PUBLIC SERVICE ELECTRIC & GAS COMPANY

PROCESS CONTROL PROGRAM

HOPE CREEK GENERATING STATION

Revision 0
July 1985

TABLE OF CONTENTS

TABLE OF CONTENTS (cont.)

1.0 PURPOSE

The purpose of the Hope Creek Generating Station (HCGS) Process Control Program (PCP) is to describe the envelope within which processing and packaging of Low-Level radioactive waste is accomplished and as such provide assurance of complete solidification of various radioactive "wet wastes" in accordance with the applicable portions of NRC regulations and guidance which includes the following documents:

- 10CFR61 "Licensing Requirements for Land Disposal of Radioactive Waste"
- 10CFR20 "Standards for Protection Against Radiation"
- 10CFR71 "Packaging of Radioactive Material for Transport and Transportation of Radioactive Material under Certain Conditions"
- 49CFR, "Transportation"
- NUREG-0800; Standard Review Plan Section 11.2 Liquid Waste Management System
- NUREG-0800; Standard Review Plan Section 11.4 Solid Waste Management System
- Branch Technical Position (ETSB) 11-3 "Design Guidance for Solid Radioactive Waste Management SystemsInstalled in Light Water Cooled Nuclear Power Reactor Plants"
- Branch Technical Position Papers pertaining to Waste Classification and Waste Form as transmitted to Commission Licensees in letter from Leo B. Higgonbotham, Chief Low-Level Waste Licensing Branch dated May 11, 1983.
- Werner & Pfleiderer Volume Reduction System Technical Manual; 10855-M137A-463.
- Werner & Pfleiderer Volume Reduction System Topical Report WPC-VRS-001 Revision 1, dated May 1978 (proprietary).
- Regulatory Guide 1.143 Rev. 0, Design Guidance for Radioactive Waste Management System, Structure, and Components Installed in Light-Water-Cocled Nuclear Power Plants.

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

- South Carolina Department of Health and Environmental Control, Radioactive Material License No. 097, as amended.

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

- State of Washington Radioactive Materials License #WN-I019-2, as amended, for Richland, Washington.

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

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

- State of New Jersey Regulations Applicable to Hope Creek Generating Station.

Toward this purpose, the Hope Creek PCP ensures that the solidified waste form maintains structural integrity in the form of a free standing monolith and has no more than 0.5% of the waste volume as free liquid. This criteria shall be met for all Class A waste as defined in the BTP on Waste Classification and Waste Form. This PCP will also ensure that solidification will be performed to maintain any potential radiation exposure to plant personnel "as low as reasonably achievable" (ALARA) in accordance with Hope Creek ALARA program procedures.

2.0 SYSTEM DESCRIPTION

The Solid Waste Management System (SWMS) collects, reduces the volume of, solidifies, and packages wet and dry types of radioactive waste in preparation for shipment offsite to a licensed burial site. The SWMS is designed to operate on a batch process basis. A block diagram of the Hope Creek SWMS is presented as Figure 1.

The SWMS accepts dry solid trash, evaporator bottoms from the concentrated waste tanks, and powdered and bead resin and filter media slurries from the waste sludge phase separator, cleanup phase separator, and the spent resin tank.

The resin and filter media slurries and concentrates are processed for preliminary volume reduction by removing the free water. Final volume reduction is accomplished in each of two (2) extruder-evaporators. The initial volume reduction process varies for each waste type, e.g., a centrifuge for resin slurries, and a crystallizer for evaporator concentrates. These radioactive waste products are further reduced in volume and mixed with asphalt in the extruder-evaporators.

Extruder-evaporator "A" receives dry cake discharge from the centrifuge or slurry feed from the centrifuge feed tank or concentrates from the crystallizer bottoms tank. Extruder-evaporator "B" receives slurry feed from the centrifuge feed tank, and concentrates from the crystallizer bottoms tank.

The extruder-evaporators mix the waste streams with asphalt at approximately 1 gpm at 325°F (supply temperature). At this temperature, all remaining water is evaporated. The extruder-evaporators through their kneeding and mixing action also compact the waste and asphalt, producing a denser product. The waste and asphalt mixture is deposited into a 55 gallon drum.

The solid radwaste monorail hoist places empty drums on the turntables, which position the drums for filling under the extruder-evaporator discharge ports. The same monorail hoist removes filled drums from the turntables. The filled drums are placed on a conveyor and guided to a capping-swipe station. At this location, the drums are capped, swiped, and labeled. Radiation readings are also taken. The drums are then conveyed to the truck bay where they are placed in the temporary storage area located in the north part of the auxiliary building by the storage area bridge crane. This facility provides for over 30 days of storage space, prior to shipment offsite.

The radwaste area (Auxiliary Building) ventilation systems (Figure 2) are arranged as follows:

- Outside air supply to the areas designated as solid radwaste consisting of two one-half capacity trains with low efficiency and high efficiency filters.

- outside air supply to the balance of the radwaste areas in the Auxiliary Building, consisting of two one-half capacity trains with low efficiency and high efficiency filters.

- ventilation of all tanks in the radwaste system. This consists of two trains of low efficiency prefilters, HEPA filters, charcoal absorbers, fire protection nozzles, and high efficiency after-filters.

- ventilation of the extruder-evaporator rooms consisting of one train of pre-filter, charcoal and HEPA filters for each.

- ventilation of the radwaste trash compactor through a HEPA filter.

The solid radwaste area exhaust, compactor exhaust and exhaust from the extruder-evaporators are directed to the filter trains dedicated to this area. This train consists of two one-half capacity low efficiency and HEPA filters after which is the north plant vent.

The tank exhaust is directed to the exhaust filter trains for the balance of radwaste. These consist of three one-third capacity units with low efficiency and HEPA filters. This flow is directed to the south plant vent.

3.0 WASTES SOURCES

3.1 Equipment Drains Filter and Demineralizer

This subsystem processes high purity waste from piping and equipment containing high quality water in the Reactor Recirculation System, Condensate System, Feedwater System, low conductivity rinse water from regenerations, etc. The waste is processed through a filter, coated with a powdered resin product and a deep-bed demineralizer.

After a batch of processed water is collected in a sample tank, a sample is taken and analyzed. If it meets water quality requirements, the water is transferred to the condensate storage tank. If the batch does not meet water quality or radiological concentration specifications, it is reprocessed.

3.2 Floor Drains Filter and Demineralizer

This subsystem processes waste the same as the equipment drain subsystem, except that the waste to be processed is of lower purity. This waste is from floor drains, drains from the fuel pool cooling system and the RHR system flush. After a batch of processed water is collected in a sample tank, a sample is taken and analyzed. If it meets water quality requirements, the water is transferred to the condensate storage tank. If the batch does not meet water quality or radiological concentration specifications, it is reprocessed.

3.3 Decontamination Solution Evaporator

The Decontamination Solution Evaporator receives laboratory waste, decontamination solutions and sample drain waste which is collected in the chemical waste tank. These wastes are neutralized and if required, buffered with sodium phosphate, then processed by the Decontamination Solution Evaporator. The Decontamination Solution Evaporator is designed to concentrate to a 10% by weight solid concentration. The bottoms are then discharged to the decontamination solution concentrates waste tank. The bottoms are later discharged to the regenerative waste concentrates tanks for processing thru a crystallizer evaporator.

3.4 Regenerant Waste Evaporator

The regenerant waste evaporator receives regeneration solutions from the condensate demineralizer and radwaste deminralizer resin regenerations as well as inputs from the high conductivity sumps in the Turbine and Auxiliary Buildings. These wastes are neutralized and then processed by the regenerant waste evaporator.

The regenerative waste evaporator is designed to concentrate wastes to a 25% by weight solid concentration of sodium sulfate. The bottoms are then discharged to the regenerative waste concentrates tank, where it is processed thru a crystallizer evaporator.

3.5 Detergent Waste

The Detergent Waste System receives waste from laundry drains, personnel decontamination and the chemistry laboratory. These wastes which are normally low in radioactivity, are processed by filtration and then discharged to the circulating water blowdown line for dilution. If unsuitable for discharge (10CFR20 limits), the waste is processed through the decontamination solution evaporator.

3.6 Crystallizer Evaporator

The crystallizer evaporator processes the sodium sulfate waste in the waste evaporator concentrates tank. This waste is concentrated to a 50% by weight concentration and is discharged to the crystallizer bottoms tank. This tank is one of two of the final waste streams that are isolated, sampled and finally introduced for solidification into the asphalt extruder-evaporator.

3.7 Spent Resin Storage Tank

Exhausted resin from the twelve condensate deep-bed demineralizers and the two radwaste demineralizers are stored in this tank. Once sufficient resin is in the tank it will be transferred to the centrifuge feed tank. This is the second of the two final waste streams that is isolated, sampled, and finally introduced for solidification into asphalt extruder-evaporator "A".

3.8 Waste Sludge Phase Separator

This separator receives exhausted powdered filter coating from the fuel pool and radwaste filters, along with crud discharged from the ultrasonic resin cleaner.

The sludge, separated from the water, is transferred to the centrifuge feed tank.

