Indian Point 3
Nuclear Power Plant
P.O. Box 215
Buchanan, New York 10511

914-736-8000

New York Power Authority

Control Copy # _____

RADIOLOGICAL & ENVIRONMENTAL SERVICES PROCEDURES (PORC)

PROCEDURE NO. RE - PCP - _____, REV. _____

TITLE: "PROCESS CONTROL PROGRAM FOR STABILIZATION OF RADIOACTIVE LIQUID WASTES, RESINS AND FILTERS"

Written By: Paul Saunders

Reviewed By: _____

PORC Review: _____ Date 10/4/91

Approved By: _____ for DA Date 10-7-91

Effective Date: 10-11-91

PROCESS CONTROL PROGRAM
for
STABILIZATION OF RADIOACTIVE LIQUID WASTES, RESINS AND FILTERS

1.0 OBJECTIVE

To assure that liquid wastes, resins and filters generated at Indian Point No. 3 are properly processed to meet current burial site criteria.

2.0 REFERENCES

2.1 10CFR20, 30, 61.71.
2.2 49CFR171, 172, 173, 178.
2.3 RE-RWM-12-20, "Radioactive Material Shipments".
2.4 Barnwell site criteria.
2.5 Barnwell (SC) burial site license.
2.6 Richland (WA) burial site license.
2.7 RE-RWM-12-2, "Demineralizer Liquid Waste Processing System".
2.8 RE-RWM-12-45, "Use of the TRASPH Computer Code".
2.9 Chem-Nuclear Systems, Inc. Topical Report CNSI-2 (4313-01354-OIP-A), "Solidification System".
2.10 NUREG-0800, "Standard Review Plan for Light Water Reactors".
2.11 NUREG-75/087.
2.12 Branch Technical Positions on Waste Form and Classification.
2.13 RE-RWM-12-3, "Waste Classification Compliance Program".
2.14 RE-RWM-12-19, "Use of the RADMAN Computer Code".
2.15 RE-RWM-12-23, "Use of the DEMTRK Computer Code".
2.16 RE-RWM-12-26, "Use of the FILTRK Computer Code".
2.17 NUREG CPR-4201, "Thermal Stability Testing of Low-Level Waste Form".
2.18 NUREG CPR-4215, "Technical Factor Affecting Low-Level Waste Form Acceptance Criteria".
2.19 RE-RWM-12-21, "Use and Handling of Polyethylene High Integrity Containers".
2.20 NRC Generic Letter No. 84-12.
2.21 NRC IE Information Notice No. 87-07.
2.22 NRC IE Circular 80-18.

2.23 Duratek Topical Report for Enhanced Volume Peduction/ Heat Enhanced Dewatering Systems for Treatment of Nuclear Power Reactor Waste Liquids, TV #DEVR/HED-1-P.

2.24 TFC Topical Report for High Integrity Containers, No. TFC-TV-84.

2.25 "RADMAN - A Computer Code", Main Topical Report.

2.26 NRC Acceptance Letter - RADMAN Topical Report, July 25, 1983.

2.27 Westinghouse-Hittman Document #STD-R-007, "Topical Report, Cement Solidified Wastes to Meet the Stability Requirements of 10CFR61.".

3.0 COMMITMENTS

3.1 All liquid wet wastes and sludges will be solidified prior to shipment off-site. All plant spent resins and spent cartridge filters will be put into HICs (high integrity containers) or steel liners and dewatered to burial site limits prior to shipment off-site, with the exception of low activity resins which may be shipped to a volume reduction vendor for use as fill material in overpacks.

3.2 All containers, shipping casks and methods of packaging will meet applicable DOT, NRC, state and burial site regulations and criteria for burial.

3.3 All radioactive wastes will either be stored in the IP-3 Interim Rad Waste Storage Facility (IRWSF) or shipped to a licensed burial site or licensed volume reduction facility in accordance with applicable NRC, DOT, state, burial site and IP-3 regulations and criteria.

