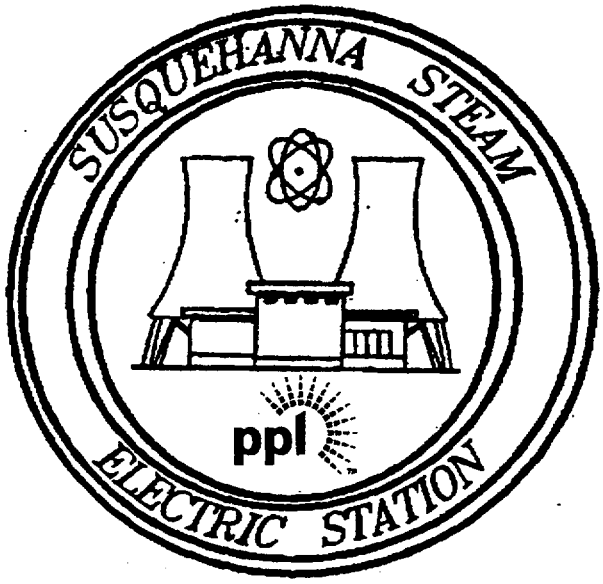

APPENDIX B

Revisions to SSES SOLID WASTE PROCESS CONTROL PROGRAM (NADP-QA-0646) AE&WD Report 1999

PP&L, Inc.
Two North Ninth Street
Allentown, Pennsylvania 18101-1179

APRIL 2000

PROCEDURE COVER SHEET

	NUCLEAR DEPARTMENT PROCEDURE	
	SOLID RADIOACTIVE WASTE PROCESS CONTROL PROGRAM	NDAP-QA-0646 Revision 5 Page 1 of 62

QUALITY CLASSIFICATION:	APPROVAL CLASSIFICATION:
(X) QA Program ( ) Non-QA Program	(X) Plant ( ) Non-Plant ( ) Instruction

EFFECTIVE DATE: 6-1-99

PERIODIC REVIEW FREQUENCY: 2 YEARS

PERIODIC REVIEW DUE DATE: 6-1-01

RECOMMENDED REVIEWS:

Procedure Owner: Jerry Hettinger

Responsible Supervisor: Health Physicist

Responsible FUM: Effluents Management Supervisor

Responsible Approver: General Manager-SSES

PROCEDURE REVISION SUMMARY

TITLE: SOLID RADIOACTIVE WASTE PROCESS CONTROL PROGRAM

The following changes will not reduce the overall conformance of the solidified waste product to existing criteria for solid wastes.

1) Incorporated PCAF 1-95-1007 providing guidance on addition of radioactive material to processed waste containers for maximizing disposal efficiency.

2) Incorporated PCAF 1-97-0017 assigning responsibilities for assisting with tank preparation in Effluents.

3) Incorporated PCAF 1-98-6690 changing to new Technical Specification requirements.

4) Changed responsibilities section to reflect recent changes in NDAP-QA-0640, Conduct of Effluents.

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ATTACHMENTS

1.0 PURPOSE

Provide administrative control, guidance and records for the processing, packaging, transportation, and disposal of radioactive waste. This procedure is the Process Control Program required by SSES Technical Specifications.

2.0 POLICY/DISCUSSION

This procedure is applicable to Low Level Radwaste (LLRW) generated as a result of the operation of the Susquehanna Steam Electric Station (SSES). The waste streams include solid and liquid waste as defined in the FSAR, but do not include spent fuel or greater than Class C waste.

Efficient generation and processing of radioactive waste is very important to the overall operation of SSES. An important objective with respect to radioactive waste generation is to minimize the volume of waste generated. The processing of large volumes of waste can result in the inability to dispose of or store all waste packaged, the significant increased costs associated with increased waste generation, and the potential to over-burden the processing system and degrade its long term reliability. The Process Control Program describes the envelope within which processing and packaging of radioactive waste is accomplished to provide reasonable assurance of compliance with Low-Level Radwaste regulations and requirements. This procedure is applicable to SSES installed systems, temporary systems and equipment provided by vendors for processing, packaging, transportation, and disposal of applicable waste forms.

3.0 REFERENCES

3.1 49CFR100 - 177, Transportation

3.2 10CFR20, Standards for Protection Against Radiation

3.3 10CFR61, Licensing Requirement for Land Disposal of Radioactive Waste

3.4 10CFR71, Packaging and Transportation of Radioactive Material

3.5 40CFR261, Identification and Listing of Hazardous Waste

3.6 SSES Technical Requirements 3.7.4, Solid Radwaste System

3.7 FSAR 13.4.4, Process Control Program (PCP)

3.8 NUREG 0800, Standard Review Plan 11.4 Solid Waste Management Systems

3.9 Technical Position on Waste Form Rev. 1, 1991

3.10 Technical Position on Radioactive Waste Classification, Rev. 0, 1983

3.11 Technical Position on Concentration Averaging and Encapsulation, Rev. 0, 1995

3.12 Regulatory Guide 1.21, Measuring, Evaluating and Reporting Radioactive Material in Solid Wastes and Release of Radioactive Material in Liquid and Gaseous Effluents from Light Water Cooled Nuclear Power Plants

3.13 Regulatory Guide 1.143, Design Guidance of Solid Waste Management Systems

3.14 Regulatory Guide 7.1, Administrative Guide for Packaging and Transporting Radioactive Material

3.15 ANSI/ANS 40.35, Volume Reduction of Low Level Radioactive Waste

3.16 ANSI/ANS40.37, Mobile Radioactive Waste Processing Systems

3.17 ANSI/ANS 55.1, Solid Radioactive Waste Processing System for Light Water Cooled Reactor Plant

3.18 Pacific Nuclear Dewatering System Topical Report No. TP-02-P-A, Rev. 3

3.19 Vendor Solidification Process Control Procedure No. PT-51-WS, Rev. 13

3.20 Vendor Mobile Incontainer Dewatering and Solidification System (MDSS) Topical Report No. STD-R-05-011-P-A, Rev. 2

3.21 Disposal Site Criteria for Barnwell, S.C.

3.22 DHEC-HIC-PL-001 South Carolina Certificate of Compliance for CNSI High Integrity Containers

3.23 DHEC-HIC-PO-006, South Carolina Certificate of Compliance for CNSI Overpack High Integrity Containers

3.24 DHEC-HIC-PL-012, South Carolina Certificate of Compliance for Vectra Technologies, Inc. High Integrity Container

3.25 DHEC-HIC-PL-005, South Carolina Certificate of Compliance for Scientific Ecology Group, Inc. High Integrity Containers

3.26 DHEC-HIC-PL-017, South Carolina Certificate of Compliance for Scientific Ecology Group, Inc. High Integrity Containers

3.27 PLA-1237, Process Control Program, August 17, 1982

3.28 Review of Process Control Program for Susquehanna, Unit 1, Youngblood to Curtis, September 30, 1982

3.29 Safety Evaluation NL-93-008, Solid Radwaste Waste Processing Services Utilizing Pacific Nuclear Processing System

3.30 IE Bulletin 79-19, Packaging of Low Level Radioactive Waste for Transportation and Burial

([1]) 3.31 NRC Information Notice No. 90-50, Minimization of Methane Gas Generation in Plant Systems and Radwaste Shipping Containers

([2]) 3.32 Generic Letter 91-02, Reporting Mishaps Involving LLW Forms Prepared for Disposal

([3]) 3.33 SOOR-1-90-148, Barnwell Received Container Pressurized with Flammable Gas

([4]) 3.34 SOOR 1-90-172, Incorrect Sampling Method Used on Resin Liner

([5]) 3.35 SOOR 1-91-322, Dose Rates on Container Higher Than Expected

([6]) 3.36 SOOR 94-581, Spent TIP Found Unexpectedly in TIP Room.

([7]) 3.37 CR 96-1555 Non Compatible Material was used on Empty Radwaste HIC.

([8]) 3.38 CR 91013 Non Compatible Material was used on Radwaste HIC.

4.0 RESPONSIBILITIES

4.1 Effluents Management Supervisor responsibilities:

4.1.1 Developing and implementing programs and procedures for radioactive waste processing, packaging, transportation and disposal.

4.1.2 Maintaining the overall radwaste program to ensure compliance with applicable radiological and shipping regulations.

4.1.3 Ensuring personnel who perform support activities such as processing, packaging, and transportation of low level radioactive waste are available and meet all qualifications and training required by SSES procedures.

4.1.4 Collecting, maintaining, reviewing and submitting accurate data/information related to waste stream quantity and nuclide composition for inclusion into Annual Radioactive Effluent Release Report and State DER-BRP Quarterly Report.

4.2 Supervisor - Operations Technology responsibilities:

4.2.1 Providing technical assistance to Effluents Management personnel. This includes interpretations of state, federal, and disposal facility regulations regarding new, imminent, or proposed regulatory changes governing processing, packaging, transportation, and disposal.

4.2.2 Maintaining a current copy of local, state, federal and disposal facility regulations pertaining to disposal and transportation of low level radioactive waste.

4.2.3 Coordinating the submittal of the Annual Radioactive Effluent Release Report as per the SSES Technical Specifications and Requirements.

4.3 Radioactive Material/Radioactive Waste Shipping Program Owner - Effluents Management

4.3.1 Maintain a sampling and analysis program to ensure 10CFR61 compliance.

4.3.2 Ensure procedures are adequate to provide for proper packaging and shipment of waste to ensure compliance with all applicable regulations.