3.9 Cleanup Phase Separators

These separators receive exhausted and fouled powdered resin from the Reactor Water Cleanup System.

The sludge separated from the water is transferred to the centrifuge feed tank.

3.10 Centrifuge Feed Tank and Centrifuge

Spent resin, fouled and exhausted powdered resin and crud from the spent resin storage tank and sludge separators are fed to this tank to be processed through the centrifuge. The feed tank recirculates the slurry to produce a homogeneous mixture. Once in a homogeneous form a sample is taken to determine the pH and the solids concentration of the slurry. The concentration measurement is used to set the metering pump flow rate for feeding to the centrifuge and on to the extruder-evaporator.

The centrifuge separates the carrier water from the resin/sludge phase separator. The remaining waste solids are discharged as a moist, solid to extruder-evaporator "A" via a vertical chute. The centrifuge can be bypassed, if inoperable, to feed the extruder-evaporators directly.

3.11 Extruder Evaporators

Extruder Evaporator A and B receive concentrates from the crystallizer bottoms tank and slurries from the centrifuge feed tank. Extruder Evaporator A is the only one to receive resin from the centrifuge.

The extruder-evaporators encapsulate a waste stream with asphalt at a temperature of approximately 325°F (supply). At this temperature the remaining water is evaporated resulting in a reduction in volume. The end product drips in a 55-gallon drum, where cooling and solidification occurs. The drums are then capped, swiped, labeled, and stored for shipment offsite.

3.12 Contaminated Oils

Oils will be collected and stored in 55 gallon drums. With a large enough volume on hand to economically justify, a contracted vendor will be brought in, with an approved topical report to solidify same.

3.13 Filter Cartridges and Miscellaneous Items

Filters and miscellaneous items, will be handled on a case by case basis, being disposed of by methods acceptable to the burial site.

3.14 Trash Compactor

Compactable low level trash will be processed and compacted in a hydraulic-operated box compactor. A 100 ft^3 container made of plywood and lined with galvanized steel is used for storing and shipping. The box compactor is equipped with an external HEPA filtration system.

4.0 PROCESS CONTROL

The process variables having a direct bearing on the properties of the final product which relate only to the ability to form a free standing monolith with no free water are described. Additional process variables such as pH, must be controlled to minimize corrosion within the system; however, since these variables do not affect the ability of the waste product to form a monolithic solid upon cooling, they will not be discussed herein.

In accordance with the foregoing limitations, the following variables influence the properties and consistency of the final solid product:

- Asphalt type;
- Waste chemical species being incorporated into the asphalt matrix;
- Ratio of waste-to-asphalt; and
- Process temperature.

4.1 Asphalt Type

Hope Creek 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 free standing monolith. Specification of Witco Pioneer 221, or an equivalent, is the means by which process control for asphalt quality is achieved. At Hope Creek, delivery of this asphalt will be sampled for product conformance.

4.2 Waste Chemical Species

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, are independent of the waste type.

A limit of 1 percent oil and organic contaminants in the waste feed stream is imposed for process control. Most oils found in a power plant waste stream are low viscosity fluids, which are liquid at room temperature. Based on calculations for a typical waste stream with 20 percent solids by weight and 1 percent oil, the total concentration of oil in the end product would be approximately 2.5 percent. This would lower the end product softening point by approximately 5° F; a negligible change.

4.3 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 that product during processing. The recommended ratios of waste-to-asphalt for each waste feed is as follows:

Feed	Ratio of Waste-to-Asphalt in the End Product
1. Evaporator Concentrates	45/55 to 50/50
2. Spent Resins (Bead or Powered)	30/70 to 50/50

Optimum value depends on type and quantity of contaminants present. For resins, the presence of fibrous additives may also influence product flow characteristics, and, therefore, waste loadings. 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 product 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 extruder-evaporator and the initial proportion of waste-to-asphalt flow. To do this, he must determine, by sampling, the solids contents of the waste feed. With the sample analysis, he need only consult the nomographs shown in Appendix B for proper feed control settings.

4.4 Process Temperature

A proper temperature profile along the length of the extruder-evaporator is required to provide adequate evaporative (process) capacity, and to assure that free water is not discharged from the machine. Typical process temperature profiles for all Hope Creek waste types are as follows:

WASTE TYPE	PROCESS TEMPERATURE (F)						
BARREL:	1	2	3	4	5	6/7	8
EVAPORATOR CONCENTRATES	85	190	250	250	250	320	280
SPENT RESINS (Centrifuge)	85	190	230	230	230	240	240
SPENT RESINS (Slurry)	85	190	240	240	240	270	270

Low temperature alarms are provided to alert the operator to a low temperature off-spec. condition which could potentially lead to the discharge of free water. These alarms are based on a percent(5) deviation from set point, typically 1/2-1% or 1-4° F. The percent deviation permitted can be adjusted in the field up to 10% (16-35 °F) of set point. While deviations of 10% will not result in free water in the product, this condition is the maximum deviation that should be tolerated since failure to hold this range indicates a problem with the equipment.

If an off-spec. condition persists for two (2) minutes, the extruder-evaporator and feed pumps are automatically tripped to prevent free water from being discharged into the container. Free water cannot be discharged in the interim, since 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 bead resins. This margin provides assurance that free water cannot be discharge under normal circumstances. Under upset or off-spec. conditions, discharge of free water is prevented by the low temperatures process interlocks.

4.5 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 insure 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.

- The asphalt and slurry metering equipment (pumps, valves, etc.).

- Crystallizer bottoms and centrifuge feed tank recirculation and agitation equipment.

- All sampling capabilities.

Batches will not be processed through the affected extruder-evaporator, when any of the above equipment is tagged out of service.

5.0 SAMPLING

From all the various sources of wastes, two final isolable tanks receive input. The crystallizer bottoms tank and the centrifuge feed tank are then recirculated and agitated to insure a homogeneous mixture. Once isolated nothing further is added.

A sample of each batch is obtained in accordance with operating procedures OP-SO-HC-004 and OP-SO-HC-005. The samples are analyzed and the sample data form (Figure 5) is completed. Chemistry personnel will determine the chemical and radionuclide content of each sample in accordance with the procedures as listed in Appendix A.

The system operators, utilizing the data form (Figure 5) and the nomograph (Appendix B) select appropriate feed rates for introduction into the extruder-evaporators.

The system will be operated until the entire batch is processed.

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

6.0 WASTE CLASSIFICATION

The eight minimum waste characteristic requirements identified in 10CFR61.56(a) shall be satisfied. The

Hope Creek 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.

The methods utilized by Hope Creek, and the frequency for determining the radionuclide concentration of the final waste form is conducted in accordance with Hope Creek Procedure RP-RW-ZZ-004 "Shipment of Radioactive Materials". Classification will be performed in accordance with this procedure.

7.0 TEMPORARY RADWASTE PROCESSING (CONTRACTED VENDOR)

In the event Hope Creek requires the services of a contracted vendor to temporarily process and package radwaste on site, PSE&G will obtain the services of a vendor with an NRC approved topical report.

An engineering review of the subject topical report will be performed to assure vendor operational requirements are compatible with Hope Creek system operations responsibility.

In all cases, safety will not be compromised and assurance that ALARA concerns are addressed will be the primary goal for any temporary radwaste system interface. The services and plant interfaces available may consist of, but are not be limited to the following:

1. Water flushing facilities
2. Drain-return "clean" liquids
3. Supply of spent resin
4. Concentrates; supply of sludge
5. Vent-off-gas thru HEPA filters
6. Air 90-115 psi
7. Electric - 120 amps/460 VAC 3 phase
8. Shielding (as required)
9. Health Physics support
10. Fire protection coverage
11. Communications

All vendor procedures will be reviewed by engineering and approved by SORC in accordance with SA-AP.ZZ-001(Q).

Technical Specification 3.11.1.4 limits will be observed.

8.0 ADMINISTRATIVE CONTROLS

This section of the Hope Creek 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 Hope Creek PCP. Public Service Electric and Gas is ulimately responsible for performing this function through the Hope Creek Operational Quality Assurance program. The responsibility of the Operational Quality Assurance program include the following:

- measures to assure control of activities affecting the function of structures, systems and components
- planned monitoring and audit program assure that specified requirements of the operational QA program are met
- coordinated and centralized quality assurance, direction, control and documentation as required by the applicable portions of 10CFR50 Appendix B are complied with
- management controls are established for the safe operation of Hope Creek

8.1 Quality Assurance

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.

Figure 3 illustrates the sequence of events in flow chart form, for the Hope Creek solidification process. In addition, this figure presents the applicable Hope Creek procedures employed for each step of the solidification process.

Figure 4 is the Operational Responsibility Chart for all radwastes systems.

Implementation of the Operational QA program is assured by ongoing review, monitoring and audit functions which fall under the direction of the General Manager - Nuclear Quality Assurance, who reports to the Vice President - Nuclear.

