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Jersey Central Power & Light Company

Proc. No. 351.28

Rev. 0, 7/10/81

ATTACHMENT I

PROCESS CONTROL PROGRAM FOR IN-CONTAINER SOLIDIFICATION OF CONCENTRATED LIQUID WASTE AND FILTER SLUDGE

FOR

OYSTER CREEK NUCLEAR GENERATING STATION

USING

Hittman Nuclear & Development Corporation
Portable Solidification System

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1.0 PURPOSE

- 1.1 The purpose of the Process Control Program (PCP) for the solidification of Concentrated Liquid Waste and Filter Sludge is to provide a program which will assure a solidified product with no free liquid prior to transportation for disposal.
- 1.2 This document shall be considered complete only when used in concert with the Pittman Nuclear and Development Corporation and JCP&L procedures for waste solidification. This PCP provides for determination of the range of acceptable ratios of waste, additional water (if required), cement and additive that will result in an acceptable product for transportation and burial. A range of the ratio of cement and additive that must be mixed with the waste to achieve acceptable solidification are determined in test solidifications. Assurance that quantities of cement and additives in this range are actually mixed with the waste is covered in Operating Procedure 351.28 Solid Rad Waste Operating Procedure Using Hittman Cement Solidification System. A Waste Solidification Data Sheet will be prepared to document this information for every test solidification.

2.0 COLLECTION AND ANALYSIS OF SAMPLES

2.1 General Requirements

- 2.1.1 As required by the Radiological Effluent Technical Specifications for PWR's and BWR's, the PCP shall be used to verify the solidification of at least one representative test specimen from at least every tenth batch of each type of wet radioactive waste form (e.g., bead resin, filter sludge, concentrated liquid waste, etc.).

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2.1.2 For the purposes of the PCP a batch is defined as that quantity of raw waste to be transferred to a disposable liner to fill the liner to the predetermined waste level.

2.1.3 If the initial test specimen from a batch of waste fails to solidify then representative samples shall be collected from the tank from which a batch is taken until samples for three (3) consecutive batches demonstrate solidification.

The Process Control Program provides for modification of test proportions of waste, cement, and additive required to assure solidification of subsequent batches of waste.

2.2 Collection of Samples

2.2.1 Waste samples shall be collected.

2.2.2 If the contents of more than one tank are to be solidified in the same liner then representative samples of each tank should be drawn. The samples should be of such size that when mixed together they form samples of standard size for performing a test solidification. If the contents of a particular tank represents x% of the total waste quantity to be solidified then the sample of that tank should be of such size to represent x% of the composite samples.

2.3 Waste Solidification Data Sheet

2.3.1 A Waste Solidification Data Sheet shall be maintained for each test sample solidified. The waste Solidification Data Sheet will contain pertinent information on the characteristics of the test sample solidified so as to provide a basis for achieving the solidification of subsequent batches of similar

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wastes without retesting. The completed Data Sheet will be filed in the Document Control Center.

3.0 TEST SOLIDIFICATION AND ACCEPTANCE CRITERIA

3.1 Test Solidification

- 3.1.1 An initial test solidification for both concentrated liquid waste and filter sludge were performed by obtaining a sample of waste, conditioning the waste and mixing the waste with specified amounts of cement and additive. These test solidifications each yielded a solidified product which met the acceptability criteria of Section 3.2.
- 3.1.2 Subsequent test solidifications will provide a data base to cover the range of waste compositions encountered by operation of the process systems. Waste samples will be analyzed to ensure that their characteristics fall within the range for which test solidifications have been performed.
- 3.1.3 Collecting, conditioning and mixing of the waste with cement are controlled by Operating Procedure 800.

3.2 Solidification Acceptability

The following criteria define an acceptable solidification process and process parameters.

- 3.2.1 The sample solidifications are considered acceptable if there is no visible or drainable free water.
- 3.2.2 The sample solidifications are considered acceptable if upon visual inspection the waste appears that it would hold its shape if removed from the beaker and it resists penetration by a rigid stick.

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3.3 Solidification Unacceptability

- 3.3.1 If the waste fails any of the criteria set forth in Section 3.2 the solidification will be termed unacceptable and a new solidification procedure will be established.
- 3.3.2 If the test solidification is unacceptable then the same test procedures must be followed on each subsequent test of the same type of waste until test samples for each of three consecutive batches are solidified.

