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PORC	YES
SQR	YES
NQA	NO
50.59	YES
RESP MGR	YES

PECO Energy Company
Nuclear Generation Group

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SOLID RADWASTE SYSTEM PROCESS CONTROL PROGRAM (PCP)

1.0 PURPOSE

1.1 This program provides guidance and boundary conditions for preparation of specific procedures for processing, sampling, analysis, packaging, storage and shipment of solid radwaste in accordance with State and Federal Regulatory requirements.

2.0 SOURCES AND REFERENCES

2.1 SOURCE DOCUMENTS

2.1.1 Low Level Waste Licensing Branch Technical Position on Waste Form.

2.1.2 Low Level Waste Licensing Branch Technical Position on Waste Classification.

2.1.3 Limerick Generating Station Unit 1 and 2 Technical Specifications, 6.5.1.6, 6.8.1, 6.13.

2.1.4 Updated Final Safety Analysis Report Peach Bottom Atomic Power Station Units 2 and 3, and Limerick Generating Station Units 1 and 2.

2.1.5 PBAPS Technical Specification 3.8.F, 4.8.F, 6.18.3.

2.1.6 49 CFR Parts 170 through 178.

2.1.7 10 CFR Parts, 20, 50, 61, and 71.

2.1.8 Standard Review Plan 11.4, including Branch Technical Position ETSB11-3.

2.1.9 Pacific Nuclear: NuPac Services Topical Report for Dewatering System TP-02-P-A.

2.1.10 General Criteria for High Integrity Containers (SCDHEC).

2.1.11 Westinghouse-Hittman Nuclear, Incorporated (SEG) Topical Report STD-R-05-011NP-A for Mobile In Container Dewatering and Solidification System (MDSS).

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2.2 CROSS REFERENCES

2.2.1 RW-C-106, Review of Vendor Topical Report for Waste Processing

2.2.2 PCP Implementing Procedures

NOTE: PCP Implementing Procedures are those which apply directly to processing, packaging, sampling, analyzing, and shipping radwaste.

1. Limerick and Peach Bottom Radwaste Procedures (RW) or Applicable Common Procedure.

2. Limerick and Peach Bottom Surveillance Test Procedures (ST) and Routine Test Procedures (RT).

3. Limerick System (S) and Peach Bottom System Operating (SO) Procedures.

2.2.3 Nuclear Quality Assurance Plan; Radwaste/Material Section.

2.2.4 Generic Letter 89-01 (Implementation of Programmatic Controls for Radiological Effluent Technical Specifications in the Administrative Controls Section of the Technical Specifications and the Relocation of Procedural Details of RETS to the Off-site Dose Calculation Manual or to the Process Control Program), 1/31/89.

2.2.5 Off Site Dose Calculation Manual.

2.2.6 Limerick and Peach Bottom Chemistry Procedures or Applicable Common Procedures.

2.2.7 Safety Evaluation for Oil Decontamination, MOD 1259A (Peach Bottom only).

2.2.8 Safety Evaluation for MOD 1750A, Radwaste Dewatering Facility Peach Bottom Atomic Power Station (Peach Bottom only).

2.2.9 NRC Generic Letter 91-02, "Reporting Mishaps Involving LLW Forms Prepared for Disposal.

2.2.10 PECO Energy 10CFR50.59 Review for Scientific Ecology Group Dewatering System Operation.

3.0 RESPONSIBILITY AND AUTHORITY

NOTE: The station operating organization is outlined in each station's UFSAR.

3.1 PORC is responsible for reviewing all revisions to the PCP.

3.2 The Plant Manager is responsible for approving all revisions to the PCP.

3.3 The Nuclear Quality Assurance Department performs audits to verify compliance with the Nuclear Quality Assurance Program.