The authority vested in the General Manager - Nuclear QA is as follows:

- independence to interpret quality requirements
- identify quality problems and trends
- provide recommendation or solutions to Quality problems

The General manager - Nuclear QA 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 10CFR 61.56. With respect to waste classification, this is achieved by Nuclear - QA verifying proper adherence to waste classification procedures and review and verification of waste classification data sheets. A Nuclear - QA representative shall observe waste classification procedure adherence for a minimum single batch waste processing operation.

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 stability requirements are achieved in accordance with 10CFR.

In the event a vendor is contracted to perform temporary radwaste services, the Nuclear - QA program requires management review of the vendor topical report. The purpose of this review is to

assure that vendor operation and requirements are compatible with responsibilities and operation of Hope Creek. The contracted vendor shall comply with all QA described in this document.

8.2 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 SWMS, the following general training programs will be implemented.

8.2.1 Initial Plant Staff Training Program - These programs are designed to provide competent, trained personnel in all disciplines and at all levels of plant organization. The programs are designed to allow personnel to be placed at various points, according to their training, experience and intended position.

- Subsequent to class room instruction, each operator must qualify on each piece of Radwaste Equipment to obtain a Qualification Card.

- On-the-job training will ensure that each SWMS operator maintains an acceptable level of skill and familiarity associated with SWMS, controls and operational procedures.

- The training procedures are detailed in the Nuclear Department Training Manual.

This training includes familiarity with the following SWMS components:

Liquid - Drains, Filters, Collection Tanks and Sub-Systems

Solid - Extruder-Evaporators, Crystallizer and Sub-Systems

8.2.2 Continuing Training Program - A continuing training program for SWMS personnel, is developed and provides continuous training and upgrading of plant personnel. Continuing training in specific areas is provided to the extent necessary for personnel to safely and efficiently carry out their assigned responsibilities in accordance with established policies and procedures. The continuing training program shall run on an annual basis with all program requirements completed during the two year training cycle. The continuing training program will consist of two areas; lectures, which may consist of vendor presentations, technical training sessions, on-the-job work experience or programmed instruction, and continuing training examinations.

(1) The continuing training program will cover fundamental review and operational proficiency. Fundamental review training will be in system modifications, revision to procedures and incidents encountered during operations. Operational proficiency training will involve lectures that will focus on essential plant operational guidelines and changes or experiences in the nuclear industry.

(2) Continuing training examinations will be given to determine the SWMS operator's knowledge of the material covered, areas where additional training may be required and operational proficiency. These examinations should consist of written examination and/or oral examination.

- Personnel are evaluated on an annual basis where individual needs for retraining will be identified. 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 combination of formal training, on-the-job experience, and SORC approved procedures which include cautions and corrective actions should a malfunction or an out of boundary condition occur,will give assurance that control parameters within this PCP are maintained.

8.2.3 Replacement training - These programs are designed to provide qualified personnel for the station organization. The General Manager - Hope Creek Operations, or the designated representative, may waive portions of the training program for individuals based on their previous experience and/or qualifications.

The SWMS training records shall be maintained for audit and inspection purposes. These records are considered nonpermanent records and shall meet the applicable requirements of ANSI/ASME N45.2.9-1979 "Requirements for Collection Storage, and Maintenance of Quality Assurance Records for Nuclear Power Plants".

8.3 Documentation Control and Record Retention

Nuclear - 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 SWMS operating procedures shall be performed by the Nuclear - QA organization 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 Hope Creek Station Operation Review Committee

(SORC) in order to ensure continued compliance with the requirements and established process parameters of the PCP. These changes may be promulgated as a result of proposed plant operations and betterment initiatives, system design changes, maintenance requirements, ALARA concerns or temporary vendor interface.

Hope Creek shall utilize the PSE&G Radioactive Shipment Record Form as presented in Attachment 19 and 20 to Procedure RP-RW.ZZ-004 for manifest preparation (Appendix C). The information contained in the form includes the required information of 10CFR 20.311.

The tracking System for manifest preparation shall be in accordance with Procedures RP-RW.ZZ-004 "Shipment of Radioactive Materials" and RP-AP.ZZ-011 "Records Management and Retention Program". The retention period for these records is the life of the company.

9.0 REVISIONS TO THE PCP

Public Service Electric & Gas Company proposed revisions to the Hope Creek PCP will receive SORC 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 interface.

The PCP, if revised, shall be submitted to the NRC with the semi annual Radioactive Effluent Release Report.

