PROCESS CONTROL PROGRAM

NORTH ANNA NUCLEAR POWER STATION

UNITS 1 & 2

VIRGINIA ELECTRIC & POWER COMPANY

NORTH ANNA STATION PROCESS CONTROL PROGRAM

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1.0 SCOPE

1.1 Purpose

The purpose of the North Anna Nuclear Power Station Process Control Program is to assure that:

a. Solidified liquid wastes, dewatered resins and aqueous filter media are packaged in the proper container based on their activity level;

b. Dewatered resins and aqueous filter media are packaged with no detectable free standing liquid prior to transportation; and

c. That liquid wastes are solidified and contain no detectable free standing liquid.

1.2 Applicability

This Process Control Program shall be implemented by all personnel who operate dewatering equipment, operate solidification equipment, package spent filter cartridges, collect and process samples used to verify conditions required by this program, and prepare documentation for shipping of radioactive waste.

2.0 SYSTEM DESCRIPTION

2.1 Dewatering System

Two sources of spent resins for dewatering and disposal exist at the North Anna Station. The first is the Spent Resin Holdup Tank which collects for decay and disposal spent resins from the primary coolant purification system. These resins are dewatered in disposable high integrity containers. The second is the High Level Liquid Waste Treatment System. This system utilizes resins which are received on-site in disposable containers. When the resins in these containers are chemically exhausted, or the activity level of the resins approaches the limit for the container, the resins are dewatered. The following sections provide a description for each dewatering system.

2.1.1 Dewatering System For Resins In The Spent Resin Holdup Tank

The dewatering system for spent resins in the Spent Resin Holdup Tank consists of the Spent Resin Holdup Tank, the Radwaste Metering Pump (1-LW-P-18), the Spent Resin Recirculation Pump (1-LW-P-21), the dewatering container, the shipping cask, the dewatering pump, the TV monitor, interconnecting hose and piping, valves, instrumentation and controls, and sample taps.

2.1.1a Spent Resin Holdup Tank

The Spent Resin Holdup Tank is a 1600 gallon atmospheric tank. It collects spent resins from the primary coolant purification system to provide for radioactive decay and temporary storage.

2.1.1.b Spent Resin Transfer Pump (1-LW-P-18)

The Radwaste Metering Pump is a 10 gpm, centrifugal pump. It takes suction from the bottom of the Spent Resin Holdup tank and discharges through flexible hose to the dewatering container.

2.1.1.c. Spent Resin Recirculation Pump (1-LW-P-21)

The Spent Resin Recirculation Pump is a 10 gpm, centrifugal pump. It takes suction from the bottom of the Spent Resin Holdup Tank and discharges to the top of the Spent Resin Holdup Tank.

2.1.1.d Dewatering Container

The dewatering container can be any certified high integrity container designed for use in dewatering and approved for transportation and disposal of dewatered spent resins.

2.1.1.e Shipping Cask

The shipping cask can be any licensed shipping cask, designed for use with the high integrity container utilized, which provides adequate radiation shielding and package integrity for transportation of dewatered spent resins.

2.1.1.f Dewatering Pump

The dewatering pump is an air driven 1-1/2" Sandpiper Pump, or equivalent.

2.1.1.g TV Monitor

The TV monitor is a remote display television utilized, when required, to monitor the container filling operation. This monitor provides information to the operator on container resin and water level, and resin slurry consistency.

2.1.1.h Interconnecting Hose and Piping

The resin transfer line used to sluice resin from the primary coolant purification demineralizers to the Spent Resin Holdup Tank, as well as connections from the tank to the Spent Resin Transfer Pump, Spent Resin Recirculation Pump, and plant ventilation system, are permanently installed stainless steel piping. The connection from the Spent Resin Transfer Pump to the dewatering container, the connection from the dewatering container to the dewatering pump, and the connection from the dewatering pump back to the Spent Resin Holdup Tank are all flexible rubber hose.

2.1.1.i Valves

Valves are installed in the system as required to select flow paths and isolate portions of the dewatering system as may be required.

2.1.1 j Instrumentation & Controls

Controls are provided to remotely start and stop pumps, remotely open and close valves, remotely monitor the container fill head level and influent flow, and remotely indicate the container fill and discharge flow.

2.1.1.k Sample Taps

As an example, a sample tap is provided on the discharge side of the Spent Resin Recirculation Pump.

