans for decommissioning the liquid radwaste system indicated that the use of temporary filitration units or demineralizers, as system decommissioning activities proceed, is most advantageous. LIPA intends on using a mobile radwaste filter/demineralizer skid, as a planned evolution, to process liquid radwaste during the final stages of system decommissioning when certain equipment is secured for removal purposes. In accordance with the Decommissioning Order Condition # 3, this plan provides a detailed description for the shutdown, dismantlement, and removal of the Liquid Radwaste System and describes how liquid radwaste will continue to be processed during system decommissioning.

In addition, LSNRC-1859, LIPA Response 10, states that "the laundry drain subsystem will be decontaminated and prepared for eventual use as an industrial waste processing facility". LIPA has subsequently determined that it would be preferable, from a schedule and cost viewpoint, to decommission the Laundry Drain Sub-system. Instead, the Regenerant Liquid and Evaporator Feed Tank subsystem and possibly other selected radwaste components will be decontaminated, modified, or replaced, to be used as the post-decommissioning Industrial Waste Water System.

LSNRC-1859, LIPA Response 10 also states that the remaining Phase 2 components will be decommissioned following the draining of the SFSP. These components may be decommissioned prior to the draining of the SFSP if the Offsite Dose Calculation Manual (ODCM) is amended to permit draining of the SFSP to the Salt Water Drain Tank.

Indirectly related to the phased decommissioning of the liquid radwaste system is the potential use of temporary filter/demineralizer equipment to maintain the quality of the water in the Spent Fuel Storage Pool (SFSP). This will facilitate removal of the Fuel Pool Clean Up (G41) System in parallel with the continued storage of the fuel assemblies in the SFSP until shipment.

Section II provides a description of the Liquid Radwaste System as it now exists and also describes how it is being operated in the current plant condition to collect, process and discharge liquid radwaste.

Section III details the phased decommissioning activities, describing in sequential order the isolation, dismantlement or decontamination, of sub-systems and components. The prerequisites to begin the respective phases are given, as are the temporary modifications required which will keep the system functional. Additionally, the collection, processing, sampling and discharge capabilities after completion of each of the phases is provided.

Section IV provides a description of the proposed Industrial Waste Water System which will be utilized to collect, hold, process, sample, and discharge waste water after the Termination Survey is completed. Portions of this new system may be placed into service prior to license termination to collect and transfer "clean" water to the radwaste system.

II. SYSTEM DESCRIPTION

In the current configuration, the Liquid Radwaste System can collect, process and discharge radioactive waste water collected from building floor and equipment drains. Liquid radwaste is transported from these collection points via the 6" floor drain header (high conductivity) or the 4" equipment drain header (low conductivity) to one of three pairs of tanks in the Radwaste Building. These tanks are the Floor Drain Collector Tanks (FDCT's) TK-061A/B; the Regenerant Liquid and Evaporator Feed Tanks (REFT's) TK-060A/B; and the Waste Collector Tanks (WCT's) TK-010A/B. Each tank has a capacity of 25,000 gallons. Each of these collection tanks has a pair of pumps which recirculate and discharge the liquid to an appropriate sub-system for processing. The sub-systems are the Waste (E-043) and the Regenerant (E-044) Evaporators, the Floor Drain Filter (FL-012), and the Radwaste Filters (FL-014A/B) & Demineralizers (DE-001A/B). The Evaporator Sub-system is not used. Currently, the collected liquid radwaste is only processed through the filter sub-systems. After processing, the liquid radwaste is then sent to one of two pairs of discharge and holding tanks. These tanks are the Discharge Waste Sample Tanks (DWST's) TK-068A/B and the Recovery Sample Tanks (RST's) TK-069A/B. Each of these tanks has a capacity of 25,000 gallons. Each tank has its own pump which re-circulates and then discharges the sampled liquid to the Condensate Storage Tank (CST), Circulating Water Discharge Tunnel, or back to one of the sub-systems for further processing.

Normal system alignment routes the floor drain effluent to one of the two FDCT's. The equipment drain effluent is normally routed to one of the two WCT's. The third pair of liquid radwaste collection tanks are the REFT's. These tanks collect high conductivity chemical liquid waste resulting from the regeneration of the condensate demineralizers which are now shut down and designated for removal. These tanks have acid and caustic injection lines which permit the neutralization of the collected liquid radwaste. Additionally, the high conductivity liquid waste from the 6" floor drain discharge header may be diverted to the REFT's should neutralization be required.

Depending upon certain conditions, the liquid waste is processed through the Floor Drain Filter or the Radwaste Filters & Demineralizers. Processed water is then transferred to the DWST's or the RST's where it is recirculated, sampled and discharged to the Circulating Water Discharge Tunnel or recycled back to the CST. During the discharge process, the radioactivity level is monitored by an existing radiation element (1D11-RE-013). A high radiation level or a loss of power at the sampling panel (PNL-013) will alarm and close the waste discharge valve (AOV-158).

III. DECOMMISSIONING PHASES

The following describes the major components and sub-systems of the Liquid Radwaste System which will be either removed or decontaminated. Existing equipment & portions of piping systems may be decontaminated and re-used in combination with new piping & components for certain temporary modifications. It also describes the prerequisites required to begin the respective phases of decommissioning, temporary modifications required to keep the remaining portions of the system functional, and a description of the remaining system capabilities after completion of each of the phases.

A. Phase I

1. Decommissioning/Dismantling Activities

   a. Isolate and decontaminate Phase Separator Tanks TK-107 A&B, remove all associated piping and components.

   b. Isolate Evaporator Sub-system. Decontaminate evaporators, remove all associated piping and components up to active system interfaces.

   c. Laundry Drain Tanks TK-020 A&B; pumps, piping and components will be isolated and removed back up to all interfaces with active portions of the system. This also includes the removal of the radwaste washer and dryer.

   d. Radwaste Solidification System (P63); isolated only, this system is not designated as contaminated, and will not be removed.

2. Prerequisites

   a. No influent into Laundry Drains Sub-system.

3. Temporary Modifications

   a. None.

4. Liquid Radwaste Processing Capabilities

   a. With exception of the Laundry Drains Sub-system, full system process capabilities remain as described in Section II.

B. Phase IIA

1. Decommissioning/Dismantling Activities

The following equipment will be decontaminated or removed:

a. Turbine Building Floor Drain Sump TK-053A, along with its associated pumps, piping and components up to connection to the 4" floor drain discharge header.

b. Turbine Building Floor Drain Sump TK-053B, along with all incoming floor drain lines, pumps, piping and components up to the interface with 4" line at the discharge from the Decon Area Drain Sump TK-012. Note: Turbine Building Sump Pumps and associated portions of discharge piping for TK-053 A&B will be decontaminated, if possible, and retained for future use.

c. Decon. Area Drain Sump TK-012, along with all incoming floor drain lines, pumps, piping and components up to the interface with 6" floor drain discharge header.

d. Exposed floor drain piping in Turbine Building

e. Drywell Equipment Drain Tank TK-049, pumps, cooler, all piping and components up to the 4" equipment drain discharge header

f. Reactor Building Equipment Drain Sumps TK-050 A&B, along with all incoming lines, pumps, piping and components up to the 4" equipment drain discharge header.

g. Reactor Building Floor Drain Sump TK-056C along with all incoming floor drains, pumps, piping and components up to the 6" floor drain discharge header.

h. Recovery Sample Tank TK-069B; pumps, piping and components will be isolated and removed up to active portions of the system.

i. Radwaste Demineralizer DE-001B, along with all associated piping and components up to interfaces with active portions of the system.

j. Discharge Waste Sample Tank TK-068B; pumps, piping and components will be isolated and removed up to active portions of the system.

k. Floor Drain Collector Tanks TK-061 A&B, pumps, influent and effluent piping and components up to the common system connections to the Floor Drain Filter, Radwaste Filters & Demineralizers and the Evaporator Sub-system.

1. 6" floor drain discharge header from AOV-245 (located in Reactor Building) to FE-397 (located in Radwaste Building) will be isolated and decontaminated for post-decommissioning service. Note: This header may have to be partially removed to provide access for decontamination and survey activities. If it is demonstrated that this header cannot be decontaminated in a timely manner, it will be removed and replacement piping installed as needed.

Note: Turbine Building Floor Drain Sump TK-053A will be returned to service during this phase of decommissioning as a "clean" sub-system. Discharge will be routed to the Radwaste Equipment Drain Sump TK-071 or the Acid & Caustic Waste Sump (1P21-TK-118) via a Temporary Modification (TM). This TM will remain in effect until the 6" floor drain header has been decontaminated or replaced.

2. Prerequisites

a. Mechanical decontamination (hydrolazing) and radiological survey of embedded piping is complete for Turbine Building Floor Drain Sumps TK-053 A&B and Reactor Building Floor Drain Sump TK-056C.

b. Mechanical isolation of Low Conductivity Drain (P71) System Sumps TK-186 A&B pump discharge piping connections to 4" equipment drain discharge header complete (for item 1.i above).

c. No radioactive influent from the Chem. Lab (for item 1.c. above) Note: Liquid drains from the existing Chem. Lab are directed to Decon Area Drain Sump TK-012. The entire Chem. Lab may be relocated or a separate "hot" lab set up in a different location to prevent the continued flow of radwaste to Decon. Sump TK-012. This would allow the "cold" lab to remain in the existing location with a new drain line installed to direct "clean" liquid discharge to the Turbine Building Floor Drain Sump TK-053A.

d. Appropriate Operations Procedures revised to incorporate changes to system.