Figure 1

HOPE CREEK SOLID RADWASTE BLOCK DIAGRAM

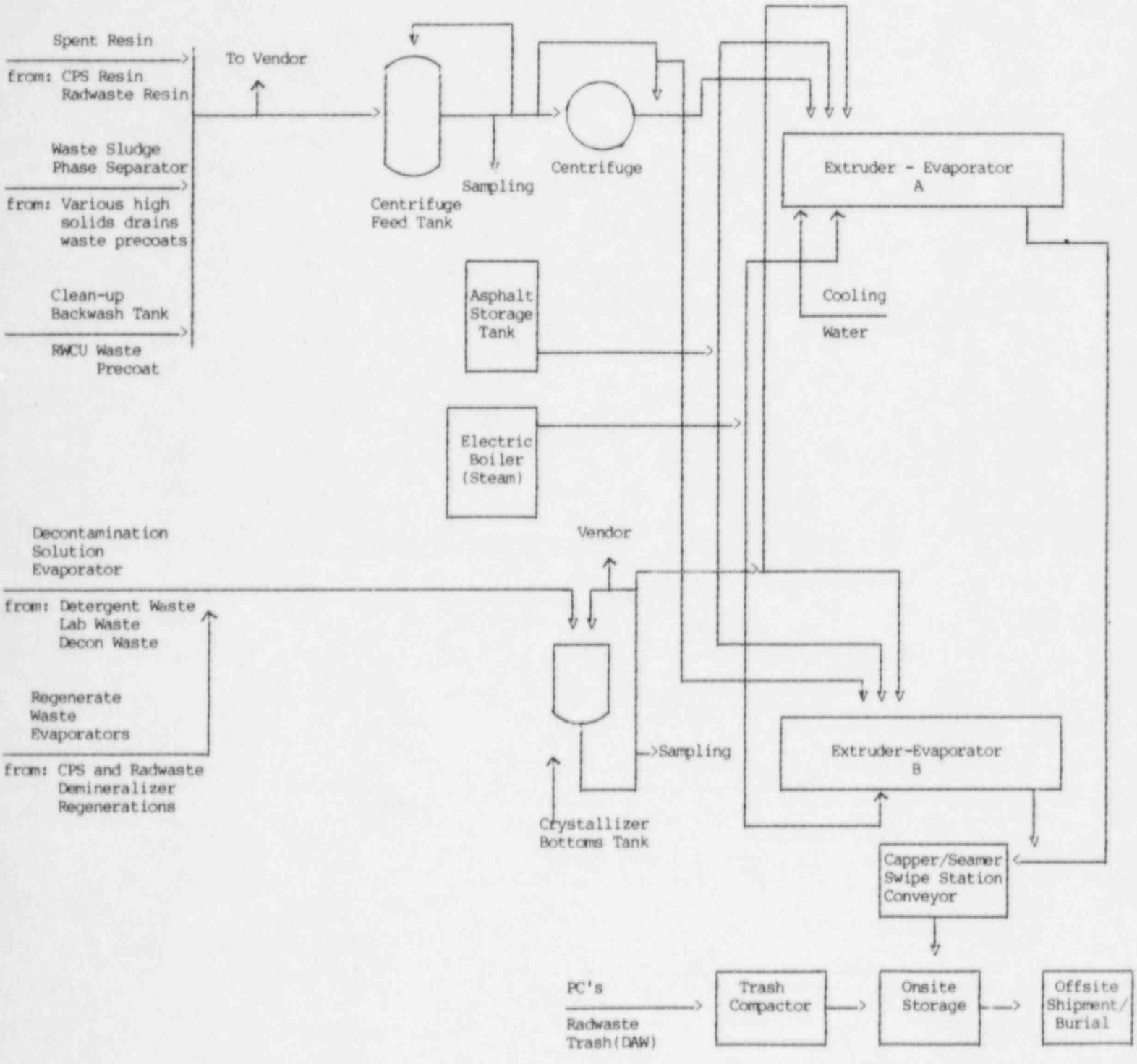


FIGURE 2

RADWASTE SUPPLY AND EXHAUST VENTILATION

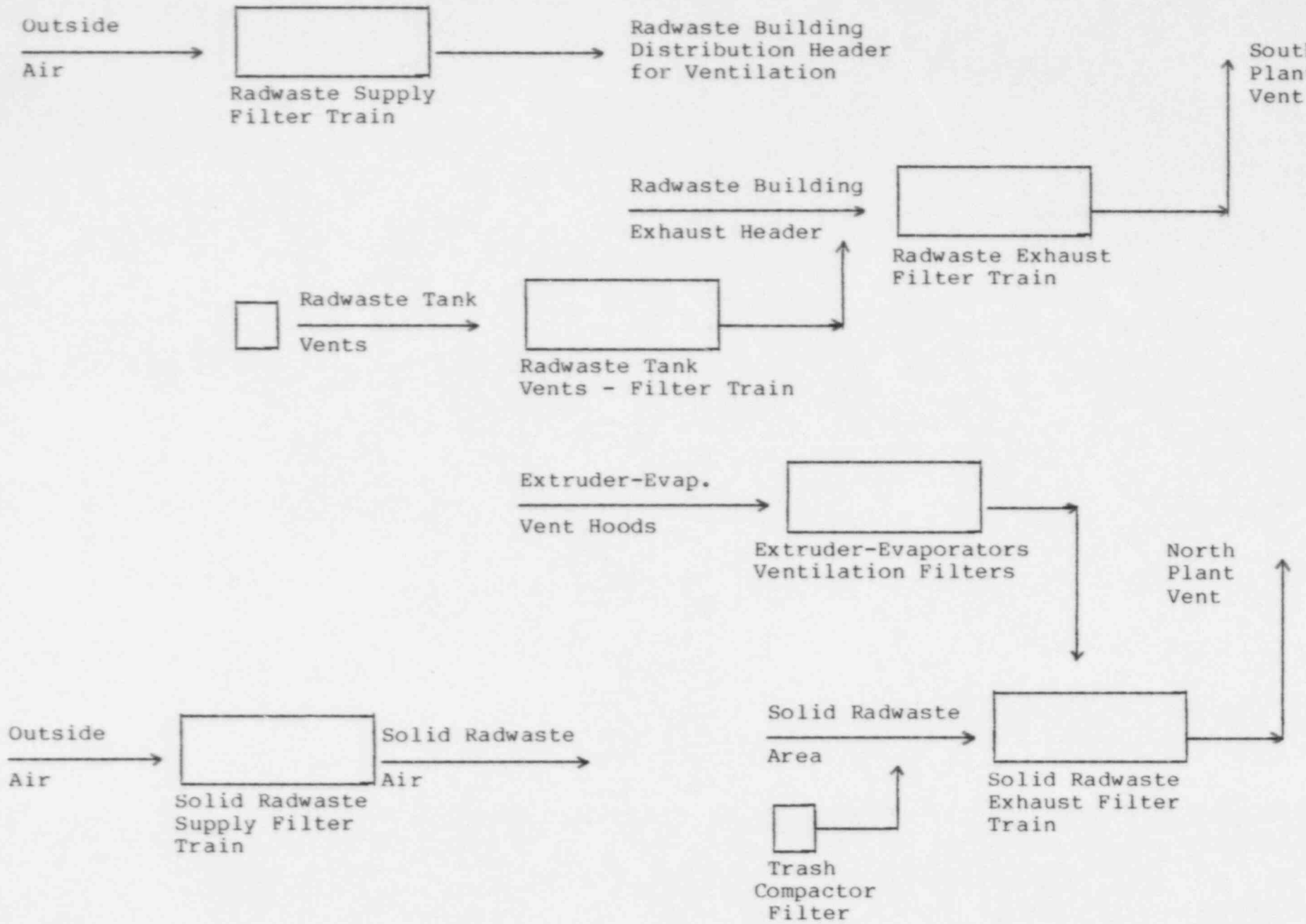


FIGURE 3

SEQUENCE OF EVENTS FOR
SOLID RADWASTE PROCESSING

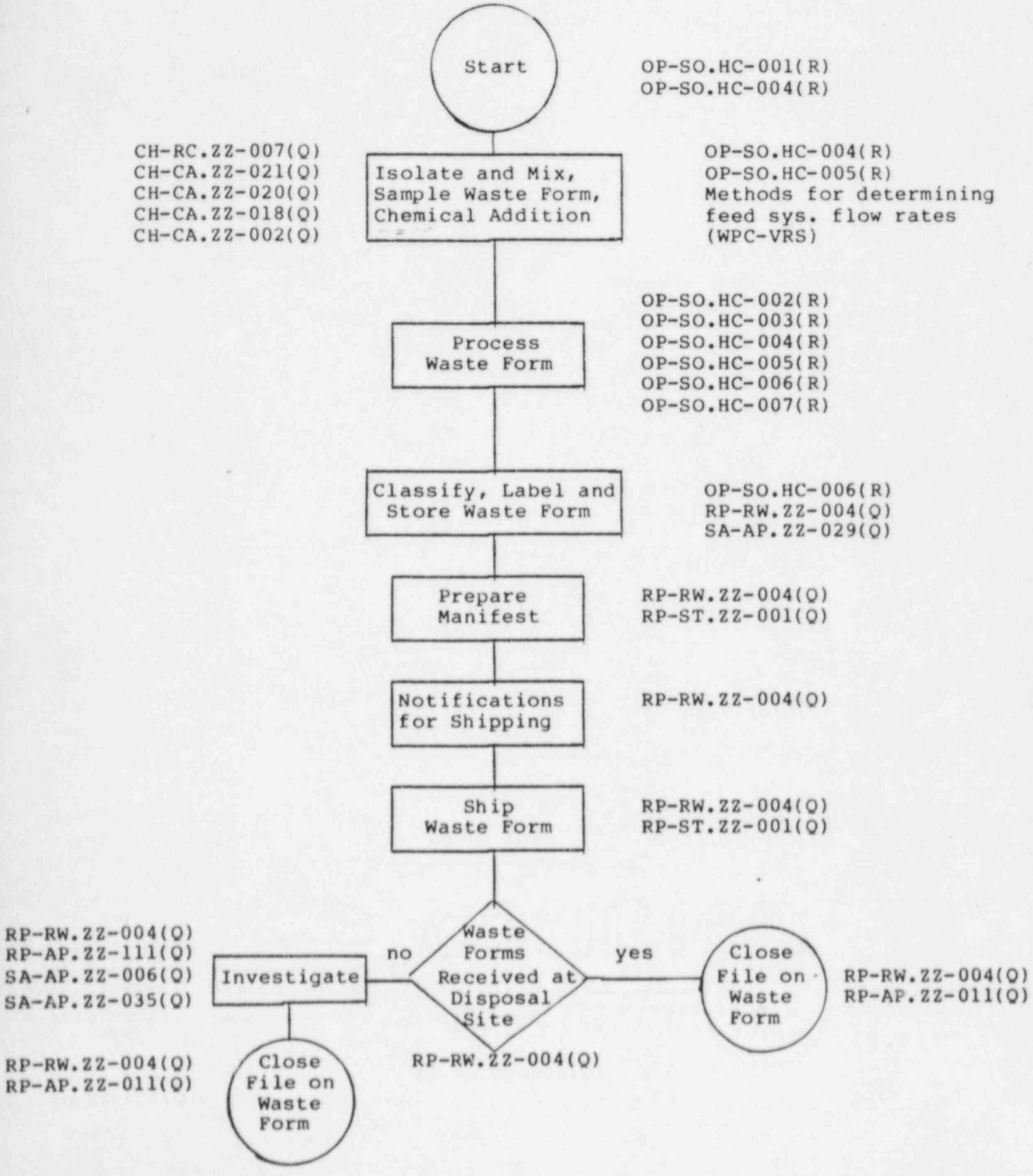


FIGURE 4

OPERATIONS RESPONSIBILITY CHART

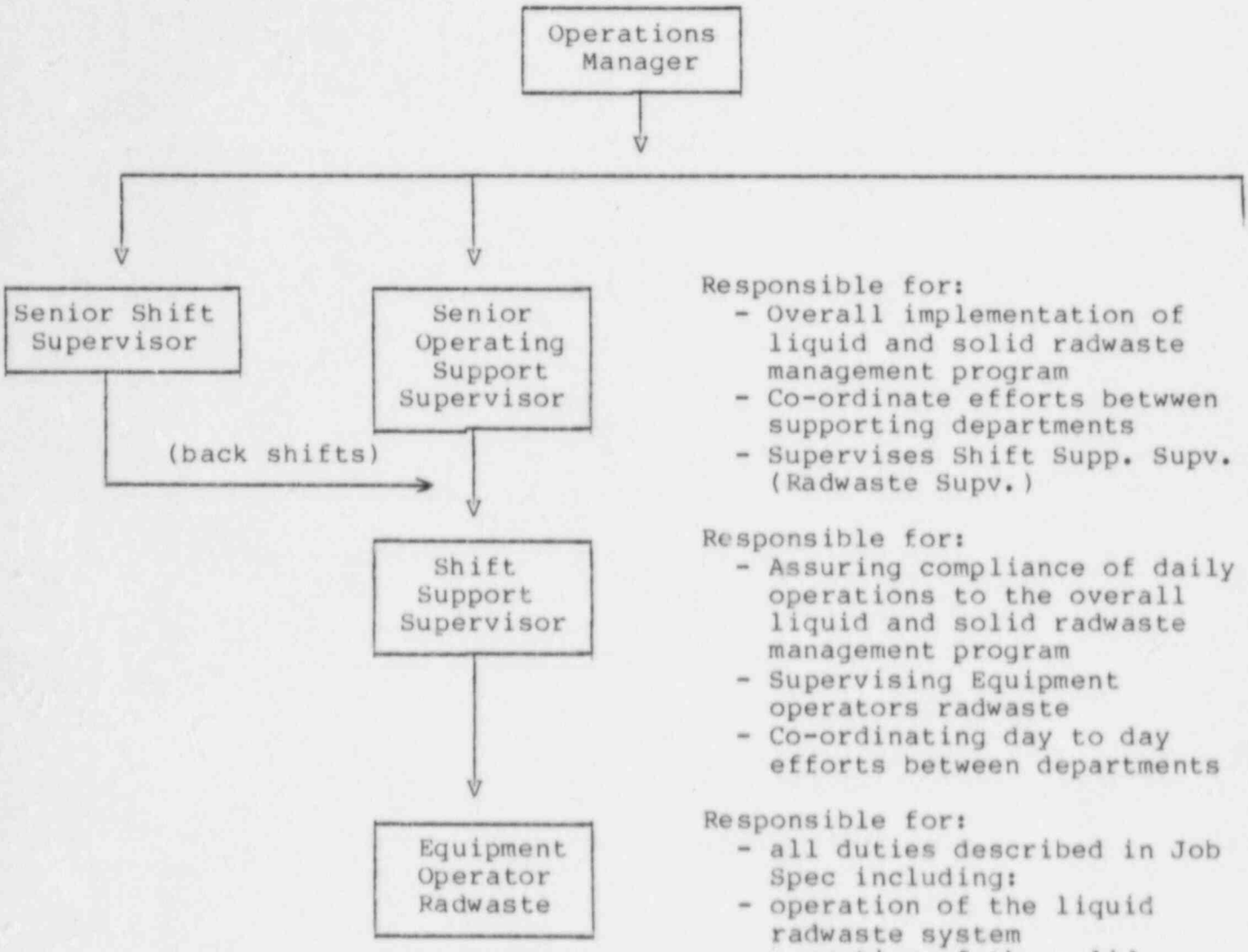


FIGURE 5

FORM
VRS. PROCESSING SHEET

DATE _____
TANK _____
BATCH NR._____
MIN. ASPHALT FEED_____gpm
MAX. WASTE FEED _____gpm

pH_____
% OIL_____
% SOLIDS_____
SP GRAVITY_____
TEMP._____

DRUM NO._____
TANK
START
LEVEL_____
START
TIME/DATE_____
INIT._____

TANK
STOP
LEVEL_____
STOP
TIME/
DATE_____
INIT._____

NOTE: Take readings once per hour, when necessary.

TIME	WASTE FLOW RATE (GPM)	ASPH FLOW (GPM)	DRUM LEVEL	TEMPERATURE PROFILE						
				1	2	3	4	5	6	7

APPENDIX A

SYSTEM OPERATING PROCEDURES

OP-SO.HA-001 Gaseous Radwaste Operation

OP-SO.HA-002 Gaseous Radwaste Ambient Charcoal

OP-SO.HB-001 Equipment Drain collection and Processing

OP-SO.HB-002 Floor Drain Collection and Processing

OP-SO.HB-003 Chemical Waste Collection and Processing

OP-SO.HB-004 Regenerate Waste Collection and Processing

OP-SO.HB-005 Liquid Radioactive Waste Release and Recycle

OP-SO.HB-006 Liquid Radwaste Filter Precoat Operation

OP-SO.HC-001 Solid Radwaste Collection

OP-SO.HC-002 Asphalt Storage and Transfer