2.1.2. Dewatering System For Resins Received In Disposable Containers

The High Level Liquid Waste (HLLW) System contains from two to seven disposable filter/demineralizer vessels. The dewatering system for the HLLW disposable filter/demineralizer vessels consists of the disposable vessel and the dewatering pump.

2.1.2.a Disposable Vessel

The disposable filter/demineralizer vessel can be any container designed for use as a disposable filter/ demineralizer vessel, with provisions for dewatering.

2.1.2.b Dewatering Pump

The dewatering pump is an air driven 1-1/2" Sandpiper pump or equivalent.

2.1.3 Dewatering System For Filter Cartridges

High Level Liquid Waste Filter is a filter which utilizes disposable cartridge filters. The cartridges are air dried prior to disposal and no dewatering system or equipment exists for dewatering spent filter cartridges.

2.2 Solidification System

There is presently no operating solidification system on site. In the event contractor services are utilized for solidification, the contractor will be required to

provide to VEPCO a complete system description for the solidification system to be used. The system description provided will be subject to VEPCO review and acceptance and once accepted will be incorporated by reference into this Process Control Program. The solidification system will not be operable until the system description is accepted by VEPCO.

3.0 CHARACTERISTICS OF WASTE FEEDS

3.1 Dewatered Resins

Resins to be dewatered are either sluiced in slurry form to the disposable dewatering high integrity container, or are contained in a disposable container. Low activity resin may be shipped in a carbon steel liner.

3.2 Filter Elements

Spent filter elements are removed from the filter vessel housing and are processed as individual units.

3.3 Liquids For Solidification

Presently liquid wastes are not fed to a solidification system. In the event contractor services are utilized for solidification, the waste stream characterization will be provided by either:

a) VEPCO personnel collecting and analyzing samples in accordance with station approved procedures; or

b) the contractor collecting and analyzing samples in accordance with station approved procedures.

The procedures will consider the solidification process utilized and will analyze for parameters or constituents which may effect the solidification process. Sample collection and analysis procedures will be subject to VEPCO review and acceptance, and once accepted will be incorporated by reference into this Process Control Program. The solidification system will not be operable until the sample collection and analysis procedures are accepted by VEPCO.

4.0 SYSTEM OPERATION

4.1 Dewatering

4.1.1 Dewatering Resins in the Spent Resin Holdup Tank

Exhausted resins from the primary loop cleanup system are sluiced to the Spent Resin Holdup Tank for decay and storage. The spent resin storage time in the tank is maximized to the extent possible to allow for maximum radioactivity decay. During the period of resin storage, the tank contents are periodically mixed using the Spent Resin Recirculation Pump to prevent excessive settling and resin packing. Prior to resin transfer to the dewatering container, the tank contents will be mixed. A sample for isotopic analysis may be taken from the sample tap on the recirculation line. Sample requirements are defined in PCP Section 5.0. If a sample is taken from the recirculation line, a portion of the recirculating slurry is drawn off into a sample container, the sample container contents decanted, and the isotopic analysis performed in accordance with approved procedures in the station Health Physics Procedures Manual, Section 3.

Following mixing and sampling (if performed), the radwaste metering pump is used to transfer resin slurry to the disposable dewatering container. The Spent Resin Recirculation Pump will be operating during resin transfer. The operator fills the container with slurry until the container has been filled. This is verified by the remote TV monitor. When the container is filled, the transfer of slurry to the container is stopped. The excess water is then removed by the dewatering pump. This water is transferred back to the Spent Resin Holdup Tank. After the excess water is drained, slurry is again transferred to the container until the container is filled with the resin and water mixture. The container is again drained using the dewatering pump. This process continues until the container is filled with resin (i.e., sluicing water removed). The resin filled container is dewatered in accordance with one of the following approved station dewatering procedures:

- VEPCO Procedure 1-OP-20.2 for dewatering disposable containers.

- Chem-Nuclear Systems Inc. procedure FO-OP-003, "Dewatering Procedure for CNSI Conical-bottom High Integrity Containers Containing Bead-Type Ion Exchange Resin, 1% Free-Standing Water."

Each procedure specifies a series of minimum periods for dewatering pump operation and shutdown, and provides a minimum time period for sample collection. These procedures are not included as they are considered proprietary. The procedures have been tested for compliance in dewatering to less than the specified percentage as required by Chem-Nuclear Systems, Inc., State of South Carolina Radwaste Material License No. 97.