3.4 The Manager-Radwaste is responsible for:

3.4.1 Compliance with this Process Control Program.

3.4.2 Record keeping and document control of shipping and processing data.

3.4.3 Assuring the Radwaste personnel are appropriately trained and qualified.

3.4.4 Coordinating reviews and revisions to this document and corresponding implementing procedures.

3.4.5 Reviewing and revising this PCP and its implementing procedures.

3.4.6 Submitting revisions to the PCP for inclusion in the NRC Annual Radioactive Effluent Release Report.

3.5 The Sr. Manager-Operations is responsible for:

3.5.1 Providing trained personnel to operate appropriate permanent radwaste process equipment.

3.5.2 Defining those Operations positions which require training.

3.6 The Director-Training is responsible for:

3.6.1 Development and implementation of training for designated personnel in accordance with Nuclear Training Division procedures.

4.0 PREREQUISITES

4.1 Processing of solid radioactive waste shall be performed by qualified and trained personnel. Training records for operators of mobile vendor processing units shall be maintained by the Manager, Radwaste while the vendor is active on-site.

4.2 Vendor services may be used for dewatering and solidification of radioactive waste processing provided the services are governed by a Topical Report and referenced in this PCP. Processing of radioactive waste by on-site vendors shall be performed in accordance with applicable Topical Report, procedures and NRC guidance. When providing solidification for stabilization, the vendor shall have an NRC approved topical report.

4.3 The Topical Reports of vendor supplied Radwaste Processing Systems shall undergo review by the Manager, Radwaste (or designee). The review shall ensure the vendor supplied system will be compatible with plant operations. The review shall be performed in accordance with RW-C-106.

4.4 On-site processing of radioactive waste shall be performed in accordance with approved station procedures.

4.5 Quality Assurance shall be maintained as defined by the Nuclear Quality Assurance Plan.

5.0 PRECAUTIONS AND LIMITATIONS

5.1 Changes to the PCP shall be submitted to the Nuclear Regulatory Commission in the Annual Radioactive Effluent Release Report for the period in which the change was made.

5.2 Changes to resin dewatering implementing procedures or systems shall require verification that the free standing water content of the packaged product is within established regulatory limits.

5.3 Prior to revising or deleting a PCP implementing procedure, the preparer shall review the procedure against the PCP to ensure that there is no compromise or conflict.

5.4 Prior to modification to an in plant liquid Radwaste Processing System, the individual responsible for the MOD shall review to ensure that it is not in conflict with or compromises the PCP.

5.5 When processing does not meet storage requirements or shipping and transportation requirements, processing shall be suspended and the PCP reviewed for adequacy. The implementing procedures and/or the Solid Waste System shall be corrected as necessary to prevent recurrence.

6.0 APPARATUS

None

7.0 PROCEDURE

7.1 PROCESS DESCRIPTIONS

NOTE: Vendor services may be used to process any radioactive waste stream provided the services are performed with an acceptable Process Control Program.

7.1.1 Waste Sources (For diagrams of the Solid Radwaste Systems, see UFSAR 11.4 for LGS and 9.2 and 9.3 for PBAPS. Also refer to MOD 1750A for PBAPS).

1. Condensate Filter/Demineralizer Waste

   a. Condensate Filter/Demineralizer Waste is the waste product generated by the backwash of the condensate filter/demineralizers consisting of: 1) contaminated powdered ion exchange resins at varying degrees of exhaustion, fibrous filter media, and small concentrations of various solids and corrosion products for the precoatable element system, and 2) iron oxide and small concentrations of various other solids for the precoatless element system (LGS).

   b. A condensate filter/demineralizer backwash consists of approximately: 1) 9,000 gallons of slurry for the precoatable element system, and 2) 3,000 gallons of slurry for the precoatless element system (LGS).

   c. Backwashes are collected and settled in a Condensate Phase Separator. Clarified liquid is decanted until sufficient volume of settled spent resin and crud is obtained for processing.

   d. Phase separator contents are recirculated prior to transfer to the Dewatering System.

   e. Slurry input to the Dewatering System is transferred to the system from the phase separators via the sludge mixing pumps.