3. Temporary Modifications

a. Install cross-tie to direct Radwaste Building Floor Drain Sump TK-054 discharge to the Radwaste Building Equipment Drain Sump TK-071.

b. Install pump discharge piping from Turbine Building Floor Drain Sump TK-053A to Radwaste Building Equipment Drain Sump TK-071 or the Acid & Caustic Waste Sump (1P21-TK-118). (after completion of item 2.a above).

c. Install temporary drain lines from the Chem. Lab and station air compressors to Turbine Building Floor Drain Sump TK-053A.

d. Install temporary line from 4" radwaste equipment drain discharge header to Regenerant Liquid and Evaporator Feed Tank TK-060B. A manual isolation valve will be installed in lieu of valve AOV-284.

4. Liquid Radwaste Processing Capabilities

With decommissioning of the Floor Drain Collector Tanks TK-061 A&B and the 6" floor drain discharge header, all liquid waste collected in the Reactor Building, Turbine Building, and the Radwaste Building sumps will be transferred to the Waste Collector Tanks TK-010 A&B or the Regenerative Evaporative Feed Tanks TK-060 A&B via the 4" equipment drain discharge header. This waste will be processed in the normal manner utilizing the Floor Drain Filter FL-012, the Radwaste Filters FL-014 A&B and the remaining Radwaste Demineralizer DE-001A. Processed liquid will be sampled and discharged utilizing the remaining Discharge Waste Sample Tank TK-068A and the Recovery Sample Tank TK-069A.

C. **Phase IIB**

1. Decommissioning/Dismantling Activities

The following equipment will be decontaminated or removed:

a. Reactor Building Floor Drain Sump TK-056B, along with all incoming floor drain lines, pumps, piping and components up to the floor drain discharge header.

b. Regenerant Liquid and Evaporator Feed Tanks TK-060 A&B, along with their associated pumps, piping and components up to interfaces with active portions of the system.

c. Waste Collector Tank TK-010B, along with its associated pumps, piping and components up to interfaces with active portions of the system.

d. Discharge Waste Sample Tank TK-068A, along with its associated pump, piping and components up to active portions of the system.

e. Radwaste Filter FL-014B, along with all associated valves, piping and components up to interfaces with active portions of the system.

f. Floor Drain Filter FL-012, along with all associated valves, piping and components up to interfaces with active portions of the system.

2. Prerequisites

a. Mechanical decontamination (hydrolazing) and radiological survey of all embedded piping is complete for Reactor Building Floor Drain Sump TK-056B.

b. Radwaste System influent has decreased to an acceptable level for processing at a reduced capacity.

c. Appropriate Operations Procedures revised to incorporate changes to system.

3. Temporary Modifications

a. Contingent - Connect the acid and caustic neutralizing lines which are currently connected to the REFT's to the Waste Collector Tank TK-010A via a Temporary Modification. This will provide direct neutralization capability of the Waste Collector Tank TK-010A.

4. Liquid Radwaste Processing Capabilities

After completion of this phase, liquid radwaste collected by the remaining operating sumps will be sent to Waste Collector Tank TK-010A and processed through Radwaste Filter FL-014A and Demineralizer DE-001A. The processed water will be sampled and discharged utilizing the Recovery Sample Tank TK-069A and existing flowpaths. After completion of this phase, the Regenerant Liquid and Evaporator Feed Tanks TK-060 A&B will be decontaminated and the pumps, piping, and components replaced for future collection and processing of "clean" industrial waste water.

D. Phase IIC

1. Decommissioning/Dismantling Activities

The following equipment will be decontaminated or removed:

a. Reactor Building Floor Drain Sump TK-056A, along with all incoming floor drain lines, pumps, piping and components up to the floor drain discharge header.

b. Drywell Floor Drain Tank TK-057, along with its associated pumps, piping and components up to the floor drain discharge header.

c. Radwaste Filter FL-014A, along with all associated piping and components.

d. Radwaste Demineralizer DE-001A, along with all associated piping and components.

e. Spent Resin Tank TK-062, along with associated piping, valves and components up to other system interfaces.

2. Prerequisites

a. Mechanical decontamination (hydrolazing) and radiological survey of influent piping (embedded drains, downcomers, etc.) is complete for Reactor Building Floor Drain Sump TK-056A.

b. No liquid radwaste from Reactor Building or Turbine Building (i.e. Termination Survey complete in all areas).

c. Existing Fuel Pool Clean Up (G41) System Demineralizers empty.

d. Appropriate Operations Procedures revised to incorporate changes to system.

Note: To facilitate the decommissioning of the Fuel Pool Clean Up (G41) System, temporary filter/demineralizer equipment may be used to clean the water in the Spent Fuel Storage Pool (SFSP) until the nuclear fuel is removed.

e. NRC approval received for use of mobile radwaste demineralizer/filter equipment. Mobile equipment will meet requirements of Reg. Guide 1.143. Existing liquid radwaste system process connections specifically designed for installation of a mobile filter/demineralizer will be used. A change to the Process Control Program (PCP) may be required to add vendor operating manual if other than currently referenced.

3. Temporary Modifications

a. Installation of mobile Radwaste Filter/Demineralizer equipment.

b. Contingent - Install temporary submersible pump(s) in decontaminated Reactor Building Floor Drain Sumps.

Note: If Reactor Building Floor Drain Sump TK-056C new discharge piping installation has been completed for "clean" service, this sump may be returned to service during this phase of decommissioning. It will temporarily discharge into the 4" equipment drain discharge header until the 6" floor drain discharge header is ready for service.

4. Liquid Radwaste Processing Capabilities

After completion of this phase, liquid waste water will be collected by the operating sumps and directed to the Waste Collector Tank TK-010A via the 4" equipment drain discharge header. With both Radwaste Filters and Demineralizers decommissioned, a mobile filter/demineralizer will be used to process collected liquid radwaste. The mobile equipment will be connected to existing system process connections designed specifically for this purpose. The mobile filter/demineralizer will discharge the processed liquid to Recovery Sample Tank TK-069A for sampling and discharge.

E. Phase IID

1. Decommissioning/Dismantling Activities

The following equipment will be decontaminated or removed:

Note: The Recovery Sample Tank TK-069A and the mobile Radwaste Filter/Demineralizer skid will be the last components removed in this phase of work; this will enable processing and discharge of water collected by means other than design flowpaths (e.g. wet vacuums, temporary pumps, etc.)

a. Complete removal of 4" equipment drain discharge header.

b. Radwaste Building Equipment Drain Sump TK-071, along with all incoming floor drains, pumps, piping and components up to interfaces with the remaining portions of the system.

c. Radwaste Building Floor Drain Sump TK-054, along with all incoming floor drains, pumps, piping and components up to interfaces with the remaining portions of the system.

d. Waste Collector Tank TK-010A, along with all pumps, piping and components up to interfaces with active portions of the system.

e. Recovery Sample Tank TK-069A, along with all remaining pumps, piping and components up to interfaces with the Demineralized Water (P21) System immediately before entering the discharge tunnel.

f. All remaining piping and components will be removed or decontaminated in place in preparation for the operational and termination surveys of the Radwaste Building.

2. Prerequisites

a. Mechanical decontamination (hydrolazing) and radiological survey of all embedded drain piping is complete for Radwaste Building Drain Sumps TK-054 & TK-071.

b. No liquid radwaste being discharged into Radwaste Building Drain Sumps TK-054 & TK-071.

c. All nuclear fuel has been removed from the Spent Fuel Storage Pool (SFSP). The SFSP has been drained prior to removal of the 4" equipment drain discharge header. This prerequisite may not be required if the Offsite Dose Calculation Manual (ODCM) is amended to permit draining of the SFSP to the Reactor Building Salt Water Drain Tank TK-190.

d. Appropriate Operations Procedures revised to incorporate changes to system

3. Temporary Modifications

a. None.

4. Liquid Radwaste Processing Capabilities

With decontamination activities (hydrolazing) completed, there should be no liquid radioactive waste streams. After the Radwaste Building Floor Drain and Equipment Drain Sumps TK-054 & TK-071 have been pumped down to Waste Collector Tank TK-010A, this water may be processed and discharged utilizing the mobile filter/demineralizer equipment and the existing sample and discharge flowpaths from the Recovery Sample Tank TK-069A. During this final phase of decommissioning, Waste Collector Tank TK-010A will be decommissioned first leaving the mobile filter/demineralizer equipment and the Recovery Sample Tank TK-069A for processing, sampling and discharging any liquids which may result from decontamination of Waste Collector Tank TK-010A. These liquids may be collected from portable pumps or "wet vacs", and pumped directly to the Recovery Sample Tank TK-069A for process, sample and discharge. The normal discharge flowpath from the Recovery Sample Tank TK-069A to the Circulating Water Discharge Tunnel will remain intact with all required components such as radiation element 1DII-RE-013 and AOV-158 fully functional (see Section II for description of discharge flowpath). Upon process and discharge of this last batch of water, the remaining parts of the system will be dismantled and removed. The mobile Radwaste Filter/Demineralizer equipment will be broken down and shipped back to the supplier for disposal.

IV. Phase III - Post Decommissioning Industrial Waste Water System

A. Phase III completes the installation and testing of the Industrial Waste Water System. Phase III does not involve any actual decommissioning activities. This work has been identified as a Phase of the Radwaste Decommissioning Plan for the purpose of maintaining continuity of the overall project since this phase of work must be coordinated with decommissioning activities.

Note: Termination surveys shall be satisfactorily completed for all systems and structures in areas where liquid waste collection floor drains are returned to service.

The Industrial Waste Water System will be partially implemented via a series of Temporary Modifications as the phased decommissioning of the Liquid Radwaste System progresses. New floor drain piping & components, sump pumps and discharge piping & components, and other piping & components associated with the collection and discharge tanks will be installed. The collection and discharge tanks are the decontaminated Regenerant Liquid and Evaporator Feed Tanks TK-060 A&B.