4.3.3 Evaluate services provided by various vendors to ensure contracted waste packaging, processing, and transportation services are performed in the most efficient and economical method, as required by applicable regulatory agencies.

4.3.4 Coordinate radioactive material evaluation of product acceptability for disposal at specific disposal facilities.

4.4 Wet Waste Program Owner - Effluents Management:

4.4.1 Ensure Solidification/Dewatering Equipment is operated in accordance with approved operating procedures, including vendor supplied equipment.

4.4.2 Ensure appropriate waste solidification and dewatering records are generated.

4.4.3 Interface with station support groups to ensure proper implementation of process control programs.

4.4.4 Provide direction to contractor personnel involved in solid waste processing activities including:

a. Ensuring test data is available to justify specific processing techniques.

b. Ensuring applicable vendor procedures and revisions are incorporated into applicable plant procedures and approved by PORC.

c. Coordinating pre-processing and post-processing treatment activities.

d. Evaluating services provided to ensure efficient and economical methods are used.

4.4.5 Ensure Solidification and Dewatering operations are carried out in an ALARA manner.

4.4.6 Ensure proper marking of containers prior to filling.

4.4.7 Ensure solidification/dewatering personnel are adequately trained per NTP-QA-42.6.

4.4.8 Estimate classification of waste for container selection and processing method.

4.4.9 Ensure that waste streams loaded into High Integrity Containers are sampled for radionuclide and evaluated for chemical compatibility applicable to the use of High Integrity Containers.

4.4.10 Ensure proper inspections and documentation are complete prior to use of a High Integrity Container and ensure that container is properly used.

4.4.11 Complete and process High Integrity Container User Certification Statement to ensure the container is used properly.

4.4.12 Ensure that radwaste tanks are prepared with Operations support.

4.4.13 Ensure procedures are adequate to provide for proper solidification and dewatering of waste.

4.4.14 Ensure test data or rationale is available to justify applicable solidification and dewatering functions of each waste type, or any combinations, to address disposal and regulatory agencies' requirements.

4.4.15 Evaluate services provided by various vendors to ensure contracted solidification and dewatering operations are performed in the most efficient and economical method, as required by the applicable regulatory agencies.

4.4.16 Define waste streams based on generator, filtration media and means of processing.

4.4.17 Collecting, reviewing and submitting data related to the reporting of mishaps and results of PCP surveillance specimen examinations to applicable regulatory agencies.

4.5 Chemistry Supervisor responsibilities:

4.5.1 Perform required sample preparation and analysis in accordance with approved chemistry procedures.

4.5.2 Perform test solidification if required. Store test solidification billet if required.

4.5.3 Provide density of initial and final waste form.

4.5.4 Provide the isotopic mix and concentration of isotopes detected in the material sampled for solidification or dewatering.

4.5.5 Complete Chemistry portion of the Solidification and Dewatering Records.

4.5.6 Ensure personnel are adequately trained per NTP-QA-41.2.

4.5.7 Provide chemical analysis and/or treatment support as necessary for use of High Integrity Containers and liners.

4.6 Foreman - Effluents Management responsibilities:

4.6.1 Interface with Wet Waste Program Owner for liner and cask selection and scheduling for solid waste shipping activities.

4.6.2 Complete, process, and file radioactive waste shipping documentation.

4.6.3 Storage of packaged radioactive waste within the radwaste facilities.

4.6.4 Determine waste classification and description of solidified, dewatered, and other packaged waste.

4.6.5 Final disposition of solidified, dewatered and other packaged waste.

4.6.6 Ensures SSES is a registered user of applicable High Integrity Containers at specific disposal facilities.

4.6.7 Ensures HP personnel involved with radioactive waste handling have received Radwaste Worker training per NTP-QA-42.6.

4.6.8 Evaluate vendor services provided to ensure efficient and economical methods are used.

4.6.9 Complete and process Certification Statement for Disposal of High Integrity Containers as required by applicable regulatory agencies.

4.6.10 Process and package Cartridge Filters, Dry Active Waste, solid sealed sources and other non process wastes.

(4) 4.6.11 Collection of DAW and non-process waste (10CFR61) samples.

4.7 Manager-Nuclear Assurance responsibilities:

4.7.1 Perform periodic audit of implementation of this program and review of radwaste service vendor's QA Programs.

4.7.2 Inspection of Radwaste Containers as required by applicable procedures.

4.7.3 Ensure process controls are adhered to by inspection of test solidification, waste volumes, solidification agent additions, product acceptability checks, dewatering process sequence/acceptance criteria and records review.

4.7.4 Inspection of packaging, storage, and shipping activities, as required by applicable procedures.

4.8 Auxiliary Systems Operator is responsible for operating the plant solid and liquid radwaste equipment in accordance with approved operating procedures as directed by Assistant Unit Supervisor.

4.9 Solidification/Dewatering/Services Vendor responsibilities:

4.9.1 Provide solidification, dewatering and/or volume reduction services in accordance with a valid contract for said services.

4.9.2 Provide test data or make data available for PP&L review during vendor audits to demonstrate that their services and equipment meet the applicable regulatory and disposal facility limitations for the service they are providing.

4.9.3 Provide training documentation to demonstrate that the personnel being provided, to conduct the applicable service, are in fact trained and knowledgeable in the applicable services.

4.9.4 Provide procedures that are or can be placed into the SSES procedure format for the services being provided.

4.9.5 Ensure an approved Quality Assurance Program exists that covers the services being provided. The vendor shall work within the SSES Quality Assurance Program when applicable.

4.9.6 Complete applicable sections of Solidification and Dewatering Records required for each container processed.

4.9.7 Ensure pre-qualification test data for each waste form shall be submitted to the Nuclear Regulatory Commission.

4.9.8 Provide a description of the equipment/process that is used in processing waste.

([4]) 4.9.9 Obtain waste samples from processing equipment in accordance with approved operating procedures.

([3]) 4.9.10 Perform all pre and post treatment activities as determined by West Waste Program Owner.

4.10 Manager - Nuclear Procurement responsibilities:

4.10.1 Ensure High Integrity Containers are not exposed to ultra violet light (sunlight).

4.10.2 Ensure proper material certification is complete prior to issuance of High Integrity Containers to plant for use.

4.10.3 Receipt inspection of High Integrity Containers and document review to ensure conformance.

4.10.4 Ensure Certificate of Compliance (C of C) is received with High Integrity Container.

4.11 Manager - Nuclear Systems Engineering is responsible for providing engineering support as required for operation of assigned radwaste systems and equipment.

4.12 Manager - Nuclear Maintenance is responsible for calibration and maintenance of applicable plant equipment in Radwaste Processing Systems.

4.13 Licensing Supervisor responsibilities:

4.13.1 Submitting transportation cask user registration requests to NRC per 10CFR71.12.

4.13.2 Submitting to the NRC the Annual Radioactive Effluent Release Report.

4.13.3 Coordinating and submitting to the NRC the reports required as a result of Condition Report (CR) events, investigations, and resolutions.

4.14 Manager - Nuclear Training responsibilities:

4.14.1 Providing training and re-training in applicable regulatory requirements to personnel directly involved in transfer, processing, packaging, storage, and transport of radioactive waste.

4.14.2 Maintaining a record of training, attendees, and subject material for all Low Level Radioactive Waste training.

4.15 Manager - Plant Services is responsible for notifying appropriate law enforcement agencies in the event of lost radioactive material shipments.

4.16 DAW Program Owner

The DAW Program Owner is responsible to:

4.16.1 Provide technical oversight of DAW processing and disposal methods.

4.16.2 Develop and implement waste minimization practices for DAW.

4.16.3 Provide management oversight of the DAW portion of the Effluents Management budget.

4.16.4 Provide technical and management oversight of DAW processing contracts.

4.16.5 Maintain Effluents Management procedures related to the DAW Program.

5.0 DEFINITIONS

5.1 APPROVED CONTAINERS: Approved means approval issued or recognized by the NRC for use in shipment of radioactive material.

5.2 BATCH: The total volume of waste contained in a liner, isolated - waste mixing tank - spent resin tank - concentrates tank or - phase separator that has been sampled for solidification/dewatering.

5.3 BILLS OF LADING: Shipping papers or manifests serving a similar purpose and containing the information required by 49 CFR 172.202, 203, and 204.

5.4 CARRIER: Means a person engaged in the transportation of passengers or property. (10CFR71.4)

5.5 CERTIFICATE OF COMPLIANCE: License requirements established by the Nuclear Regulatory Commission for the use of approved Radioactive Material Shipping Containers.

5.6 CHELATING AGENT: A chemical which combines with a metal so as to form a ring structure held by coordination bonds.

5.7 CHEMICAL FORM: The chemical content of the Radioactive Material being shipped.

5.8 CLOSED TRANSPORT VEHICLE: A vehicle equipped with a securely attached exterior enclosure, which during normal transport, restricts the access of unauthorized persons to the cargo space. (49 CFR 173-403)

5.9 COMPOSITE SAMPLE: A mixture of samples collected representing conditions at time of sampling, from the same sampling point, at different times.

5.10 CONSIGNEE: The individual or organization to whom the shipment is consigned or intended.

5.11 CURING TIME: The time allowed for the solidified product to set prior to its evaluation for product acceptability.

5.12 DECAY HEAT: The heat produced by radioactive decay, usually expressed in Watts or BTU/hr, but can be related to Curie Content.

5.13 DEWATERED: The removal of free liquid from solid material to a point where less than 1% for HIC's and less than 0.5% for steel liners by waste volume remains as required by the disposal facility license.