2. Condensate Deep Bed Demineralizer Waste (Limerick Only)

   a. Condensate Deep Bed Demineralizer waste is the waste product generated by the backwash of the condensate deep bed demineralizers consisting of contaminated ion exchange bead resins at varying degrees of exhaustion and small concentrations of various solids and corrosion products.

   b. Each condensate deep bed demineralizer backwash consists of approximately 2,800 gallons of slurry.

   c. Each backwash contains 320 cubic feet of resin and is collected in an empty Spent Resin Receiver Tank.

   d. During normal operations the Spent Resin Receiver Tank contents will be transferred to the Floor and Equipment Drain deep bed demineralizers for reuse.

e. Resins that are determined unacceptable for reuse or excess will be processed from the 1A Spent Resin Receiver Tank using vendor dewatering.

f. The 1A Spent Resin Receiver Tank Contents are recirculated for a minimum of 25 minutes to mix contents of the vessel, resulting in a homogeneous resin slurry.

g. The solids slurry is then fed to the External Processing Station for dewatering.

3. Waste Sludge Tank Waste

a. Waste Sludge Tank Waste is the waste product generated by the backwash of the liquid radwaste and fuel pool filters and demineralizers consisting of contaminated powdered ion exchange resins and bead resins at varying degrees of exhaustion, fibrous filter media, carbon overlay material and small concentrations of various solids and corrosion products.

b. Backwashes from radwaste filter/demineralizers, radwaste deep bed demineralizers, and fuel pool filter/demineralizers are collected in the Waste Sludge Tank.

c. A backwash from a radwaste filter consists of approximately 1,925 gallons of slurry (PB) or 1,500 gallons (LGS).

d. A backwash from the radwaste deep bed demineralizer consists of approximately 1,500 gallons of slurry.

e. At Peach Bottom, the Waste Sludge Tank contents are transferred to a Condensate Phase Separator for processing. From the Condensate Phase Separators, waste is processed using a Dewatering System.

f. At LGS, Waste Sludge Tank contents may be processed directly to the Dewatering System or transferred to a condensate phase separator for processing.

g. Tank contents are recirculated prior to transfer to the Dewatering System.

4. Reactor Water Cleanup Waste

   a. Reactor Water Cleanup waste is the waste product generated by the backwash of the Reactor Water Cleanup filter demineralizers consisting of contaminated powdered ion exchange resins at varying degrees of exhaustion, fibrous filter media, and small concentrations of various solids and corrosion products.

   b. A RWCU filter-demineralizer backwash consists of approximately 1,100 gallons of slurry.

   c. Backwashes are collected and settled in a phase separator. Clarified liquid is decanted until sufficient volume of settled spent resin and crud is obtained for processing.

   d. Phase separator contents are recirculated prior to transfer to the Dewatering System.

5. Oily Waste

   a. Sludges and oils generated during operation and maintenance are collected in containers in appropriate approved areas throughout the plant. The filled and labeled containers are sealed and moved to available areas for temporary staging.

   b. Sludges/oils may be decontaminated to below station free release limits and processed as non-radioactive waste.

   c. Sludges/oils may be shipped off-site for processing/incineration.

6. Miscellaneous Waste

   a. Certain wet wastes may be allowed to dry and be treated as dry active waste or filters.

7.2 WASTE STREAM PROCESSING

7.2.1 Dewatering

1. Resin processing is normally performed using a Dewatering System.

   a. The Dewatering System shall be operated in accordance with the system's Topical Report and applicable procedures.

   b. The Dewatering System processes resin by using equipment described by the Topical Report to remove free standing water.

c. Dewatered resin is packaged in appropriately selected liners or High Integrity Containers based on waste classification.

d. Station to Dewatering System interfacing is addressed by an approved 10 CFR 50.59 Review.

7.2.2 Solidification

1. Resins, sludges and oily wastes may be solidified by a Mobile Solidification System.

a. The Mobile Solidification System shall be operated in accordance with the system's Topical Report and applicable procedures.

b. The Mobile Solidification System processes waste using equipment described by the Topical Report to remove free standing liquid.

c. Solidified waste is packaged in appropriately selected containers based on waste classification.

d. Station to Mobile Solidification system interfacing shall be addressed by an approved 10 CFR 50.59 Review.