The approved procedures must be completely followed and the documentation required by the above procedures must be completed.

4.1.2 Dewatering Resins In Disposable Filter/Demineralizer Vessels

Exhausted resins from the High Level Liquid Waste System are contained in disposable filter/demineralizer vessels. The vessels may be removed from service when either calculations indicate the resins contain close to 1 μCi/gm radioactivity, or the resins have insufficient ion exchange capacity remaining for adequate liquid processing. Once removed from service, the vessels are drained and dewatered in accordance with one of the following procedures. The procedure selected will be determined by the container to be dewatered.

- VEPCO procedure 1-OP-20.2 for dewatering disposable containers.

- Chem-Nuclear Systems Inc. procedure 06601-27-01, "Dewatering Procedure for the Annular L14-195 and L21-300 Demineralizer Liners, 1% FSW."

- Chem-Nuclear Systems Inc. procedure FO-OP-005, "Dewatering Procedure for the 10 Cu.Ft. Filtration Unit Containing Ion Exhange Resins, 1% FSW."

- Chem-Nuclear Systems Inc. procedure FO-OP-001, "Dewatering Procedure for the 24-inch Diameter Pressure Demineralizer Vessel Containing Activated Carbon, 0.5% Free-Standing Water."

- Chem-Nuclear Systems Inc. procedure FO-OP-004, "Dewatering Procedure for the 24-inch Diameter Pressure Demineralizer Vessel Containing Ion Exchange Resins, 0.5% FSW."

- Chem-Nuclear Systems Inc. procedure FO-OP-007, "Dewatering Procedure for the L14-195 and 14-170 Conical-Bottom Demineralizer Vessels, 0.5% Free-Standing Water."

Each procedure specifies a series of minimum periods for dewatering pump operation and shutdown, and provides a minimum time period for sample collection. These procedures are not included as they are considered proprietary. The procedures have been tested for compliance in dewatering to less than the specified percentage as required by Chem-Nuclear Systems, Inc., State of South Carolina Radwaste Material License No. 97.

The above procedures must be completely followed and the documentation required by the above procedures must be completed.

4.2 Spent Filter Cartridge Disposal

When used High Level Liquid Waste cartridge filters are to be removed from service, the vessels will be drained and the elements removed. [Note: The wound type elements used do not contain void spaces which can trap liquid in pockets.] In accordance with Health Physics Department Procedures, a sample of the element will be removed for radioassay following removal of the element from the filter vessel. The element will be allowed to air dry. The element will be considered to contain less than 0.5% free-standing water when it can be placed on a clean dry plastic sheet for a minimum of four hours and, when removed, the plastic contains no free liquid. If free liquid remains on the plastic, the filter element will continue to be placed on a dry piece of plastic for four hour increments until, when the element is removed from the plastic, no free liquid remains on the plastic. Drying of the elements may be assisted by placing the elements in a flow of warm dry air or any other means which meets station HP procedures for control of airborne particulates. However, the four-hour dryness verification shall occur with no drying air flow present. Contractors may use mechanical filters for this service that would be controlled by contractor procedures.

4.3 Solidificaton

There is presently no operating solidification system on site. In the event contractor services are utilized for solidification, the contractor will be required to provide to VEPCO system operating procedures. The system operating procedures must define the process control parameters which assure the proper proportioning and mixing of waste and solidification agents. The operating procedures shall also specify minimum data logging requirements to document system operation within the specified ranges. The system operating procedures will be subject to VEPCO review and acceptance, and once accepted will be incorporated by reference into this Process Control Program. The solidification system will not be operable until the system operating procedures are accepted by VEPCO.

5.0 COLLECTION AND ANALYSIS OF SAMPLES

5.1 General Rquirements

5.1.1 Definitions

5.1.1.a Batch - The amount of waste which fills one disposable liner or drum.

5.1.1.b Transfer - The delivery of liquid or slurry radioactive waste to a solidification or disposable container. There may be several transfers made from several sources that compose a batch. If the transfers are made from the same source and the contents of the source are known not to change during the time of the transfers, the volume of each transfer need not be known. If the transfers are made from several different sources, the volume of each transfer must be known. If several transfers are made from one source which has inputs to that source during the duration of the transfers, the volume of each transfer must be known.