5.14 EXCLUSIVE USE VEHICLE (a/k/a: Sole Use or Full Load): Shipment from a single consignor having the exclusive use of a transport vehicle and for which all initial, intermediate, and final loading and unloading is carried out by, or under the direction of the consignor, consignee, or his designated agent. (49 CFR 173.403)

5.15 FREE LIQUID: Liquid which is still visible after solidification or dewatering is complete, or is drainable from the low point of a punctured container.

5.16 HAZARDOUS MATERIAL - A substance or material, including a hazardous substance which has been determined by the Secretary of Transportation to be capable of posing a threat to health, safety, and property when transported in commerce, and which has been so designated. The term includes hazardous substances, hazardous wastes, marine pollutants, and elevated temperature materials as defined in 49CFR171.8, materials designated as hazardous under the provisions of 49CFR172.101 and 172.102, and materials that meet the defining criteria for hazard classes and divisions in 49CFR173.

5.17 HAZARDOUS WASTE: Waste which contains material listed in 40 CFR 261, Subpart D and/or exhibits one or more of the four characteristics cited in 40 CFR 261, Subpart C, and is not excluded from regulation under 40 CFR 261, Subpart A.

5.18 Hazmat Employee means a person who is employed by a Hazmat Employer who during the course of employment:

5.18.1 Loads, unloads or handles hazardous materials.

5.18.2 Prepares hazardous materials for transportation.

5.18.3 Modifies, marks, or otherwise represents containers, drums, or packaging as qualified for use in transport of hazardous materials.

5.18.4 Is responsible for safety of transporting hazardous material.

5.19 HIGH INTEGRITY CONTAINER (HIC): A disposal site approved container that has an expected life of 300 years and provides the structural stability to meet disposal requirements.

5.20 HIGHWAY ROUTE CONTROLLED QUANTITY: A quantity, the aggregate radioactivity of which exceeds that specified in (49 CFR 173.403).

5.21 ISOTOPIC ANALYSIS: The identification of the isotopic elements involved in a sample of Radioactive Material.

5.22 LABELING: Labels applied to a container denoting the contents of the container and degree of hazard associated with the containers. The labels are identified as the White I label, the Yellow II, and Yellow III label. A label stating Radioactive - LSA can also be applied to a container when appropriate. (49 CFR 172, Subpart E)

5.23 LIMITED QUANTITY OF RADIOACTIVE MATERIAL: Means a quantity of radioactive material not exceeding the material package limits specified in 49 CFR 172.425, and which conforms with requirements specified in 49 CFR 173.421. (49 CFR 173.403)

5.24 LINER: Steel container in which dewatered or solidification product is deposited.

5.25 LOW SPECIFIC ACTIVITY: Material in which the activity is essentially uniformly distributed and in which the estimated average concentration per gram of contents does not exceed the specification as stated in 49 CFR 173.403.

5.26 LOW LEVEL RADIOACTIVE WASTE (LLRW): Radioactive waste generated as a result of operation of SSES, excluding spent fuel or by product material, is classified by the NRC as low-level radioactive waste. LLRW does not include "greater than class C" waste.

5.27 MIXING RATIO: The ratio of waste to cement and additives required for satisfactory solidification.

5.28 MIXING RECIPE: The amount of waste, cement and additives mixed to solidify waste.

5.29 MIXED WASTE: A mixture of low level radioactive and hazardous waste.

5.30 NORMAL FORM RADIOACTIVE MATERIALS: Means radioactive materials which do not meet the requirements of Special Form Radioactive Materials (49 CFR 173.403).

5.31 PLACARDING: A label affixed to all four sides of the transport vehicle denoting the presence and level of Radioactive material on the vehicle. (49 CFR 172, Subpart F)

5.32 PROCESS CONTROL PROGRAM (PCP): Program which contains the sampling, analysis, and formulation determination by which solidification of radioactive wastes from liquid systems is assured.

5.33 RADIOACTIVE MATERIAL: For purposes of transportation only, any material having a specific activity greater than 0.002 microcuries per gram of material. (49 CFR 173.403)

5.34 RADWASTE WORKER: A Hazmat Employee involved with the collection, packaging, and transportation of radioactive waste.

5.35 SEALED SOURCES: Any by-product material that is encased in a capsule designed to prevent leakage or escape of by-product material.

5.36 SOLIDIFICATION: A conversion of radioactive materials from liquid and solid systems to a homogeneous (uniformly distributed) monolithic, immobilized solid with definite volume and shape, bounded by a stable surface of distinct outline on all sides (free standing).

5.37 SOLIDIFIED RADWASTE: Wet waste which is solidified (e.g. evaporator concentrates, sludge), meets the free liquid criteria, and satisfies applicable transportation and disposal site requirements. Dewatered resins or filter sludge satisfying the two latter criteria shall also be defined as solidified radwaste.

5.38 SPECIAL FORM RADIOACTIVE MATERIALS: Radioactive material that is either a single piece, or is contained in a sealed capsule, that can be opened only be destroying the capsule and meets the additional requirements specified in 49 CFR Part 173.403.

5.39 STABLE AND UNSTABLE WASTE FORMS: Shall be defined as stated in 10CFRPart 61 and other supporting regulatory documents.

5.40 TEST SOLIDIFICATION: The mixing of waste(s) and solidification agents in the laboratory to support selection of mixing ratios and provide insurance for final product acceptability.

5.41 TRANSPORT INDEX (TI): The dimensionless number placed on the label of a package to designate the degree of control to be exercised by the carrier during transportation. The transport index will be determined in accordance with 49 CFR 173.403.

5.42 TYPE "A" PACKAGING: Packaging which is designed in accordance with the general packaging requirements of 49 CFR 173.410 and 173.412, which is adequate to prevent the loss or dispersal of the radioactive contents, and to retain the efficiency of its radiation shielding properties if the package is subjected to the test described in 49 CFR 173.465 or 173.466, as appropriate. (49 CFR 173.403)

5.43 TYPE "A" QUANTITY RADIOACTIVE MATERIAL: That material which may be transported in Type "A" packaging. (49CFR 173.431[a])

5.44 TYPE "B" PACKAGING: Packaging which meets the standards for Type "A" Packaging, and in addition, meets the standards for the hypothetical accident conditions set forth in 10CFR71. (49 CFR 173.403)

5.45 TYPE "B" QUANTITY RADIOACTIVE MATERIAL: That material which may be transported in Type "B" packaging. (49CFR 173.431[b])

5.46 WASTE STREAM: A by-product of a process system or component with unique characteristics and maintained separate from other waste streams.

5.47 WASTE TYPE: Specific contents of a liner or tank which may contain one or multiple waste streams, the category of waste suitable for a particular means of processing.

5.48 WASTE PRE-CONDITIONING: The physical or chemical adjustment of the waste to bring it within an established envelope to assure solidification.

6.0 PROCEDURE

6.1 CONTRACTED VENDOR SERVICES

6.1.1 Solidified radwaste processing services are provided by Allied Technology Group, Inc. (ATG) for waste types included in this Process Control Program.

6.1.2 NRC approved Topical Report TP-02-P-A, describes ATG's waste processing equipment, methods and verification of acceptable waste forms for dewatering.

6.1.3 ATG's Solidification Process Control Procedure PT-51-WS, describes waste processing equipment, methods and verification of acceptable waste forms for solidification. This procedure does not provide stability per the Branch Technical Position on Waste Form, Rev. 1.

6.1.4 Volume reduction services are provided by ATG for waste types included in the Process Control Program.

6.1.5 NRC approved Topical Report STD-P-05-011-P-A, describes ATG's waste processing equipment, methods and verification of acceptable waste forms for dewatering and solidification. Selected solidified waste forms have been approved to provide stability per the Branch Technical Position on Waste Form, Rev. 1.

6.1.6 Other contracted vendor services which are required for solidification, dewatering and volume reduction services shall be evaluated to the requirements stated in this Process Control Program on a case by case basis.

6.2 WASTE TYPES

The following waste types shall be processed in accordance with this procedure or in combinations as defined. The waste should be dewatered whenever possible to minimize disposal volume.

6.2.1 Mixed Solids

a. The following process waste streams are collected either in Waste Mix Tanks, Waste Sludge Phase Separator or transferred directly to a liner/High Integrity Container and are considered Mixed Solids:

(1) LRW Filter Media and drain liquid

(2) Sump Sludge

(3) Ultrasonic Resin Cleaner Waste (URC Waste)

(4) Condensate Filter Backwash Material

b. The constituents of these waste streams may include the following:

(1) Powdered Resins

(2) Fibrous material

(3) Carbon material

(4) Corrosion products

(5) Various solids and dirt in small concentrations

c. Mixed Solids may be solidified or dewatered for final disposal.

d. Each waste stream should be processed separately. The Waste Sludge Phase Separator may have some materials mixed and is sampled as a separate waste stream for 10CFR61 analysis.

6.2.2 RWCU Filter Media

a. The Reactor Water Cleanup System and Fuel Pool Cooling and Cleanup System filter/demineralizer waste are collected in the RWCU Phase Separator and should be allowed to decay for a minimum of 60 days. This waste stream is considered RWCU Filter Media.

b. The constituents of this waste stream may include anion and cation powdered resin, corrosion and contaminants removed from the primary coolant.

c. RWCU Filter Media shall be dewatered in High Integrity Containers. If this waste must be solidified, Technical Requirement 3.7.4 action statement must be performed.

