Monticello Nuclear Generating Plant

Process Control Program Manual
Revision 7

In accordance with the Monticello Technical Specifications, Section 6.5.D, Process Control Program (PCP), the following changes to the Monticello PCP are reported:

1. Revision 7 includes a format change which was made to facilitate future revisions.

2. Section 4.0, DEWATERING OF RESIN AND OTHER FILTER MEDIA, was added.

3. Appendix B was deleted because it is no longer considered an option for waste solidification.

4. In response to NRC recommendations (letter dated 10/20/86), the following revisions were made:

   a. Item 1.1.B was added to the PURPOSE section, assuring a completely stabilized product with no free-standing water;

   b. Section 1.5 was added, assuring compliance with all applicable regulations;

   c. Sections 2.6 and 2.7 were revised to indicate that verification of solidification is done prior to the capping of the drum and after the cure time. Action to be taken in the event that free-standing water is detected was also added to section 2.7.

   d. Appendices A and C were deleted.

These changes do not reduce the overall conformance of the solidified waste product to existing criteria for solid wastes.

These changes were reviewed and approved by the Monticello Operations Committee on May 17, 1988.

Instructions for Entering Revision 7 to the Monticello PCP

Replace Revision 6 of the Monticello PCP in its entirety with Revision 7.

Process Control Program

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Revision 7 to the Monticello Process Control Program is a format change. This change was made to facilitate changes to the PCP. Also included at this time were the recommendations from the NRC in a letter dated October 20, 1986. The last major change was the additon of the dewatering system. Attached is a copy of these changes for submittal with the Semi-annual effluent report.

PROCESS CONTROL PROGRAM

PCP 1.0

FUNCTION

Prepared by: L. E. Bechtel Date 3-14-88

Reviewed by: [illegible] Date 3-14-88

User Review by: Donald A Bryson Date 4-29-88

QA Review: L D Wilkerson Date 5/2/88

Q.A. Revision Review Required: Yes ___ No X

ALARA Review: [illegible] Date 5/13/88

ALARA Revision Review Required: Yes X No ___

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Op. Com. Revision Review Required: Yes X No ___

Approved by: R L Bevis for H Swanies Date 5/17/88

NOTE: Revision 7 is a complete rewrite and format change.

WP/djj

1.0 FUNCTION

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1.0 FUNCTION

1.1 Purpose

The purpose of this process control program (PCP) is to detail the program of sample analysis and formulation determination by which stabilization of radioactive wastes from liquid systems is assured. The use of any solidification methods herein described are governed by plant procedures for sampling and operation.

Specifically included in the PCP are:

A. Assurance that the system is operated as designed.

B. Assurance that the final product is completely stabilized with no free-standing water.

C. Identification of interfaces with plant systems.

D. Identification of the sampling requirements prior to processing.

E. Identification of process parameters within which a particular solid radwaste system shall be operated.

F. Define acceptance criteria for solidified product.

G. Define remedies to be implemented in the event that the acceptance criteria for solidification are not met.

H. Assurance that the void spaces are kept to the minimum practical.

1.2 Scope

This PCP provides for the solidification of:

A. Plant ion exchange resin and filter media as used on the various filter demineralizers.

B. Liquid waste.

This PCP also provides for the dewatering of plant ion exchange resin and filter media.

1.3 Definitions

Batch - A quantity of waste from a tank or tanks whose composition is known, i.e., T-34B.

Solidification - Solidification is the conversion of wet radioactive wastes into a form that meets shipping and burial site requirements.

1.4 ALARA Considerations

1.4.1 Comply with applicable radiation work permits.

1.4.2 Dispose of solidified samples properly.

1.5 Compliance

Compliance shall be with all applicable DOT, 10CFR61, 10CFR71, 49CFR and burial site regulations. Each process has a detailed procedure which has been reviewed by the Plant.

WP/djj

PROCESS CONTROL PROGRAM

PCP 2.0

INSTALLED ATCOR SOLIDIFICATION SYSTEM

Prepared by: L. E. Behm Date 3-14-88

Reviewed by: [signature] Date 3-14-88

User Review by: Donald A Bergman Date 4-29-88

QA Review: J. W. Wilkerson Date 5/2/88

Q.A. Revision Review Required: Yes ___ No X

ALARA Review: [signature] Date 5/17/88

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Op. Com. Revision Review Required: Yes X No ___

Approved by: R L Bernero for H K Shaw Date 5/17/88

NOTE: Revision 7 is a complete rewrite and format change.

WP/djj

2.0 INSTALLED ATCOR SOLIDIFICATION SYSTEM

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2.0 INSTALLED ATCOR SOLIDIFICATION SYSTEM

2.1 Purpose

To establish the process parameters which provide reasonable assurance of complete solidification of spent resins and filter media.

2.2 Applicability

This section of the PCP is applicable to solidification of spent resins and filter media, using the ATCOR Solidification Systems and related equipment.

2.3 References

Operations Manual, B.7.3 Solid Radwaste.
ATCOR-Solidification System, Part I, Operating Instruction, NSP Manual NX 10392-16.

2.4 Description of System

The solidification system mixes moist radioactive wastes with dry portland cement and feeds the resulting mixture into a standard or acceptable shipping containers. The major components of the system are described below and shown in Figure 2.0. Detailed operating procedures are provided in the System Operation Manual.

A. Waste Conditioning and Metering

The waste conditioning subsystem receives the solid wastes, adjusts its moisture content to assure a proper cement mixture, and meters the conditioned waste into the Mixer/Feeder unit for subsequent mixing with cement.