OP-SO.HC-003 Solid Radwaste Auxiliary Boiler

OP-SO.HC-004 Solid Radwaste Crystallizer

OP-SO.HC-005 Solid Radwaste Extruder-Evaporator

OP-SO.HC-006 Solid Radwaste Drumming and Capping

OP-SO.HC-007 Compactible Trash

ALARM RESPONSE PROCEDURES

OP-AR.HC-001 Slurry - Solid Radwaste Annunciator Panel

OP-AR.HC-002 Concentrates - Solid Radwaste Annunciator Panel

OP-AR.HC-003 Asphatl - Solid Radwaste Annunciator Panel

STATION ADMINISTRATIVE PROCEDURES

IC-AP.ZZ-010(Q) Preventive Maint. - Calibration Frequency Determination

SA-AP.ZZ-024(Q) Radiation Protection Program - Training

SA-AP.ZZ-029(Q) Administrative Control-Radiation Materials

SA-AP.ZZ-006(Q) Incident Report and Reportable Occurrences

SA-AP.ZZ-035(Q) Reporting Requirements

RP-AP.ZZ-111(Q) Abnormal Radiation Occurrence

SA-AP.ZZ-001(Q) Preparation and Approval of Station Procedures

RP-AP.ZZ-011(Q) Records Management and Retention Program

CHEMISTRY PROCEDURES

CH-RC.ZZ-021(Q) Total Dissolved Solids By Gravimetric Analysis

CH-CA.ZZ-020(Q) Oil and Grease By Gravimetric Analysis

CH-CA.ZZ-018(Q) Suspended Solids By Gravimetric Analysis

CH-CA.ZZ-002(Q) PH Analysis

CH-RC.ZZ-002(Q) Gross Beta By Liquid Scintillation

CH-RC.ZZ-001(Q) Gross Beta By Proportional Count Rate

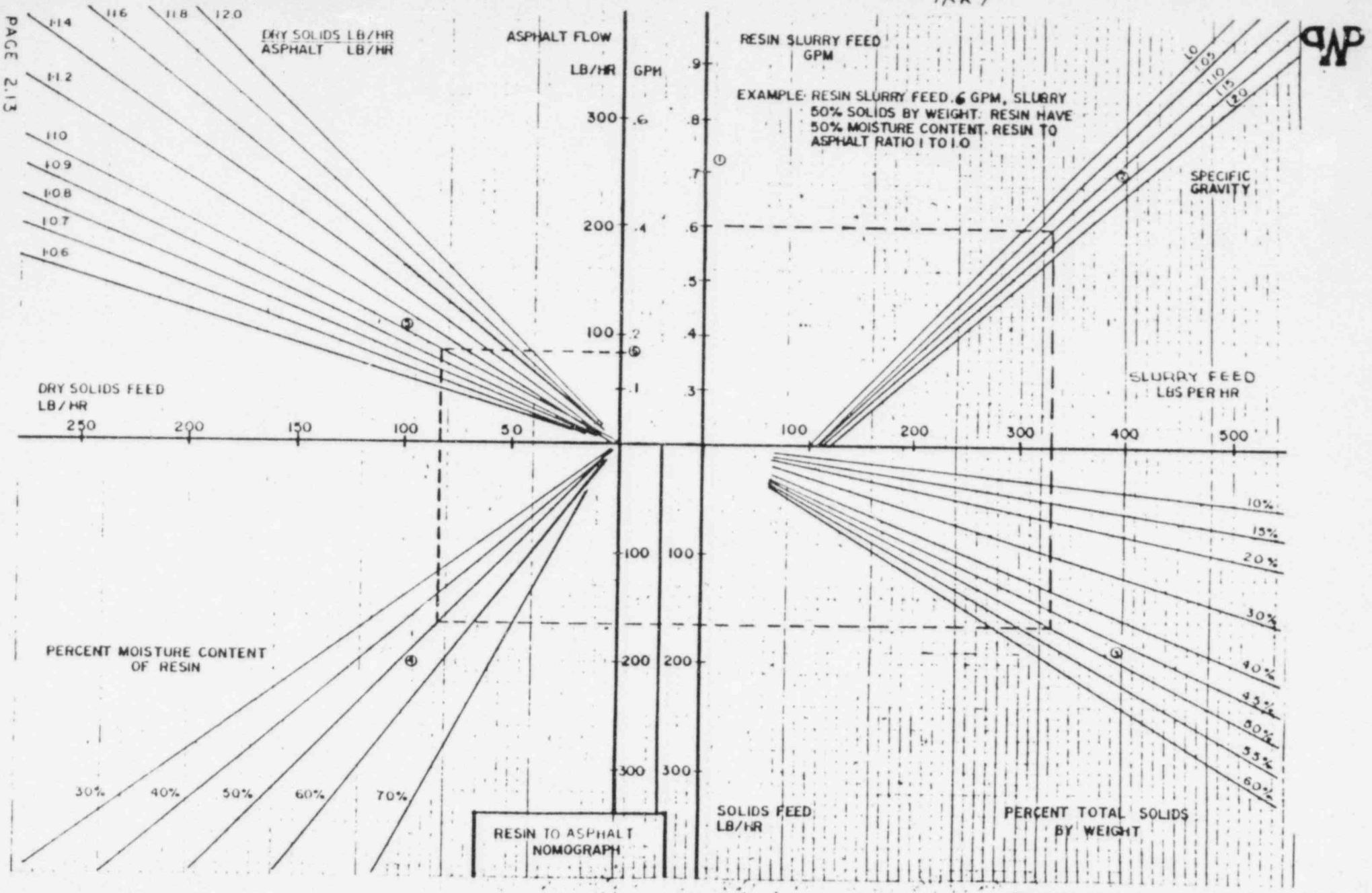
CH-RC.ZZ-006(Q) Gross Beta By Proportional Count Rate