6.2.3 Condensate/Radwaste/Chemical Waste Process Demineralizer Bead Resin

a. Resins from the Condensate Demineralizers, Liquid Radwaste Demineralizer and vendor provided demineralization are collected in the Spent Resin Tank or transferred directly to a liner/High Integrity Container. This is considered to be Condensate/Radwaste/Chemical Waste Process Demineralizer Bead Resin.

b. The constituents of this waste stream may include various types of anion, cation, mixed bead resin and corrosion and contaminates removed from liquid waste streams.

c. Bead Resin may be used to demineralize Liquid Waste in either steel liners or High Integrity Containers.

d. Condensate Demineralizer bead resin should be ultrasonically cleaned prior to collection in the Spent Resin Tank.

e. Bead Resin may be solidified or dewatered for final disposal.

f. Bead Resin may also be processed by volume reduction methods which include drying, incineration, compaction, use as fill materials or other evaluated method(s) on a case by case basis.

6.2.4 Cartridge Filters

a. Cartridge Filter waste type consists of the following waste streams and constituents:

(1) CRD Filters - CRD or other filters and small un-irradiated primary system equipment such as valves, CRD lift pump filters, Rinse Tank filters and other metal components.

(2) RWCU Septa - Septa from RWCU Filter Demineralizer including septa from Fuel Pool Cleanup Filter Demineralizer.

(3) Radwaste Filters - including degasifier filters, laundry filters and other fiber or paper filters other than primary system.

(4) Underwater Vacuum Filters - non-process filters generated from wet cleaning activities.

(5) Condensate Filtration System Filters Elements - filters from CFS used for condensate iron removal.

(6) Suppression Pool Filter Skid Filters - Filters from system used for cleanup of the suppression pools.

b. Cartridge Filters may be processed by the following methods:

(1) Emplacement in a cement matrix in a steel drum/liner or in a High Integrity Container.

(2) Dried to a point where no free liquid is visible. Absorbent material may be included to absorb unintentional and incidental amounts of liquids.

(3) Dewatered if drying is impractical.

(4) Incineration or other volume reduction methods.

c. Cartridge Filters to be solidified for final disposal shall not be mixed with any other waste type.

6.2.5 Irradiated Hardware

a. Irradiated hardware is neutron activated metal removed from the internal area of the reactor pressure vessel.

b. The constituents of this waste stream may include control rod blades, LPRMS's, IRM's, TIP's and components expended during hardware processing and packaging activities. Startup sources may also be processed as part of this waste stream.

c. Irradiated hardware is packaged in steel liners for disposal.

d. Liquid shall be drained to ensure free liquid Acceptance Criteria are met.

e. Irradiated hardware shall not be mixed with any other waste type in final processing.

6.2.6 Dry Active Waste (DAW)

a. Dry Active Waste is a waste stream.

b. The constituents of this waste stream consist of contaminated paper, plastic, wood, metal and other discarded material.

c. Dry Active Waste shall be processed by volume reduction methods which may include incineration, compaction, decontamination and metal melting.

d. At a minimum, DAW shall be packaged in strong-tight containers for disposal.

6.2.7 Liquid Oil Waste or Petroleum Based Materials

a. The constituents of this waste stream may include turbine lubricating oil, EHC fluid and other petroleum based materials.

b. Contaminated Liquid Oil Waste generated at the facility should be processed by a decontamination system, solidified for final disposal, volume reduced by incineration, or other acceptable methods.

c. Liquid Oil Waste at concentrations 1% and greater may be solidified provided the following are adhered to:

(1) An emulsification agent is added at required concentrations.

(2) The Liner is NOT SHIPPED to a disposal facility without prior disposal facility approval.

6.2.8 Solid Sealed Sources

a. Solid Sealed Sources requiring disposal shall be packaged for disposal as requested by Health Physics Supervision.

b. Method of disposal is dependent on waste class of the Solid Sealed Source and disposal facility requirements.

6.2.9 Activated Carbon

a. Activated Carbon from vendor provided liquid waste demineralization is transferred directly to a liner/High Integrity Container. This waste stream is considered Activated Carbon.

b. The constituents of this waste stream may include various types of charcoal, ion specific carbon filter media and corrosion and contaminants from liquid waste streams.

c. Activated Carbon may be solidified, dewatered or processed by volume reduction methods which include drying, incineration, compaction, use as fill materials or other evaluated methods on a case by case basis.

6.2.10 A Waste Type that is combined with a known amount of hazardous waste or "Mixed Waste" shall be processed for final disposal pending approval obtained from the processing and disposal facilities, Environmental Protection Agency, U.S. Nuclear Regulatory Commission and other regulatory agencies as required.

6.2.11 Waste types containing chelating agents within the range of 0.1 to 8.0 percent by weight shall be processed to a stable waste form in accordance with and authorized by disposal facility requirements and approvals.

6.2.12 Various other materials not specifically identified as waste types will be evaluated for solidification, dewatering volume reduction or other processing on a case by case basis.

(4) 6.3 RADIOACTIVE WASTE ANALYSIS AND CLASSIFICATION

6.3.1 Radionuclide concentrations of radioactive waste are used to classify waste for shipping and disposal. Radionuclide concentrations should be determined based upon isotopic analysis, volume and weight of final waste form.

6.3.2 The 10CFR61 Compliance Program establishes a methodology for characterizing radioactive waste through the use of correlation factors. This program shall require as a minimum that:

a. Samples representative of Susquehanna's waste streams are collected and analyzed such that results are obtained from a designated laboratory at least every two years (Class A) for development of specific correlation factors. Waste streams known or suspected to be classified Class B or Class C should be analyzed on an annual basis.

b. Technical basis documentation and justification of correlation factors are developed for each waste stream and are acceptable for use. Periodic evaluations and necessary adjustments to established ratios are performed in a timely manner.

c. Correlation factors are re-evaluated following significant changes (greater than a factor of 10) in plant operations (such as significant changes in fuel leakage, radwaste operations, or equipment).

6.3.3 Determination of waste classification shall be in accordance with 10CFR61.55, Waste Classification, and its supplementary Branch Technical Position on Radioactive Waste Classification as follows:

a. Class A - Usually segregated from other waste classes at the disposal facility. Physical form and characteristics shall meet the minimum requirements specified in 10CFR61.56(a). If the stability requirements in 10CFR61.56(b) are met, the waste does not have to be segregated for disposal.

b. Class B - Physical form and characteristics shall meet both the minimum and stability requirements specified in 10CFR61.56.

c. Class C - Physical form and characteristics shall meet both the minimum and stability requirements specified in 10CFR61.56. In addition, measures shall be taken at the disposal facility to protect against inadvertent intrusion.

6.3.4 Isotopic analysis may be performed by:

a. Gamma spectrometry of a sample and use of correlation factors.

b. Direct gamma spectrometry of waste and use of correlation factors.

c. Complete radionuclide analysis of waste sample.

d. Dose to Curie calculations.

e. Activation analysis.

6.3.5 Volume and weight of final waste may be determined by:

a. Calculation using analytically derived sample densities.

b. Calculation using standard waste densities.

c. Direct measurement of volume and weight.

d. Acceptable methods described in the Technical Position on Concentration Averaging and Encapsulation.

6.3.6 If samples of waste are used for classification, sampling program shall include:

a. Samples shall be obtained and analyzed for each batch of wet waste if practical and ALARA.

b. Preferentially, samples should be taken for analysis following processing into a final waste form.

c. Samples taken prior to final processing should enable results of sample analysis to be directly translated to final waste form.

d. Bead resin and Activated Carbon used for chemical demineralization shall be sampled after having been depleted in process.

e. Solidification/Dewatering Services Vendor or another qualified individual shall obtain required samples.

6.3.7 Preparation of waste for sampling or analysis

a. Wet Waste Collection tanks shall be recirculated in accordance with approved operating procedures prior to sampling or analysis.

b. Waste processing in solidification liners/High Integrity Containers shall be mixed in accordance with approved procedures prior to sampling or analysis.

c. Wet waste to be processed may also be mixed, recirculated and sampled or analyzed from mobile processing equipment.

(5) 6.3.8 Final waste form containing a mixture of waste types or streams shall be individually analyzed to determine radionuclide concentrations. The summation of each individual radionuclide concentration shall be used to characterize the final waste form for shipping and disposal. Waste types or streams of different waste classes (estimated by historical precedent or projected analysis) shall not be mixed.

6.3.9 Deviations from sampling and analysis requirements shall be approved by Chemistry Supervisor and Effluents Management Supervision.

(1) (3) 6.4 TESTING/TREATMENT OF SOLIDIFIED RADWASTE FOR COMBUSTIBLE GASES

6.4.1 Solidified waste shall be tested and/or treated to ensure it is not capable of generating quantities of flammable or toxic gases, vapors or fumes which may be harmful to persons transporting, handling, storing or disposing of the waste.

6.5 RADIOACTIVE WASTE SOLIDIFICATION

6.5.1 General Requirements

a. Wet Waste Types which may be solidified in High Integrity Containers are Mixed Solids, Condensate/Radwaste Demineralizer Bead Resin, RWCU Filter Media and Liquid Oil Waste or Petroleum Based Material, Cartridge Filters, Solid Sealed Sources and Activated Carbon.

b. High Integrity Containers shall be used to meet the stability criteria in accordance with federal and disposal facility regulations.

c. Solidification processing shall be conducted by qualified SSES or Solidification/Dewatering/ Services Vendor personnel.

d. The solidification process shall be operated in accordance with approved procedures. Procedures shall specify waste stream, amounts of solidification agent and additives or method for determination.

