NINE MILE POINT NUCLEAR STATION

ADMINISTRATIVE PROCEDURE

PROCEDURE NO. AP-3.7.1

PROCESS CONTROL PROGRAM

APPROVALS	SIGNATURES	DATE AND INITIALS REVISION 0	REVISION 1	REVISION 2
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FOR INFORMATION ONLY

Summary of Pages

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NIAGARA MOHAWK POWER CORPORATION

THIS PROCEDURE NOT TO BE USED AFTER AUGUST 1988 SUBJECT TO PERIODIC REVIEW.

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Process Control Procedure

AP-3.7.1

1.0 PURPOSE

1.1 The NMP2 Process Control Program (PCP) describes the guidelines for processing and packaging low-level radioactive waste and provides assurance of complete solidification of various radioactive "wet wastes" in accordance with the applicable portions of NRC regulations and guidance.

This document satisfies the Nuclear Regulatory Commission's Low-Level Waste and Uranium Recovery Projects Branch (WMLU) requirement and establishes process parameters within which the Werner & Pfleiderer Corporation Volume Reduction System (WPC-VRS) must be operated to ensure complete solidification. Conformance with WMLU requirements provides assurance that the requirements identified in 10CFR61, which state that Class A waste shall be a free standing monolith with less than 0.5% latent water, will be met.

2.0 TECHNICAL SPECIFICATIONS REFERENCES

2.1 Semi Annual Radiological Effluent Release Report, Section 6.9.1.8.

2.2 Nine Mile Point - Unit 2 Technical Specifications, Section 3/4 11.3 (Specifications for Solid Waste Handling and Disposal).

3.0 REGULATORY REQUIREMENTS REFERENCES

3.1 Refer to 10CFR61 sub part D technical requirements for land disposal facilities and final waste classification and waste form technical position papers (an approved process control procedure, Report No. WPC VRS-001, Rev. 1, May 1978).

3.2 Refer to 10CFR71 for NRC requirements (refer to S-RP-6).

3.3 Refer to 49CFR173 for DOT requirements (refer to S-RP-6).

3.4 Refer to burial licenses and criteria (of Barnwell and Hanford Sites) for applicable requirements. S. C., Department of Health and Environmental Control, Radioactive Material Licensee 097, as amended. State of Washington Radioactive Material License #WN-I019-2 as amended.

3.5 For disposal of unused or off-standard chemicals. Refer to Requirements Resource Conservation and Recovery Act (RCRA) of 1976 (Ref. Corporate Guide to Hazardous Waste Disposal and Spill Reporting).

3.6 NRC Special Nuclear Material License No. 12-13536-02, as amended, for Barnwell, SC.

3.7 NRC Special Nuclear Material License No. 16-19204-01, as amended, for Richland, Washington

4.0 OTHER REFERENCES

4.1 Nine Mile Point 2 Waste Handling Procedures

4.2 WPC Topical Report No. WPC-VRS-001, November 1976, Rev. I - May 1978

4.3 Nine Mile Point 2 Quality Assurance Department Procedures

4.4 Nine Mile Point Nuclear Process Survey Procedure N2-CSP-14, Solid Radioactive Surveillance Chemistry

4.5 Nine Mile Point 2 Nuclear Training Procedure S-NTP-14, Training and Retraining of Radiation Protection Technician

4.6 Nine Mile Point 2 Nuclear Training Procedure S-NTP-1, Training and Retraining of Chemistry and Radiochemistry Technician

4.7 Nine Mile Point 2 Nuclear Training Procedure S-NTP-13, Radwaste Operator Training

4.8 Nine Mile Point Nuclear Station, Site Radiation Protection Procedure S-RP-6 Packaging and Transportation of Radioactive Material

4.9 NUREG 0123 - "Standard Radiological Effluent Technical Specifications for Boiling Water Reactors"

4.10 ANSI/ANS-55.1/1979, American National Standard for Solid Radioactive Waste Processing System for Light Water Cooled Reactor Plants

4.11 Regulatory Guide 1.143, Rev. 0, Design Guidance for Radioactive Waste Management System, Structure, and Components Installed in Light-Water-Cooled Nuclear Power Plants

4.12 NUREG-0800, Standard Review Plan Section 11.2 Liquid Waste Management System

4.13 NUREG-0800, Standard Review Plan Section 11.4 Solid Waste Management System

4.14 QATR-1 QA Program Topical Report.

5.0 SYSTEM DESCRIPTION

The Solid Waste Management System (SWMS) collects, reduces the volume, solidifies and packages wet and dry types of radioactive waste in preparation for shipment off site to a licensed burial site. A process control flow path is presented as Figure A, and a system flow schematic diagram of the NMP2 SWMS is presented as Figure B.

5.0 SYSTEM DESCRIPTION (Cont'd)

The Solid Waste Management System accepts dry solid trash which is, when physically possible, compacted with a trash compactor. Resin beads or powdered resins will be dewatered in high integrity containers or will be processed along with evaporator bottoms through the extruder evaporator. When required, NMP2 will also use the services of a vendor to solidify waste.

The extruder/evaporator is a one-step volume reduction and solidification process. Two screws inside the extruder/evaporator convey the waste/asphalt mixture along its length, continually shearing and mixing the waste/asphalt. The screw speed can be regulated to control the evaporating capacity and residence time of the waste. The extruder/evaporator discharges a homogeneous mixture of asphalt and waste containing less than 1% latent water.