Solids from the centrifuge are added to a premeasured amount of liquid in the waste hopper until a predetermined level is reached. This results in a sludge with the proper moisture content suitable for mixing with cement.

The waste is fed to the Mixer/Feeder by means of an open throat positive displacement pump located directly below the hopper. The pump speed can be adjusted from the control panel. The flow rate is approximately 1 cubic foot per minute.

B. Dry Cement Storage and Metering

Dry cement is loaded into a 75 cubic foot capacity cement bin by means of a bucket elevator fed from a bag dump station. The cement bin is equipped with a self-contained vibrating bin bottom for positive and continuous flow of cement. From the bin, the cement is fed to the Mixer/Feeder through a combination of two screw feeders at approximately 1 cubic foot per minute.

C. Product Mixing and Package Filling

The combined waste product and dry cement are introduced to the Mixer/Feeder simultaneously. While the materials are being conveyed to the drum feed pipe, the screw flight and paddle arrangement within the Mixer/Feeder insures a thorough mixing action.

After completion of the filling operation, the full drum is ready to be conveyed to the capping station and storage areas utilizing the radwaste conveying system and controls.

D. Controls

Controls for the solidification system are contained on a panel shielded from the waste materials.

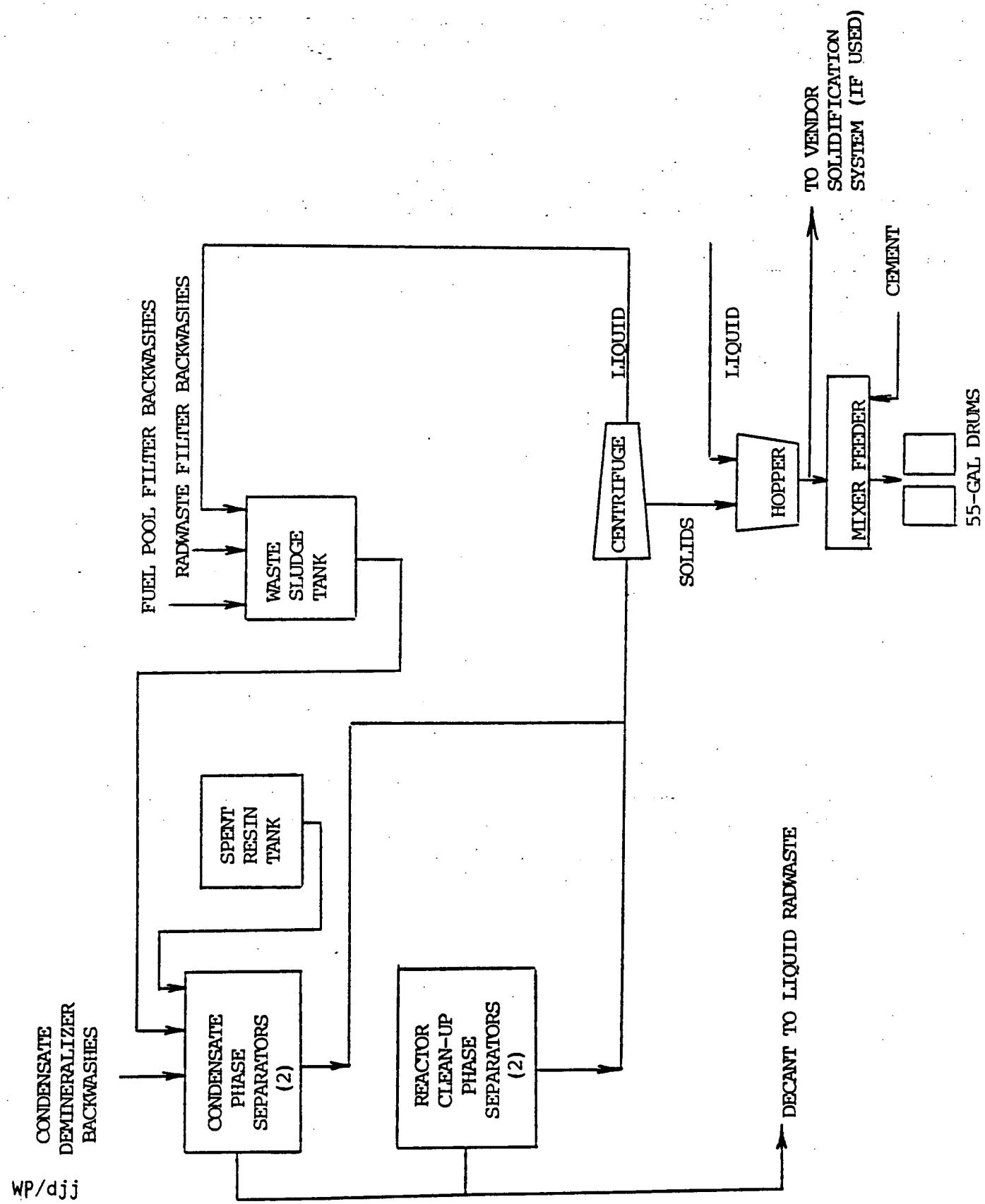
Gauges indicating feed rate of cement and waste liquid are located on the control panel.

The level in the hopper is monitored by a television camera. The monitors are located in the radwaste control room and near the ATCOR panel. The filling of the barrels can be viewed through view ports with the use of mirrors.

Rates of cement feed and liquid feed are adjustable from the control panel during processing.