6.5.2 Waste Preconditioning

a. Waste preconditioning requirements shall be determined by chemistry analysis.

b. Preconditioning of waste shall be performed if required prior to determining mixing ratios.

c. Waste preconditioning is required when any of the following conditions exist:

(1) A high or low pH condition, as determined by chemical analysis.

(2) Liquid content of the batch is out of the acceptable envelope for solidification.

(3) Solids content of the batch is out of the acceptable envelope for solidification.

(4) Known potential problem chemicals and constituents within waste that may adversely affect setting and stability of cement-solidified waste form.

d. Waste preconditioning shall be performed in accordance with approved procedures to ensure waste is within the acceptable envelope for solidification.

e. Upon completion of waste preconditioning, additional samples, as required, shall be obtained in accordance with Radioactive Waste Analysis and Classification section of this procedure.

6.5.3 Determination of Mixing Ratios

a. Determination of mixing ratios shall be performed for each waste batch to be processed.

b. Deviation from the recommended mixing ratios shall be reviewed by Plant Operations Review Committee (PORC).

c. Chemistry Group determines:

(1) Density of the waste samples.

(2) Specific gravity of Sodium Sulfate Solution in Evaporator Concentrates.

d. Solidification/Dewatering/Services Vendor determines if the final mixing ratios are within the acceptable envelope for solidification.

e. For solidification performed on site:

(1) Chemistry Group shall perform test solidification of waste as required by Test Solidification section of this procedure.

(2) Chemistry Group determines mixing ratios to ensure proper solidification.

f. For solidification performed offsite:

(1) Solidification/Dewatering/Services Vendor shall perform test solidification of waste as required by Test Solidification section of this procedure. Vendor test solidification documentation shall be attached to the Technical Requirements Surveillance document.

(2) Solidification/Dewatering/Services Vendor determines mixing ratios to ensure proper solidification.

6.5.4 Test Solidification

a. Test solidification shall be performed to support waste mixing ratios as follows:

(1) At least every tenth (10th) batch of the same waste stream.

(2) When sample analysis fall outside the established range and criteria indicating a change in waste characteristics.

(3) When it is believed that some unexpected or abnormal contaminant may be present.

(4) When requested by Wet Waste Program Owner.

(5) Mixing of materials shall be accomplished in a manner that duplicates, to the extent practical, mixing conditions that are obtained with full-scale mixing in container.

(6) Curing shall be performed under conditions similar to those used in laboratory qualification test program.

b. Upon failure of a test solidification, an LCO is entered, additional samples shall be obtained, alternative solidification parameters are determined and a subsequent test verifies solidification. Test solidification shall be performed on each subsequent batch of the same waste stream until at least three (3) consecutive initial test solidification demonstrate acceptability in accordance with Technical Requirement 3.7.4.

c. Quality Control shall verify test solidification acceptability and indicate the acceptability on the surveillance documentation. The acceptability requirements are defined in the PCP Surveillance Specimen section of this procedure. This QC verification is not required when the test solidification is performed by an approved vendor's offsite facility.

d. Extra sample volume for backup testing shall be disposed of after acceptable container checks are completed.

e. High Integrity Container test solidification billets should be disposed after acceptable container checks are completed.

f. Test solidification should be performed with samples from waste obtained as follows:

(1) In accordance with Radioactive Waste Analysis and Classification section of this procedure.

(2) Sampling of the solids in the container and the liquids used for hydration, then mixed to the ratios that exist in the container.

g. Test Solidification Procedures shall be developed for each specific waste type as required.

h. Cement, water type and additives to be used in actual solidification shall be used in preparation of test solidification.

6.5.5 PCP Surveillance Specimens

a. High Integrity Container test solidification billets shall be examined and tested for acceptability after the specified cure time for:

(1) Liquid on surface of solidified product less that 1.0% by waste volume.

(2) Visible defects, such as cracking, spalling, or disintegration.

(3) Strength by physically poking the surface of solidified product with a rigid unyielding device. Nominal surface denting is acceptable.

b. If cement solidification in steel liners is NRC approved to provide stability, PCP surveillance specimen examination testing and reporting is required in accordance with the Branch Technical Position on Waste Form, Rev. 1.

6.5.6 Curing Time

a. A minimum of 30 hours shall be allowed for curing prior to capping or transporting container.

b. The container may be moved during the first hour after solidification but must remain undisturbed for the remaining 29 hours.

c. Deviations from minimum required curing time shall be approved by Wet Waste Program Owner and justifications documented in remarks section of Solidification Record.

6.5.7 Solidification Product Quality

a. Solidification product quality is assured by use of predetermined mixing ratios of waste, cement and additive. Liquid to be used for solidification should be demineralized water.

b. Pre-qualification mixing ratios are based on laboratory testing using non-radioactive waste materials.

c. Mixing ratios are re-enforced by the following:

(1) Test solidification performed periodically as stated in Test Solidification section of this procedure.

(2) Visually and physically checking at least every fifth (5th) container of the same waste type.

d. Container checks shall consist of:

(1) A visual check of solidified product for liquid on surface of product not to exceed 1.0% by waste volume.

(2) Physically poking the surface of solidified product with a rigid unyielding device prior to capping (Nominal surface denting may occur and is acceptable).

e. Quality Control shall verify acceptability of solidified product when containers are checked.

f. Deviation from the container checking requirement shall be approved by the Wet Waste Program Owner.

6.5.8 Handling of Unacceptable Solidified Waste Containers.

a. If a solidified waste container does not meet acceptability requirements, a Condition Report (CR) shall be issued.

b. If the reason for unacceptability is free liquid:

(1) The free liquid will be removed; or

(2) Extra cement/additive will be added to solidify free liquid.

c. If portions or all of the product did not solidify after three days:

(1) The waste container will be capped and placed in a storage location and periodically checked until such a time product is acceptable; or

(2) Additional solidification agents may be added to achieve satisfactory solidification, as determined by the Wet Waste Program Owner.

d. If the product solidifies prematurely prior to completing the addition of required amount of cement and additive, as calculated on the solidification calculation sheet for the specific procedure used, the following is required:

(1) A test solidification shall be performed using the actual ratio of cement and waste in the container, provided sufficient sample volume remains to complete this item.

(2) Quality Control shall check the product for acceptability in accordance with Container Checks section of this procedure.

(3) The container is considered to meet acceptable waste form criteria for shipping provided the subsequent test solidification and/or container checks are acceptable to Quality Control and concurrence of the Wet Waste Program Owner is obtained.

(4) The above apply only if the Effluents Management Supervisor determines that the product can be classified as "Class A Unstable" or is placed in a High Integrity Container or structure that provides stability in accordance with 10CFR61 and the disposal facility criteria.

e. If the product does not solidify properly in accordance with the specific solidification procedure, the following is required:

(1) An evaluation of the liner shall be made by the following personnel:

(a) Effluents Management Supervision

(b) Solidification Vendor - Operations

(c) Solidification Vendor - Engineering

(2) Disposal facilities shall be contacted and requirements for receipt of the liner in question shall be defined.

(3) Alternative packaging/processing shall be evaluated.

(4) Recommendations for final disposition shall be made to the Wet Waste Program Owner-Effluents Management.

(5) Final disposition shall be reviewed by Plant Operations Review Committee (PORC).

(6) Records shall be kept and documentation supportive of final disposition attached to the solidification record package.

(7) The liner may be shipped after Q.C. review of documentation is complete and disposal facility concurrence is received in letter form.

f. Specific instructions shall be established for handling unacceptable solidified waste container on a case by case basis.

g. Quality Control shall re-verify acceptability of solidified product by performance of Container Checks.

6.5.9 Capping of Solidified Waste Containers

a. The requirements of Solidification Product Quality section of this procedure shall be met prior to capping the container.

b. If the container is not equipped with a passive vent and its contents are within the requirements of Low Specific Activity (LSA) ensure one of the following:

(1) The container should be shipped within (10) ten days after capping; or

(2) If a container has been capped for longer than (10) days, it shall be opened, vented, and re-capped within (10) ten days of shipment.

c. If the container exceeds the limits for Low Specific Activity and contains water and/or organic substances which could radiolytically generate combustible gases, determination must be made such that the following criteria are met over a period of time that is twice the expected shipment time:

(1) The hydrogen generated shall be limited to a molar quantity that would be no more than 5% by volume of the container gas void; or

(2) The container and shipping cask cavity shall be inerted with a diluent to assure that oxygen is limited to less than 5% by volume in those portions of the package which could have hydrogen greater than 5%.

6.5.10 Solidification Agent Control

a. Portland Cement - ASTM C-150 Type I shall be used for the mobile solidification process.

b. Other solidification agents may be used only after acceptable testing of the agent has been completed that demonstrates acceptable solidification and disposal facility approval has been obtained.

c. Documented Certification is not required for materials received in bags provided material verification can be obtained as follows:

(1) Cement is acceptable provided the bag containing the cement indicates that cement is Portland Type I.

(2) Sodium Silicate is acceptable provided the bag containing the additive indicates Anhydrous Sodium Metasilicate.

(3) Other additives are acceptable provided the container is clearly marked indicating the type of additive.

d. Other additives may be used for enhancement of solidification process as specified in the solidification procedure and documented in the solidification records.

6.5.11 Radioactive Waste Solidification Records

A Solidification Record Sheet (Form NDAP-QA-0646-1) shall be completed for each container filled with solidification products.