CH-RC.ZZ-007(Q) Gamma Spectroscopy

RADIATION PROTECTION PROCEDURES

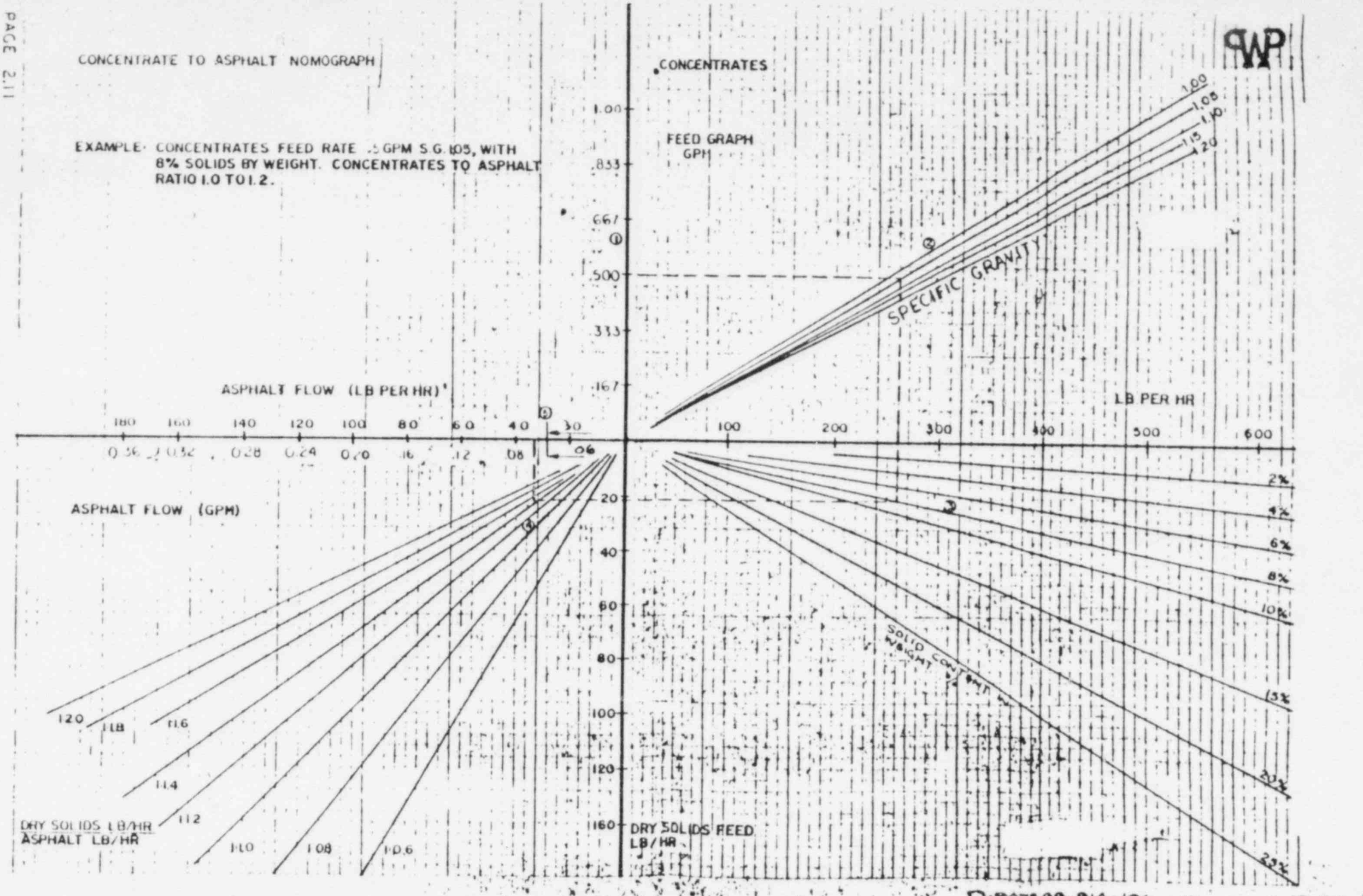
RP-ST.ZZ-001(Q) Shipment Surveillance

RP-RW.ZZ-004(Q) Radwaste Shipment


DRY SOLIDS LB/HR
ASPHALT LB/HR
1.14
1.16
1.18
1.20
1.12
1.10
1.09
1.08
1.07
1.06
ASPHALT FLOW
LB/HR
GPM
300
.6
200
.4
100
.2
.1
.9
.8
.7
.6
.5
.4
.3
RESIN SLURRY FEED
GPM
EXAMPLE: RESIN SLURRY FEED .6 GPM, SLURRY 50% SOLIDS BY WEIGHT. RESIN HAVE 50% MOISTURE CONTENT. RESIN TO ASPHALT RATIO 1 TO 1.0
1.0
1.05
1.10
1.15
1.20
SPECIFIC GRAVITY
DRY SOLIDS FEED
LB/HR
250
200
150
100
50
SLURRY FEED
LBS PER HR
100
200
300
400
500
10%
15%
20%
30%
40%
45%
50%
55%
60%
PERCENT MOISTURE CONTENT OF RESIN
30%
40%
50%
60%
70%
100
200
300
SOLIDS FEED
LB/HR
PERCENT TOTAL SOLIDS BY WEIGHT
RESIN TO ASPHALT NOMOGRAPH

CONCENTRATE TO ASPHALT NOMOGRAPH

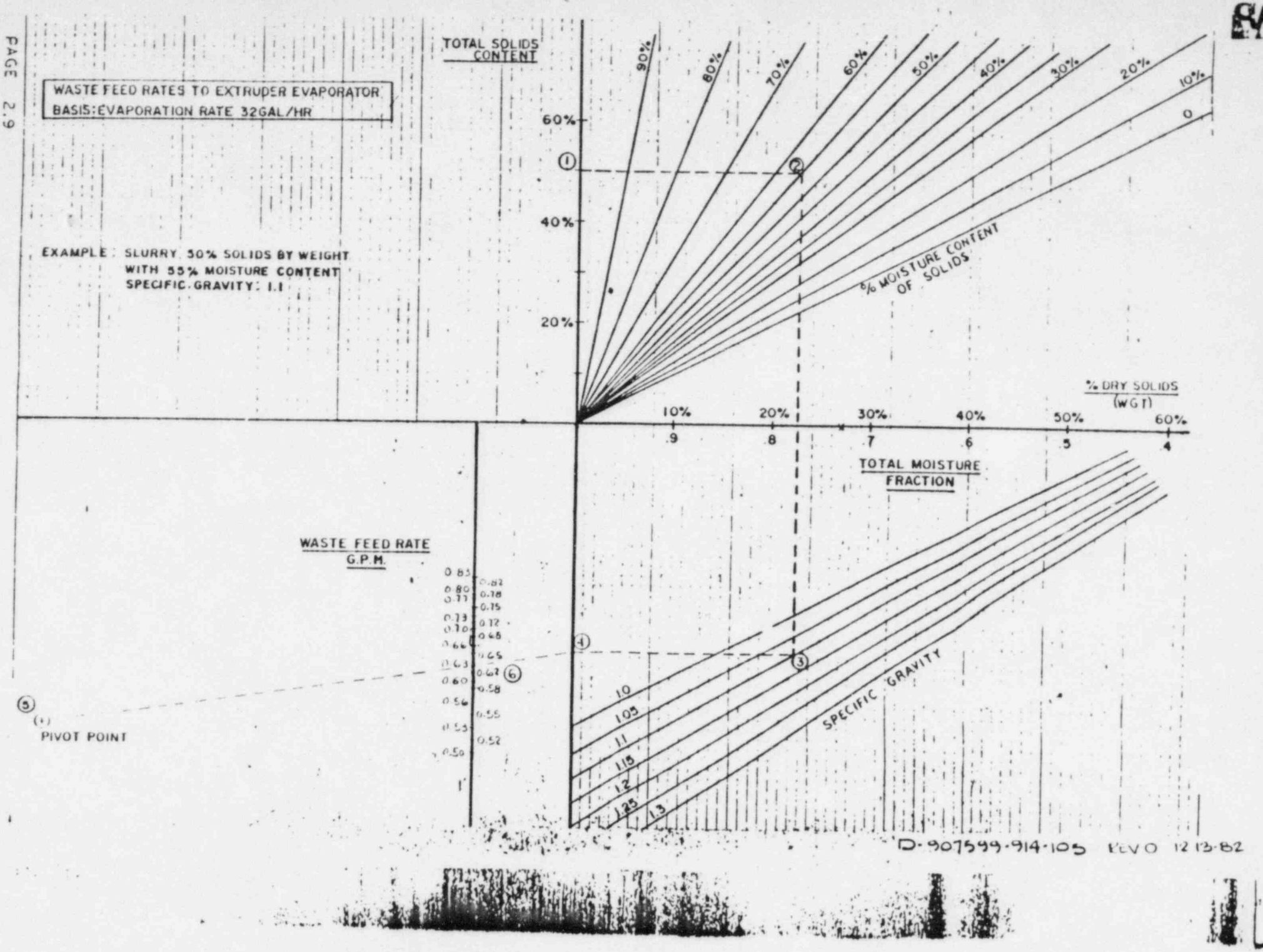
EXAMPLE: CONCENTRATES FEED RATE 500 GPM S.G. 1.05, WITH 8% SOLIDS BY WEIGHT. CONCENTRATES TO ASPHALT RATIO 1.0 TO 1.2.