FIGURE 2.0

SOLID RADWASTE BLOCK DIAGRAM



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2.5 Operation

To ensure a representative sample of waste is obtained the phase separator should be put on recycle for approximately 20 minutes prior to drawing a sample.

Once the sample is obtained, it is analyzed for isotopic content and pH. If pH is greater than 5.0, no adjustments need be made. If the pH is less than 5.0, it must be increased to between 5.5 and 7.0 with the addition of lime. Adjustments to pH, if required, should be made to the liquid to be added.

After sampling, the spent resin is centrifuged into "B" hopper, which already contains a specific amount of liquid (pH adjusted, as necessary) for solidification. Solidification is then verified.

2.6 Cure Time

Cure time is normally 48 hours.

2.7 Verification of Solidification

Representative barrels of each batch are to be inspected to verify solidification and the absence of free water. A drum may be considered solid when the cemented mass offers significant resistance to penetration by a hammer, or similar object. Absence of free water may be determined visually. The drums are capped and stored for burial.

If solidification fails to take place, the process shall be suspended until the cause is determined and remedies are defined.

2.8 Sample Solidification of Spent Resins and Filter Media

2.8.1 Sampling Requirements

Sample solidification shall be conducted for at least every tenth batch of spent resins and filter media.

2.8.2 Prerequisites

Before drawing a specimen from a phase separator for sample solidification, the contents must be adequately mixed to achieve a representative mixture.

2.8.3 Sample Preparation

Obtain a specimen from a phase separator in the required volume. The volume required will be approximately 200 ml for each sample mixed.

NOTE: Depending on dose rates, a smaller sample may be used.

2.8.3.1 Place the waste in a beaker. Record the volume of the waste in the beaker on Attachment 1A.

2.8.3.2 Check the pH of the mixture and record this on Attachment 1A. If the pH is less than 5.0, notify radwaste system engineer. Normally, the pH of the waste is about 6.0.

2.8.3.3 Additional samples may be mixed from the initial test specimen at the discretion of the radwaste system engineer using additional mix ratios. The following table defines the mix ratios which should be used:

WASTE TYPE	VOLUME OF WASTE (ml)	VOLUME OF CEMENT (ml)	WEIGHT SAMPLE CEMENT (gm)	ESTIMATED SAMPLE VOLUME (ml)	ESTIMATED OENSITY (lbs/ft^3)
BEAD RESIN	200	200	218	266	96.8
SOLKA FLOC/ FILTER AID (Including POWDEX, ECODEX ETC.	200	200	218	266	83.3

1. For Masonry Cement $V_{Product} = 1/3\ V_{Cement} + V_{Waste}$
2. Waste/Cement Ratio's for Solka Flock Filter Aid, Bead Resin, etc.: W/C=1.0.
3. Solka Floc or Filter Aid Bulk Density is $27\#/ft^3$ @ 60% moisture, conditioned waste density $43\#/ft^3$.
   Bead Resin Bulk Density is $45\#/ft^3$ @ 50% moisture, conditioned waste density $61\#/ft^3$.

2.8.3.4 Place the required amount of cement in a beaker. Add half of the waste sample to the cement and mix to ensure homogenity. Add the remainder of the waste sample to the cement, mixing continuously.

2.8.3.5 Cover and store the sample in a shielded area.

2.8.3.6 Observe the sample at the following intervals until solidification is complete. Record the results on Attachment 1B.

NOTE: Some water may appear on the surface and be re-absorbed during solidification.

a. 1 hour - Visual inspection for settling with free water on surface.

b. 4 hours - Visual inspection for free water on surface.

c. 12 hours - Visual inspection for free water on the surface. Probe with stirrer to check for hardness. Repeat this step at 12-hour intervals until the probe will not penetrate the sample billet. When hard, no free water is allowed on the surface.

Set the sample aside for future disposal.

Complete ATTACHMENT 1C before proceeding with the full-scale solidification.

2.8.4 Sample Acceptance Criteria

2.8.4.1 Visual inspection after mixing will confirm that the sample is homogeneous.

2.8.4.2 Visual inspection of the sample after curing will confirm that no free water exists on the surface of the sample

2.8.4.3 Physical inspection of the sample after curing will confirm that the end product is a uniform, liquid-free, free-standing solid that resists penetration when probed with a pencil-sized probe.

2.8.4.4 If test samples from the initial specimen fail to produce a mixture which will solidify, additional specimens shall be drawn and mixed to determine the proper solidification parameters before full-scale solidification can commence.

Additionally, if test samples from the initial specimen fail to produce a mixture which will solidify, sample solidification of specimens from successive batches shall be conducted until at least three samples from consecutive batches demonstrate solidification.

SAMPLE VERIFICATION FORM

RPS: _____ Date: _____

Waste Type: _____ Temp: _____

NOTE: ATTACH ISOTOPIC OF WASTE STREAM TO THIS FORM.

Sample Proportions Sample No._____

			Amount	
S_1	-	Sample Waste Volume	_____	ml
S_2	-	Delete		
S_3	-	Sample Cement Weight	_____	gm
S_4	-	Solidified Sample Weight	_____	gm
S_5	-	Solidified Sample Volume	_____	ml
S_6	-	Solidified Sample Density (S_4/S_5)	* _____	gm/ml

(Waste pH _____)
(Waste Temp. _____)

Material Ratios

S_7 - Ratio of Waste Volume to Final Volume (S_1/S_5) *_____

* Calculated Value

ATTACHMENT 1A

WP/djj

SAMPLE VERIFICATION FORM

Sample No. _____

Describe sample appearance, water amount, etc. for sample verification problems. See page 3

Initial

- Sample at completion of mixing:

  Condition _____

  _____

  _____ _____

- Sample at 1 hour:

  Condition _____

  _____

  _____ _____

- Sample at 4 hours:

  Condition _____

  _____

  _____ _____

- Sample at 12 hours:

  Condition _____

  _____

  _____ _____

- Sample at 24 hours:

  Condition _____

  _____

  _____ _____

NOTE: IF SOLIDIFICATION IS NOT COMPLETE AFTER 24 HOURS, ATTACH SHEETS TO CONTINUE OBSERVATIONS AT 12 HOUR INTERVALS (MORE FREQUENTLY IF REQUIRED).