Final tie-ins, initial check-out, and operational tests will be completed prior to placing the entire Industrial Waste Water System in service.

V. REFERENCES

1. USNRC letter dated June 11, 1992 to L.M. Hill from S.W. Brown; subject: Order Approving the Decommissioning Plan and Authorizing Decommissioning of the Shoreham Nuclear Power Station, Unit 1.

2. Long Island Power Authority (S. Klimberg) letter LSNRC-1859 dated November 27,1991 to U.S. Nuclear Regulatory Commission (Document Control Desk); subject: Additional Informatiom in Support of the Decommissioning Plan for Shoreham.

3. Offsite Dose Calculation Manual (ODCM)

4. Process Control Program (PCP)

5. Flow Diagrams, MFSK-17 (A-F)

6. Flow Diagrams, MFSK-46 (A-D)

7. Regulatory Guide 1.143

VI. ILLUSTRATIONS

1. Figure 1 - Existing Liquid Radwaste System - G11
2. Figure 2 - Liquid Radwaste System After Completion of Phase I
3. Figure 3 - Liquid Radwaste System After Completion of Phase IIA
4. Figure 4 - Liquid Radwaste System After Completion of Phase IIB
5. Figure 5 - Liquid Radwaste System After Completion of Phase IIC
6. Figure 6 - Proposed Method of Dewatering Spent Fuel Storage Pool - Utilizing Existing Discharge Flowpath
7. Figure 7 - Alternate Method of Dewatering Spent Fuel Storage Pool (requires change to ODCM)
8. Figure 8 - Proposed Industrial Waste Water System Configuration

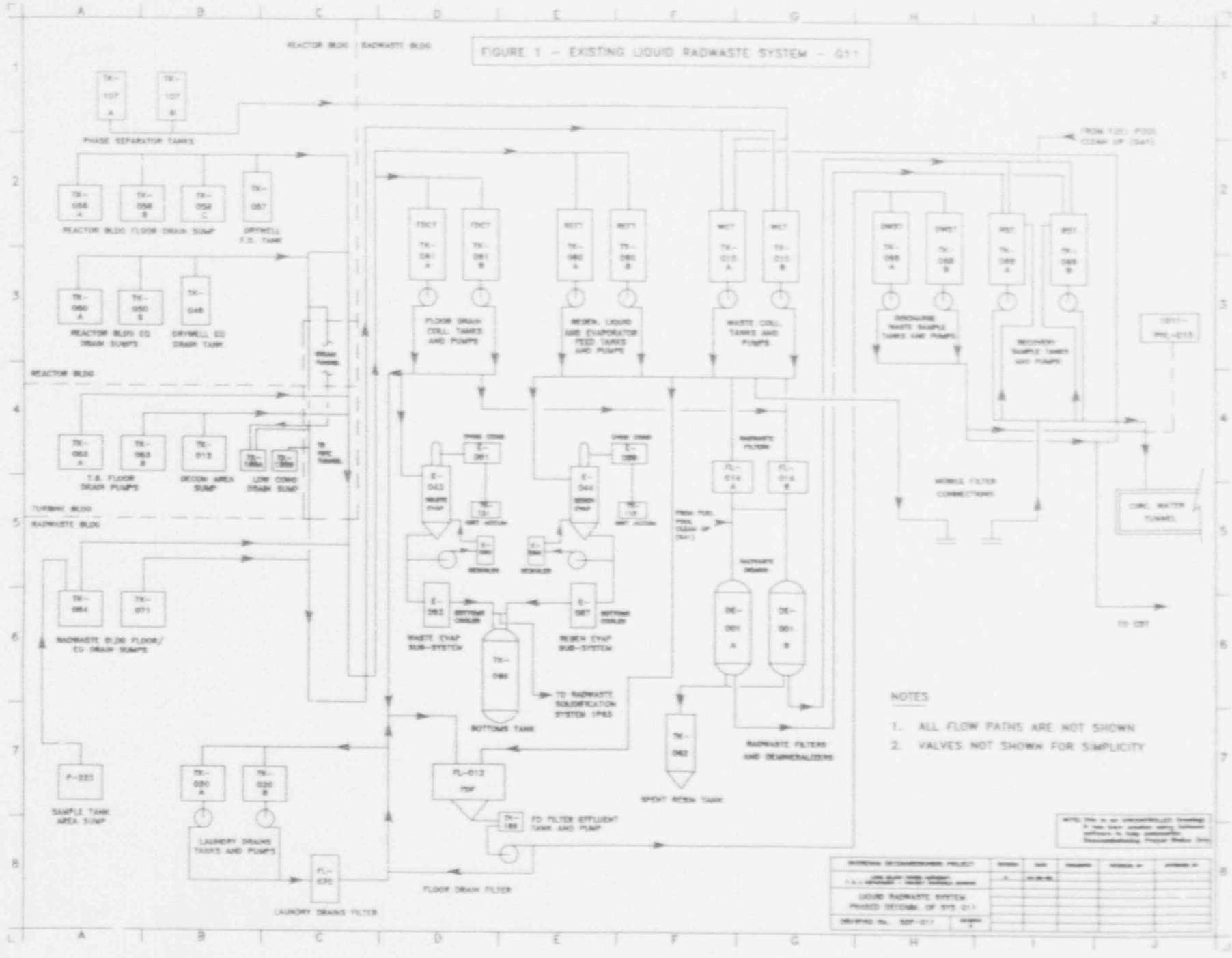

REACTOR BLDG
RADWASTE BLDG
FIGURE 1 – EXISTING LIQUID RADWASTE SYSTEM – G11
PHASE SEPARATOR TANKS
REACTOR BLDG FLOOR DRAIN SUMP
DRYWELL F.D. TANK
REACTOR BLDG EQ DRAIN SUMPS
DRYWELL EQ DRAIN TANK
DRAIN TUNNEL
REACTOR BLDG
TURBINE BLDG
RADWASTE BLDG
T.B. FLOOR DRAIN PUMPS
DECON AREA SUMP
LOW CONDUCTIVITY DRAIN SUMP
TO TURBINE BLDG
RADWASTE BLDG FLOOR/EQ DRAIN SUMPS
SAMPLE TANK AREA SUMP
LAUNDRY DRAINS TANKS AND PUMPS
LAUNDRY DRAINS FILTER
FLOOR DRAIN COLL. TANKS AND PUMPS
FLOOR DRAIN FILTER
FD FILTER EFFLUENT TANK AND PUMP
WASTE EVAP SUB-SYSTEM
RESIN EVAP SUB-SYSTEM
BOTTOMS TANK
TO RADWASTE SOLIDIFICATION SYSTEM (P&S)
SPENT RESIN TANK
BRDRN. LIQUID AND EVAPORATOR FEED TANKS AND PUMPS
WASTE COLL. TANKS AND PUMPS
RADWASTE FILTERS AND DEMINERALIZERS
FROM TCS, PCCS, CLEAN UP (G41)
DRYWELL WASTE SAMPLE TANKS AND PUMPS
RECOVERY SAMPLE TANKS AND PUMPS
MOBILE FILTER CONNECTIONS
CIRC. WATER TUNNEL
TO CST
NOTES
1. ALL FLOW PATHS ARE NOT SHOWN
2. VALVES NOT SHOWN FOR SIMPLICITY