The solid radwaste system uses the extruder/evaporator to process waste feed from two inputs: the evaporator bottoms tank or the waste sludge tank. The waste is mixed with asphalt in the extruder. Only one waste feed path can be processed at a time.

The evaporator bottoms tank and lines are electrically heat traced to prevent crystallization of waste salts. The contents of the tank are fed to the extruder/evaporator via a transfer pump that supplies redundant metering pumps. The waste flow rate is controlled manually by adjusting the flow rates on the metering pumps.

The contents of the waste sludge tank are fed to the extruder/evaporator by a system similar to, but separate from, the evaporator bottoms feed system. The waste sludge tank is supplied by waste from three sources: the radwaste filters, the floor drain filter and the spent resin tank . The waste sludge tank has the ability for decantation. A decant pump takes a suction off the sludge tank and discharges to the spent resin tank.

The contents of the asphalt tank is fed to the extruder/evaporator via redundant recirculation pumps, strainers and metering pumps. The asphalt flow rate is automatically adjusted to yield the proper ratio of asphalt to solids. The asphalt tank and lines are continuously steam heated to keep the asphalt in a liquid state for ease of pumping.

As the waste/asphalt mixture moves through the extruder/evaporator, it is heated by steam from the electric radwaste boiler. This boiler is a skid mounted boiler system which utilizes electricity for steam production. It is a closed system, thus most of the water used for steam is returned to the boiler as condensate via the boiler feedwater system. The boiler vessel is capable of supplying 1400#/hr of steam at 233 psig and 400°F. The steam applied to the extruder is utilized in six separate heating zones for moisture evaporation. Each zone has its own temperature controller for optimum operating conditions.

5.0 SYSTEM DESCRIPTION (Cont'd)

Three devolatization ports along the extruder allow for water vapor to separate from the product and enter the three steam domes. A predetermined amount (4 gal.) of demineralized water is used, which dissolves and boils out any salt sediment at the devolatization port. The vapors are condensed in the steam domes using turbine building closed loop cooling and drained to the distillate collection system.

The distillate collection system is a recirculating system used to continuously filter and cool the condensate from the extruder/evaporator steam domes. The condensate is recirculated from the distillate collection tank through the distillate pumps, roughing filter and the distillate cooler, then routed back to the collection tank. The level controller maintains collection tank level and system flow.

A forced circulation ventilation system is incorporated into this system, consisting of a vent hood over the extruder/ evaporator turntable, a fan which draws air from the plant ventilation system across the extruder/evaporator turntable, and liner cool down areas.

The extruder/evaporator product empties into 50 cubic feet liners. The liners are placed on the fill station turntable. The operator indexes (turns) the turntable, via a control switch, placing a liner under the discharge chute of the extruder/evaporator. This turntable holds three liners. When the liner level reaches a predetermined level, a high level alarm sounds to inform the operator it is time to index the container. Liners are indexed without shutting down the extruder/evaporator. Using control switches, the operator, via a pneumatic carrier, extends a drip pan under the extruder/evaporator discharge chute. The operator then indexes the turntable. Once the new liner is in place under the extruder/evaporator discharge chute, the pneumatically operated carrier is withdrawn. During this withdrawal operation, the drip pan is removed from the carrier by a stationary arm as the carrier retracts past the arm and drops the drip pan into the new liner.

Full liners are removed from the turntable to the cooldown area via a radio controlled/ operated crane. The liners remain in the cooldown area for approximately 52 hours. After the cooldown is completed the liners are capped. They are then moved by crane to the storage area using a ceiling grid coordinate system for placement of the liner.

Operation of the extruder evaporator is detailed in operating procedure 2WSS-OP-41.

6.0 SOLID WASTE SOURCES

A description of each solid waste source is provided below: Radwaste Filters - these mechanical filters filter resin and crud (backwash material) from the waste collector sub-system. When a

6.0 SOLID WASTE SOURCES (Cont'd)

filter reaches a pre-determined differential pressure, it backwashes the material into the backwash tank, which is then pumped to the spent resin tank.

Radwaste Demineralizers - these demineralizers are used as an ionic exchange media for processing high quality water from the waste collector tanks. When determined that the resin can no longer be regenerated, the depleted resin is pumped to the spent resin tank.

Condensate Demineralizer - these demineralizers remove soluble and insoluble impurities from the condensate water to maintain reactor feedwater purity. After it is determined that these resins can no longer be regenerated, the depleted resins are pumped to the spent resin tank.

Floor Drain Filter - contributes to solid waste because it uses diatomaceous earth to process liquid waste of low quality. Input to the filter is from the floor drain system and the regeneration waste tank. When the filter reaches a predetermined pressure drop it backwashes to the waste sludge tank for processing through the extruder evaporator.

Spent Fuel Phase Separator - these tanks receive the exhausted powdered filter (ecodex) coating from the fuel pool clean up system which is subsequently pumped to the spent resin tank.

RWCU Phase Separator - these separator tanks receive exhausted ecodex or powdered resin from the reactor water clean up system which is subsequently pumped to the spent resin tank.

Contaminated Oil - oil from sources within the unit that become contaminated will be stored in containers to be solidified by a vendor with an approved procedure.

Compactible Solids - compactible low level trash will be processed and compacted in a hydraulic-operated box compactor. Shoe covers, trash, contaminated paper from the chem lab, and similar materials are included in this category.

Filters and Miscellaneous Items - Solid items with higher dose rates than those above will be handled on a case-by-case basis, being disposed of by methods acceptable to the burial site. They will, for example, be placed in a suitable cask prior to shipment to the burial site.