ATTACHMENT 1B

WP/djj

SAMPLE TO CONTAINER WORKSHEET

A_1 - Sample Activity _____ uci/ml

W_1 - Dry Cement Feedrate 1.0 cfm

W_2 - Volume of Waste _____ gal

W_3 - Volume of Drum 7.0 ft^3

W_4 - Weight of Drum with Cap 50 lb

W_5 - Delete

EXPECTED CEMENT/WASTE FLOWRATE

W_6 - Radwaste Mixer Output ($W_1 \times (S_5/S_3)$) *_____ cfm

T_1 - Time to Fill Container (W_3/W_6) *_____ minutes

FEED RATE OF WASTE REQUIRED

W_7 - Conditioned Waste Feedrate

$((7.48) \times (S_1/S_5 \times W_6))$ *_____ gpm

SOLIDIFIED WASTE OATA

W_8 - Filled Container Weight $((W_3 \times S_6) \times 62.4) + W_4)$ *_____ lb

A_2 - Activity in Container ($A_1 \times W_7 \times T_1$ (3.78×10^{-3})) _____ uci

* Calculated Value
+* Should be 1 CFM (± 5%)

ATTACHMENT 1C

WP/djj

PROCESS CONTROL PROGRAM

PCP 3.0

ABSORPTION OF LIQUID WASTES

Prepared by: L. E. Bebon Date 3-14-88

Reviewed by: Myron A Dan Date 3-14-88

User Review by: Donald A Bergeron Date 4-29-88

QA Review: K Wilkerson Date 5/2/88

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ALARA Review: [signature] Date 5/17/88

ALARA Revision Review Required: Yes ___ No X

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Op. Com. Revision Review Required: Yes X No ___

Approved by: R L Bevis for H Swailes Date 5/17/88

NOTE: Revision 7 is a complete rewrite and format change.

WP/djj

3.0 ABSORPTION OF LIQUID WASTES

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3.0 ABSORPTION OF LIQUID WASTES

3.1 Purpose

To establish the process parameters which provide reasonable assurance of complete absorption of liquid wastes.

3.2 Applicability

This section of the PCP is applicable to the manual absorption of liquid wastes with approved absorbent material. Waste liquids which may be absorbed include:

A. Oils

B. Chemical Waste

C. Laundry Waste

3.3 Description of Operation

The absorbent of liquid waste is a manual process in which the waste and absorbent is layered in an approved container. Approved absorbent materials are listed in the current revisions of the site license or site criteria. The specific absorbent material will be assigned to the project by the Radioactive Material Shipping Coordinator (RMSC) after checking the site requirements.

The drums are then capped and stored awaiting shipment to the approved burial site.

3.4 Operation

A representative sample of each type of waste is to be sampled and analyzed for isotopic content. After sampling, the waste is to be layered with absorbent into an approved shipping container starting with absorbent. The drum is then inspected, capped and stored.

3.5 Verification of Absorption

Each container is to contain twice the amount of absorbent required for absorption, as determined prior to the full-scale absorption.

If absorption fails to take place, the process shall be suspended until the cause is determined and remedies are defined.

3.6 Sample Absorption of Liquid Wastes

3.6.1 Sampling Requirements

Each type of waste to be absorbed is to be sampled.

3.6.2 Prerequisites

Before drawing a sample of waste, the waste must be adequately mixed to achieve a representative sample.

3.6.3 Sample Preparation

Obtain a speciman of each waste in the required volume. The volume required will normally be 1000 ml.

3.6.3.1 Transfer 250 ml of samples to 2-liter containers for each type of waste. Record the sample number.

Note: Label container and sample with same number.

3.6.3.2 Add approximately 500 ml of absorbent material to each container and mix for a minimum of 30 seconds.

3.6.3.3 Record results.

3.6.3.4 Add approximately 50 ml absorbent material to each container, and record results.

3.6.3.5 Continue to add about 50 ml of absorbent material and record results until some uncoated absorbent remains.

Note: Acceptable ratio is approximately 3 to 1.

3.6.4 Sample Acceptance Criteria

3.6.4.1 Visual inspection after mixing will confirm that there is some uncoated absorbent material.

3.6.4.2 If no uncoated absorbent remains refer to 3.6.3.5.

PROCESS CONTROL PROGRAM

PCP 4.0

DEWATERING OF RESIN AND OTHER FILTER MEDIA

Prepared by: L. E. Behm Date 3-14-88

Reviewed by: [signature] Date 3-14-88

User Review by: Donald G Bergen Date 4-29-88

QA Review: [signature] Date 5/2/88

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Approved by: K Bevis for H Swailes Date 5/17/88

NOTE: Revision 7 is a complete rewrite and format change.

WP/djj

4.0 DEWATERING OF RESIN AND OTHER FILTER MEDIA

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4.0 DEWATERING OF RESIN AND OTHER FILTER MEDIA

4.1 Purpose

To establish the process parameters which will provide reasonable assurance that the material after dewatering and packaging will meet or exceed the requirements of the burial sites, 10CFR part 61 and all applicable state and federal shipping requirements.