FIGURE 2 – LIQUID RADWASTE SYSTEM AFTER COMPLETION OF PHASE I

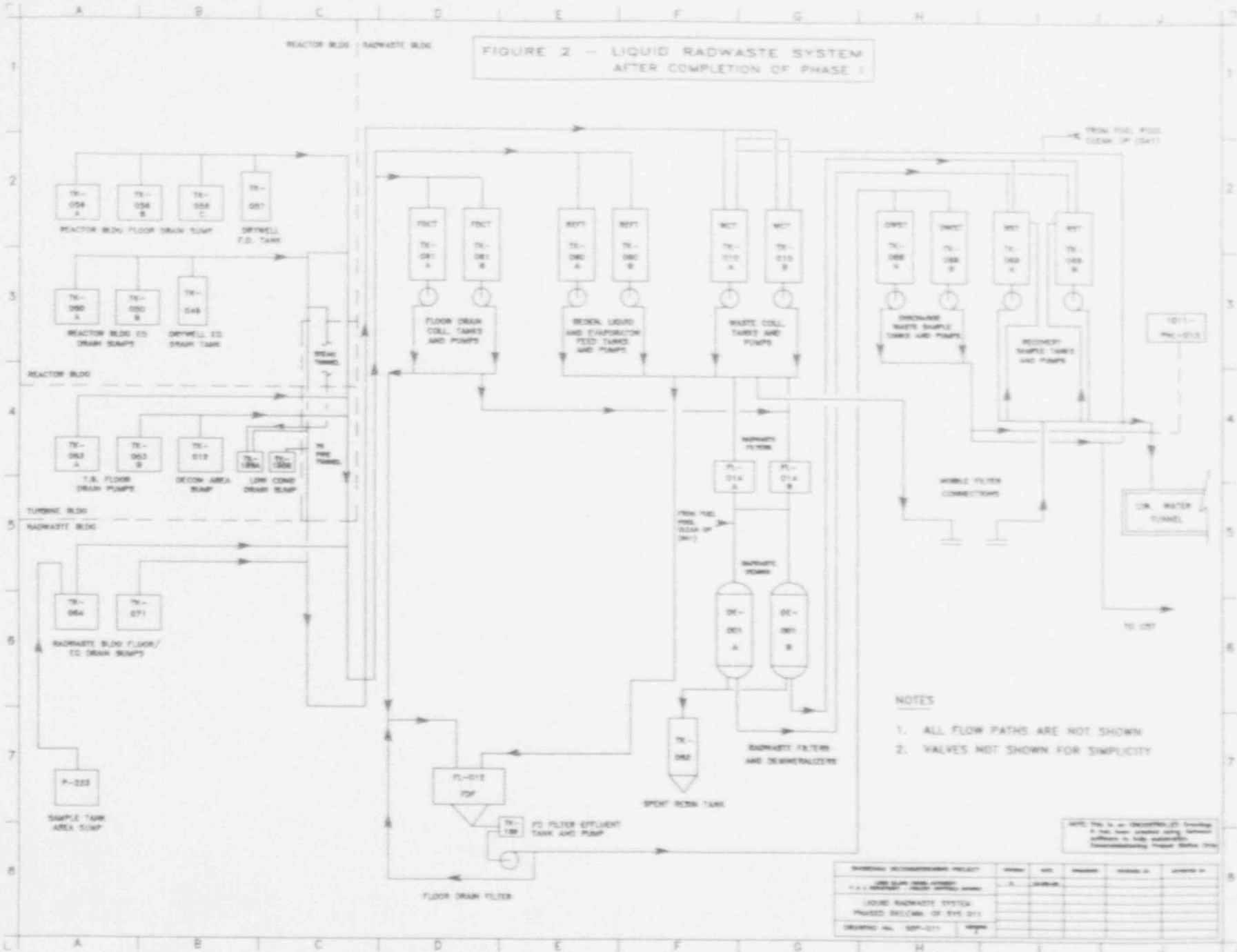


FIGURE 3 — LIQUID RADWASTE SYSTEM AFTER COMPLETION OF PHASE IIA

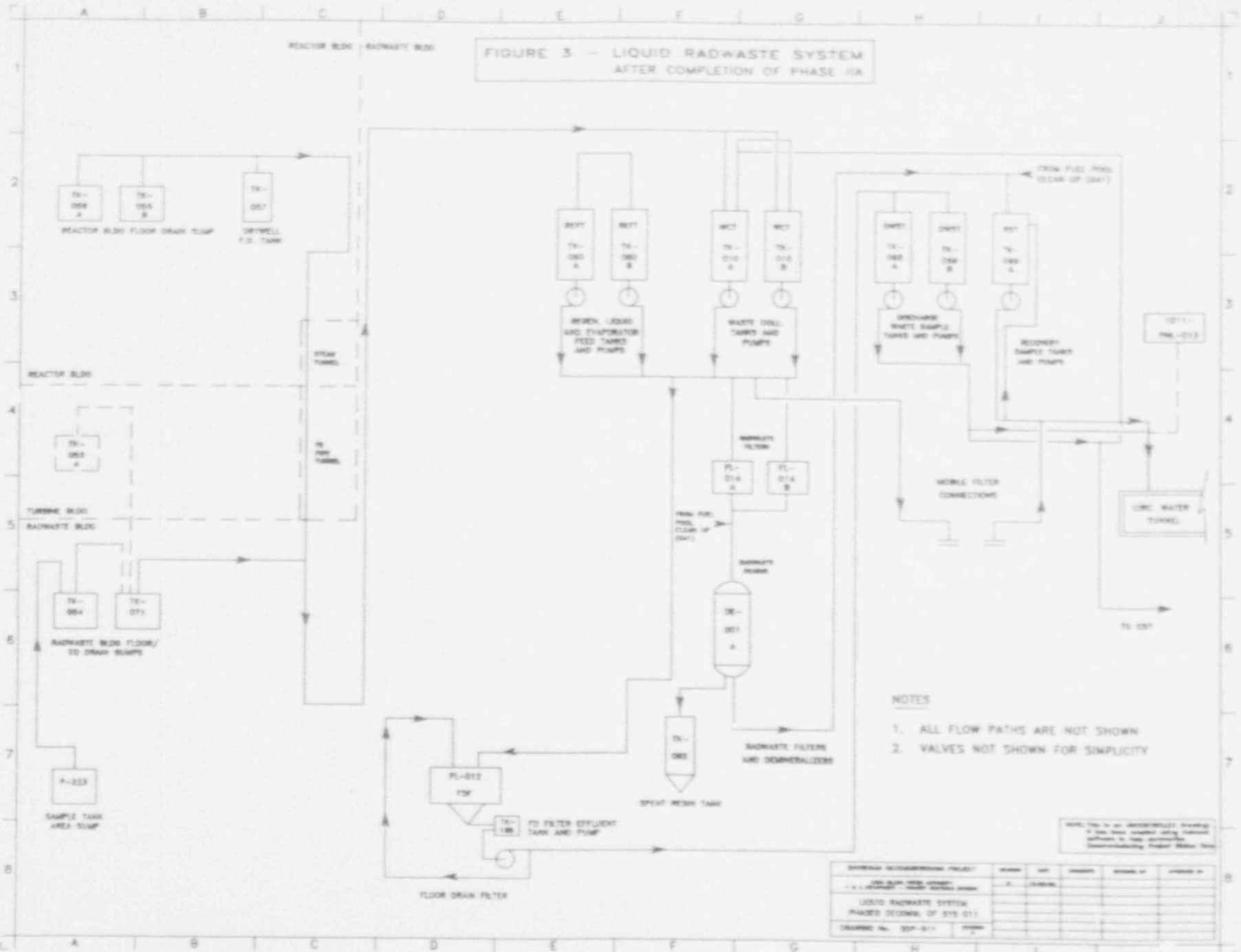


FIGURE 4 — LIQUID RADWASTE SYSTEM AFTER COMPLETION OF PHASE IIB

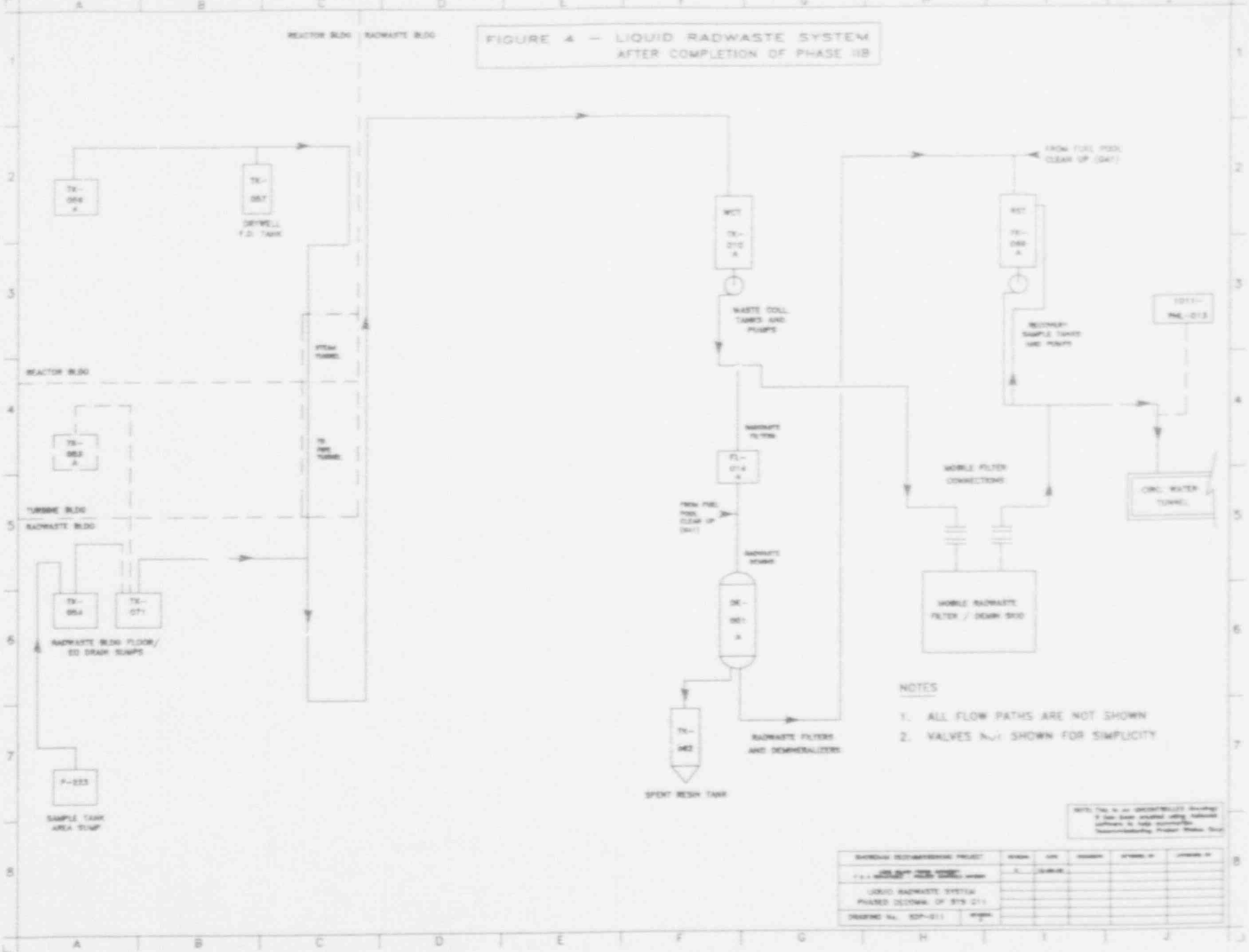
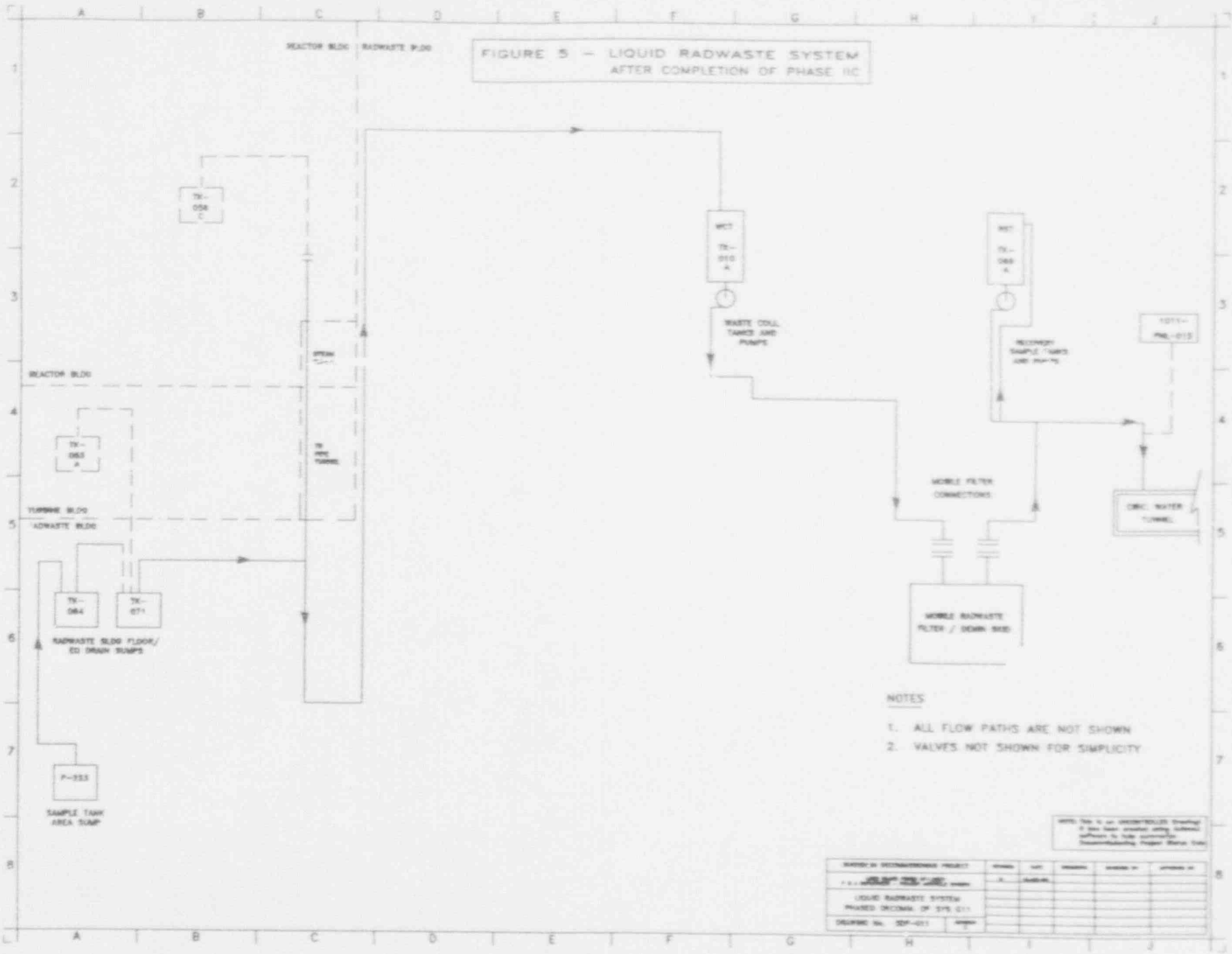