7.2.3 Decontamination

1. Decontamination of oil may be performed on-site using a vendor service. The service shall be performed in accordance with the applicable 10 CFR 50.59 Review.

7.3 PRODUCT CONTROL

7.3.1 Routine sampling is performed by one of two techniques:

1. Direct sample from each batch. These samples are analyzed for activity and isotopic identity. If radionuclide distributions are shown to be consistent between similar batches, consideration may be given to decreasing the frequency of routine measurements. This constitutes routine sampling OR

2. Dose rate reading taken from a container of waste. Dose rates are converted to activity and isotopic breakdown based on annual samples.

7.3.2 Scaling factors for nuclides which are hard to identify are established for waste by analysis through an off-site vendor. Frequency of sampling is on an annual basis as a minimum.

7.3.3 Tests are performed on-site quarterly, as a minimum, to verify scaling factors. If the tests indicate that the scaling factors obtained through annual samples have changed by more than a factor of ten, consideration shall be given to increased off-site analysis.

7.3.4 When plant parameters affecting waste stream isotopics are altered (ex., fuel failure), consideration shall be given to further waste stream sampling.

7.3.5 Administrative controls for preventing unsatisfactory waste forms from being released for shipment are described in applicable station procedures.

7.3.6 Liquid wastes or wastes containing liquids shall be converted to a form that contains as little free standing and non-corrosive liquid as is reasonably achievable. The liquid shall not exceed 1% of the volume of the waste, or 0.5% of the waste volume for solidified waste.

7.3.7 Processed resin is tested annually as a minimum to verify the free standing water content of the packaged product is within applicable regulatory limits. In addition to the annual verification, the free standing water content is determined whenever process changes occur that may significantly alter system performance. Tests are performed to verify operability and for ensuring the waste form is similar to that indicated in prequalification testing.

7.3.8 To prevent accumulation of radiolytically generated combustible gas in greater than Type A radioactive waste packages containing wa[illegible] and/or organic substances, one or more of the following measures are taken:

1. The container is equipped with a vent to prevent accumulation of such gas.

2. A determination by calculation, test, or measurement is performed to ensure that hydrogen generation is limited to a molar quantity that would be no more than 5% by volume of the secondary container gas void at standard temperature and pressure (STP) over a period of time that is twice the expected shipment time.

3. The cask cavity will be inerted.

7.3.9 Sufficient analyses shall be performed to verify that the quality of waste forms prepared for disposal by vendor's on-site processing shall be similar to vendor's test results.

7.4 WASTE CHARACTERISTICS FOR LAND DISPOSAL

The following are minimum requirements for all classes of waste and are intended to facilitate handling at the disposal site and provide protection of health and safety of personnel at the disposal site:

7.4.1 Waste shall not be packaged for disposal in cardboard or fiberboard containers.

7.4.2 Waste shall not be readily capable of detonation or of explosive decomposition or reaction at normal pressure and temperatures, or of explosive reaction with water.

7.4.3 Waste shall not contain, or be capable of generating, quantities of toxic gases, vapors, or fumes harmful to persons transporting, handling, or disposing of the waste.

7.4.4 Waste shall not be pyrophoric. Pyrophoric materials contained in the waste shall be treated, prepared, and packaged to be nonflammable.

7.4.5 Waste containing hazardous, biological, pathogenic or infectious material shall be handled in a manner that minimizes the potential hazard from the non-radiological materials.

7.4.6 Each waste shipment shall be accompanied by a shipping manifest giving a physical description of the waste, the volume, the radionuclide identity and quantity, the total radioactivity, the principal chemical form, and waste class.

7.5 WASTE STABILITY

The following requirements are intended to provide stability and are applicable to Class B and Class C wastes:

7.5.1 Waste shall have structural stability which can be provided by the waste form itself, processing the waste to a stable form, or placing the waste in a disposal container or structure that provides stability.

7.5.2 Void spaces within the waste and its package should be reduced to the extent practicable.

7.5.3 Waste requiring stabilization is normally packaged in approved High Integrity Containers (HIC). The HICs are handled and stored in accordance with the applicable Certificate of Conformance (C of C). Upon arrival at the burial site, Class B and C wastes are placed in concrete overpacks for structural stability.