4.2 Applicability

This section of the PCP is applicable to the dewatering of spent resins and other filter media containing less than one percent oil by volume.

4.3 References

CNSI Drawing, C-340-E-500, "P&ID, RDS-1000"
CNSI Topical Report, RDS-25506-01-P, "RDS-1000 Radioactive Waste Dewatering System,"
CNSI Procedure, QA-TP-009, "Hydrostatic Test Requirements."
CNSI Procedure, FO-OP-022, "Ecodex Precoat/Powdex/Solka-Floc/ Diomaceous Earth Dewatering Procedures."
CNSI Procedure, FO-OP-032, "Set up and Operating Procedure for the RDS-1000 unit."
CNSI Procedure, DM-OP-022, "Process Control Program for the CNSI Demineralization System."

4.4. Description of System

The Rapid Dewatering System, RDS-1000 (Figure 4.1), developed by Chem-Nuclear Systems, Inc. (CNSI) is a self-contained system for accelerated dewatering of a particulate radioactive waste slurry. Use of a vacuum pump (blower) to remove water through a filtering system (Figure 4.2) provides for a simple operation. The system provides measurable end points and is compatible with both steel liners and High Integrity Containers (HICS). Dewatering is conducted on a liner contained inside a shield cask or a shipping cask.

The waste is processed to a liner and then dewatered, using plant procedures or procedures which have been reviewed by the plant (Vendor Topical Reports are on file with NRC). Transfer hoses are leak-tested prior to use.

The system uses a positive displacement pump to remove the major portion of free water from the container. A closed loop high velocity air flow is then employed to rapidly remove the remaining water. The extracted water is removed from the air stream via a moisture separator, and returned to the plant.

4.5 System Operation

After waste transfer through an automatic waste inlet valve, the excess water is pumped from the liner through a filter system, leaving the solids in the liner. The remotely controlled fill operation is viewed via a video monitor on the control panel.

A remote level control system detects and monitors the waste level in the liner, minimizing operator exposure during dewatering operations. Overfill protection is provided through this system and an independent level control in the fillhead, either of which will automatically close the waste inlet valve. The operator can also manually activate this valve, if necessary.

A dewatering pump is activated to remove the excess slurry water during waste transfer, and to aid in compaction of the media during the initial gross dewatering.

The blower is turned on, and air is recirculated through the liner and moisture separator after all waste has been received, and the gross dewatering is complete, this air flow is maintained until the liner meets the specified acceptance criteria.

The temperature of the material in the liner is monitored to ensure that the thermal limits are not exceeded. There is also a relief valve, which relieves thru a HEPA filter to the plant offgas system, should the liner become pressurized.

4.6 ALARA

The dewatering system was designed with ALARA as one of the major design criterion. The occupational exposure received from operation of this system will be minimized by the following features:

A. Flushing provisions in the fillhead, plant stand, moisture separator, and piping system.

B. Remote location of the control panel.

C. Operation with liner in a shield or cask, as necessary.

D. Automatic control of the waste inlet valve with redundant shutdown controls to prevent overfilling the liner.

E. Quick disconnect hose fittings and fillhead anchors.

F. HEPA filtration of all discharge air.

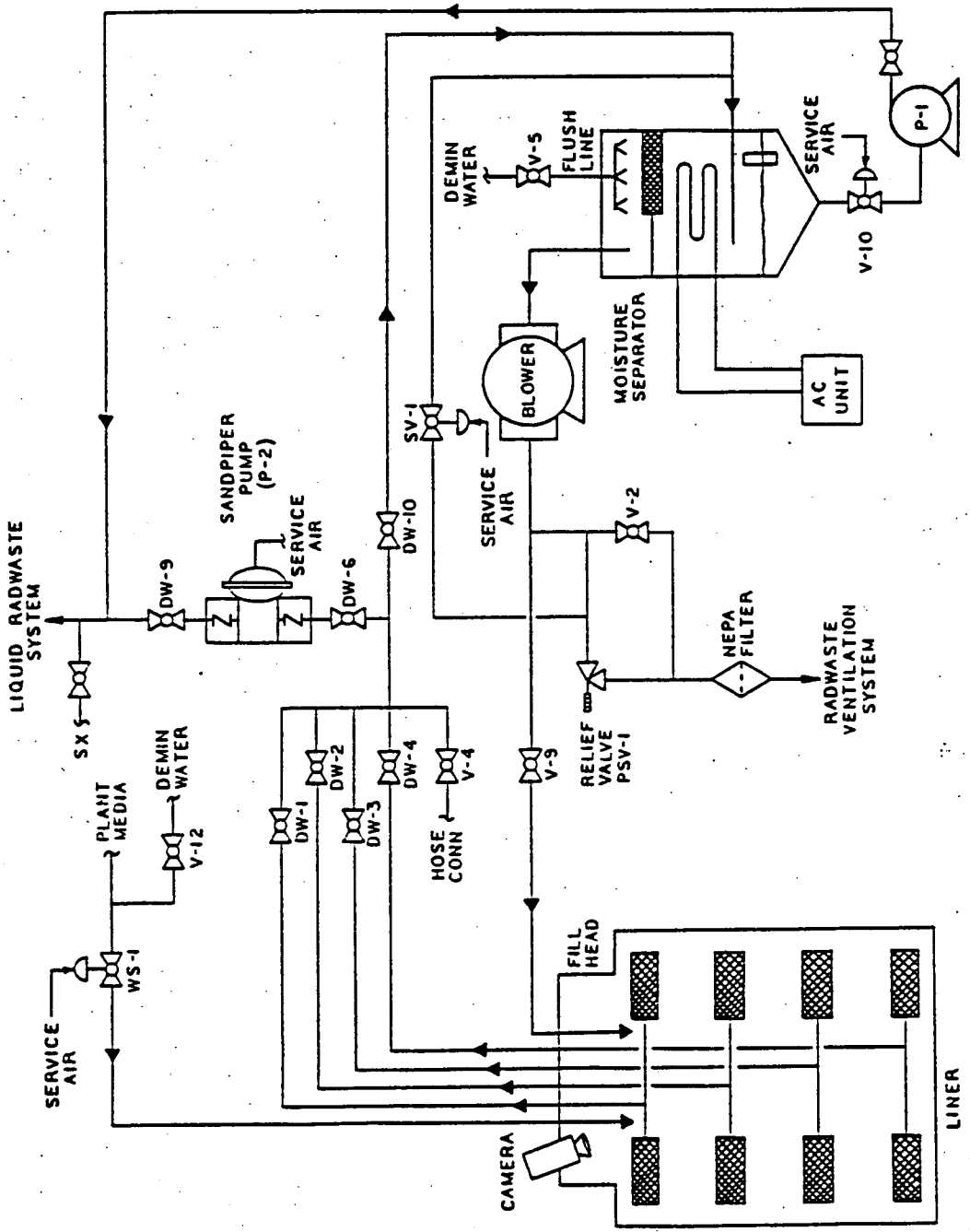
G. Stainless steel components designed for easy decontamination with a minimum of crud traps.