FIGURE 5 – LIQUID RADWASTE SYSTEM AFTER COMPLETION OF PHASE IIC

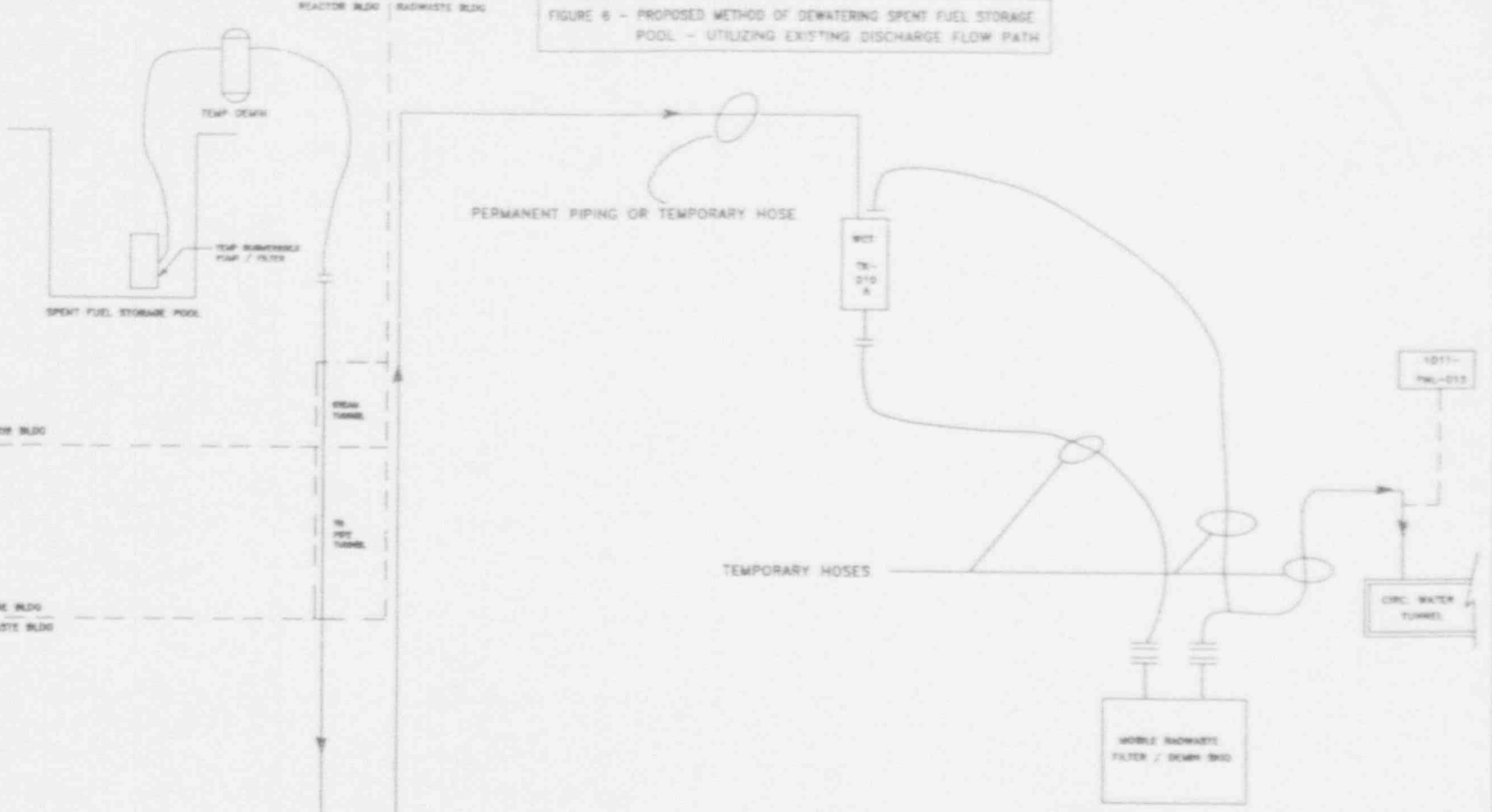


NOTES

1. ALL FLOW PATHS ARE NOT SHOWN
2. VALVES NOT SHOWN FOR SIMPLICITY

LIQUID RADWASTE SYSTEM PHASED ORDINAL OF SYS 011					
DRAWING No. SDF-011					

FIGURE 6 – PROPOSED METHOD OF DEWATERING SPENT FUEL STORAGE POOL – UTILIZING EXISTING DISCHARGE FLOW PATH

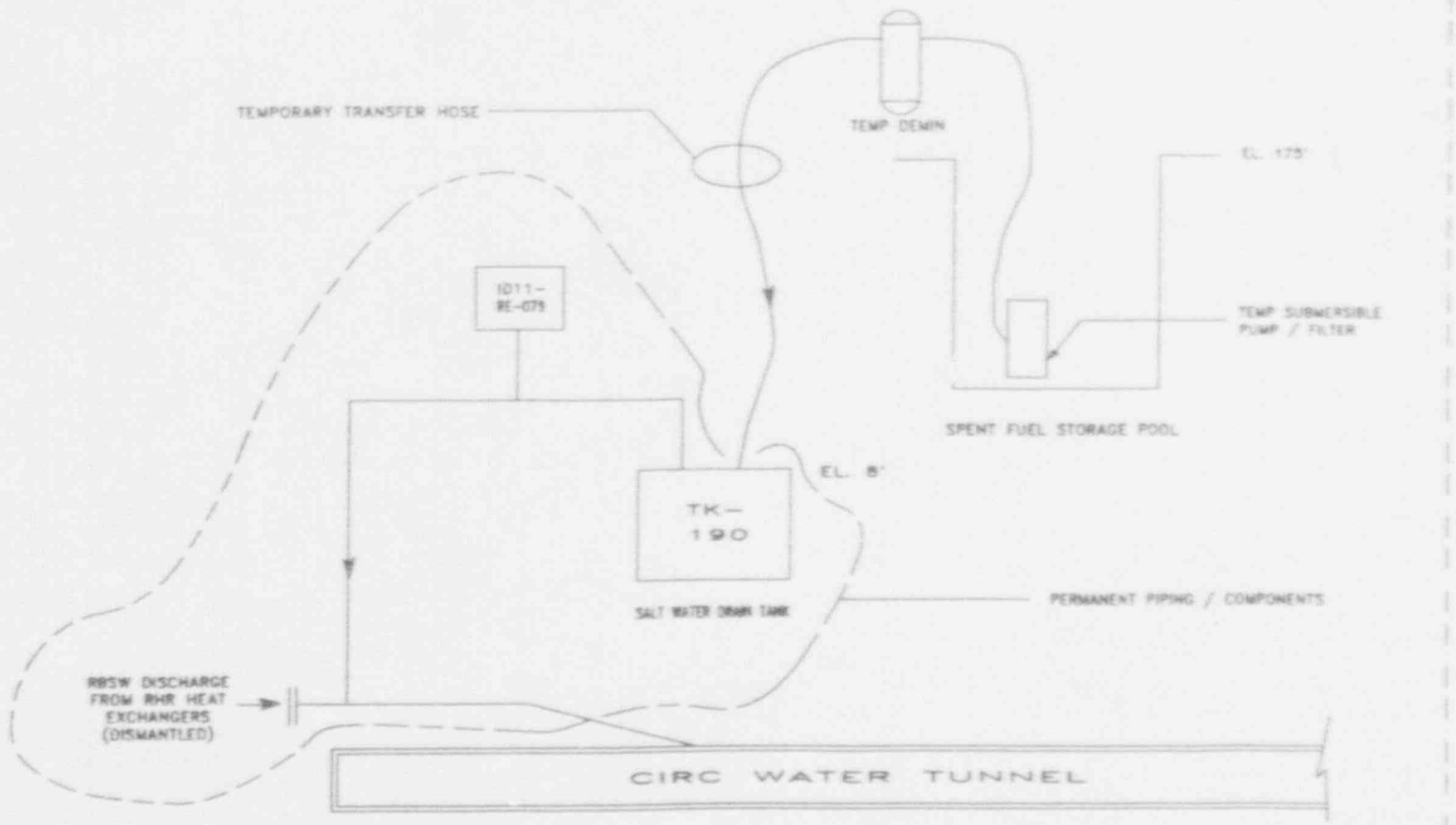


NOTES

1. ALL FLOW PATHS ARE NOT SHOWN
2. VALVES NOT SHOWN FOR SIMPLICITY

LIQUID RADWASTE SYSTEM PHASED DECOMM. OF SYS 011					
DRAWING No. 5DP-011	REVISION 0				

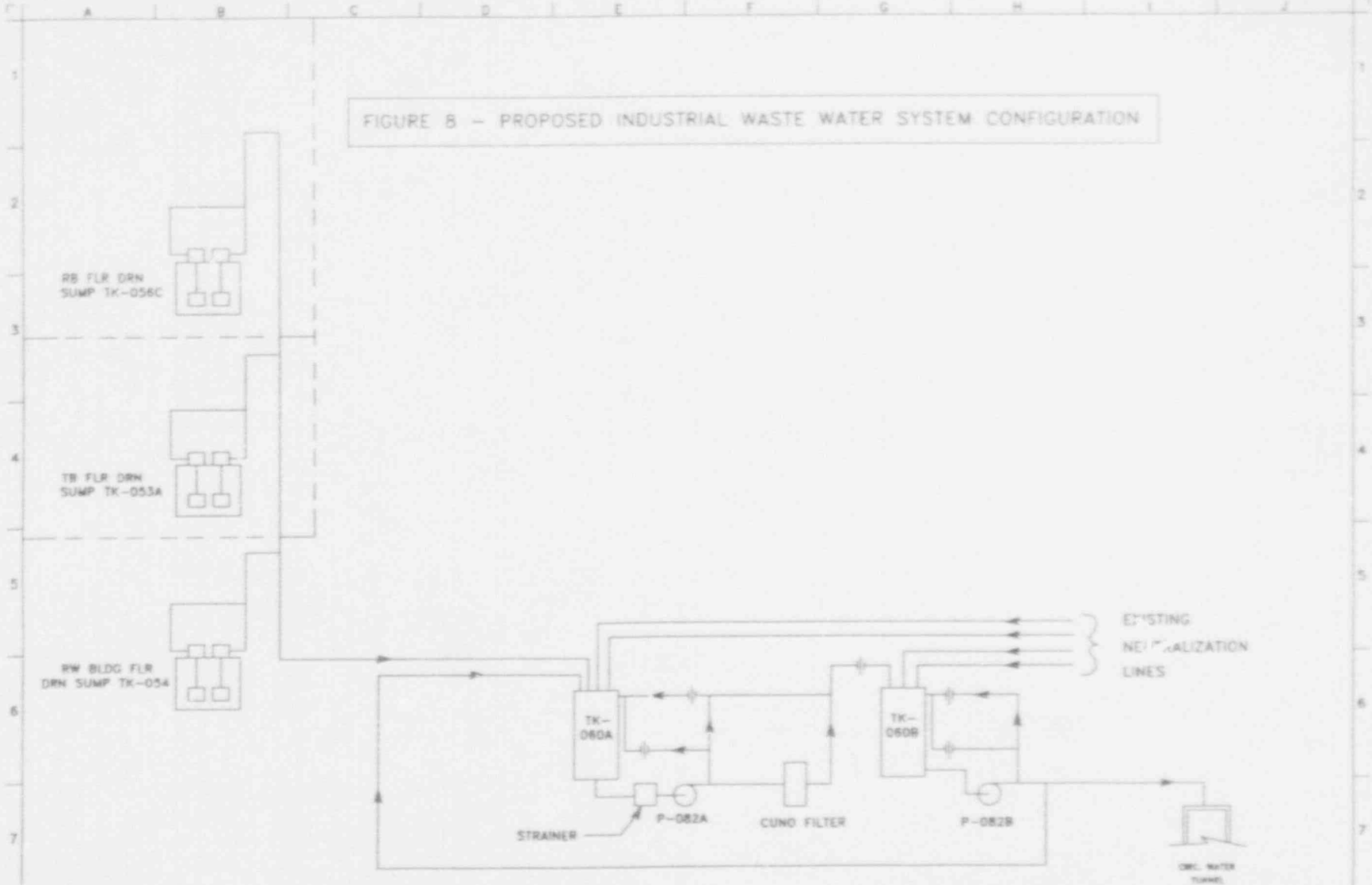
FIGURE 7 – ALTERNATE METHOD OF DEWATERING SPENT FUEL STORAGE POOL (REQUIRES CHANGE TO ODCM)



NOTES

1. ALL FLOW PATHS ARE NOT SHOWN
2. VALVES NOT SHOWN FOR SIMPLICITY