Completion of the Solidification Record Sheet and the required accompanying documentation shall be as follows:

a. The Wet Waste Program Owner is responsible for initiating this form and completing Parts 1 and 2.

b. Effluents Management Supervision, Chemistry and Solidification/Dewatering/Services Vendor personnel shall provide and check off the required documentation specified in Part 3.

c. Quality Control shall provide review as required for the Solidification Records.

6.6 RADIOACTIVE WASTE DEWATERING

6.6.1 General Requirements

a. Waste Streams which may be dewatered in either High Integrity Containers or steel liners are LRW Filter Media, Ultrasonic Resin Cleaner Waste, Sump Sludge, RWCU Filter Media, Condensate/Radwaste Demineralizer Bead Resin, Cartridge Filters, Activated Carbon Condensate Filter Backwash Material and Chemical Waste Process Demineralizer resins. The type of container used shall be based on the waste classification and stability criteria in accordance with federal and disposal facility regulations.

b. Dewatering of Radioactive Waste shall be performed by qualified SSES or Solidification/ Dewatering Services Vendor personnel.

c. Dewatering of Radioactive Waste shall be performed in accordance with approved procedures.

d. Dewatering procedures shall be based on documented test data that has demonstrated the ability to achieve free liquid limits as specified by disposal facilities and applicable regulatory agencies. Liquid volume and drainage calculations and actual drainage verification may also be used to meet free liquid limits.

e. High Integrity Containers shall be used for disposal when the concentration of radionuclides with half-lives greater than 5 years exceeds 1 μCi/cc.

f. Each waste stream which may be dewatered should be characterized by the Solidification/ Dewatering Services Vendor to ensure the operating parameters and effectiveness of the dewatering system are in accordance with the parameters established in the Topical Report.

6.6.2 Dewatered Product Control

a. The final dewatered product shall contain less than 1% non-corrosive free liquid for High Integrity Containers and 0.5% for steel liners. Quality Control checks shall be performed on process steps.

b. If a dewatered waste container does not meet acceptability requirements, a Condition Report (CR) shall be issued.

c. Specific instructions shall be established for handling unacceptable dewatered waste container on a case-by-case basis.

d. Deviation from the container checking requirement shall be approved by the Wet Waste Program Owner-Effluents Management.

6.6.3 Radioactive Waste Dewatering Records

A Dewatering Record Sheet (Form NDAP-QA-0646-2) shall be completed for each container filled with dewatered waste streams. Parts of the form shall be completed by the following responsible individuals or groups:

a. The Wet Waste Program Owner is responsible for initiating this form and completing Parts 1 and 2.

b. Chemistry Group shall complete Part 3 Sampling and Analysis.

c. Effluents Management Supervision, Chemistry and Solidification/Dewatering/Services Vendor personnel shall provide and check off the required documentation specified in Part 4.

d. Quality Control shall provide review as required for the Dewatering Records.

6.7 HIGH INTEGRITY CONTAINERS (HIC)

6.7.1 Storage of High Integrity Containers

a. High Integrity Containers (HIC) stored in direct sunlight or in areas where there is a strong source of ultraviolet radiation shall be filled and disposed of within one year of manufacturing date.

b. Once filled a High Integrity Container may be stored for a period until a total of one (1) year of ultraviolet radiation is received.

c. Short exposures (i.e., several hours) to sunlight, such as occurring during shipment and on site transfer need not be counted when determining total ultraviolet exposure.

6.7.2 Uses of High Integrity Containers

a. High Integrity Containers may be used to package the following waste materials for disposal:

(1) Dewatered bead resin, powdered resin and fibrous materials.

(2) Compressible and non-compressible solid wastes.

(3) Filter elements and cartridges.

(4) Solidified resins, sludges, and liquid wastes.

(5) Incinerator ash, residuals, or equivalent waste which has been rendered non-dispensable in a binding matrix.

(6) Other dewatered and dry material provided concurrence is received by container vendor and disposal facility.

b. Prior to using a High Integrity Container for a specific waste material, procedures shall be established to define the specific requirement that shall be met during use of the container.

The procedures shall contain:

- Documentation requirements that specific conditions have been met such as inspection and exposure to degrading conditions.
- Instructions as to how to handle and properly close the container.
- Instructions for on-site storage of loaded containers for ultimate shipment for disposal.

c. The procedures shall provide a method for documenting required information relevant to the container from initial receipt to shipping for disposal.

d. Required information shall be based upon the container certificate of compliance and disposal facility requirements.

e. Retention and utilization of the documentation shall be defined in the procedures.

f. The procedures shall establish specific Quality Control inspection requirements.

g. Prior to the first shipment of a specific type of High Integrity Container, authorization shall be requested from the applicable regulatory agency governing use of the container in question at the disposal facility of concern.

6.7.3 High Integrity Container Limitations

a. High Integrity Containers are approved for use provided the following physical limitations of the waste are met:

(1)	Payload density	:	≤1.47 gms/cc
(2)	Loading temperature	:	≤170°F
(3)	EL-50 N.S. loaded weight	:	≤4200 lb
(4)	EL-142 N.S. loaded weight	:	≤8250 lb
(5)	EL-142 S. loaded weight	:	≤11250 lb
(6)	EL-190 N.S. loaded weight	:	≤11950 lb
(7)	EL-190 S. loaded weight	:	≤14800 lb
(8)	EL-210 N.S. loaded weight	:	≤13000 lb
(9)	EL-210 S loaded weight	:	≤17300 lb
(10)	CNSI Small loaded weight	:	≤2500 lb
(11)	CNSI Medium loaded weight	:	≤2500 lb
(12)	CNSI Large loaded weight	:	≤2500 lb
(13)	Radlok 179 loaded weight	:	≤18500 lb
(14)	Radlok 195 loaded weight	:	≤18500 lb
(15)	Enduropak 105 loaded weight	:	≤1700 lb
(16)	Enduropak 205 loaded weight	:	≤1900 lb
(17)	Enduropak 150 loaded weight	:	≤2400 lb

b. The maximum concentration of radionuclides with half lives greater than (5) five years that may be disposed of in a High Integrity Container is 350 μCi/cc. Other waste forms shall not exceed 1.0×10^8 rads maximum integrated dose to the container.

([7])([8])

c. The polyethylene High Integrity Containers shall not be used for storage of or have prolonged contact with materials listed in Attachment E. Short term contact such as in Krylon paint is acceptable. If the type of paint used is changed, specific approval from the HIC vendor is required.

d. A passive vent design shall be incorporated into the container to relieve internal container pressure.

6.7.4 Closure of High Integrity Containers

a. Closure of High Integrity Containers shall be completed in accordance with approved procedures.

b. If the container is not equipped with a passive vent and its contents are within the limits of Low Specific Activity ensure one of the following:

(1) The container is shipped within (10) ten days after closing; or

(2) If the container has been closed for longer than (10) ten days, it shall be opened, vented, and re-closed within ten (10) days of shipment.

c. If the container exceeds the limits for Low Specific Activity or contains water and/or organic substances which could radiolytically generate combustible gases, determination must be made such that the following criteria are met over a period of time that is twice the expected shipment time:

(1) The hydrogen generated shall be limited to a molar quantity that would be no more than 5% by volume of the container gas void; or

(2) The container and shipping cask cavity shall be inerted with a diluent to assure that oxygen is limited to $\leq$5% by volume in those portions of the package which could have hydrogen greater than 5%.

d. Step 6.7.4.b and 6.7.4.c shall also apply to dewatered waste in steel liners.

6.8 IRRADIATED HARDWARE PROCESSING AND DEWATERING

6.8.1 General Requirements

a. Processing and dewatering of Irradiated Hardware shall be performed by qualified SSES or vendor personnel.

b. Processing and dewatering of Irradiated Hardware shall be performed in accordance with approved procedures.

([6]) c. Irradiated Hardware consisting of non-fuel Special Nuclear Material shall be inventoried during processing in accordance with NDAP-QA-0337.

d. Dewatering procedures shall be based on liquid volume and drainage calculations and actual drainage verification to demonstrate the ability to achieve free liquid limits as specified by disposal facilities and applicable regulatory agencies.

6.8.2 Dewatered Product Control

a. The final dewatered product shall contain less than 0.5% free liquid for steel liners.

b. Quality Control checks shall be performed on process steps.

6.8.3 Irradiated Hardware Processing and Dewatering Records

a. All records generated shall be completed and filed in accordance with approved implementing procedures.

6.9 CONTAINER INSPECTIONS

6.9.1 Quality Control shall inspect containers to be used for solidification, dewatering, and other packaging for disposal.

6.9.2 This inspection shall assure that prior to use, the containers to be used for solidification, dewatering, or other packaging are intact and their internals are free of any visual damage that would prevent them from performing their intended function.

6.9.3 Packages shall meet the general criteria for normal transport conditions in accordance with the requirements of 49 CFR. Type A packages shall meet the additional design requirements specified in 49 CFR.

6.10 WASTE CONTAINER SPACE UTILIZATION

6.10.1 Waste volume shall be maximized within the guidelines of specific procedures to minimize potential void space at the top of waste container after solidification or dewatering is complete.

a. Additional radioactive material should be added only after the initial waste volume is in final form and sampled and the added waste volume is in final form and sampled.

b. The additional material may be drawn into containers able to withstand higher external pressures without degradation by creating an area of low pressure inside the container, such as with steel liners.

c. For all other containers, the additional material shall be added via mechanical processes or by other conveyance which does not exert higher external pressures.