4.7 Sampling

A representative sample of the waste will be taken from each tank, i.e., T-34B, as it is processed to the liner or a grab sample from each liner.

RDS 1000 PROCESS FLOW DIAGRAM

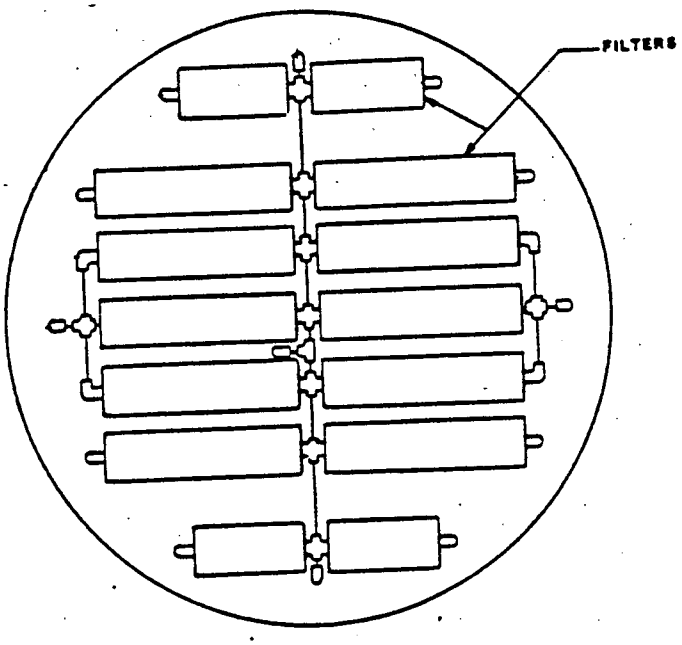
FIGURE 4.1



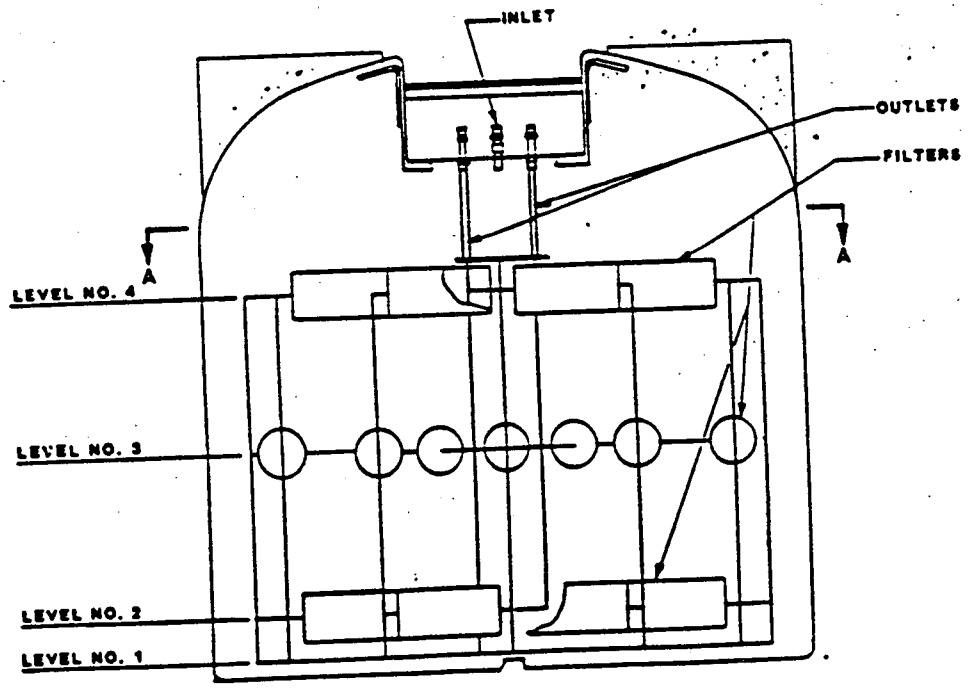
WP/djj

TYPICAL PRECOAT DEWATERING LINER INTERNALS
FOR HICS OR STEEL LINERS

FIGURE 4.2



SECTION A-A



WP/djj

PROCESS CONTROL PROGRAM

PCP 5.0

SOLIDIFICATION OF RESIN USING CEMENT

Prepared by: T. E. Buhm Date 3-14-88

Reviewed by: [signature] Date 3-14-88

User Review by: [signature] Date 4-29-88

QA Review: [signature] Date 5/2/88

Q.A. Revision Review Required: Yes ___ No X

ALARA Review: [signature] Date 5/17/88

ALARA Revision Review Required: Yes ___ No X

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Approved by: R L Bevis for H Swailes Date 5/17/88

NOTE: Revision 7 is a complete rewrite and format change.

WP/djj

5.0 SOLIDIFICATION OF RESIN USING CEMENT

Table of Contents

5.0 SOLIDIFICATION OF RESIN USING CEMENT

5.1 Purpose

To establish the process parameters which will provide reasonable assurance that the material after solidifying and packaging will meet or exceed the requirements of the burial Site, 10CFR part 61 and all applicable state and federal shipping requirements.

5.2 Applicability

This section of the PCP is applicable to the solidification of spent resins and other filter media using cement.

5.3 References

CNSI Procedure, SD-OP-003, "Process Control Program for CNSI Cement Solidification Units"

5.4 Description of System