FIGURE 8 – PROPOSED INDUSTRIAL WASTE WATER SYSTEM CONFIGURATION



NOTES

1. ALL FLOW PATHS ARE NOT SHOWN
2. VALVES NOT SHOWN FOR SIMPLICITY

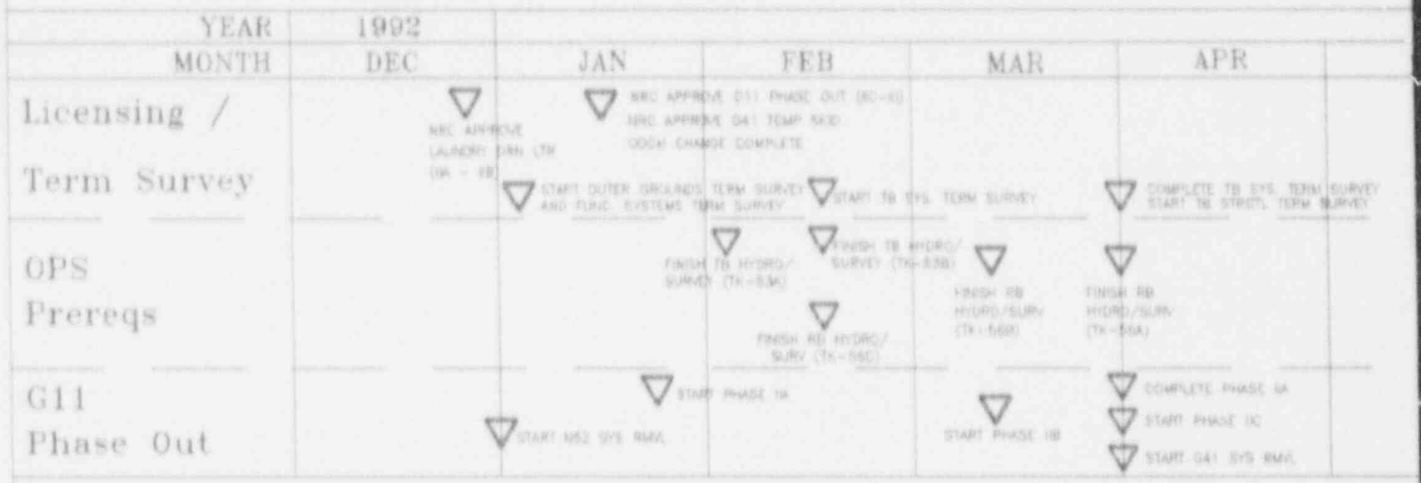
WASTE WATER SYSTEM

ATTACHMENT 2
TO LSNRC-2004

Proposed Schedule For The
Planned Phased Decommissioning
Of The Liquid Radwaste System

Long Island Power Authority

PHASED DECOMMISSIONING O



PHASE I

REQUIRED CONDITIONS:

No influent from Laundry Drains Sub-System

DECOMMISSIONING ACTIVITIES

a) ISOLATE EVAPORATOR SUB-SYSTEM
b) ISOLATE PHASE SEPARATORS
WORKING — EOR T-084

c) LAUNDRY DRAIN TANKS TK-020A & B (Need ltr LSNRC -2016) — EOR T-203

d) RMV EVAP SUB-SYS PIPING
SRC TBD — EOR T-084 Rev

EOR T-219 "FIELD RUN" PIPE TO DOC CNTRL - 12/18

PHASE IIA

REQUIRED CONDITIONS:

* Identify normal design influent drains & re-route as needed to 'A' or 'B' Sump.