5.1.1.c Sample - A portion of a transfer or batch that represents the contents of that transfer or batch.

5.1.1.d Composite - A mixture of samples proportional by volume to the individual transfers making up a batch, thus resulting in the test specimen being representative of the batch.

5.1.1.e Direct In-Container Sample - A sample removed from the disposable container after the container has been filled, the contents of which are a composite of samples taken from various positions within the container.

5.1.2 Frequency of Samples

5.1.2.a Dewatered Resins - A sample for radioassay purposes shall be taken from each batch. The sample may be a representative sample taken at the source (when the source remains unchanged during the transfer of a batch), a composite sample composed of samples collected at the source, or a direct in-container sample.

5.1.2.b Spent Filter Cartridges

A sample of each spent filter cartridge shall be obtained for radioassay purposes.

5.1.2.c Solidification

A sample of at least every tenth batch of each type of liquid or slurry radioactive waste (e.g., boric acid solutions, spent resins, evaporator bottoms) shall be used to demonstrate solidification.

If any test specimen fails to solidify, the batch under test shall be suspended until such time as additional test specimens can be obtained, alternative solidification parameters can be determined in accordance with the procedures incorporated by reference into this Process Control Program, and a subsequent test verifies solidification. Solidification of a batch may then be resumed using the alternate solidification parameters determined.

If the initial test specimen from a batch of waste fails to verify solidification, then representative test specimens shall be collected from each successive batch of the same type of waste until three (3) consecutive initial test specimens demonstrate solidification. The operating procedure incorporated by reference into this Process Control Program shall be modified as required to assure solidification of subsequent batches of waste.

5.1.3 ALARA Considerations

5.1.3.a Prior to obtaining any samples or performing any waste transfers, a Radiation Work Permit (RWP) will be obtained. All activities shall be in compliance with the conditions of the RWP. The Health Physics department will stipulate protective clothing requirements and protective measures to be implemented to maintain doses ALARA.

5.1.3.b For high activity wastes, where handling of samples could result in personnel radiation exposures which are inconsistent with the ALARA principle, representative diluted samples will be tested/assayed or representative non-radioactive samples will be tested (for solidification verification only).

5.2 Dewatered Resins

5.2.1 Sample Collection

Representative sample(s) shall be taken of each batch of spent resins. Samples may be taken from the sample tap on the Spent Resin Recirculation pump discharge line, or as a direct in-container sample from the disposable container. For samples taken at the recirculation pump discharge, the tank contents shall be recirculated to provide a minimum of one tank contents changeover prior to obtaining a sample. The design of the direct in-container sampling probe assures a representative sample and, therefore, no mixing requirements exist when direct in-container sampling is used. Samples shall be taken in accordance with approved Health Physics Department Procedures/Instructions.

5.2.2 Sample Analysis

The spent resin sample shall be analyzed by radioassay techniques in accordance with approved procedures in the station Health Physics Procedures Manual. A sample of the output data documenting the radioassay is provided in Appendix A.

5.2.3 Acceptance Criteria

The results of the radioassay are considered acceptable when it has been verified and documented that the spent resins are packaged in a container which is acceptable for transportation and burial considering the radioactivity concentrations which exist in the waste. Standard containers are acceptable for waste containing less than 1 µCi/gm activity when dewatered to less than 0.5% water. High Integrity containers are required for wastes containing more than 1 µCi/gm activity and must be dewatered to less than 1.0% water.

5.3 Spent Filter Cartridges

5.3.1 Sample Collection

A sample of the cartridge filter element material shall be removed from the filter element. This sample shall be removed in accordance with a Health Physics department procedure/instruction.

5.3.2 Sample Analysis

The cartridge filter sample shall be analyzed by radioassay techniques in accordance with approved procedures contained in the Health Physics Procedures Manual, Section 3. A sample of the output data sheet documenting the radioassay is provided in Appendix A.

5.3.3 Acceptance Criteria

The results of the radioassay are considered acceptable when it has been verified and documented that the spent filter cartridge is packaged in a container which is acceptable for transportation and burial considering the radioactivity concentrations which exist in the waste. Standard liners and drums are acceptable for waste containing less than 1 uCi/gm activity, and High Integrity Containers are required for waste containing more than 1 uCi/gm activity.