The CNSI Mobile Cement Solidification System is a process to solidify liquids and sludges using cement. The interface connections to the plant consist of a waste hose from the radwaste system, a vent hose from the liner back to the radwaste building ventilation system, electrical, air and demineralized water for the waste processing unit. A sketch of the typical system (figure 5.1) is attached. The waste in the phase separators is normally transferred to the processing liner in basically the same way as the ATCOR system. Waste is centrifuged to "B" hopper where liquid has been added, mixed and then pumped to CNSI. Solidification is conducted in a liner contained inside a shield cask or a shipping cask.

5.5. System Operation

CNSI, having received the waste, proceeds to solidify it, using procedures which have been reviewed and approved by the plant. Alarms are provided to annunciate high sludge levels in the liner. Transfer hoses are leak-tested prior to use.

5.6 ALARA

The cement solidification system was designed with ALARA as one of the major design criterion. The occupational exposure received from operation of this system will be minimized by the following features:

A. Remote location of the control panel.

B. Operation with liner in a shield or cask, as necessary.

C. Quick disconnect hose fitting and fillhead anchors.

D. Stainless steel components designed for easy decontamination with a minimum of crud traps.

E. Closed-circuit television system to monitor the solidification process.

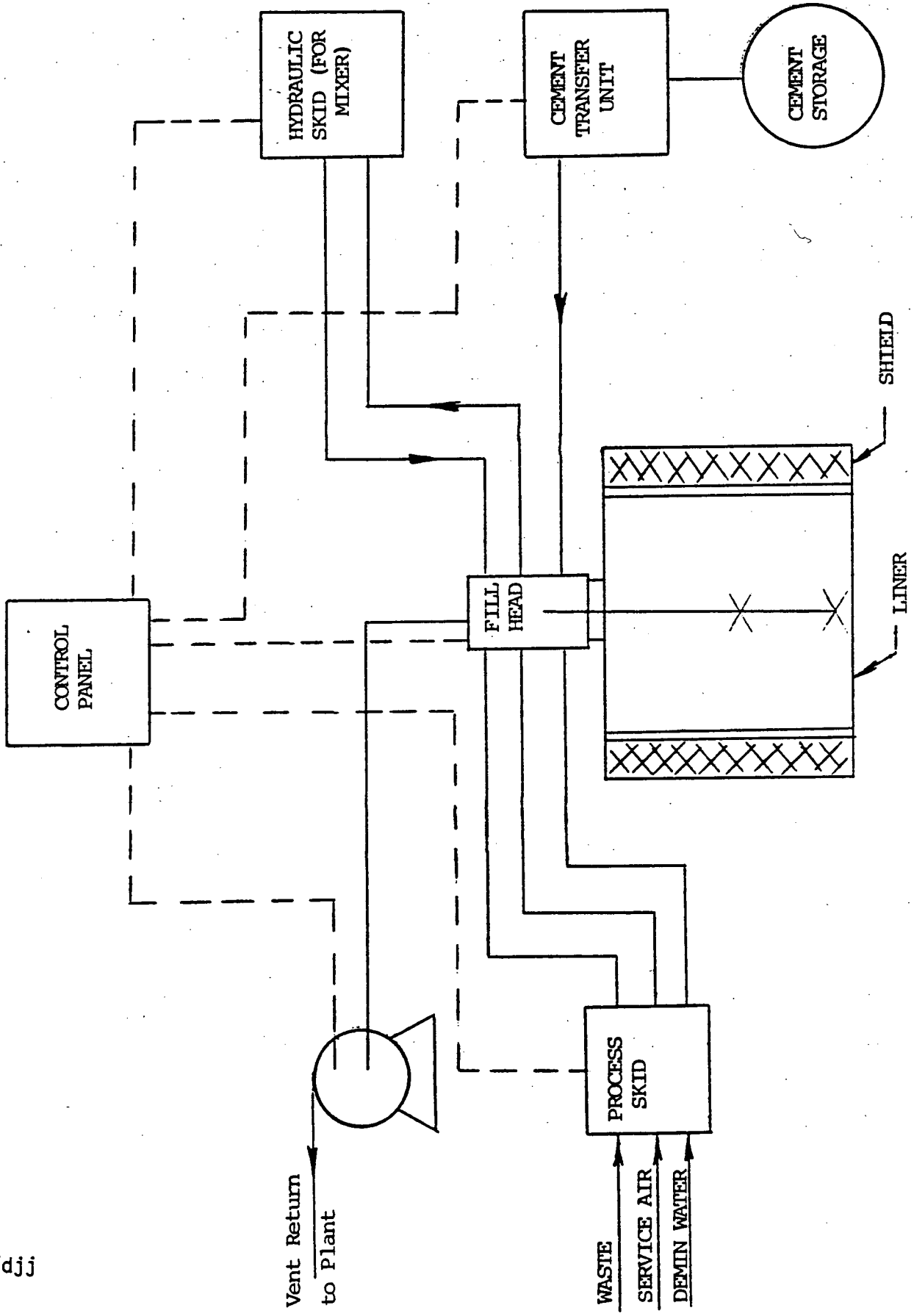
F. Flushing provisions in the fillhead.