4 0 DISCUSSION

The Indian Point No. 3 process control program is written to satisfy regulatory requirements and to assure that burial site criteria for classification of waste content and free-standing liquid is met. IP-3 does not presently have an installed solidification system, thus liquid wastes are normally processed through contracted demineralizer services.

Additional wet wastes generated on site are oily wastes, installed spent bead resins, spent cartridge filter elements and sludges. Oily wastes and sludges are solidified utilizing contracted services. Spent bead resins and spent cartridge filters are normally put into HICs or steel liners and dewatered. Waste oil may be burned off-site if a facility is available.

5.0 ALARA

ALARA considerations are addressed in all phases of the solidification process and all other processes involving handling, packaging and transfer of any type or form of radioactive waste (wet, dewatered or dry). All spent resins, spent filter cartridges and sludges are processed within shields (normally the shipping cask). Sluiceable demineralizers are shielded when in service. Radiation exposure and other health physics requirements are controlled by the issuance of a radiation exposure authorization (REA) for each task.

6.0 PROCESS CONTROL PROGRAM

6.1 Solidification of liquid and oil wastes, resins and encapsulation of filters, New York Power Authority/ contractor interaction:

The New York Power Authority will assure that the solidification contractor/vendor documents the following in writing prior to processing of liquid and oily wastes, resins and encapsulation of filters. Process parameters will be incorporated in NYPA-approved procedures.

6.1.1 A general description of the laboratory mixing of a sample of the waste to arrive at process parameters prior to commencing the solidification process.

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NOTE

Samples must be from the actual waste stream. Simulated waste samples are not acceptable.

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6.1.2 A general description of the solidification process, including type of solidification agent, process control parameters, parameter boundary conditions, proper waste form properties, and assurance the solidification systems are operated within the established process parameters.

6.1.3 A general description of sampling of at least one representative sample from every tenth batch to ensure solidification and the action to be taken if the sample fails to verify solidification.

6.1.4 The provisions to verify the absence of free-standing liquid.

6.1.5 The provisions to reprocess containers n which free-standing liquids are detected.

6.1.6 For solidification processes that are exothermic, the process control parameters that must be met prior to capping the container.

6.1.7 Vendor must submit the test results that support their PCP that the minimum requirements for Class A wastes and the stability requirements for Class B and C wastes as stipulated in the NRC Branch Technical Position on Waste Form are met.

6.2 Spent bead resins and spent cartridge filters will be transferred to either HICs or steel liners and dewatered. Wastes that are Class B or C and/or have a specific activity greater than 1 uCi/cc for isotopes with half-lives greater than 1 year will be placed in HICs. Class A wastes with a specific activity less than 1 uCi/cc will be placed in steel liners or HICs.

6.2.1 Laboratory mixing of waste sample: not applicable.

6.2.2 General description of the dewatering process:

HICs are currently constructed out of cross-linked polyethylene, provided with dewatering internals, and are padded or contain a waste buffer such as spent resins if spent cartridge filters are to be shipped. Steel liners are constructed out of steel.

Each supplier of the HIC or steel liners provides process control parameters and parameter boundary conditions which are incorporated into the IP-3 operation procedures and submitted to the Plant Operating Review Committee (PORC) for approval prior to commencing work. The supplier is also required to provide test data that documents that the dewatering criteria is met. This will assure that the HIC or steel liner is operated within established process parameters.

At NYPA's discretion, a final dewatering step is added to any vendor's process. This backfit to a HIC or steel liner consists of a small stone filter attached to a vacuum line, flask or pump (25" mercury capacity). This system also serves to verify that the vendor's dewatering process and equipment is working properly, and verifies that no free-standing liquid is detected. If any free-standing liquid is detected, then this system is used to fully dewater the liner.

6.2.3 A general description of sampling of at least one representative sample to verify solidification: not applicable.

6.2.4 The provisions to verify the absence of free liquid:

The loss of suction by the dewatering pump indicates that no free-standing water exists.