7.6 SURVEILLANCE REQUIREMENTS FOR SOLIDIFICATION

7.6.1 At least one representative test specimen from at least every tenth batch of waste shall be solidified.

7.6.2 If any test specimen fails to verify solidification, the solidification of the batch under test shall be suspended until additional test specimens can be obtained, alternative solidification parameters can be determined and a subsequent test verifies solidification.

7.6.3 If the initial test specimen from a batch of waste fails to verify solidification, representative test specimens from consecutive batches shall be tested until at least three consecutive test specimens demonstrate solidification. The solidification process control program shall be modified as required to assure solidification of subsequent batches.

7.7 QUALITY ASSURANCE PROGRAM

7.7.1 Quality Assurance shall be maintained as defined by the Nuclear QA Plan.

7.7.2 Audits by personnel independent of the activities are performed and reviewed by appropriate management personnel.

7.7.3 Administrative controls for preventing unsatisfactory waste forms from being released for shipment are described in applicable station procedures.

7.7.4 Procedures are reviewed to ensure compliance with the requirements and process parameters of this PCP.

7.7.5 Radioactive wastes not described within this document shall be evaluated for inclusion in this PCP or in a vendor Process Control Program prior to processing.

7.8 REVISIONS

7.8.1 Revisions to the PCP shall be approved in accordance with applicable station or Common Nuclear Generation Group Procedures.

7.8.2 Any changes to the Solid Radwaste process Control Program shall be submitted for input to the Annual Radioactive Effluent Release Report.

8.0 DOCUMENTATION

8.1 Records of all data, tests, analysis results, and records of training, inspection, and audits are maintained in accordance with applicable procedures.

8.2 Waste classification records, waste form records, and other records required for the preparation of the Annual Radioactive Effluent Release Report shall be prepared and retained in accordance with the requirements of 10CFR20, 10CFR71, 49CFR170-178, and Station Technical Specifications.

8.3 Sufficient documentation shall be maintained to demonstrate compliance with this PCP.

9.0 EXHIBITS

None

ODCM Revision 16 Changes

Purpose:

Recognize the auxiliary boiler exhaust stacks as a radiological effluent release point during the burn of waste oil which has been radiologically contaminated.

Basis:

Burning of radiologically contaminated waste oil in the site auxiliary boilers is allowed by 10CFR20.2004 as long as :

1. the total radioactive effluent from the facility, including effluents from such incineration, is within normal limits stated in the ODCM and

2. the radiological release offsite caused by the burning of the waste oil is determined and reported in the station Annual Effluent Report.

Points:

* The Operating procedure S21.1.C contains a prerequisite requiring the Effluent Physicist to evaluate and approve burning of each batch of waste oil. This prompts the use of ST-0-104-882-0, Trailer and Oil Sampling Procedure.

* The calculation of the activity released offsite is based on a pre-burn sample which determines activity present in each batch. This calculation is proceduralized in ST-0-104-882-0.

* The calculation is conservative in the following ways:

  - assumes instantaneous release vs. actual release spread over several days or weeks,
  - assumes no dilution of oil during the injection process to the boiler,
  - uses annual average meterological dispersion factor (X/Q) vs. actual met. data,
  - does not factor in high temperature of auxiliary boiler exhaust stream which will promote greater dispersion.

* Calculated dose rates from the burn planned for 4/26/94 are as follows:

	Incinerated Oil Value	ODCM Limit
Organ Dose Rate:	0.52 mrem	1500 mrem/yr
Iodine/Particulate Pathway:		

ODCM Revision 16 Changes

Ground pathway 5.62E-7 mrem	30 mrem/yr
Ingestion pathway 6.26E-8 mrem	30 mrem/yr
Inhalation pathway 1.02E-6 mrem	30 mrem/yr

* The results of ST-0-104-882-0 are automatically input into the data base used to develop the annual effluent report.

* 10CFR20.2004 states no Tech Spec change is required to add the auxiliary boiler exhaust stacks as a radiological release point for this activity.