5.7 Sampling

To assure a representative sample, sampling is normally done from the waste transfer line when pumping to CNSI. Because of the high radioactivity of the clean-up sludge, only condensate sludge is used for sample solidification. Experience has demonstrated that the clean-up sludge is very similar to the condensate phase separator sludge and does not require a separate test solidification. Test solidification results are reviewed and accepted by the designated site personnel prior to conduction of full-scale solidification operations. Each solidified liner is inspected by plant personnel for proper solidification prior to capping. Sampling of waste processed to CNSI, and calculations to determine the total activity and radionuclide compositions are performed for each mixture of waste.

FIGURE 5.1

Portable Cement Solidification System



WP/djj

PROCESS CONTROL PROGRAM

PCP 6.0

SOLIDIFICATION OF OIL USING CEMENT

Prepared by: L E Bechtold Date 3-14-88

Reviewed by: Myron A Date 3-14-88

User Review by: Donald A Bergman Date 4-29-88

QA Review: John Wilkerson Date 5/2/88

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NOTE: Revision 7 is a complete rewrite and format change.

WP/djj

6.0 SOLIDIFICATION OF OIL USING CEMENT

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6.0 SOLIDIFICATION OF OIL USING CEMENT

6.1 Purpose

To establish the process parameters which will provide reasonable assurance that the material after solidifying and packaging will meet or exceed the requirements of the burial site, 10 CFR part 61 and all applicable state and federal shipping requirements.

6.2 Applicability

This section of the PCP is applicable to the solidification of waste oil using cement.

6.3 References

CNSI Procedure, SD-OP-026, "Process Control Program for CNSI Cement/Oil Solidification Units"

6.4 Description of System

The CNSI Mobile Cement/Oil Solidification System is a process to solidify oil using cement. The interface connections to the plant consist of a waste hose from temporary storage containers, a vent hose from the liner back to the radwaste building ventilation system, electrical, air and demineralized water for the waste processing unit. The waste is normally transferred to the processing liner from temporary storage containers and the other chemicals are then added. Solidification may be conducted in a liner contained inside a shield cask, shipping cask or may not require shielding.

6.5 System Operation

CNSI, having received the waste, proceeds to solidify it, using procedures which have been reviewed and approved by the plant. Alarms are provided to annunciate high waste levels in the liner. Transfer hoses are leak-tested prior to use.

6.6 ALARA

The cement solidification system was designed with ALARA as one of the major design criterion. The occupational exposure received from operation of this system will be minimized by the following features:

A. Remote location of the control panel.

B. Operation with liner in a shield or cask, as necessary.

C. Quick disconnect hose fitting and fillhead anchors.

D. Stainless steel components designed for easy decontamination with a minimum of crud traps.

E. Closed-circuit television to monitor the solidification process.

F. Flushing provisions in the fillhead.

6.7 Sampling

A representative sample of each type of waste is to be sampled and analyzed for isotopic content. Test solidifications are performed and the results are reviewed and approved by designated site personnel prior to conduction of full-scale solidifcation operations. Each solidified barrel or liner is inspected by plant personnel for proper solidification prior to capping. Sampling of waste processed to CNSI, and calculations to determine the total activity and radionuclide compositions are performed for each mixture of waste.

PROCESS CONTROL PROGRAM

PCP 7.0

REVISIONS

Prepared by: L E Bachman Date 3-14-88

Reviewed by: [illegible] Date 3-14-88

User Review by: Donald A Bergman Date 4-29-88

QA Review: [illegible] Date 5/2/88

Q.A. Revision Review Required: Yes ___ No X

ALARA Review: [illegible] Date 5/17/88

ALARA Revision Review Required: Yes ___ No X

Operations Committee Final Review: Meeting Number: 1571 Date 5-11-88

Op. Com. Revision Review Required: Yes X No ___

Approved by: R L Bernig for H Swailes Date 5/17/88

NOTE: Revision 7 is a complete rewrite and format change.

WP/djj

7.0 REVISIONS

Table of Contents

7.0 REVISIONS

Revisions to the PCP shall be made in accordance with Technical Specification 6.5.D.

The following items shall be reviewed to determine applicability prior to the revision:

IEIN 83-14. Dewatered Spent Ion Exchange Resin Susceptability to Exothermic Chemical Reaction.

IEIN 88-008. Chemical Reactions with Radioactive Waste Solidification Agents.

WP/djj

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