6.10.2 Waste volumes shall meet or exceed disposal site criteria. If waste volume is less than disposal facility criteria, requirements for disposal of the container in question shall be defined by the disposal facility.

6.10.3 Specific waste volumes committed to by the Solidification/Dewatering/Services Vendor shall be met or otherwise justified as to why waste volumes were not achieved.

6.10.4 Susquehanna Guaranteed Solidified/Dewatered Waste Volume Record, Form NDAP-QA-0646-3, shall be completed by the Solidification/Dewatering/ Services vendor personnel, approved by the Wet Waste Program Owner and shall be used to track solidified/dewatered waste volumes achieved in each individual container.

6.11 STORAGE OF PACKAGED RADIOACTIVE WASTE

6.11.1 Wet Waste Program Owner shall provide Solidification and/or Dewatering Record sheets that have been reviewed by Quality Control personnel stating that processed waste has been solidified or de-watered in accordance with the Process Control Program and meets the applicable shipping and disposal criteria.

6.11.2 Solidification and Dewatering Records shall include the isotopic mix, isotopic concentration of the waste that was packaged, the total volume of the waste, and the amount of water, cement or other solidification agent used, as appropriate.

6.11.3 Solidification and Dewatering Records shall be part of the permanent shipping records and adhere to requirements of the Process Control Program.

6.11.4 For materials packaged in a high integrity container, documentation shall be maintained on HIC storage and pre-shipment checklist information.

6.11.5 Packaged radioactive waste shall be stored in areas designated by Foreman Effluents Management. Storage of packaged radioactive waste in the Low Level Radwaste Holding Facility (LLRWHF) shall be in accordance with approved procedures.

6.11.6 An inventory of stored, packaged waste shall be maintained in accordance with approved procedures.

6.12 TRANSPORTATION, SHIPPING AND DISPOSAL REGULATIONS

6.12.1 Specific regulatory documents shall be maintained on site in a status that is current. Specific regulations that shall be maintained include but are not limited to the following:

a. 10CFR71 Packaging of Radioactive Material for transport and transportation of radioactive material under certain conditions.

b. 49CFR100 - 199 Transportation.

c. Chem-Nuclear Systems Inc. Barnwell S.C. disposal site operating license number 097 State of South Carolina, as required.

d. Chem-Nuclear System Inc. NRC Material License 12-13536-01, as required.

e. Chem-Nuclear System Inc. Barnwell S.C. disposal site operating procedures and site criteria, as required.

f. Cask Manuals for casks of which PP&L is an authorized user.

g. A copy of the license for each facility to which Radioactive Material is sent.

h. 10CFR61 Licensing requirements for land disposal of Radioactive Waste.

6.12.2 Procedures applicable to transportation, shipping and disposal shall be developed.

a. Procedures shall be established and maintained to provide directions and assure regulatory compliance for manifesting, which include applicable federal, state, and disposal facility regulations, and NRC guidance.

b. Procedures shall contain check off lists where and when applicable to assure specific attention is paid to the critical function being controlled.

c. Procedures shall contain Quality Control notifications or hold points.

6.12.3 Computer software used to implement applicable portions of the Process Control Program shall be in accordance with NDAP-QA-0801.

6.13 SHIPPING OF RADIOACTIVE WASTE

6.13.1 All radioactive waste shall be shipped by Effluents Management.

6.13.2 All radioactive waste shipped from SSES shall only be to facilities licensed to receive the waste and in accordance with 10CFR20, 10CFR71 and 49CFR100-199.

6.13.3 Dry Active Waste (DAW) should normally be shipped as Type A quantities and therefore do not require specific licensed containers.

6.13.4 Waste containers shall be placed in a USNRC approved licensed shipping container if it is required per plant procedures.

6.13.5 The specific conditions of the Certificate of Compliance for each approved shipping cask shall be strictly adhered to.

6.13.6 Packaged waste may be shipped unshielded provided it meets the requirements of plant procedures.

6.13.7 Prior to the shipment of a package of radioactive waste, the Foreman Effluents Management shall assure the container is surveyed for contact dose rates and surface contamination. Decontamination, if required, shall be done under the direction of the Foreman Effluents Management. Decontamination may be waived based upon radiological conditions.

6.13.8 All vehicles used to transport radioactive waste requiring the vehicle to be placarded shall be checked for adequate operation and safety conditions.

6.13.9 All Radwaste shipments from SSES shall normally be via "Exclusive Use" vehicles. Specific instructions given to the driver include:

a. Expected route of travel to his final destination.

b. Maintaining "Exclusive Use" status.

c. Specific actions to be taken in the event of an accident.

6.13.10 No vehicle carrying radioactive waste that is overweight shall leave SSES without a Pennsylvania overweight permit.

a. A DAW shipment or other shipment capable of having its weight adjusted, shall not be allowed to leave SSES overloaded.

b. An overloaded condition for any vehicle is based on total weight and weight per axle.

6.13.11 In the event access is denied to SSES at all operating disposal facilities, PP&L will provide carrier with a letter stating that SSES will meet all applicable federal, state, and compact requirements for receipt back of the radioactive waste/material in carrier's possession.

6.14 SHIPMENT CONFIRMATION

If disposal site shipment acknowledgement is not received within 18 days from departure from SSES, Effluents Management Supervision shall conduct a trace investigation for shipment location. If the disposal facility shipment receipt can not be confirmed within 20 days, a Condition Report (CR) shall be generated.

6.15 CHANGES TO THE SOLID RADIOACTIVE WASTE PROCESS CONTROL PROGRAM

6.15.1 Any changes as described in the Technical Specifications, to the Solid Radioactive Waste Process Control Program shall be provided in the Annual Radioactive Effluent Release Report filed with the NRC.

6.15.2 Any changes to the Solid Radioactive Waste Process Control Program shall be approved by Plant Operations Review Committee (PORC) prior to implementation.

(4) 6.16 EVALUATION OF PROCESS OR OPERATIONAL CHANGES

6.16.1 Changes in radioactive waste processing or operational changes shall be evaluated to determine any impacts on waste characteristics and/or form.

6.16.2 Evaluation should include as a minimum:

a. Operational evaluation of processing impacts.

b. Chemistry evaluation of changes to sampling and analysis methodology.

c. Effluents Management evaluation of packaging and/or shipping impacts.

d. Effluents Management evaluation for 10CFR61 compliance.

e. Solidification/Dewatering Services Vendor waste stream characteristic evaluation of the dewatering/solidification system operating parameters and effectiveness.

(2) 6.17 REPORTING OF MISHAPS INVOLVING LOW LEVEL WASTE FORMS

6.17.1 10CFR61 establishes the minimum and stability requirements for Low Level Waste (LLW) forms. 10CFR20 requires certification that the processed waste satisfies the requirements of 10CFR61. Mishaps which may impact the final waste form shall be reported to the NRC.

6.17.2 Types of mishaps which should be reported include:

a. Failure of high-integrity containers used to ensure a stable waste form. Container failure can be evidenced by changed container dimensions, cracking, or damage resulting from mishandling (e.g., dropping or impacting against another object).

b. Misuse of high-integrity containers, evidenced by a quantity of free liquid greater than 1 percent of container volume, or by an excessive (>15%) void space within the container.

c. Production of a cement solidified Class B or C waste form that has any of the following characteristics:

(1) Contains free liquid in quantities exceeding 0.5 percent of the volume of the waste.

(2) Contains waste with radionuclides in concentrations exceeding those considered during waste form qualification testing accepted by the regulatory agency, which could lead to errors in assessment of waste class.

(3) Contains a significantly different waste loading than that used in qualification testing accepted by the regulatory agency.

(4) Contains chemical ingredients not present in qualification testing accepted by the regulatory agency, and those quantities are sufficient to unacceptably degrade the waste product.

(5) Shows instability evidenced by crumbling, cracking, spalling, voids, softening, disintegration, non-homogeneity, or dimensional changes.

(6) Evidence of processing phenomena that exceed the limiting processing conditions identified in applicable topical reports or process control plans, e.g., foaming, temperature extremes, premature or slow hardening, and production of volatile material.

d. Failure to adhere to high integrity container limitations as required by container certificate of compliance.

e. Notification of violation by disposal facility regulatory authorities at time of container receipt for disposal.

f. Failure of cement-solidified stable waste form long term PCP surveillance specimens due to evidence of significant cracking, spalling, or bulk disintegration, compression or penetrometer strength and immersion test results.

6.17.3 Requirements for reporting of mishaps shall apply only to processing liners and high integrity containers containing radioactive waste in its final product form.

6.17.4 A Condition Report (CR) shall be generated if one of the mishaps mentioned occurs.

6.18 PCP IMPLEMENTING PROCEDURES

Procedures required for implementation of the Process Control Program are shown in Attachment D.

7.0 RECORDS

7.1 The Solidification Records or Dewatering Records and the attached documents shall be forwarded to Effluents Management Supervision for retention until such time as the container identified on Record is shipped for final disposition.

7.2 When the identified container is shipped the Solidification Records or Dewatering Records and other documents concerning the Shipment shall be filed with the shipping documentation and forwarded to DCS for retention.