Waste Evaporator - the waste evaporator processes low quality waste from the floor drain collector system and, as an option, waste from the waste discharge tanks. The waste evaporator is designed to concentrate to a 25% solid concentration. The concentrates are then discharged to the evaporator bottoms tank for processing through the extruder evaporator.

6.0 SOLID WASTE SOURCES (Cont'd)

Regenerant Evaporator - the regenerant waste evaporator receives regeneration solutions from the condensate demineralizer system and radwaste demineralizer resin regeneration system as well as the radwaste regeneration sump. The regenerative waste evaporator is designed to concentrate to a 25% by weight solid concentration of sodium sulfate. The concentrates are then discharged to the evaporator bottoms tank to be processed thru the extruder evaporator.

Spent Resin Storage Tank - exhausted resin from the condensate demineralizer, the radwaste demineralizer, RWCU phase separator, the spent fuel pool phase separator and the radwaste filter backwash tanks are sluiced to the spent resin storage tank. The waste from the spent resin tank is pumped to the waste sludge tank for processing thorough the extruder evaporator.

7.0 PREREQUISITES

7.1 Adhere to Station Radiation Protection Procedures

7.2 Assure proper asphalt input per ASTM-D-312-71 and N2-CSP-14.

7.3 Assure that NMPC Safety Procedures are adhered to.

7.4 Assure adequate recirculation of waste to be solidified (per 2WSS-OP41-Asphalt Operating Procedure).

7.5 Assure proper ventilation (radwaste ventilation).

8.0 PROCESS CONTROL SYSTEM COMPONENTS

8.1 Asphalt Volume Reduction System

Variables Influencing End Product Properties

This section identifies and defines the process variables of the WPC-VRS System. These process variables have a direct bearing on the properties of the final waste product and relate only to the ability to form a free standing monolith with essentially no free-standing water. Additional process variables, such as pH, must be controlled to minimize corrosion within the system. However, because these variables do not affect the ability of the waste product to form a monolithic solid upon cooling, they will not be discussed below.

The following variables influence the properties and consistency of the final solid product:

A. Asphalt type;

8.1 Asphalt Volume Reduction System (Cont'd)

B. Waste chemical species being incorporated into the asphalt matrix, water content;

C. Ratio of waste-to-asphalt; and

D. Process temperature.

A detailed discussion of the effect and limitations placed on each of the foregoing items follows:

8.1.1 Asphalt Type

NMP2 will use an oxidized petroleum-based asphalt, conforming to ASTM-D-312-71, Type III requirements. This grade of asphalt has a low residual volatile content, and a high molecular weight. At room temperature, and at all normal ambient conditions, this material is a freestanding monolith. Unit 2 will specify Witco Pioneer 221, or an equivalent. This is one of the means by which process control for asphalt quality is achieved. Werner & Pfleiderer Corporation will be consulted if use of an alternate asphalt material is planned. A chemical analysis will be performed on each batch of asphalt received at the site. Verification of the asphalt type will be done per N2-CSP-14.

8.1.2 Waste Chemical Species

Testing will be done to determine the oil content and physical properties of the waste to be solidified per N2-CSP-14. The type and relative quantity (waste-to-asphalt ratio) of waste chemicals being incorporated in the asphalt matrix has a direct influence on the properties of the final product. Encapsulation of inorganic salts and solids typically "stiffen" and harden the waste product; whereas organic liquids have the opposite effect. When the proper ratio of waste-to-asphalt is maintained, final product properties relative to solidification,for all practical purposes, are independent of the waste type.

Werner & Pfleiderer Corporation places a limit of 1.0% oil and organic contaminants in the waste feed stream for process control, and Unit 2 adheres to these guidelines.

8.1.3 Waste-to-Asphalt Ratio in the Product

The ratio of waste-to-asphalt contained in the end product has the most bearing on the viscosity and physical consistency of the product during processing. The recommended weight ratios of waste-to-asphalt for each waste feed is as follows:

8.1.3 Waste-to-Asphalt Ratio in the Product (Cont'd)

Feed	Ratio of Waste-to-Asphalt in the End Product
1. Evaporator Concentrates	40/60 to 50/50*
2. Spent Resins	45/55 to 50/50*
3. Filter Sludge	40/60 to 50/50*

* Optimum value depends on type and quantity of contaminants present.

Should the ratio of waste-to-asphalt be increased above the range specified in the foregoing table, the end product viscosity will increase and may exhibit a grainy texture. This could lead to "pyramiding" of the product in the container, thereby decreasing the container filling efficiency. In all cases, the product will cool to form a freestanding monolith. If lower than specified waste loadings are realized, the end properties will approach that of pure asphalt.

Proper waste-to-asphalt ratios in the product are automatically maintained by a coordinated proportioning feed system to the extruder/evaporator. Operator involvement is limited to setting the initial proportion of waste-to-asphalt flow. To do this, the chemistry department will determine, by sampling, the solids content of the waste feed. After the sample analysis, the chemistry department will determine the proper feed control settings. See N2-CSP-14 for flow rate calculations. The operator must visually confirm that the proper ratios are being maintained. A CCTV camera can be used to "view" the discharge from the extruder/evaporator, and the TV monitor located in the control room allows the operator to observe the physical consistency of the product as it is discharged into the container. Flow rates will be calculated based on the information supplied in Topical Report No. WPC-VRS.001, Rev. 1, May 1978 - Appendix B Solid Contents.