5.4 Liquids for Solidification

There is presently no operating solidification system on-site. In the event contractor services are utilized for solidification, the contractor, or VEPCO, shall provide procedures for sample collection and sample analysis. The sample collection and sample analysis procedures shall be for both radioactivity determinations, and solidification verification. These procedures will be subject to VEPCO review and acceptance, and once accepted will be incorporated into this Process Control Program by reference. The solidification system will not be operable until the sample collection and analysis procedures are accepted by VEPCO.

All chemicals used to condition or solidify waste or simulated waste in solidification tests shall be representative of the actual chemicals to be used in full scale solidification. If chemicals of a different type or from a different manufacturer are used, the new material shall be tested to verify it produces a solid product prior to full scale solidification.

6.0 STATION RECORDS

Station records shall be maintained for sample radioassay, verification of: dewatering per applicable procedure, filter element dryness, solidification, solidification system operation within specified process parameters, and documentation of: packaged container weight and packaged container survey results. Table 6.1 specifies the forms to be used for the above data, references the samples provided in Appendix A, and stipulates whether the form is a sample or mandatory. Where forms are a sample only, any form may be used provided it contains the minimum information provided on the sample.

TABLE 6.1

SUMMARY OF FORMS REQUIRED TO IMPLEMENT THIS PROCESS CONTROL PROGRAM

Data	Form Sample # In Appendix A	Mandatory
Sample Radioassay	1	No
Verification of Spent Resin Dewatering	2 through 5*	Yes*
Verification of Filter Element Dryness	NA (Logbook Data Sufficient)	NA
Verification of Solidification	None - To Be Provided By Solidification Contractor	NA
Verification of Solidification System Operation Within Specified Process Parameters	None - To Be Provided By Solidification Contractor	NA
Documentation of Packaged Container Weight	6	Yes
Documentation of Packaged Container Survey	6	Yes

*Applicable form based upon dewatering procedure utilized.

7.0 INTERFACES BETWEEN STATION AND CONTRACTOR SERVICES

7.1 Dewatering Spent Resins

7.1.1 Station Responsibilities

7.1.1.a RWP preparation and issue.

7.1.1.b HP coverage, including determination of special protective measures and shielding requirements.

7.1.1.c Resin sample collection.

7.1.1.d Resin sample radioassay

7.1.1.e Transfer of spent resins from the Spent Resin Holdup Tank to the dewatering container.

7.1.1.f Operation of the dewatering equipment in accordance with approved procedures.

7.1.1.g Verification (QA/QC) of operation in accordance with approved procedures.

7.1.1.h Weighing the filled waste container when ready for shipment.

7.1.1.i Survey the filled waste container when ready for shipment.

7.1.1.j Prepare and maintain all records.

7.1.2 Contractor Responsibilities

7.1.2.a Operate contractor provided treatment system in accordance with approved procedures.

7.1.2.b Place fresh demineralizer vessels in service, and take spent demineralizer vessels out of service.

7.1.2.c Remove shielded vessels for disposal.

7.1.3 Physical Interfaces

7.1.3.a Process Fluids

1) High Level Liquid Waste Tank Discharge - 5-25 gpm, 30-150 psig, maximum temperature 125F; 1-1/2", 150 psi hose with Kam-Lock fitting.

2) Filter Atmospheric Vent Hose - 1/2" tygon hose connected to a 1/2" needle valve (150 psi rating) connected to a Kam-Lock fitting.

3) Demineralized Water Discharge: 5-25 gpm at 150 psig, 1-1/2", 150 psi hose with Kam-Lock fitting.

4) Resin Transfer - 1-1/2", 150 psi hose, 25 gpm max, 150 psi max, quick disconnect fitting at disposable liner fill head.

5) Dewatering Line - 1-1/2" hose connection at disposable liner fillhead, quick disconnect fitting.

6) Crane Services for loading and unloading vessels.

7) Protective clothing and dosimetry devices for Chem-Nuclear System Inc. operators.

8) Shielding

7.2 Filter Cartridges

The utility is responsible to remove the cartridges from the filter housing. All actions following cartridge removal are utility actions and, therefore, there are no additional interfaces.