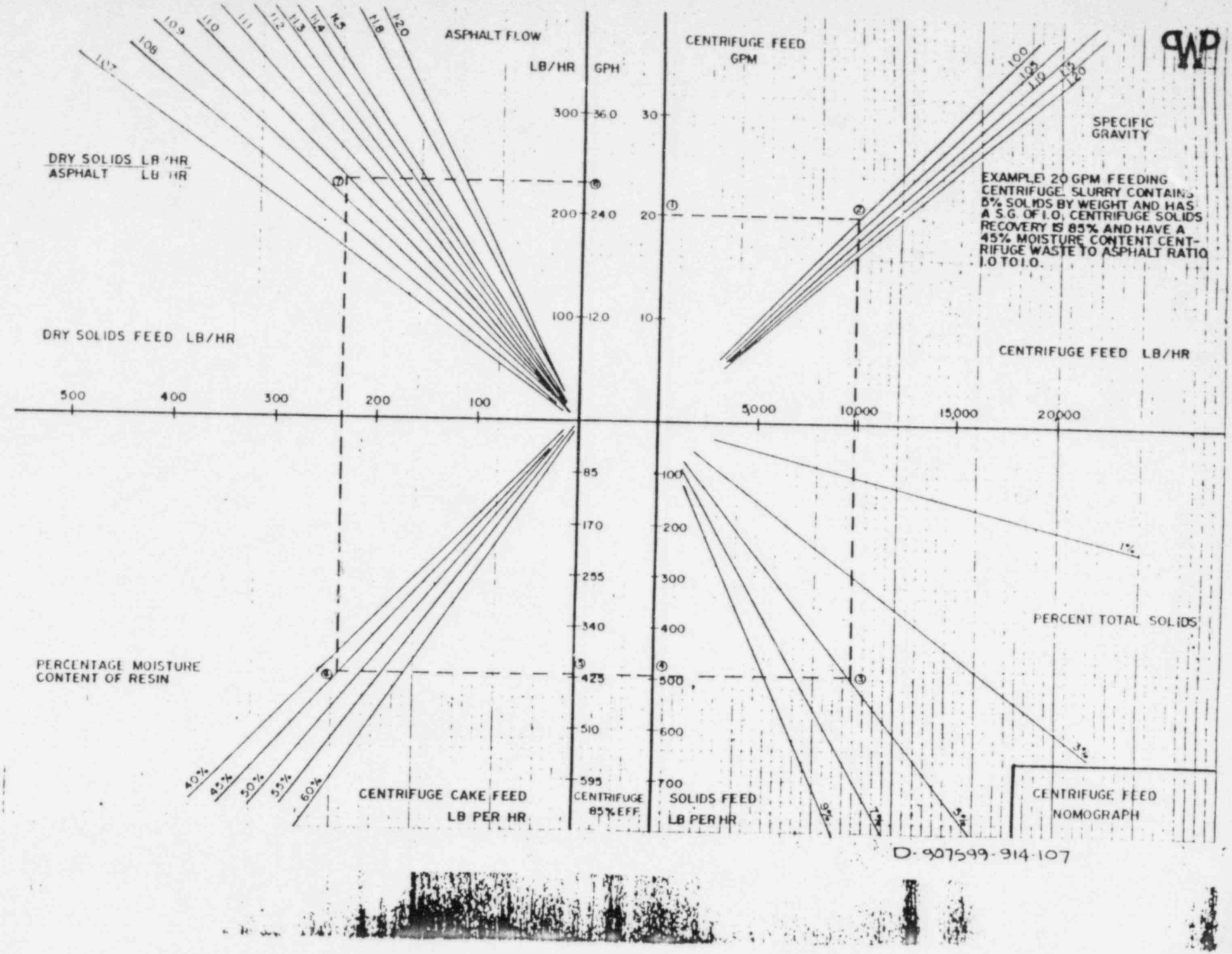
D-907599-914-106 KLV 0 12-13-82

WASTE FEED RATES TO EXTRUDER EVAPORATOR
BASIS: EVAPORATION RATE 32GAL/HR

EXAMPLE: SLURRY 50% SOLIDS BY WEIGHT
WITH 55% MOISTURE CONTENT
SPECIFIC GRAVITY: 1.1



D-907599-914-105 REV 0 12-13-82


ASPHALT FLOW
LB/HR
GPH
CENTRIFUGE FEED
GPM
SPECIFIC GRAVITY
1.07
1.08
1.09
1.10
1.11
1.12
1.13
1.14
1.15
1.18
1.20
1.00
1.05
1.10
1.15
1.20
DRY SOLIDS LB/HR
ASPHALT LB/HR
DRY SOLIDS FEED LB/HR
CENTRIFUGE FEED LB/HR
EXAMPLE: 20 GPM FEEDING CENTRIFUGE. SLURRY CONTAINS 5% SOLIDS BY WEIGHT AND HAS A S.G. OF 1.0, CENTRIFUGE SOLIDS RECOVERY IS 85% AND HAVE A 45% MOISTURE CONTENT CENTRIFUGE WASTE TO ASPHALT RATIO 1.0 TO 1.0.
PERCENTAGE MOISTURE CONTENT OF RESIN
40%
45%
50%
55%
60%
1%
2%
3%
5%
PERCENT TOTAL SOLIDS
CENTRIFUGE CAKE FEED LB PER HR
CENTRIFUGE 85% EFF
SOLIDS FEED LB PER HR
CENTRIFUGE FEED NOMOGRAPH
D-907599-914-107

APPENDIX C

ATTACHMENT 19

BARNWELL SHIPMENT RECORD (TYPICAL)

(1) GENERATOR NAME

ADDRESS

CITY STATE

CONTACT PHONE

(2) consigned to:
CHEM NUCLEAR SYSTEMS, INC
P. O. BOX 726, OSBORN ROAD
BARNWELL, S.C. 29812

BARNWELL WASTE MANAGEMENT FACILITY
Operated by: CHEM-NUCLEAR SYSTEMS, INC.
P. O. Box 726, Barnwell, South Carolina 29812
(803) 259-1781
RADIOACTIVE SHIPMENT MANIFEST FORM

(3) USE THIS NUMBER ON ALL CONTINUATION PAGES

VOLUME ALLOCATION NO PAGE OF

(4)

CARRIER ADDRESS

TELEPHONE SHIPPING DATE

SHIPMENT TYPE SHIPMENT SURFACE EXPOSURE mR/hR

SHIPMENT NO LINER SERIAL NO

DRIVER SIGNATURE DATE

(5) TOTAL FOR EACH CLASS: NO. 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
		Other (Specify)	

(6) SHIPMENT TOTALS

VOLUME (Cubic Feet)	TOTAL NO. OF PACKAGES	ACTIVITY (CURIES OR SI EQUIVALENT) ALL ISOTOPES	TRITIUM	C-14	Tc-99	I-129	SOURCE (Pounds)

(7) TOTAL SNM

ISOTOPE	GRAMS
U-233	
U-235	
Pu-241	
Pu Other	
TOTAL	

(8) TOTAL PALLET VOLUME (CU. FT.)

(9) WASTE DESCRIPTION

(10) PHYSICAL FORM/ SOLIDIFICATION AGENT

(11) CHEMICAL FORM AND NAME AND % OF CHELATING AGENT(S)

(12) WASTE FORM CLASS ☐ A ☐ B ☐ C

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

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

Signature

Company Date

(15) "Certification is hereby made to the South Carolina Department of Health and Environmental Control that this shipment of low level radioactive waste has been inspected in accordance with the requirements of South Carolina Radioactive Material License No. 097 as amended, and the Nuclear Regulatory Commission's License No. 12-13536-01 as amended, and the effective Barnwell Site Disposal Criteria within 48 hours prior to shipment, and further certification is made that the inspection revealed no items of non compliance with all applicable laws, rules and regulations."

Date By

Title and Organization

Telephone No. ( )

CNSI USE ONLY

☐ This material meets all license requirements

☐ This material was disposed of in accordance with license

☐ Discrepancy

Arrival Date Arrival Survey No.

Date/Time Buried H. P. Initial

Trench No. Location Code

Waste Class Code

Date Personnel Exposure

Authorized Signature Title

Form No. CNS 201
(9-83)

SEE INSTRUCTIONS ON REVERSE SIDE FOR FILLING OUT THIS FORM

ATTACHMENT 19 (cont'd)

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, (1 1) SURFACE (mR/HR / R/HR)	(30) RADIATION LEVELS 1 METER mR/HR	(31) CONTAMINATION CONTAINER SURFACE (DPM/100cm2) Alpha Beta Gamma	(32) D.O.T. SUB TYPE (A1, A2, LSA, etc.)	(33) FISSILE CLASS	(34) LABELS/ MARKINGS USED
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
																			Radioactive -
					PAGE TOTALS														

Form No. CNS 201
(9-83)

GENERATOR NUMBER [ ][ ] - [ ][ ] - [ ][ ][ ][ ]

RADIOACTIVE WASTE SHIPMENT & DISPOSAL MANIFEST

US ECOLOGY, INC.