8.1.4 Process Temperature

A proper temperature profile along the length of the extruder/evaporator is required to provide adequate evaporative (process) capacity, and to ensure that free water is not discharged from the machine. The process temperature profiles for all typical Nine Mile Point waste types are as follows:

Waste Type	Process Temperature* (°F)					
Zones:	1	2	3	4	5/6	7
Evaporator Concentrates	165	265	300	330	375	350
Spent Resins, Filter Sludge	165	265	285	300	285	230

*Temperatures are approximate.

8.1.4 Process Temperature

Low temperature alarms are provided to alert the operator to a low temperature off-normal condition which could potentially lead to the discharge of free water. These alarms are based on a percent (%) deviation from set point, typically $\pm$ 10°F. The percent deviation permitted can be adjusted in the field up to + or - 25% (+ or - 75°F) of the instruments range.

If off-normal conditions persist for two minutes, the extruder/evaporator is automatically tripped to prevent free water from being discharged into the container. Free water cannot be discharged in the interim, because the residual heat of the extruder/evaporator itself is sufficient to effect evaporation. The foregoing controls/interlocks are provided to prevent the discharge of free water to the container. The temperature profiles specified above have been proven by experiment to yield residual total moisture content in the product of 1% by weight for waste concentrates (inorganic salts) and 10% by weight for bead resins. This margin provides assurance that free water cannot be discharged under normal circumstances. Under upset or off-normal conditions, discharge of free water is prevented by the low temperature process interlocks.

Temperature profiles will be logged every two hours of equipment operating run time. See Figure "D".

8.1.5 Minimum Functional Components

In support of maintaining the four major process parameters;

- Process Temperature
- Asphalt Type
- Mixture Ratio
- Oil Content

and, to assure a stable waste form consistent with the guidance of the PCP, operators will ensure that the following list of equipment is available, as a minimum, prior to beginning processing:

- closed circuit television system at the asphalt loading stations;
- all temperature profile monitoring instrumentation with calibration;
- the asphalt and waste metering equipment are operational; and
- all radwaste sampling stations.

Wastes will not be processed through the extruder/evaporator, when any of the above equipment is inoperative.

8.2 High Integrity Containers

NMP2 will also use a high integrity container (HIC) for dewatering to satisfy the stability requirements. Each HIC used will have a certificate of compliance available and dewatering procedures based on an NRC approved vendor process control program or "Topical Report" will be a part of N2-WHP-4 Cask Loading procedures. Documentation of adherence to these procedures shall be kept as records.

8.3 Oil Solidification

Contaminated oils will be stored in containers at designated areas within the plant. A vendor with an approved process control program that is acceptable at the burial sites will be used to solidify the oil. An operating procedure for the portable oil solidification system will be established as N2-WHP-10A. A sample production level process control program will be established as N2-WHP-10B.

8.4 Temporary Radwaste Processing (Contracted Vendor)

In the event NMP2 requires the services of a contracted vendor to temporarily process and package radwaste on site, NMPC will obtain the services of an NRC approved vendor demonstrating their commitment to 10CFR61 stability requirements. The vendor must demonstrate that they have completed Class B and C testing or provide a schedule of completion. Vendor must have an approved procedure to process Class "A" waste.

After fuel load an engineering review, per 10 CFR50.59 of the subject topical report procedure or program will be performed to assure that vendor operational requirements are compatible with NMPC system and licensing commitments.

All vendor procedures will be reviewed and approved as required by Site Administrative Controls. The operating procedure for the vendor solidification will be approved. A production sample level process control procedure shall be implemented. The vendor shall be provided samples per 2WSS-OP-41 and N2-CSP-14.

8.5 DRY ACTIVE WASTE (DAW)

NMPNS Procedure No. N2-WHP-12, "Solid Dry Waste Collection and Compaction", describes the proper and safe steps required to collect and prepare low specific activity DAW for offsite shipment. Procedure No. N2-WHP-11, "Process Control DAW", assures the process control of Dry Waste Collection and Compaction by identifying those items which most directly influence the quality of the end product. All dry active waste is examined before

8.5 DRY ACTIVE WASTE (DAW) (Cont'd)

compaction, and any liquids or items found that would compromise the integrity of the package or violate the burial site license and/or criteria are removed and separated as specified in this procedure. Dry active waste is shipped in containers that meet the transport requirements of 49CFR173.425. At times, radiation limits preclude disposing of DAW in LSA boxes or drums, and this waste is disposed of in liners per Procedure No. N2-WHP-4.

9.0 SAMPLING

All the various sources of wastes are directed to one of two final tanks. These tanks are the evaporator bottoms tank (Tk10) and the waste sludge tank (Tk8). When ready to process waste from one or the other of the above sources, the tank's contents are isolated from further input, recirculated and Tk8 agitated to ensure a homogeneous mixture. Once these tanks are isolated, no further waste is added and a batch number will be assigned per the operator work sheet. Figure "C"

Before processing, a sample of each batch is obtained from the tank in accordance with Operating Procedures N2-IOP-41 - Asphalt Solidification Operating Procedure and N2-CSP-14 - Solid Radwaste Surveillance. The samples are analyzed and the sample data form in N2-CSP-14 is completed. Chemistry personnel will determine the chemical and radionuclide content of each sample in accordance with the procedures as listed. After the sample is analyzed, the operator will complete the "Operator Work Sheet" per instructions and complete the "Temp Profile Log" (Figure "D") during processing. After collecting the feed rate data from the chemistry department, the operator will select the given feed rates for introduction into the extruder/evaporator.

Should circumstances result in interruption of a batch, the source tank will be isolated and remain so until processing can resume.