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ATTACHMENT II

SAFETY EVALUATION FOR PORTABLE

RADWASTE CEMENT SOLIDIFICATION SYSTEM

1. Title - Portable Radwaste Solidification System using the Hittman Nuclear and Development Corporation Portable Solidification System.
2. Purpose - The purpose of this modification is to provide a Cement Solidification System to process concentrated liquid waste and filter sludge in the New Radwaste Building storage area. The system is being installed to satisfy new site disposal criteria at Barnwell, South Carolina. The Hittman Nuclear Development Corporation In-Container Cement Solidification System is the basis for this modification.
3. System Affected
 - A. Radwaste Solidification System
 - B. Service Air System
4. Drawings

Reference Equipment Arrangement (Attached as Figure 1)
Reference Flow Diagram (Attached as Figure 2)

The P&ID for the New Solids Radwaste System which interfaces the proposed modification is depicted in the Hittman Nuclear and Development Corporation Drawing H615-5-003, Rev. D, Sheets 1 and 2.
5. Documents
 - 5.1 Special Operating Procedure, Radwaste Solidification System - Hittman Nuclear & Development Corporation Portable Cement Solidification System, by Plant Operation Department.
 - 5.2 JCP&L Procedure 351.11, "Packaging Radioactive Waste for Shipment to Offsite Burial Site."
 - 5.3 JCP&L Procedure 351.4, "Solid Radwaste Operating Procedure."
6. Effect on Safety
 - 6.1 Documents Defining Safety Function
 - 6.1.1 WDSAR
 - 6.1.2 NRC Regulatory Guides 1.21, 1.26, 1.29, 1.30, 1.32, 1.143, and 8.8.
 - 6.1.3 10 CFR Part 20, Part 50, and Part 71.

6.2 Description of System Related Function

Since the Radwaste System is not necessary to assure the integrity of the reactor coolant pressure boundary, to shutdown the reactor and maintain it in a safe shutdown condition, or to prevent or mitigate the consequences of accidents which could result in offsite exposures, it has no safety related function during plant operation.

6.3 Effect of Proposed Modification on System Safety Related Function

Since the modification is for a non-safety related system as described in 6.2, it will not alter the safety function of the plant or reduce its margin of safety.

The following areas are evaluated for the proposed modification.

6.3.1 System Performance

Performance of the existing system will be improved because of the following.

- A) The Portable Solidification System will provide a solidified product acceptable for disposal at the Barnwell facility which meets current regulations. Significant volume reduction is afforded over current shipments in that the entire contents of both Radwaste Holdup Tanks SL-T-3A and 3B should be accommodated in a single HN-600 sized liner. With two HN-600 sized liners stacked in a HN-100 cask for shipment, there will be a volume reduction realized from current practice by a factor of four (4).
- B) Processing will take place completely in the liner storage area which is designed for waste shipping liner handling while providing full radiation protection for operating personnel because of the new concrete shielded cubicle and access way from the process aisle. Within the "bathtub," this location will contain any spills.

The Hydraulic Mixing Head Drive Assembly will be manually placed on the waste shipping liner for radwaste processing to proceed. The Hydraulic Mixing Head Drive Assembly will extend through the port in the process shield cover.

Radiation protection for operating personnel is afforded by the new concrete shield walls and cover plug. Protection from radiation from stored liners is provided to personnel as they traverse the access way from the existing process aisle to the new cubicle where processing will be performed. Also, a 13 foot high concrete shield wall will protect personnel atop the process shield cover as they handle the Hydraulic Mixing Head Drive Assembly.

A penetration is required to convey cement from the cement hopper into the process area. The penetration for the cement feeder will be sealed to isolate the process area from the environment. Contaminated air will have no path from the process area to the environment except through the cement feeder when the cement hopper and cement feeder are empty. However, during processing, the waste shipping liner will be at a negative pressure (because of the dust collector) and air flow will be from the cement hopper into the waste shipping liner. When processing is completed, a slidegate valve on the cement hopper discharge, and a ball valve on the Hydraulic Mixing Head Drive Assembly seal the cement feeder from the process area.

- C) The existing waste shipping liner and cask handling and loading procedures are completely compatible with the future Interim Solidification System. The truck bay in the New Radwaste Building will not contain any components of the Portable Radwaste Solidification System and will, therefore, have unrestricted availability for transportation operations.

6.3.2 Seismic Classification

The system is classified as non-seismic.