7.3 Solidification

There is presently no operating solidification system on site. In the event contractor services are utilized for solidification, the contractor will be required to

provide a list of physical interfaces, services required, and breakdown of utility/contractor responsibilities. These documents will be subject to VEPCO review and acceptance, and once accepted will be incorporated into this Process Control Program by reference. The solidification system will not be operable until the definition of physical interfaces, services required, and utility/contractor responsibilities are accepted by VEPCO.

APPENDIX A

SAMPLE FORMS

****

********** 5 OCT 1982 4:51:37 PM **********

SAMPLE COPY FOR INFORMATION ONLY

SAMPLE DATE: 15AUG82 1200:00
SAMPLE IDENTIFICATION: RAD. WASTE
TYPE OF SAMPLE: RESIN
SAMPLE QUANTITY: 15.00000 UNITS: CC
SAMPLE GEOMETRY: 15 ML SHELF
EFFICIENCY FILE NAME: GELI.SHLF21

ACQUISITION DATE: 5OCT82 1635:33	FWHM(1332) 2.225
PRESET TIME(LIVE): 300. SEC	SENSITIVITY: 5.000
ELAPSED REAL TIME: 303. SEC	SHAPE PARAMETER : 20.0 %
ELAPSED LIVE TIME: 300. SEC	NBR ITERATIONS: 5.

DETECTOR: GELI.#2	LIBRARY:GELI.LIB69
DATE CALIBRATED: 5OCT82 1128:54	ENERGY TOLERANCE: 1.500KV
KEV/CHNL: 0.9998521	HALF LIFE RATIO: 8.00
OFFSET: 0.0756639 KEV	ABUNDANCE LIMIT: 80.00%

SAMPLE 1

ENERGY WINDOW 50.068 TO 2047.773

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	81.01	3477.	1373.	1.15	80.94	77	9	1.159E 01	2.3	
2	0	276.59	540.	718.	1.92	276.55	272	9	1.801E 00	8.2	
3	0	303.09	1414.	708.	1.19	303.06	298	10	4.712E 00	3.8	
4	0	356.15	3927.	825.	1.30	356.13	351	12	1.309E 01	1.9	
5	0	383.98	569.	549.	1.20	383.97	380	9	1.897E 00	7.2	
6	0	437.13	125.	587.	1.92	437.12	433	9	4.175E-01	28.8	
7	0	661.61	4341.	384.	1.85	661.63	656	12	1.447E 01	1.6	
8	0	1172.99	3793.	189.	1.93	1173.09	1166	14	1.264E 01	1.7	
9	0	1332.25	3311.	60.	2.32	1332.37	1325	14	1.104E 01	1.8	

PEAK SEARCH COMPLETED

SUMMARY OF NUCLIDE ACTIVITY

TOTAL LINES IN SPECTRUM	9	
LINES NOT LISTED IN LIBRARY	2	
IDENTIFIED IN SUMMARY REPORT	7	77.78%

ACTIVATION PRODUCT

NUCLIDE	ENERGY	AREA	BKGND	EFF	UC/UT	%ERROR
CO-60	1173.21*	3793.	189.	1.230E-03	1.888E-02	1.70
	1332.46	3311.	60.	1.111E-03	1.824E-02	1.77
ZN-69M	438.63*	125.	587.	2.830E-03	2.821E-04	28.78

SAMPLE 1

FISSION PRODUCT

NUCLIDE	ENERGY	AREA	BKGND	EFF	UC/UT	%ERROR
CS-137	661.64*	4341.	384.	1.971E-03	1.475E-02	1.65
BA-133	356.30*	3927.	825.	3.353E-03	1.029E-02	1.90
	80.99	3477.	1373.	4.873E-03	1.169E-02	2.27
	303.00	1414.	708.	3.852E-03	1.112E-02	3.76

FIGURE 1

CNSI Conical-Bottom EnviroSAFE™ High Integrity Containers
Dewatering Completion Record - 1% FSW

Customer _____ Plant _____

Vessel Designation _____ Vessel Serial # _____

FO-OP-003 Proc. Step	Description	Date	Time	CNSI Operator
4.2.3	Start Dewatering Pump	_____	_____	_____
	Secure Dewatering Pump	_____	_____	_____
	Total Pump Time*		_____	_____
4.2.4	Let Vessel Stand For ≥ 16 Hours			
4.2.5	Start Dewatering Pump	_____	_____	_____
	Secure Dewatering Pump	_____	_____	_____
	Total Pump Time*		_____	_____
4.2.6	Let Vessel Stand For ≥ 16 Hours			
4.2.8	Start Dewatering Pump	_____	_____	_____
	Secure Dewatering Pump	_____	_____	_____
	Total Pumping Time*		_____	_____
4.2.9	Volume Of Water Collected		_____ mls	_____