10.0 WASTE CLASSIFICATION

The minimum waste characteristic requirements identified in 10CFR61.56(a) shall be satisfied via implementation of Procedure S-RP-6.

The NMP2 PCP assures that wastes determined acceptable for near surface disposal are properly classified for the purpose of segregation at the disposal site. Waste classification is performed consistent with the guidance provided in the Branch Technical position pertaining to Waste Classification and is based upon the concentration of certain radionuclides in the waste form as given in 10CFR parts 61.55 and 61.56.

10.0 WASTE CLASSIFICATION (Cont'd)

The methods utilized by NMP2, and the frequency for determining the radionuclide concentration of the final waste form is conducted in accordance with NMP2 Procedure For Solid Radwaste Sampling, N2-CSP-14. Classification will be performed in accordance with S-RP-6, Packaging and Transportation of Radioactive Material. Chemistry and Rad Protection assume these responsibilities.

11.0 ADMINISTRATIVE CONTROLS

This section of the NMPC PCP describes administrative controls as they relate to quality assurance, training, documentation, and record keeping programs implemented by the PCP.

Administrative controls are utilized to ensure that all processing is performed in accordance with the guidelines set forth in the PCP. Management controls are established for the safe operation of NMP2.

11.1 Quality Assurance

Implementation of the Operational QA program is assured by ongoing review, monitoring and audit functions in accordance with the Applicable NMPC Quality Assurance Department Procedures.

The administrative controls designed to prevent solidified waste forms from being released for shipment prior to test sample verification of acceptability require QA to verify that a sample record sheet has been properly executed for each waste batch prior to processing.

The Manager - Nuclear QA, operations has the authority to stop work when significant conditions adverse to quality require action.

The Nuclear QA program assures compliance with the waste classification and characterization requirements of 10CFR61.55 and 10CFR61.56.

With respect to waste characterization, the requirements of 10CFR 61.56 are intended to provide stability of the waste. Stability is intended to ensure that waste does not structurally degrade and affect overall stability of the waste disposal site. The auditing function of the Nuclear QA program assures that stability requirements are achieved in accordance with 10CFR61.

In the event a vendor is contracted to perform temporary radwaste services, the Nuclear - QA program requires management review of the vendor procedure. The purpose of this review is to assure that vendor operation and requirements are compatible with responsibilities and operation of NMP2.

11.2 Training

A training program is being implemented for personnel having responsibilities related to waste processing operations. The results of this training program shall ensure that waste processing is performed within the specific requirements of the PCP. To accomplish this objective and to provide the necessary control of the solid waste processing the following training programs will be implemented.

11.2.1 Radwaste Operations Unit 2 Plant Training Program -

A. These programs are designed to provide competent, trained personnel. During classroom instruction, each operator must qualify by completion of the described course with an average grade of 80 or above. On-the-job training, in conjunction with classroom instructions, will ensure that each radwaste operator maintains an acceptable level of skill and familiarity associated with radwaste controls and operational procedures. Due to the involvement of radwaste operators in the start-up of NMP2 radwaste systems, the experience gained will suffice for the on-the-job training requirement. The training procedures are detailed in the Nuclear Department Training Manual. (N2-NTP-13)

This training includes familiarity with the following radwaste components or related systems.

- LIQUID - Drains, collection tanks with sub systems, waste and regeneration evaporators, seal water
- SOLID - Extruder-evaporator and associated support systems
- LWS - Computer operation and interfaces
- Waste handling procedures for packaging and shipping of radioactive material
- Condensate demineralizer system
- Spent fuel and phase separators subsystem
- Steam supplies

11.2.1.1 Chemistry and Radio Chemistry Technicians will be trained per S-NTP-1 (Training and Retraining of Chemistry Radio Chemistry/Technician).

11.2.1.2 Rad Protection Technicians will be trained per S-NTP-14 (Training and Retraining of Radiation Protection Techs).

11.2.2 Training Schedule

The formal classroom Radwaste training program is scheduled for approximately twelve weeks. Depending on the needs of the plant staffing, this program could cover a continuous twelve week cycle or become part of the NMP2 normal rotating shift schedule which would cover one full year.

11.2.3 Personnel Retraining

Personnel will be retrained on an annual basis to identify individual needs for retraining. Personnel demonstrating a significant deficiency in a given area of knowledge and proficiency may be placed into a remedial training program. This program is specifically structured to upgrade knowledge and skills identified as deficiencies. Successful completion of the accelerated training program is evaluated by a written and/or oral examination.

The Requalification Training Program will cover fundamental review of system modifications, revisions of procedures, and changes or experiences in the nuclear industry.

11.2.4 Training Records - The training records shall be maintained for audit and inspection purposes. These records are considered permanent records and shall meet the applicable requirements of "Requirements for Quality Assurance Records for Nuclear Power Plants" and AP 9.0 (Administration of Training).

11.3 Documentation Control and Record Retention

QA program audits of waste classification records are performed on a periodic basis. Management evaluation of such audits shall be performed and as such satisfy the requirements of 10CFR20.311 (d)(3).

Audits of the Radwaste operating procedures shall be performed by the Quality Assurance Department at a minimum of once per 24 months. Changes to operating procedures shall be reviewed on an as required basis by Nuclear - QA in parallel with the NMPC Operations Review.

All Waste Management Records shall be maintained per Administrative Procedures.

11.4 REVISION TO THE PCP

Proposed revisions to the NMP2 PCP will receive approval. These revisions may be initiated as a result of proposed plant operations and betterment initiatives, system design changes, maintenance requirements, ALARA concerns or temporary vendor interfaces.