6.3.3 Pipe Whip Protection

Protection from pipe whip is not provided because of following conditions which are met as per the BTP APCS B3-1:

- A) The service temperature and design pressure of the system is less than 200°F and 275 psig, respectively.
- B) The piping system will be physically isolated from structures, systems, or components important to safety.
- C) In the event of a single break, the unrestrained pipe movement of either end of the ruptured pipe in any possible direction cannot impact any structure, system, or component important to safety.

6.3.4 Environmental Protection

The modification will minimize leakage to the environment because:

- A) Waste and chemical additions into the liner are monitored and indicated continuously by the operator. Level indicators within the liner provide visual indication of critical levels.

Quantities of waste and chemical addition to the liner will be known prior to operation.

Positive overflow protection will be provided by a high level indicator which will automatically stop radioactive waste flow to the Hydraulic Mixing Head Drive Assembly.

Cement addition will be an exact predetermined volume placed in the cement hopper to preclude overfilling of the waste shipping liner. (If any overfilling of the waste shipping liner would occur, it would be contained by the QASL Radwaste Building Seismic Structure.)

- B) Release of cement dust to the atmosphere will be limited by the use of an HN&DC Dust Collector which will draw a negative pressure on the cement hopper during the hopper filling operation.

6.3.5 Missile Protection

Since the system will not be important to safety, the protection against dynamic effects of missiles, pipe whipping, and discharging will not be required.

6.3.6 Fire Protection

Not affected. No significant combustible materials are present in the Hittman Portable Cement Solidification System, nor are any combustible materials used in the process.

6.3.7 Natural Phenomena Protection

Since the system will not be important to safety, the protection against the effects of natural phenomena such as earthquakes, tornados, hurricanes, and floods will not be required.

6.3.8 Single Failure Criteria

Not a consideration, as the system is not safety related.

6.3.9 Separation Criteria

Not a consideration, as the system is not safety related.

6.3.10 Electrical Separation

Not a consideration, as the system is not safety related.

6.3.11 Material Compatibility

All materials are specified to be compatible with the intended service. The waste lines will be rated for 300 psi service to provide adequate protection for this application.

7. Plant Procedures Requiring Change

7.1 JCP&L Procedure 351.4, "Solid Radwaste Operating Procedure"

8. Conclusion

The proposed modification will not adversely affect Nuclear Safety for reasons stated herein and is, therefore, concluded not to constitute an un-reviewed safety question as defined in 10 CFR 50.59(a).

SAFETY EVALUATION SUMMARY SHEET

1. Subject: E.T. 328.13-5 - Portable Hittman Solidification System
2. Personnel Responsible for Safety Evaluation:

L. Rutland (B&R)
R. A. Pinelli
R. M. Ashby
D. N. Grace
3. System(s)/Subsystem(s)/Component(s) Affected:
NRW Service Air System, Radwaste Solidification System
4. Conclusion of the Safety Evaluation:
Proposed modification does not constitute an unreviewed safety question as defined in 10 CFR 50.59(a).
5. Technical Specifications Affected:
None
6. FDSAR Sections Affected:
None
7. A. What plant procedures were reviewed in this evaluation?
JCP&L Procedure 351.4, "Solid Radwaste Operating Procedure"
B. What changes, if any, to the procedures are recommended?
Added a new waste line to the SL System to route wastes to the portable system. Also changed the operation of valves SL-AOV-025A and B.
8. Recommendation:
None
9. Comments:
None

Safety Evaluation Submitted by:



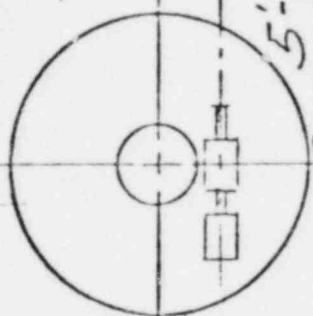
Date: 6-23-81

TRUCK BAY

TOP OF
NEW WALL
EL 36'-0"

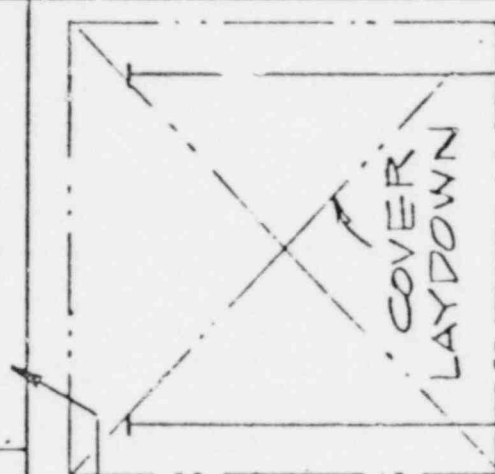
Φ OF
LINER

4'-6"