SAMPLE 2

Comments: _____

*Pumping Time Must Be ≥ 8 Hours

FIGURE 1

CNSI 24-INCH DIAMETER PRESSURE DEMINERALIZER
CONTAINING ION-EXCHANGE RESINS
DEWATERING COMPLETION RECORD - 0.5% FSW

Customer: _____ Plant: _____

Vessel Serial Number: _____

FO-OP-001 Proc.Step	Description	Date	Time	CNSI Operator
4.2.1	Start Dewatering Pump	____	____	_____
4.2.3	Secure Dewatering Pump	____	____	_____
	Total Pumping Time (Must Be ≥ 4 Hours)		____	_____
4.2.5	Start Dewatering Pump (After ≥ 24 Hours)	____	____	_____
4.2.7	Stop Dewatering Pump	____	____	_____
	Total Pumping Time (Must Be ≥ 1 Hour)		____	_____
4.2.8	Water Removed (During 2nd Dewatering)	_____ mls		_____
4.2.9	Start Dewatering Pump (After ≥ 24 Hours)	____	____	_____
	Stop Dewatering Pump	____	____	_____
	Total Pumping Time (Must Be ≥ 1 Hour)		____	_____
	Water Removed (During 3rd Dewatering)	_____ mls		_____

SAMPLE 3

Comments: _____

_____

_____

_____

FIGURE 1

24-Inch Diameter Pressure Demineralizer
Containing Activated Carbon
Dewatering Completion Reocrd - 0.5% FSW

Customer: _____ Plant: _____

Vessel Serial Number: _____

FO-OP-001 Proc. Step	Description	Date	Time	CNSI Operator
4.2.1	Start Dewatering Pump			
4.2.3	Secure Dewatering Pump			
	Total Pump Time*			
4.2.4	Let Vessel Stand For ≥ 14 Hours			
4.2.5	Start Dewatering Pump			
	Secure Dewatering Pump			
	Total Pumping Time*			
4.2.6	Let Vessel Stand For ≥ 14 Hours			
4.2.7	Start Dewatering Pump			
	Secure Dewatering Pump			
	Total Pumping Time*			
4.2.8	Let Vessel Stand For ≥ 14 Hours			
4.2.10	Start Dewatering Pump			
	Secure Dewatering Pump			
	Total Pumping Time*			
4.2.11	Volume Of Water Collected		mls	
4.2.12	Let Vessel Stand For ≥ 14 Hours			
4.2.13	Start Dewatering Pump			
	Secure Dewatering Pump			
	Total Pumping Time*			
4.2.14	Volume of Water Collected		mls	

*Pumping Time Must Be ≥ 8 Hours

SAMPLE A

FIGURE 1 (Cont'd)

FO-OP-001

Proc. Step	Description	Date	Time	CNSI Operator
4.2.15	Let Vessel Stand For ≥ 14 Hours			
4.2.16	Start Dewatering Pump.	____	____	_____
	Secure Dewatering Pump	____	____	_____
	Total Pumping Time*		____	_____
4.2.17	Volume Of Water Collected	_____mls		_____
	Let Vessel Stand For ≥ 14 Hours			
(If Necessary)	Start Dewatering Pump	____	____	_____
	Secure Dewatering Pump	____	____	_____
	Total Pumping Time*		____	_____
	Volume of Water Collected	_____mls		_____

SAMPLE A

*Pumping Time Must Be ≥ 8 Hours

Comments: _____

_____

_____

_____

_____

_____

FIGURE 1

CNSI 14-195 or 14-170 Demineralization Vessel
Dewatering Completion Record - 0.5% FSW