The PCP, if revised, shall be submitted to the NRC.

11.5 Shipping Manifest (See Figures E and F)

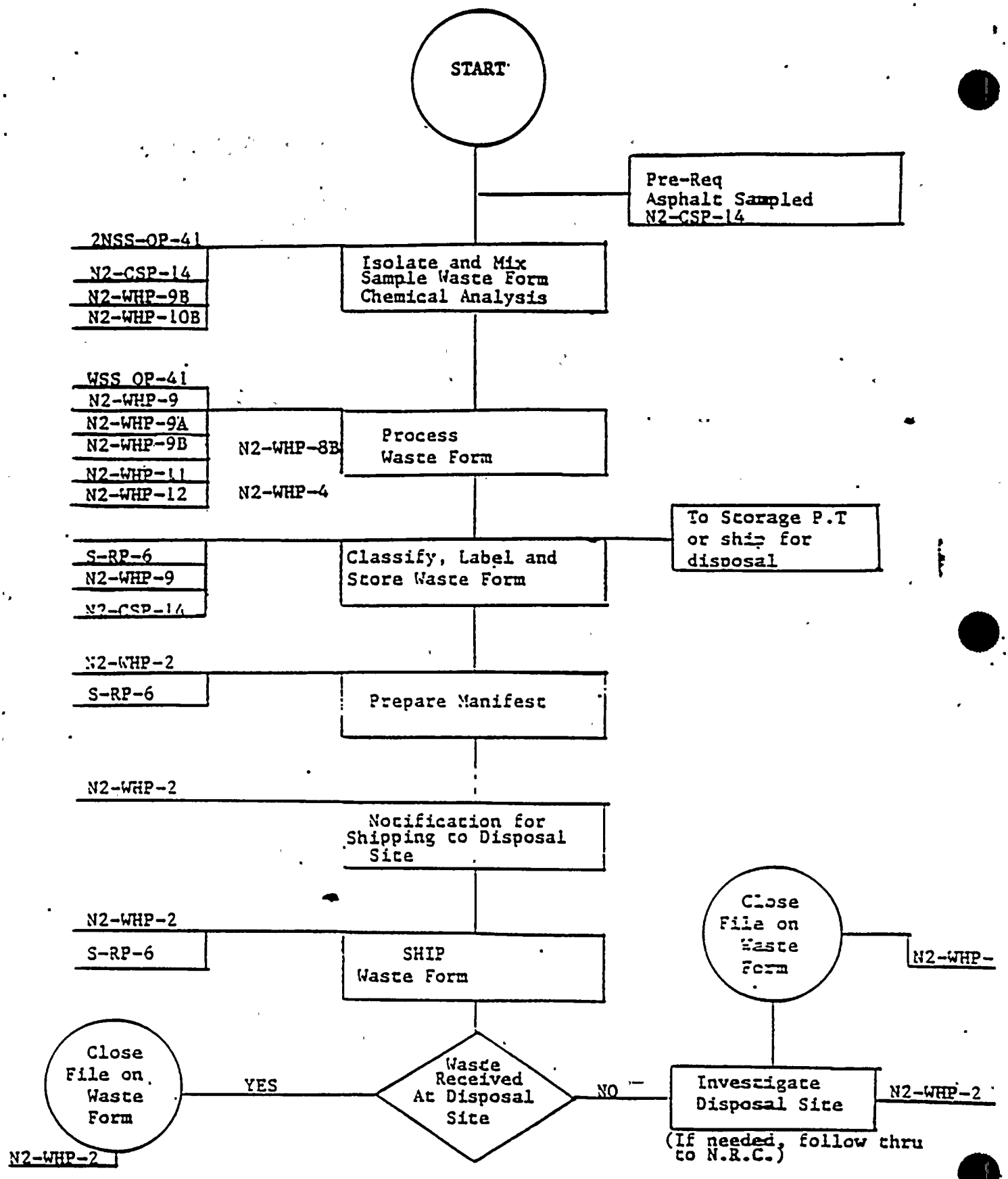
- All shipping manifests will be completed and tracked to satisfy the requirements in 10CFR20.311 per Waste Handling Procedures.

- Radwaste Management will monitor the status of Manifest per N2-WHP-2, Section 6.9.

11.6 Temporary Storage

Any solid radwaste material that is to be temporarily stored while awaiting shipment in an area other than one in which such material is designated to be stored will be done in accordance with AP-7.2.

PROCESS CONTROL FLOW PATH (FIGURE A)



FLOW SCHEMATIC (Figure B)

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Figure C

10.2 Operator Worksheet

10.2.1 Batch Number _____ Date _____

A batch is considered (1) a sampled Sludge TK, or (2) a sampled EVAP bottoms tank with no waste being added to the tank during the processing of that batch.

NOTE: Batch number will consist of; BA (Batch Asphalt), year, and a four digit successive number, (beginning with 001).

Ex. BA (Unit) 84 (Year) 001 (Batch Number)

10.2.2 Type of Waste Resin/Filter Media _____ Concentrate Waste _____

A) Waste Temperature _____ °F
B) Rad Level _____
C) Specific Gravity _____
D) pH _____
E) % Oil _____
F) % Solid _____
G) Activity _____
μCi/ml _____

10.2.3 Feed Flow Settings

10.2.3.1 Asphalt Feed Flow Settings _____

10.2.3.2 Waste Feed Flow Settings _____

10.2.4 Radioactive materials classification _____
A) Radioactive materials LSA _____
B) Other _____

10.2.4.1 Waste container labeled in respect to S-RP-6. _____

NOTE: Labels with the appropriate data will be supplied to the Radwaste Operator by the Radiation Protection Department/Chemistry Department. The operator must label container.