7.3 Documentation of Radioactive Waste Shipments shall be retained as required by SSES Technical Specifications.

7.4 Radioactive waste shipping documentation shall consist of, but not limited to, the following records:

7.4.1 Radioactive Material Shipping Manifest

7.4.2 Evaluation of isotopic mix and concentration

7.4.3 Radiological surveys of:

a. Vehicle upon arrival

b. Package to be shipped

c. Loaded vehicle prior to shipment

7.4.4 Vehicle Safety inspection

7.4.5 Check-off sheet for loading procedure

7.4.6 Documentation of adherence to Process Control Program (if applicable)

7.4.7 Special instructions to driver

SOLIDIFICATION RECORD SHEET

PART 1: Container Identification Information

1. PP&L Liner Number_____ 2. Container Vendor Serial Number_____

3. Waste Stream_____(RWCU Filter Media cannot be entered)

4. Test Solidification required? YES NO (circle one)

PART 2: Container Selection (Refer to WM-PS-100)

1. Estimated Liner Contact Dose Rates _____mR/hr

2. Projected Curie Concentration _____μCi/gm

3. Expected Waste Classification/Stability _____

4. Container Type to be Used _____ 5. Empty Weight of Container _____lbs

6. Expected Cask Type to be Used _____

PART 3: Documentation Checklist

1. Form NDAP-QA-0646-1 (original)
2. Waste Form Documentation
   - ___ WM-RP-___ Forms (original)
   - ___ SC-068-002 Forms (copy)
   - ___ Waste Form: STABLE UNSTABLE (circle one)
   - ___ ≥85% Liner Volume Utilized: YES NO (circle one)
3. Waste Activity Documentation
   - ___ CH-RC-___ Forms (copy)
   - ___ Isotopic Analysis (copy)
   - ___ Compost added/Log entry made on CH-TP-055-1 _____/____
     Chem. Suprvn. Date
4. Health Physics Data
   - ___ Liner Radiological Survey (original)
   - ___ Actual Filled Container Weight _____ lb. (If available ALARA)

PART 4: REMARKS:

_____

_____

_____/____ _____/____ _____/____

WET WASTE PROGRAM OWNER / DATE QC REVIEW / DATE FOREMAN EFFL. MGMT / DATE

DEWATERING RECORD SHEET

PART 1: Container Identification Information

1. PP&L Liner Number _____ 2. Container Vendor Serial Number _____

3. Waste Stream _____

PART 2: Container Selection (Refer to WM-PS-100)

1. Estimated Liner Contact Dose Rates _____mR/hr

2. Projected Curie Concentration _____μCi/gm

3. Expected Waste Classification/Stability _____

4. Liner Type to be Used _____ 5. Empty Weight of Container _____ lbs.

6. Expected Cask Type to be Used _____

Wet Waste Program Owner	Date	Time

DEWATERING RECORD SHEET

PART 3: Sampling and Analysis

1. Tank/Container sampled _____

2. Sample Number _____

3. Waste Stream _____

4. Isotopic Analysis attached _____
   By

5. Specific activity of Dewatered Sample _____ μCi/gm

6. a. Dewatered Volume _____ cc

   b. Dewatered Weight _____ gm

   c. Sample density _____ gm/cc x 62.43 = _____ lb/ft^3

7. Composite added/Log entry made on CH-TP-055-1 _____
   BY

The above tank/container containing solids has been analyzed in accordance with CH-RC-075 and found to contain the isotopes and specific activities as indicated on the attached data sheets.

_____ _____ _____
Chemistry Supervision Date Time

DEWATERING RECORD SHEET

PART 4: Container Shipment Information Summary

1. PP&L Liner Number _____ 2. Waste Volume _____ ft^3

3. Form NDAP-QA-0646-2 (original)

4. Waste Form Documentation

_____ WM-RP-_____, _____, _____, _____, _____ Forms (original)

_____ Calculated Waste Weight = _____ (Part 3.6.c) lb/ft^3 x _____ (Part 4.2) ft^3 = _____ lb.

_____ Actual Filled Container Weight _____ lb. (if available ALARA)

_____ 100 x (Dewatered Waste Volume) _____ (Part 4.2) ft^3 ÷ _____ (Avail Volume) ft^3 = _____%

_____ >85% Container Volume Utilized YES / NO (Circle one)

_____ Waste Form: STABLE UNSTABLE (Circle one)

5. Waste Activity Documentation

_____ CH-RC-_____ Forms (Copy)

_____ Isotopic Analysis (Copy)

PART 5: REMARKS:

_____

_____

_____

_____/_____ _____/_____ _____/_____

Wet Waste Program Owner / Date | QC Review / Date | Foreman Effl. Mgmt. / Date

SUSQUEHANNA GUARANTEED SOLIDIFIED/DEWATERED WASTE VOLUME RECORD

1. Date _____ Liner number _____

2. Waste Type _____

3. Container Type _____

4. Burial Volume _____

5. Useable Container Volume _____ ft^3

6. Guaranteed Minimum Waste Volume _____ ft^3

7. Waste Volume Attained
_____ inches x _____ ft^3/inch = _____ ft^3

8. Waste Volume Container Usage

100 x (Waste Vol. ____ ft^3 ÷ Guaranteed Min. Waste Vol. ____ ft^3) -100 = _____%

9. Dead band Assessment Volume

Guaranteed Min. Waste Vol. ___ ft^3 ± (0.01 X Guaranteed Min. Waste Vol. ___ ft^3

Minimum(-) ___ ft^3 to Maximum(+) ___ ft^3

10. Performance Assessment Volume

Dead band Assessment Vol. ___ ft^3 - Waste Vol. ____ ft^3 = ____ ft^3

11. Remarks:

12. Signature _____
Solidification Vendor Representative

13. Signature _____
Wet Waste Program Owner

PCP IMPLEMENTING PROCEDURE MATRIX

WASTE PROCESSING

Mixed Solids - Solidified

Vendor Procedure PT-51-WS
Vendor Procedure OM-104-WS
Vendor Procedure OM-114-WS

LRW Filter Media, URC Waste, RWCU Filter Media, Sump Sludge - Dewatered

Vendor Procedure OM-43-WS
WM-RP-107

Condensate/Radwaste Demineralizer Bead Resin - Solidified

Vendor Procedure PT-51-WS
Vendor Procedure OM-114-WS
Vendor Procedure OM-104-WS

Condensate/Radwaste Demineralizer and other Bead Resin - Dewatered

Vendor Procedure OM-43-WS
WM-RP-106
Vendor Procedure STD-P-22-002
(Resin Express)
WM-RP-104
Vendor Procedure P-06-005

Cartridge Filters

FO-OP-019 (Overpack)

WM-PS-230

OM-16-NS

WM-RP-105

PCP IMPLEMENTING PROCEDURE MATRIX

Irradiated Hardware - Dewatered (Steel Liner)

None

Dry Active Waste (DAW) - Packaging

WM-PS-210

Liquid Oil Waste - Solidified

None

Liquid Oil Waste - Decontamination

None

Solid Sealed Sources

None

WASTE ANALYSIS AND CLASSIFICATION - 10CFR61

Vendor Procedure OM-45-WS

CH-RC-075	WM-PS-155
CH-RC-076	WM-PS-160
CH-TP-055	WM-PS-150

TESTING/TREATMENT COMBUSTIBLE GASES

WM-RP-009

WM-RP-301

RADIOACTIVE WASTE SOLIDIFICATION - GENERAL (CEMENT)

Vendor Procedure OM-114-WS

SC-068-002 (Test Solidification)

PCP IMPLEMENTING PROCEDURE MATRIX

RADIOACTIVE WASTE DEWATERING - GENERAL

Vendor Procedure OM-60-WS
WM-RP-010
WM-RP-011

HIGH INTEGRITY CONTAINERS

Vendor Procedure OM-16-NS
Vendor Procedure P-03-008
WM-RP-012

DISPOSAL STORAGE FACILITY REQUIREMENTS

WM-PS-401 (LLRWHF)
WM-PS-402

PACKAGING

WM-PS-310 (HN-142)
WM-PS-311 (LN-142)
WM-PS-315 (SEG 3-82)
WM-PS-345 (CNSI 14-195)
WM-PS-351 (CNSI 21-300)
WM-PS-356
WM-PS-354 (CNSI 14-215)
WM-PS-316 (SEG 14-215)
WM-PS-318 (Westinghouse TCT)

TRANSPORTATION - 49CFR/10CFR71

WM-PS-100
WM-PS-110
WM-PS-120
WM-PS-180
WM-PS-240
WM-PS-250

MATERIALS NOT COMPATIBLE WITH POLYETHYLENE CONTAINERS

Aliphatic hydrocarbons (hexane, bexene, octane, etc.)
Acetone
Amyl Acetate
Amyl Chloride
Aniline
Aqua Regia

Benzene
Bromine liquid
Butane

Camphor Oil
Carbon Disulphide
Carbon Tetrachloride
Chlorine liquid
Chlorobenzene
Chloroform
Chlorosulfonic acid
Chromic/sulfuric acid
Cyclohexanone

Dibutylphtalate
Dimethylamine
Diesel fuel

Ethyl acetate
Ethyl butyrate
Ethyl chloride
Ethyl ether
Ethylene chloride
Ethylene chlorohydrin
Ethylene dichloride

Fluorine
Furfural
Furfuryl alcohol
Fuel Oil

Gasoline

Iodine

Methyl bromide
Methyl Chloride
Methyl ethyl ketone (MEK)
Methylene Chloride
Moist Chlorine gas

Nitric Acid (50% weight concentration)

Organ Peroxides
Octyl cresol
Oleic acid
Oleum

Pentane
Petroleum ether
Phenol
Propane
Propylene dichloride

Sulfric acid (60% weight concentration)

Tetrahydrofurance
Titanium tetrachloride
Toulene
Trichloroethylene
Turpentine
Tetralin

Xylene