6.2.5 The provisions to reprocess containers in which free liquids are detected:

The HICs and steel liners are dewatered following several pump and stand cycles. These are continued until no liquid is removed from the container.

6.2.6 If the solidification process is exothermic, what process control parameters must be met prior to capping the container?

This is not an exothermic process; however, there are temperature limits which must be met that are required by the certificate of compliance which is issued for the HIC. The Duratek heat enhanced dewatering (HED) system, if used, is not exothermic, but does add heat to the resin. The outlet temperature of the HED system is set at 180°F at 70 scfm.

6.3 Liquid waste processing through contractor demineralizers: the following criteria are to be met:

6.3.1 Laboratory mixing of waste sample: not applicable.

6.3.2 A general description of the solidification process:

The demineralizer system normally consists of sluiceable pressure vessels filled with bead resin or other ion exchange media, a pre-filter, a post filter, process pumps, a sample station, shield for the pressure vessel and the shipping containers and dewatering equipment. The influent and effluent activities are monitored to ensure that specific activity of the resin is within acceptable limitations, and that liquid release limits to the environment are not exceeded. Generally, the total effluent activity is restricted to less than 10^{-5} uCi/ml. To assure the system is operated within the established process parameters, all contractor procedures are PORC-approved.

6.3.3 Representative sample to verify solidification: not applicable.

6.3.4 The provisions to verify the absence of free liquid:

The HICs are dewatered following several pump and stand cycles. These are continued until no liquid is removed from the container.

6.3.5 The process is not exothermic, therefore there are no process control parameters needed to be met prior to capping the container.

6.4 Waste Characteristics and Stability

6.4.1 The eight minimum waste characteristic requirements identified in 10CFR61.56(a) shall be met for all waste classes.

6.4.2 Waste Class A may, and Waste Classes B and C must meet the stability requirements of 10CFR61.56(b).

6.5 Waste Classification

6.5.1 All wastes shipped off-site shall be classified to meet the requirements of 10CFR61.55. Classification shall be performed by the RADMAN computer program, which has received Topical Report approval from the NRC.