EXECUTIVE OFFICE: (502) 426-7160
P.O. BOX 7246 • LOUISVILLE, KENTUCKY 40207
Illinois Office: (815) 454-2376

REV. 7-83

PAGE 1 OF _____ USE THIS NO. ON ALL CONTINUATION PAGES → 20747

(1) GENERATOR NAME _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
CONTACT _____ PHONE _____
USER PERMIT # _____ SHIPMENT # _____

(2) BILL DISPOSAL CHARGES TO _____
NAME _____
ADDRESS _____
CITY _____ ST _____ PURCHASE ORDER # _____

(3) AGENT/BROKER _____
BROKER EPA# [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ] (10CFR20.311)
ADDRESS _____
CITY _____ STATE _____ ZIP _____
CONTACT _____ PHONE _____
BROKER SHIPMENT _____ BROKER USER PERMIT # _____

(4) CONSIGNED TO:
☐ P.O. BOX 638, Hanford Reservation, Richland, WA 99352, 509-377-2411
☐ P.O. BOX 578, HWY 95, 12 m. So. of Beatty, NV 89003, 702-553-2203
☐ OTHER
CONTACT _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
PHONE _____

(5) CARRIER _____ SHIPPING DATE _____
CASK TYPE _____ CASK SURFACE EXPOSURE RATE _____ mR/hr
DRIVERS SIGNATURE _____

(6)

TOTAL FOR EACH CLASS # OF PACKAGES	TOTAL FOR EACH CLASS 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

(7) 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

(8) THIS IS TO CERTIFY THAT THE MATERIALS NAMED IN THIS MANIFEST ARE PROPERLY CLASSIFIED, DESCRIBED, PACKAGED, MARKED AND LABELLED AND ARE IN PROPER CONDITION FOR TRANSPORTATION ACCORDING TO 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 OR EQUIVALENT STATE REGULATIONS.

_____
Authorized Signature Title

TERMS AND CONDITIONS

A. 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.

B. 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.

C. 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 the 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			
CASKS			
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

CONTAINER SEPARATION ☐, ☐, ☐
(Code all that apply to this load.)
CODES: 8= soil (SAW) _ 1 4F1 waste (SAW) _ 2
10F1 between upright containers (Gauss) _ 3
10F1 soil (Chelating agent 1% by volume) _ 4
Other _ 8 No requirement _ 9

ASSIGN DISPOSAL SITE WITH THIS WASTE CATEGORY FROM THE MANIFEST				
WASTE CATEGORY	HIGH Rev	CLASS A	CLASS B	CLASS C
DEPTH in FEET				

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 # ☐☐☐☐☐☐
(Must agree with Agent/Broker name, if any)
US ECOLOGY INVOICE DATE: ☐☐ MO ☐☐ DY ☐☐ YR
DISCREPANCY CODE(S) ☐☐,☐☐,☐☐,☐☐,☐☐

BATES #

CONSIGNEE ORIGINAL COPY

FORM REV 12/27/83 LNC (MUST ACCOMPANY WASTE IN TRANSIT)

RP-RW.ZZ-004(Q)

ATTACHMENT 20

US ECOLOGY SHIPMENT RECORD (TYPICAL)

GENERATOR NO ______________________

GENERATOR NAME ______________________

AGENT/BROKER ______________________

US ECOLOGY, INC.

CONTINUATION SHEET

[redacted]

MANIFEST No. ____________

(9) Item No.	(10) Container Type	(11) Container Volume (Cu. ft.)	(12) Container Weight (pounds)	(13) Physical Form (See Note #1)	(14) Waste Description (See Note #2)	(15) Solidification or Absorbent Media (See Note #3)	(16) Chemical Form/ Chelating Agent (10CFR20.311)	Check Below if 0.1% Chelating Agent by Weight	(17) Radionuclide (10CFR20.311)	(18) Activity [ ] Curies [ ] Millicuries (10CFR20.311)	(19) D.O.T. Sub Type (A, A, LSA etc.)	(20) Special Nuclear Material (Grams)	(21) Source Material (Kilograms)	(22) Waste Form Class 10CFR 61.55	(23) Stability class (See Note 4) 10CFR 61.56	Radiation Levels mR/HR (24) Disposal Container Surface	(25) Reserved for US Ecology Use Only	(26) Disposal Container At 1 Meter	(27) Transport Index	(28) Fissile Class	(29) D.O.T. Label Classification Label 49CFR172.444
																					Radioactive
																					Radioactive
																					Radioactive
																					Radioactive
																					Radioactive
																					Radioactive
																					Radioactive
																					Radioactive
																					Radioactive
																					Radioactive
																					Radioactive
																					Radioactive
																					Radioactive
																					Radioactive
																					Radioactive
																					Radioactive
																					Radioactive
																					Radioactive
																					Radioactive
																					Radioactive
																					Radioactive
																					Radioactive
																					Radioactive
																					Radioactive
																					Radioactive
																					Radioactive
																					Radioactive
																					Radioactive
																					Radioactive
(30) PAGE TOTALS																					

NOTE #1 - Physical Form Code

1 Solid
2 Liquid
3 Gaseous
4 Animal Carcasses
5 Scintillation vials
*99 Other

NOTE #2 - Waste Description Codes

1 Vials
2 Dry Solid
3 Solidified Liquid
4 Biological
7 Filter Media
8 Dewatered Resins
9 Solidified Resins
10 Absorbed Aqueous Liquid
11 Absorbed Scintillation Liquid
*99 Other

NOTE #3 - Solidified or Absorbent Media Codes

1 Diatomaceous Earth
2 Speedi Dry
3 Celatom (M-P78)
4 Floor Dry/Super Fine
5 Hi Dri
6 Florco or Florco X
7 Instant Dri
8 Safe T Sorb
9 Oil Dri (Safe n Dri)
10 Zonolite Grades 2, 3, 4
11 Dow Media
12 Cement
13 Asphalt
14 Delaware Custom Media
15 Envirostone
*99 Other

NOTE #4 - NRC Stability Class Code

S - Stable
N - Not Stable

(MUST ACCOMPANY WASTE IN TRANSIT)

* ANY USE OF "OTHER" AS A DESCRIPTION MUST INCLUDE A WRITTEN AND SIGNED EXPLANATION ATTACHED TO THIS MANIFEST

FORM REV 12/27/83 LNC

CONSIGNEE ORIGINAL COPY

RP-RW.ZZ-004(Q)

ATTACHMENT 20 (con'd)

RP-RW.ZZ-004(Q)

ATTACHMENT 21

PSE&G SHIPPING RECORD (TYPICAL)

Legal Company Name _____

(1) Contact _____

Address _____

Telephone # _____

(2) _____

PSE&G Public Service Electric and Gas Company

RADIOACTIVE SHIPMENT RECORD FORM

Page _____ of _____

(3) Carrier Name _____

Driver Signature _____

Date & Time Rec'd _____

(6) SHIPMENT TOTALS

VOLUME (Cubic Feet)	TOTAL NO OF PACKAGES	ACTIVITY ☐ Curies ☐ Millicuries	TOTAL WEIGHT (Pounds)

(4) Shipping Date _____

Customer Survey No _____

shipment type (van, cask, etc.)

Type _____

Trailer # _____

shipment surface exposure _____ mR/HR

(8) ITEM NO	(9) RADIO NUCLIDE EACH CONTAINER	(10) PERCENT OF ACTIVITY EACH NUCLIDE	(11) ACTIVITY EACH CONTAINER (mCi)	(12) PHYSICAL FORM	(13) CHEMICAL FORM AND NAME & % OF CHELATING AGENT	(14) WASTE DESCRIPTION	(15) WASTE FORM CLASS	(16) STABILITY CLASS (S, U)	(17) SPECIAL NUCLEAR MATERIAL (grams)	(18) SOURCE MATERIAL (pounds)	(19) DISPOSABLE CONTAINER WEIGHT (pounds)	(20) DISPOSABLE CONTAINER VOLUME (Cu. Ft.)	(21) CONTAINER TYPE	(22) RADIATION LEVELS (T.I.) CONTAINER SURFACE mR/HR or R/HR	(22) 1 METER mR/HR	(23) CONTAMINATION CONTAINER SURFACE (DPM/100cm²) Alpha Beta Gamma	(24) DOT SUB TYPE (A1, A2, LSA, etc.)	(25) FISSILE CLASS	(26) LABELS/ MARKINGS USED
																			Radioactive
																			Radioactive
																			Radioactive
																			Radioactive
																			Radioactive
																			Radioactive
																			Radioactive
																			Radioactive
																			Radioactive

PAGE TOTALS

(7)

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

Signature _____

Company _____ Date _____

(5)

TOTAL FOR EACH CLASS NO OF PACKAGES	TOTAL FOR EACH CLASS 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	