10.2.5 Radioactive waste classification _____

A) Class A Waste _____
B) Class B Waste _____
C) Class C Waste _____.

10.2.5.1 Waste container labeled in respect to S-RP-6. _____

NOTE: The radwaste operator will receive labels and marking from the Radiation Protection Department. The radwaste operator will label containers.

Figure D

10.3.1 Temperature Profile Log

Record of Temperature in Degree °F every two hours of run time for a particular batch.

TYPE OF WASTE_____
BATCH NUMBER_____
START TIME_____

Batch #	1	2	3	4	5	6	7	Initials/Time
Normal Temp. Sludge	165	265	300	330	375	375	350	
Normal Temp. Conc. Waste	165	265	385	300	285	285	230	
After 2 Hours								
After 4 Hours								
After 6 Hours								
After 8 Hours								
After 10 Hours								
After 12 Hours								
After 14 Hours								
After 16 Hours								
After 18 Hours								
After 20 Hours								
After 22 Hours								
After 24 Hours								

10.3.2 Did temperature profile remain within limits?_____

NOTE: The temperature profile should be monitored constantly but must be logged every two hours.

BARNWELL WASTE MANAGEMENT FACILITY

Operated by: CHEM-NUCLEAR SYSTEMS, INC.

GENERATOR NAME ____________________

USE THIS NUMBER ON ALL CONTINUATION PAGES VOLUME ALLOCATION NO

CONTINUATION SHEET

PAGE ____ OF ____

(16) ITEM NO	(17) RADIO NUCLIDE EACH CONTAINER	(18) PERCENT OF ACTIVITY EACH NUCLIDE	(19) ACTIVITY EACH CONTAINER (mCi)	(20) PHYSICAL FORM	(21) CHEMICAL FORM AND NAME & % OF CHELATING AGENT	(22) WASTE DESCRIPTION	(23) WASTE FORM CLASS	(24) STABILITY CLASS (S U)	(25) SPECIAL NUCLEAR MATERIAL (grams)	(26) SOURCE MATERIAL (pounds)	(27) DISPOSABLE CONTAINER WEIGHT (pounds)	(28) DISPOSABLE CONTAINER VOLUME (Cu. Ft.)	(29) CONTAINER TYPE	(30) RADIATION LEVELS CONTAINER (11) SURFACE ☐ mR/HR ☐ R/HR	(30) RADIATION LEVELS CONTAINER (11) 1 METER mR/HR	(31) CONTAMINATION CONTAINER SURFACE (DPM/100cm2) Alpha Beta Gamma	(32) DOT SUB TYPE (A1, A2, LSA, etc.)	(33) FISSILE CLASS	(34) LABELS/MARKINGS USED
																			Radioactive –
																			Radioactive –
																			Radioactive –
																			Radioactive –
																			Radioactive –
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					PAGE TOTALS														

Form No CNS 201
(9-83)

DISPOSAL SITE COPY

FIGURE E

GENERATOR NAME
ADDRESS
CITY / STATE / ZIP
CONTACT / PHONE
USER PERMIT # / SHIPMENT #

BILL DISPOSAL CHARGES TO
NAME / PURCHASE ORDER #
ADDRESS
CITY / STATE / ZIP

US ECOLOGY, INC.

EXECUTIVE OFFICE: (502) 426-7160
P.O. BOX 7246 • LOUISVILLE, KENTUCKY 40207

(2) AGENT/BROKER
BROKER'S US ECOLOGY #
ADDRESS
CITY / STATE / ZIP
CONTACT / PHONE
BROKER SHIPMENT # / BROKER USER PERMIT #

Broker's Authorized Signature Acknowledging Waste Receipt / Date

☐ P.O. BOX 638, Hanford Reservation, Richland, WA 99352
☐ P.O. BOX 578, Beatty, NV

☐ OTHER
CONTACT
ADDRESS
CITY / STATE / ZIP
PHONE

(3) CARRIER / SHIPPING DATE
CARRIER EPA # (if any)
ADDRESS
CITY / STATE / ZIP
PHONE
CASK TYPE / CASK SURFACE EXPOSURE RATE mR/hr

TOTAL FOR EACH CLASS # OF PACKAGES	WEIGHT (Pounds)	PROPER SHIPPING NAME & HAZARD CLASS (PER 49 CFR 172.101)	ID NUMBER
		Radioactive Material, empty packages	UN2908
		Radioactive Material, fissile, n.o.s. – Radioactive Material	UN2918
		Radioactive Material, low specific activity, n.o.s. – Radioactive Material	UN2912
		Radioactive Material, n.o.s. – Radioactive Material	UN2982
		Radioactive Material, limited quantity, n.o.s. – Radioactive Material	UN2910
		Radioactive Material, special form, n.o.s. – Radioactive Material	UN2974
		Radioactive Material, instruments and articles – Radioactive Material	UN2911
		Thorium Nitrate – Radioactive Material	UN2976
		Uranyl Acetate (RQ-5000/2270) – Radioactive Material	NA9180
		Uranyl Nitrate, solid (RQ-5000/2270) – Radioactive Material	UN2981

SHIPMENT TOTALS (DO NOT WRITE IN SHADED AREAS)

VOLUME (cu ft)	TOTAL # OF PACKAGES	SOURCE MATERIAL (kgs)	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	PLUTONIUM	TOTAL

ACTIVITY

ACTIVITY TOTALS: ☐ Curies ☐ Millicuries (10CFR20.311)	TRITIUM	C-14	Tc-99	I-129	ALL ISOTOPES

(4) THIS IS TO CERTIFY THAT THE HEREIN 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 AND ARE IN COMPLIANCE WITH ALL REQUIREMENTS APPLICABLE AT THE DESIGNATED DISPOSAL SITE AND THAT THE MATERIALS ARE CLASSIFIED AND DESCRIBED IN ACCORDANCE WITH THE REQUIREMENTS OF 10CFR, PART 61 AND PART 20.311 OR EQUIVALENT STATE REGULATIONS.