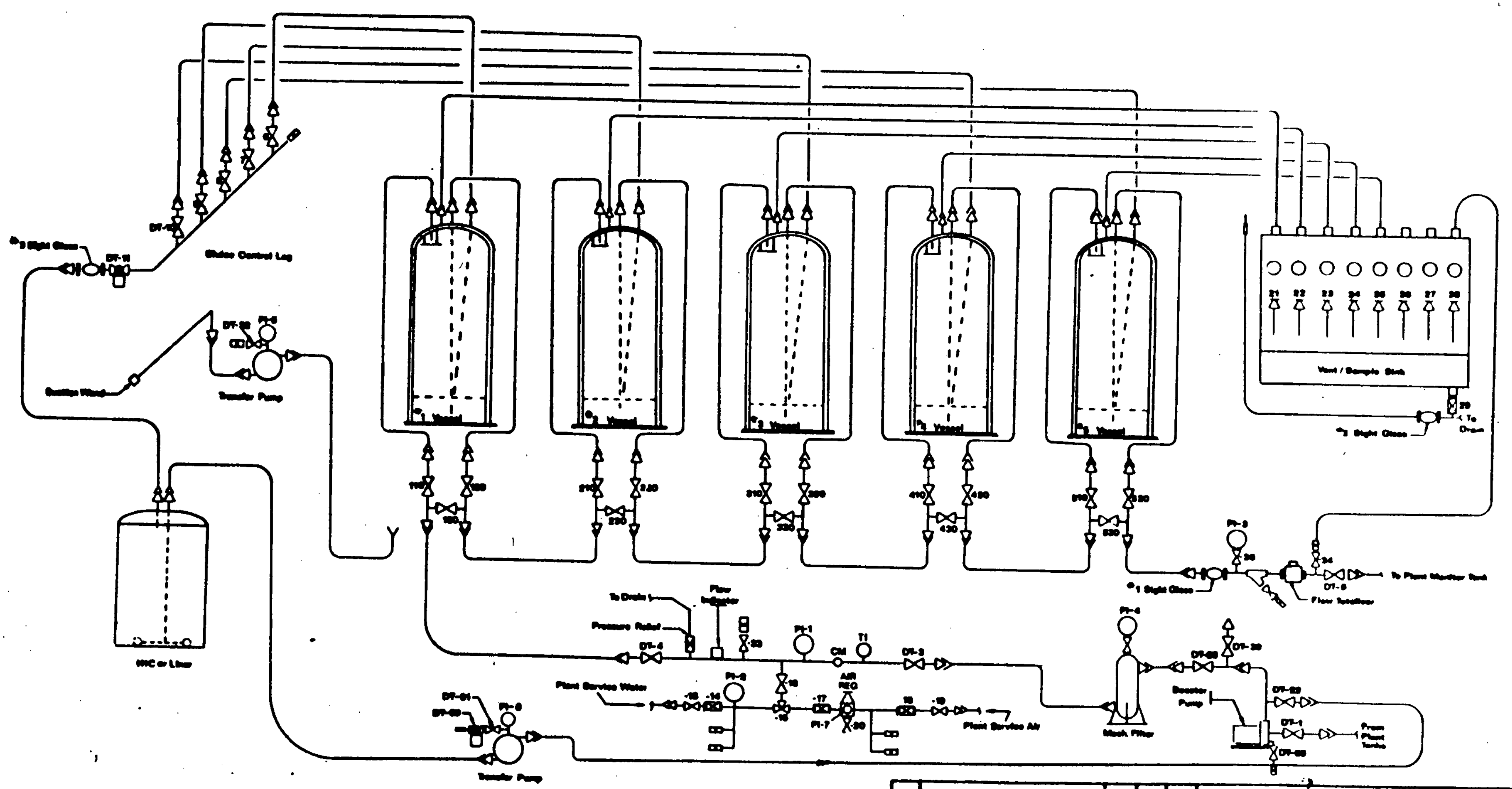
7.0 ATTACHMENTS

7.1 Block diagram of the typical vendor-supplied waste processing system.

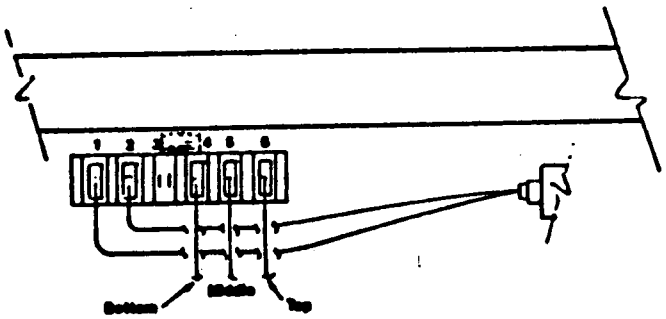
7.2 Block diagram of Duratek's heat-enhanced dewatering system (HED). May be used on HICs and liners with Duratek's dewatering internals installed.

7.3 Block diagram, generic dewatering system.

Attach. 7.1

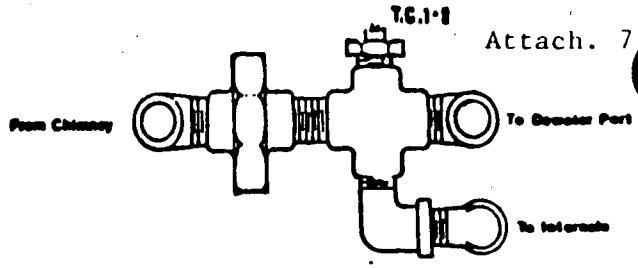


DURATEK CORP.					
SYSTEM LINE I.D.					
SCALE: none	JOB - N.Y.S.R.A.	DRN:			
DATE: 5 31 86	DRW'G: DT-00	CKD: BB			
TOL:		APP'D:			
A	Relocated Valves				
REV	DESCRIPTION	DRN	CK'D	DATE	