1) *NRC approval of ltr LSNRC-2016 (Phase II logic)*
2) Hydrolazing & Survey of influent piping is complete for sumps TK-053A & B and TK-056c
3) Implementation of EOR T-177 (P71 Isol) (Prior to TK-061A & B)
4) No radioactive influent from Chem Lab. (Prior to TK-012)
5) Condensate Demineralizer (N52) System Isol complete (Prior to TK-061A & B)

DECOMMISSIONING ACTIVITIES

a) TURBINE BLDG FLOOR DRAIN SUMP TK-053A
b) TURBINE BLDG FLOOR DRAIN SUMP TK-053B
c) DECON AREA SUMP TK-012
SRC 12/28 — EOR T-209

d) EXPOSED TB FLR DRN PIPING
SRC 1/23 — EOR T-220

e) DRYWELL EQUIP DRAIN TANK
f) RX BLDG EQUIP DRAIN SUMP TK-060A & B
SRC 1/19 — EOR T-211

g) RX BLDG FLOOR DRAIN SUMP TK-056C
SRC 1/19 — EOR T-212

h) RECOVERY SAMPLE TANK TK-069B
i) RADWASTE DEMINERALIZER DE-001B
j) DISCHARGE WASTE SAMPLE TANK TK-068B
SRC 1/3 — EOR T-205

k) FLOOR DRAIN COLLECTOR TANK TK-061A & B & Flr Drn HDR
SRC 12/4 — EOR T-185

TEMP MODS REQUIRED (PHASE IIA)

TM 92-11-01 (need for TK-61A/B) PRE-SRC 12/30

TM 92-11-02 (need ECR T-219) PRE-SRC 12/30

c) Install cross-tie to direct Radwaste Bldg Floor Drain Sump (TK-054) discharge to Radwaste Equip Drain Sump (TK-071).

b) Install new piping from the Turbine Bldg Sump (TK-053A) to the Radwaste Equip Drain Sump (after TK-053A complete).

PHASE IIB

REQUIRED CONDITIONS:

* Identify normal design influent drains & re-route as needed ('A' Sump in RX Bldg and 'B' Sump in Turbine Bldg.)

1) Hydrolazing & Survey of influent piping is complete for sump TK-056B.
2) Influent to Radwaste Reduced to acceptable level for operation at reduced capacity (Prior to FL-012 & FL-014B)

ECR 7-18
SI 12/14 — F: 3/1 (HOLD SRC)

DECOMMISSIONING ACTIVITIES

a) RX BLDG FLOOR DRAIN SUMP TK-056B — EOR T-212

b) REGEN EVAP FEED TANKS TK-060A & B

c) WASTE COLLECTOR TANK TK-010B

d) DISCHARGE WASTE SAMPLE TANK TK-068A

e) RADWASTE FILTER FL-014B

f) FLOOR DRAIN FILTER FL-012

TEMP MODS REQUIRED (PHASE IB)

Contingent - Install temp piping to 'A' Collector Tank to connect Acid & Caustic neutralizing lines that are currently connected to the REFT's.

TEMP MODS REQUIRED (PHASE IIA)

TM 92-11-03 PRE-SRC 12/30

c) Install temp 3" line from 4" Radwaste Equip Drain Hdr to the REFT. A manual isolation valve will be installed in new line to serve the same purpose as ACV-264 does now. (After TK-061A & B complete)

F G11 - LIQUID RADWASTE SYSTEM

PHASE IIC

REQUIRED CONDITIONS:

1) Hydrolazing & Survey of influent piping is complete for sump TK-056A.
2) No liquid Radwaste from RX Bldg or Turbine Bldg.
3) *NRC approval received for Temp SFP Filter/Demin req'd to empty G41 Demin & decomm. G41 System.*
4) *NRC approval to use Temp Radwaste Demin/Filter Skid & Skid connected to system.*

ECR T-IIC
S: ~1/1/93 F: 3/15/93 (HOLD SRC)

DECOMMISSIONING ACTIVITIES

a) RX BLDG FLOOR DRAIN SUMP TK-056A
b) DRYWELL FLOOR DRAIN TANK TK-049
c) RADWASTE FILTER FL-014A
d) RADWASTE DEMIN DE-001A
e) SPENT RESIN TANK TK-062

TEMP MODS REQUIRED (PHASE IIC)

a) Install Temp. Radwaste Filter/Demin. skid in system; connect to existing connections to process from WCT to RST. (NOTE: maybe new procedure in lieu of T.M.)

Contingent - Install temporary submersible pump(s) in decon'd RX Bldg sumps.

PHASE IID

REQUIRED CONDITIONS:

1) Hydrolazing & Survey of influent piping is complete for sumps TK-054 & TK-071.
2) No Liquid Radwaste being discharged to Radwaste Bldg. Sumps TK-054 / TK-071.
3) SFP must be drained prior to removal of the 4" Drain Header from the RX Bldg unless alternate method to draining SFP approved.
4) *ODCM change required.*

ECR T-IID
S: ~1/1/93 F: 4/15/93 (HOLD SRC)

DECOMMISSIONING ACTIVITIES

a) COMPLETE REMOVAL OF 4" DRAIN DISCHARGE HDR RUNNING FROM RB TO RW BLDG. & TANK ROOM ECR T-212
b) RADWASTE EQUIP. DRAIN SUMP TK-071
c) RADWASTE FLOOR DRAIN SUMP TK-054
d) WASTE COLLECTOR TANK TK-010A
e) RECOVERY SAMPLE TANK TK-069A
f) ALL REMAINING PIPING & COMPONENTS WILL BE REMOVED OR DECON'D IN PLACE IN PREP FOR OPERATIONAL & TERMINATION SURVEYS OF RADWASTE BLDG

PHASE III

REQUIRED CONDITIONS:

1) Termination Survey completed in non-fuel areas.

REVISE ECR T-219

DECOMMISSIONING ACTIVITIES

a) COMPLETE FINAL TIE-INS OF WASTE WATER SYSTEM ECR T-219
b) PERFORM CHECK AND PRE-OP OF WASTE WATER SYSTEM
c) PLACE WASTE WATER SYSTEM IN SERVICE

CONT.

REV: 0 UPDATE: 0 DATE: DEC 9, 1992

9301130138-01

ATTACHMENT 3
TO LSNRC-2004

Project Technical Description
For Mobile Filtration/Demineralizer Units

Pages 2 thru 6 of 9
And Associated Figures

Section I

PROJECT TECHNICAL DESCRIPTION

A. RESPONSE TO SPECIFICATION

In this section, DT responds to the technical specification included with LIPA **Inquiry No. S-02-0075 for a Mobile Radwaste Filter/Demineralizer Unit.**

1. DT's proposed Mobile Radwaste Filter/Demineralizer Unit (RF/DU) is designed for easy installation and demobilization. The modular components are interconnected with cam-lok fitted hosing and piping to aid in easy assembly. The design, materials, fabrication and testing all comply with Nuclear Regulatory Guide 1.143.

   The unit vessel will be pre-loaded with 15 cubic feet ~~(30 cf if larger, optional vessel is chosen)~~ of mixed bed (60/40 cation/anion ratio) resin. The materials supplied are nuclear grade cation (H^+) and anion (OH^-) resins for maximum decontamination of the process stream. These resins have been shown to be effective at over 20 nuclear power plants.

2. The Mobile RF/DU consists of the following components:

QTY	DESCRIPTION
1	15 cf demineralizer equipped with pressure and interface connections ~~(30 cf demineralizer optional)~~
2	Tri Nuclear 150 psi, 125 gpm mechanical filters, parallel flow and isolable
1	Centrifugal Pump - 10 HP, close coupled, open faced
1	Suction strainer, pressure gauges and flush port
2	25' influent/effluent hoses w/2" 150# RF Flanges X cam-lok
1	Piping assembly, spool pieces and instrumentation package
1	Set of sample/vent hoses and valves for unit venting and sampling
1	Set of sluice in/out hoses and suction wand for vessel reloading

A detailed description of unit components begins on Page 4. Material Safety Data Sheets for cation and anion resin may be found in Proposal Section IV.

The Mobile RF/DU is fully equipped with pressure indication and interface connections. The demineralizer vessel is hydrotested to 225 psi. The following are unit capabilities of note:

BYPASS: The Mobile RF/DU permits bypassing of;
- the booster pump,
- both, or either, of the mechanical filter(s),
- the demin vessel, or
- any combination of booster pump, mechanical filter(s) and demin.

ISOLATION: The following components can be isolated while the unit is operating;

- the booster pump,
- both, or either, of the mechanical filter(s),
- the demin vessel, or
- any combination of booster pump, mechanical filter(s) and demin.

FILTER CHANGEOUT: The mechanical filter units are equipped with isolation and bypass valves, air inlet and drain ports for blowing down and changing each filter unit while the other remains in service. It's important to note that these filter units utilize the same mechanical filter elements used in the UF-260 and UF-600 that have been employed throughout Shoreham's decommissioning project. The commonality of spare parts (consumables) reduces plant inventory and simplifies waste disposal.