Authorized Signature / Title / Date

TERMS AND CONDITIONS

TITLE: Upon inspection and acceptance at the disposal site by US Ecology and all appropriate regulatory authorities, title to the Waste which conforms to Company's representations herein shall thereupon transfer from the Customer and be vested in US Ecology.

WASTE PRODUCTS: Customer represents and warrants that data set forth in this Radioactive Waste Shipment & Disposal Manifest is true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and the designated facility license.

INDEMNIFICATION: Customer agrees to indemnify US Ecology, its officers, employees and agents against all loss and liability whatsoever if such loss or liability results from the failure of the Waste to conform in all material respects to the data supplied on the Radioactive Waste Shipment & Disposal Manifest or this shipment fails to meet standards prescribed by the Department of Transportation or any other governmental agency having jurisdiction over such matters.

FOR US ECOLOGY'S USE ONLY

TYPE OF CONTAINER	CONTAINER VOLUME CU FT.	# OF PKGS	CU FT PER CONTAINER TYPE
DRUMS			
OVERPACK			
55	7.50		
30	4.01		
5	0.67		
OTHER			
BOXES			
1st SIZE			
2nd SIZE			
3rd SIZE			
CASK LINERS			
OTHER			
OTHER			
SHIPMENT TOTALS			

LOAD EVALUATION

CHECK ALL THAT APPLY TO THIS LOAD. DESCRIBE INADEQUACIES IN COMMENT SECTION
☐ Manifest Waste Description Inadequate
☐ Contamination or Leakage Detected
☐ Unexpected Exposure Rates Detected
☐ No Violations Detected on this Load
☐ Bracing Inadequate
☐ Labels, Markings, etc. Inadequate
☐ Container Integrity Inadequate
☐ Other

DESCRIBE THE EXTENT OF ANY VIOLATION CHECKED ABOVE AND THE REMEDIAL ACTION TAKEN

☐ CHECK HERE IF A SUPPLEMENTAL REPORT IS ATTACHED

BURIAL DATA

Date Received
Date Disposed
Trench No.
( ) This material meets licensed limits
( ) This material was disposed of in accordance with license
AUTHORIZED INITIALS

US ECOLOGY INVOICE #
US ECOLOGY CUSTOMER #
US ECOLOGY INVOICE DATE: MO DY YR
DISCREPANCY CODE(S)

BATES #

CONSIGNEE ORIGINAL COPY

(MUST ACCOMPANY WASTE IN TRANSIT)

FIGURE F

PROCEDURES WHICH IMPLEMENT THE PCP

Waste Handling Procedures (WHP's)

N2-WHP-1 "Required Documentation Concerning Packaging and Shipping of Radioactive Wastes"

N2-WHP-2 "Paperwork for Radioactive Waste Shipments"

N2-WHP-3 "Cask Handling Procedure"

N2-WHP-4 "Cask Loading Procedure" (Liners for Dewatering)

N2-WHP-6 "Van Handling Procedure"

N2-WHP-7 "Van Loading Procedure"

N2-WHP-9 "Process Control for Asphalt Systems"

N2-WHP-9A "Operating Procedure Vendor Solidification"

N2-WHP-9B "Process Control (Sample Production) Vendor Solidification"

N2-WHP-10B "Operating Procedure Oil Solidification"

N2-WHP-11 "Process Control DAW"

N2-WHP-12 "Solid Dry Waste Collection and Compaction"

N2-WHP-8A "Flat Bed Handling Procedure"

N2-WHP-8B "Flat Bed Loading Procedure"

NOTE: Procedures N2-WHP-8A & N2-WHP-8B shall be used for Dewatering and Solidification in large liners unless dose rates dictate that cask will be used.

Radiation Protection Procedures (RP's)

S-RP-1 "Access and Radiological Control"

S-RP-2 "Radiation Work Permit Procedure"

S-RP-3 "Performance of Radiological Surveys"

S-RP-4 "Picking Up, Receiving and Opening Packages Containing Radioactive Materials"

S-RP-5 "Radiation and Radioactive Contamination Control"

S-RP-6 "The Packaging and Transportation of Radioactive Material"

Chemistry Procedures

N2-CSP-14 "Solid Radwaste Surveillance"

FIGURE G

PROCEDURES WHICH IMPLEMENT THE PCP

Quality Assurance Procedures (QAPs)

QAP-10.03 "Quality Assurance Department Surveillance Activities for Operations"

QAP-10.30 "Quality Assurance Department Inspection Activity"

QAP-18.10 "Quality Assurance Department Activity"

Operating Procedures

2WSS-OP-41 "Asphalt Solidification Operating Procedure"

2LWS-OP-40 "Liquid Radwaste Operating Procedures"

Site Administrative Procedure

AP-10.1 "Management of Station Records"