DETAIL # 1

T.C. JUNCTION BOX



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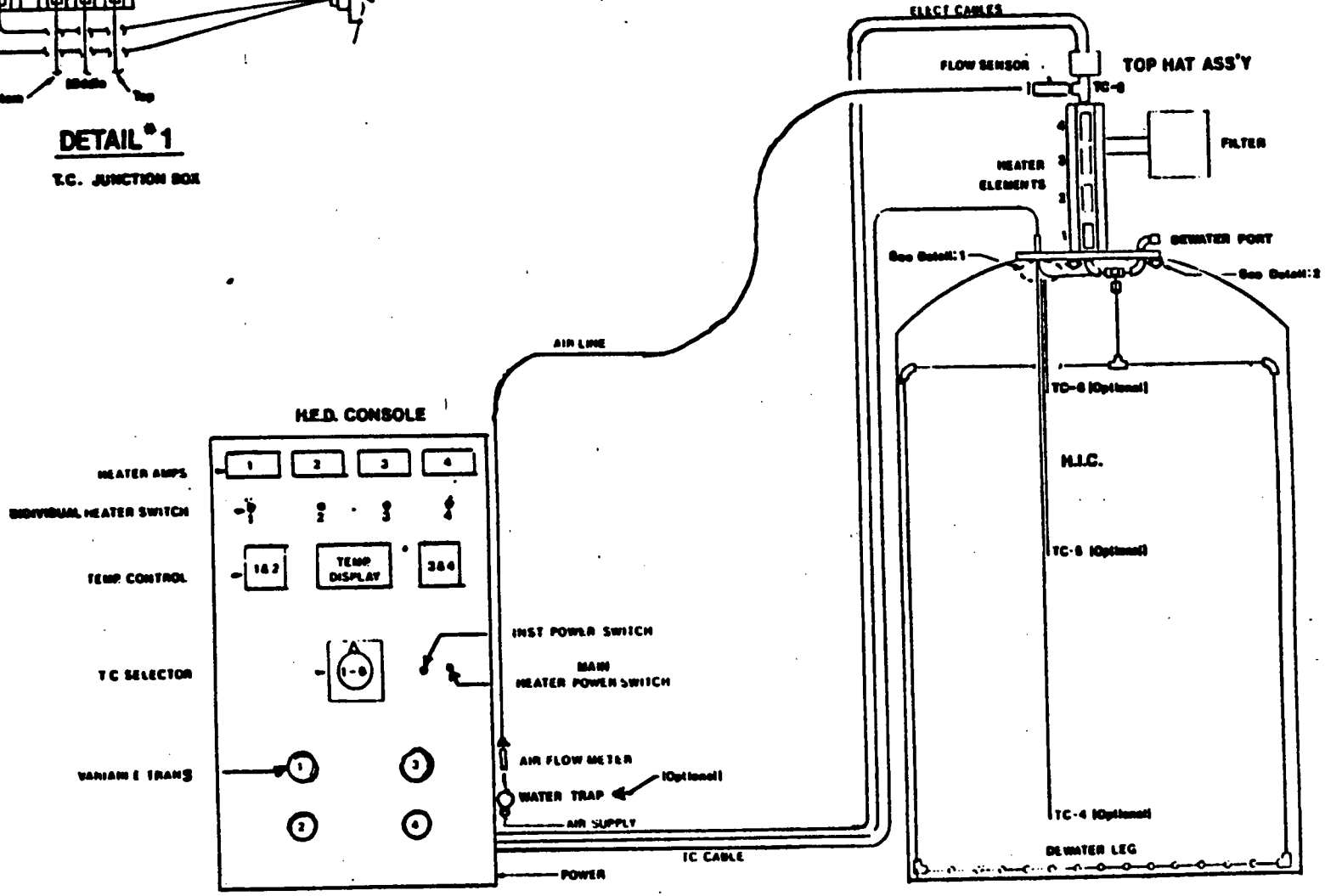
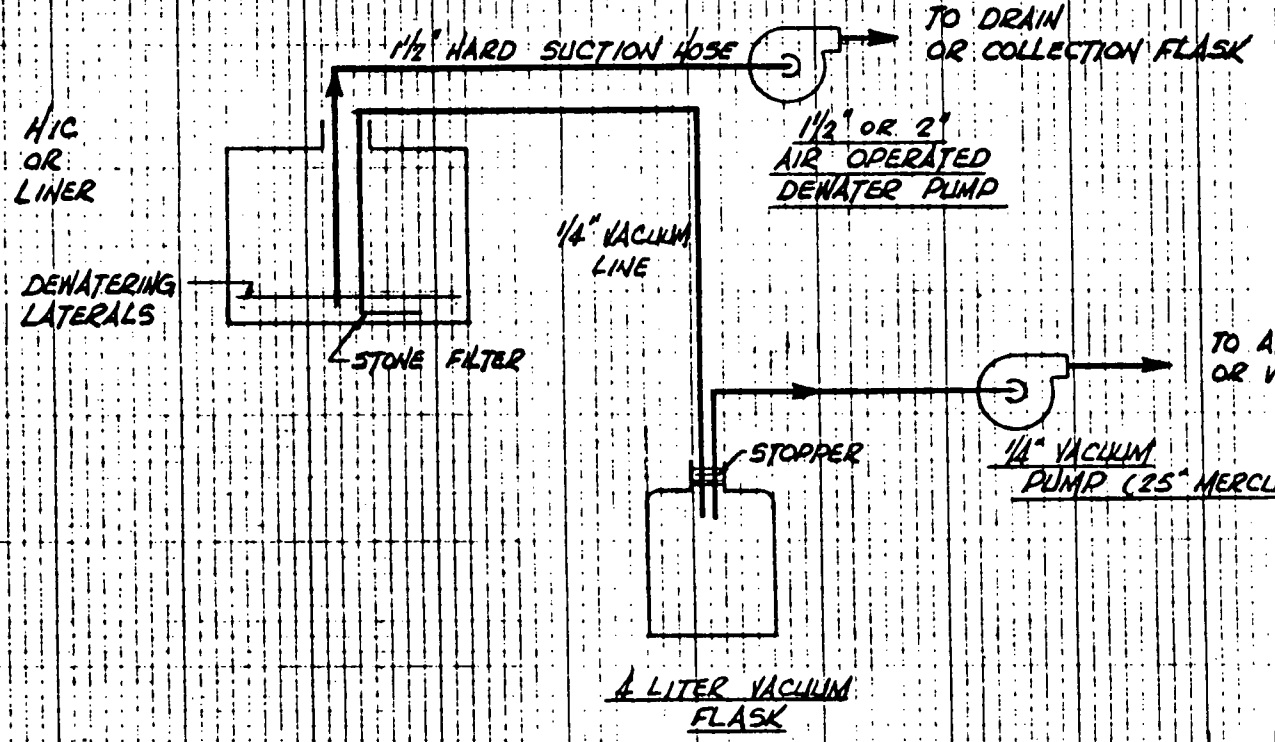


	DRAWN [illegible]	JOB-H.E.D.S.	DRWN RKJ	DURATEK CORP.
	DATE 9-4-84	DRWG HEDS-8	CKD	H.E.D.S. SYSTEM
	APP'D [illegible]		APD	



NO	DESCRIPTION	DATE	APPR.
	REVISIONS		

POWER AUTHORITY OF THE STATE OF NEW YORK
INDIAN POINT NO. 3 NUCLEAR POWER PLANT

TITLE: GENERIC DEWATERING SYSTEM

MODIFICATION No.: | SCALE: | DRAWN BY: J. FIELDS | REVIEWED BY:

DATE: 7-7-88 | APPROVED BY: | DRAWING NUMBER: SK-7788 | REV. NO.