Customer: _____ Plant: _____

Vessel Serial Number: _____ Vessel Type: _____

FO-OP-007

Proc. Step	Description	Date	Time	Operator
4.2.2	Start Dewatering Pump	_____	_____	_____
4.2.3	Secure Dewatering Pump	_____	_____	_____
	Total Pumping Time*		_____	_____
4.2.4	Let Vessel Stand for ≥ 16 Hours			
4.2.5	Start Dewatering Pump	_____	_____	_____
	Secure Dewatering Pump	_____	_____	_____
	Total Pumping Time*		_____	_____
4.2.6	Let Vessel Stand for ≥ 16 Hours			
4.2.7	Start Dewatering Pump	_____	_____	_____
	Secure Dewatering Pump	_____	_____	_____
	Total Pumping Time*		_____	_____
4.2.8	Let Vessel Stand for ≥ 16 Hours			
4.2.10	Start Dewatering Pump	_____	_____	_____
	Secure Dewatering Pump	_____	_____	_____
	Total Pumping Time*		_____	_____
4.2.11	Volume Collected _____mls	_____	_____	_____
	Let Vessel Stand for ≥ 16 Hours			
4.2.12	Start Dewatering Pump	_____	_____	_____
	Secure Dewatering Pump	_____	_____	_____
	Total Pumping Time*		_____	_____
	Volume Collected _____mls	_____	_____	_____

SAMPLE 5

*PUMPING TIME MUST BE > 8 HOURS

(1)
FROM Company Name ______________________
Address ______________________
____
Contact ______________________
Phone # ______________________
(2) TO ______________________
____
CARRIER ______________________
DRIVER SIGNATURE ______________________
DATE AND TIME RECEIVED ______________________

BARNWELL WASTE MANAGEMENT FACILITY

Operated by: CHEM-NUCLEAR SYSTEMS, INC.
P. O. Box 726, Barnwell, South Carolina 29812
(803) 259-1781

RADIOACTIVE SHIPMENT RECORD FORM

Page ______ of ______

(4) Volume Allocation No. ______________

(5)
Shipping Date ______________
Shipment No ______________
Type of Cask ______________
Trailer No ______________
LINER SERIAL # ______________

CNSI USE ONLY
Arrival date ________ AS# ________
Date/Time Buried ________ By ______
Radiation Readings ________ Weight ________
Trench # ______ LOC ______ WCC ______
Total Personnel Exp ________ (mRem)
Project # ________

(3) — (a) Description of Materials	(b) Total # of Pkgs This Shipment	(c) Total Activity This Shipment	(d) Total Volume This Shipment	(e) Type Containers This Shipment
( ) RADIOACTIVE MATERIAL, L.S.A., N.O.S. ( ) RADIOACTIVE MATERIAL, N.O.S. ( ) RADIOACTIVE MATERIAL, SPECIAL FORM N.O.S. ( ) RADIOACTIVE DEVICE, N.O.S., RAD. MATERIAL		mci	cu. ft	

(6) Item No.	(7) Radionuclide each container	(8) Percent Abundance Each Nuclide	(or) Activity Each Nuclide (mCi)	(9) Physical form	(10) Chemical form	(11) Waste Description	(12) U-235 (grams)	(13) U-238 Th-232 (pounds)	(14) Disposable Container Weight (pounds)	(15) Disposable Container Volume (Cu. Ft.)	(16) Container Spec.	(17) RADIATION LEVELS Disposable Container Surface	Package Surface	3 Ft. (TI)	(18) Removable Contamination Package Surface (a) DPM/100cm² (B-Y)	(19) Transport Group	(20) Label Used
(21) TOTAL																	

SAMPLE

6

(22) ( ) Yes ( ) No THIS VEHICLE IS CONSIGNED EXCLUSIVE USE. LOADING AND UNLOADING MUST BE ACCOMPLISHED BY CONSIGNOR OR CONSIGNEE OR HIS DESIGNATED AGENT

(23) IMPORTANT: "This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation."

Signature ______________________

Company ______________________ Date ______________

(See Reverse Side for Instructions for Completing This Form)

(24) "Certification is hereby made to the South Carolina Department of Health and Environmental Control that this shipment of low-level radioactive waste has been inspected in accordance with the requirements of South Carolina Radioactive Material License No. 097 as amended, and the Nuclear Regulatory Commission's License No. 46-13536-01 as amended, and the effective Barnwell Site Disposal Criteria within 48 hours prior to shipment and further certification is made that the inspection revealed no items of non-compliance with all applicable laws, rules and regulations."

Date ______________ By ______________

Title and Organization ______________________

Telephone No. ( ) ______________________

Form No. CNS-201
(4/80)

White: Accompany Shipment, Yellow: Customer, Pink: Carrier