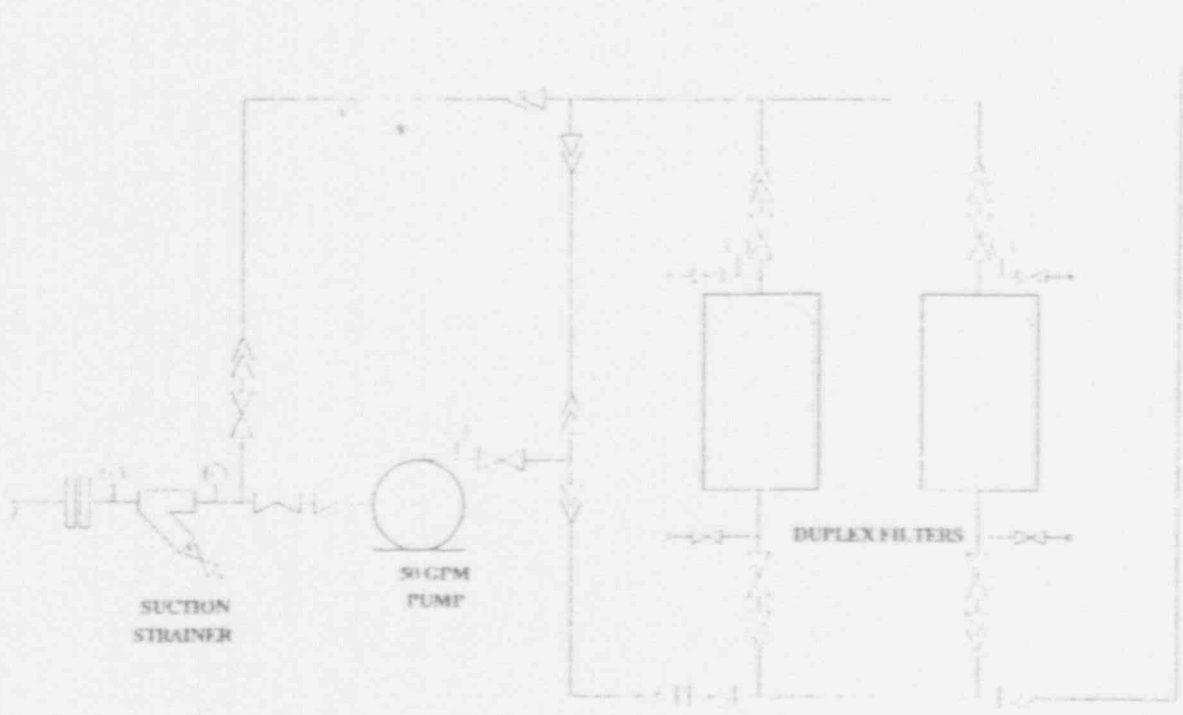
PRESSURE & FLOW INDICATION: Pressure gauges are positioned to permit determination of the pressure drop across the strainer, booster pump, either/both mechanical filters, and IX bed during normal operations. The flow rate meter (the same instrument utilized on the UF-260 and UF-600) will accurately indicate flow through the unit.

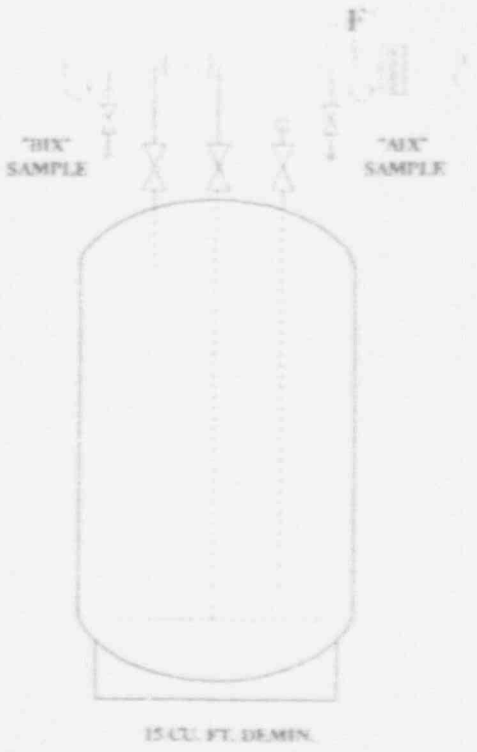
SYSTEM(S) COMPATIBILITY: Due to the commonality of system and interface components of DT's process systems, the Mobile RF/DU can be utilized in the Temporary Spent Fuel Pool Cleanup Demineralizer System (ref: LIPA Inquiry No. S-02-0076), or vice versa, to increase process rates or flexibility, should future processing needs (either volume or DF) dictate. Given the unknown and unpredictable nature of decommissioning work, such flexibility may be an important benefit.

MANUFACTURER'S RECOMMENDATION: All resin manufacturers have a recommended flow rate of 7-8 gallons per square foot of surface area of a bed. Flow rates above the recommended levels will result in poor DFs for targeted isotopes, high pressure drops across the IX bed (followed by even higher pressure drops as the bed compacts under the elevated pressure) and possible hydraulic damage to the resin. A 24" (15 cf) vessel has approximately 3.14 square feet of surface area. At 8 gpm/square foot (maximum recommended flow rate), the maximum flow rate for a 24" vessel is 25.12 gpm.

~~To alleviate this operational restriction, DT offers, as an **option**, a 36" (30 cf) vessel for use in the Mobile RF/DU. This vessel can process 57 gpm (7.07 square feet x 8 gpm) while maintaining resin manufacturers' recommended flow rates. The 24" and 36" vessels have completely interchangeable fittings and components -- only vessel diameter and height are different.~~

3. A P&ID of the proposed unit (DRWG:92-275) follows this page. This unit incorporates all of the valving and bypass capabilities dictated by LIPA's specification. More importantly, it also includes sampling and venting capabilities, as well as the hosing and fittings necessary for sluicing spent resin out and new resin in when the vessel must be reloaded.





REV.	DESCRIPTION	DATE	CKD

DIVERSIFIED TECHNOLOGIES
187 Dixon Drive Chestertown, MD 21620

Mobile Radwaste Filter/Demineralizer System

DATE: 12/9/92	Long Island Power Authority Shoreham Nuclear Station	DRWG. C213
SCALE: NONE		CKD.
TSK. NONE	DRWG. 92-213	APP'D.

B. DESCRIPTION OF UNIT COMPONENTS

Major components of the Mobile RF/DU are described below:

15 cf Vessel

The efficiency of ion exchange and filtration is directly related to vessel design. To assure optimum performance, DT has designed pressure vessels with the characteristic of uniform plug-flow of the process water, that allow complete removal of spent media during sluicing. 316SS Johnson screens (a standard-setter for the filtration industry) are arrayed to provide maximum flow rates with minimum pressure drops.

To reduce the number of threaded connections subject to leaking, top penetrations, including the influent and effluent ports, are welded cam-loks instead of threaded fittings or flanges.

DT's 15 cf vessel accommodates a wide range of process media, flow rates and processing configurations. Its small diameter permits it to be installed in unusual, out of the way location.

Height	72"
Width	24"
Volume	15 cf usable
Weight	800# empty, 2500# water-filled
Wetted Surfaces	304/316SS
Vessel Shell	304/316SS
Specs	ASME Sec.VIII Code Stamped & Nat'l Board Registered

30 cf Vessel **OPTIONAL**

DT's 30 cf vessel is designed to the same specifications as the 15 cf vessel.

Height	74"
Width	36"
Volume	30 cf usable
Weight	1000# empty, 3000# water-filled
Wetted Surfaces	304/316SS
Vessel Shell	304/316SS
Specs	ASME Sec.VIII Code Stamped & Nat'l Board Registered

Mechanical Filters

Mechanical filter accepts inside-loading pleated paper element to filter the process stream to between 1 and 30 microns, depending on filter element selected. SS-clad lead annulus shield has hinged top for quick element changes is available as an option.

Height	40"
Width	8"
Volume	1 cf usable
Weight	70# empty, 200# water-filled
Wetted Surfaces	304/316SS
Vessel Shell	304/316SS
Specs	ANSI B31.1, ASME IX

Centrifugal Pump

A 10 HP centrifugal pump assures proper process pressures and flow rates. This skid-mounted pump is protected by a low-pressure cutoff switch to prevent cavitation or burnout. All electronic controls, connections and piping fittings are provided. Electrical hookup requires a 3 pig-tail lead.

Height	15"
Length	27"
Depth	15"
Weight	275#
Material	Case Iron and Bronze
Electric	440V, 3-phase, 20 amp
Design	150 PSIG (225 PSIG Hydro)

Suction Strainer, Pressure Gauges & Flush Port

An inline suction strainer prevents ingestion of pump damaging solids. The strainer is equipped with a flushing port. Pressure gauges and flow instrumentation have been selected for reliability and ruggedness. The flow instrumentation is the same as used on the Tri Nuclear UF-260 and UF-600 underwater filters presently being used at Shoreham.

Hoses

Custom fabricated, hydro tested (in accordance with NuReg. Guide 1.143) hosing is supplied, including the appropriate terminal fittings (flanges, reducers and cam-loks for quick assembly and installation of the process unit.

Material Design	Wire Reinforced Polyester Carcass 300 PSIG WP
Material Design	Suction Hose with PVC Carcass - same hose as supplied with Underwater Filters 100 PSIG WP

Piping Assembly, Spool Pieces & Instrumentation Package

Isolation or bypassing of individual vessels is provided by the valving assemblies. Their status can be visually monitored from a distance to minimize personnel exposure. All necessary ports, fittings and access points for recharging vessels with new media is also provided.

Height	15"
Weight	25#
Material	304SS
Design	150 PSIG (225 PSIG Hydro)
Specs	ANSI B31.1, ASME IX

Suction Wand

A specially-designed conduit to aid in suctioning new media from the shipping containers into the process vessel during vessel recharging is provided as part of the unit package.