5'-6"

TOP OF
NEW WALLS
EL 29'-4"



Φ OF
CEMENT
FEED LINE

14"

4" @ EL. 32'-7"



FIGURE 1A

EQUIPMENT ARRANGEMENT
PLAN

Process
Aisle

NOTES

1. MIXER HEAD ASSEMBLY
IN STORE POSITION

FIGURE 1B
EQUIPMENT ARRANGEMENT
ELEVATION

JIB CRANE FOR
HYD. MIXER HEAD ASS'Y

+ 30 TON BRIDGE CRANE

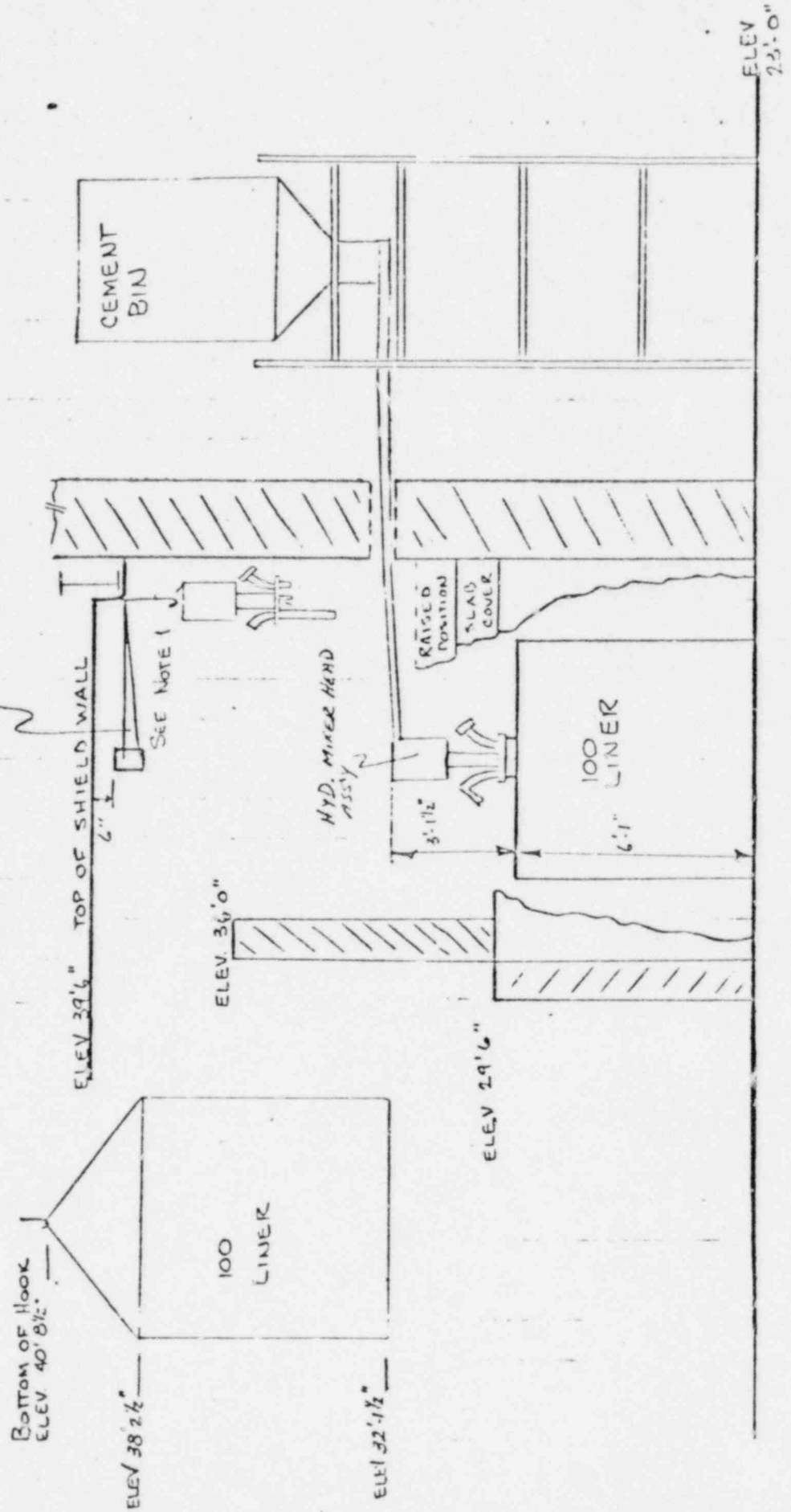
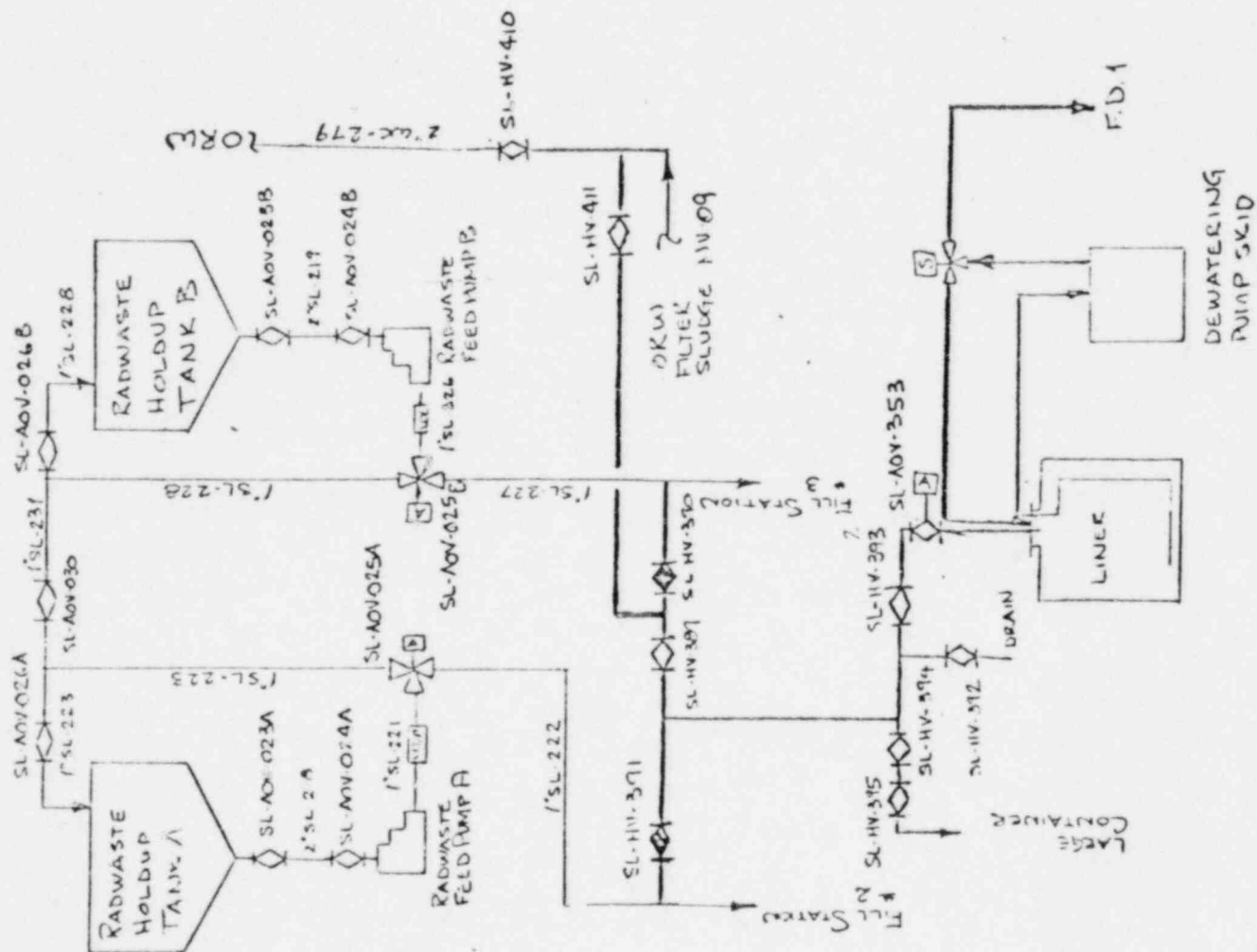


FIGURE 2
FLOW DIAGRAM



SK-MO4