REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8310170313 DOC.DATE: 83/10/11 NOTARIZED: NO DOCKET #
FACIL:50-397 WPPSS Nuclear Project, Unit 2, Washington Public Powe 05000397
AUTH.NAME AUTHOR AFFILIATION
SORENSEN,G.C. Washington Public Power Supply System
RECIP.NAME RECIPIENT AFFILIATION
SCHWENCER,A. Licensing Branch 2

SUBJECT: Forwards draft Amend 33 to FSAR consisting of solid waste mgt sys re utilization of interim portable solid radwaste solidificatiob sys.Submittal will be incorporated in FSAR Amend 33.W/two oversize drawings.Drawings in PDR.

DISTRIBUTION CODE: B001S COPIES RECEIVED:LTR 1 ENCL 60 SIZE: 2+2
see drawing
TITLE: Licensing Submittal: PSAR/FSAR Amdts & Related Correspondence
All Encls.

NOTES: Aperture card Dist

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	NRR/DL/ADL	1	0	NRR LB2 BC	1	0
	NRR LB2 LA	1	0	AULUCK,R. 01	1	1
INTERNAL:	ELD/HDS2	1	0	IE FILE	1	1
	IE/DEPER/EPB 36	3	3	IE/DEPER/IRB 35	1	1
	IE/DEQA/QAB 21	1	1	NRR/DE/AEAB	1	0
	NRR/DE/CEB 11	1	1	NRR/DE/EHEB	1	1
	NRR/DE/EQB 13	2	2	NRR/DE/GB 28	2	2
	NRR/DE/MEB 18	1	1	NRR/DE/MTEB 17	1	1
	NRR/DE/SAB 24	1	1	NRR/DE/SGEB 25	1	1
	NRR/DHFS/HFEB40	1	1	NRR/DHFS/LQB 32	1	1
	NRR/DHFS/PSRB	1	1	NRR/DL/SSPB	1	0
	NRR/DSI/AEB 26	1	1	NRR/DSI/ASB	1	1
	NRR/DSI/CPB 10	1	1	NRR/DSI/CSB 09	1	1
	NRR/DSI/ICSB 16	1	1	NRR/DSI/METB 12	1	1
	NRR/DSI/PSB 19	1	1	NRR/DSI/RAB 22	1	1
	NRR/DSI/RSB 23	1	1	REG FILE 04	1	1
	RGN5	3	3	RM/DDAMI/MIB	1	0
EXTERNAL:	ACRS 41	6	6	BNL(AMDTS ONLY)	1	1
	DMB/DSS (AMDTS)	1	1	FEMA-REP DIV 39	1	1
	LPDR 03	1	1	NRC PDR 02	1	1
	NSIC 05	1	1	NTIS	1	1

Extra Encls. to: PM

TOTAL NUMBER OF COPIES REQUIRED: LTTR 53 ENCL 46

[illegible]

[illegible]

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

Washington Public Power Supply System
P.O. Box 968 3000 George Washington Way Richland, Washington 99352 (509) 372-5000

October 11, 1983
G02-83-907

Docket No. 50-397

Director of Nuclear Reactor Regulation
Attention: Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Schwencer:

Subject: NUCLEAR PROJECT NO. 2
SOLID WASTE MANAGEMENT SYSTEM FSAR CHAPTER 11
SECTION 11.4, UTILIZATION OF INTERIM PORTABLE
SOLID RADIOACTIVE WASTE SOLIDIFICATION SYSTEM

Reference: Letter, G02-83-175, G. D. Bouchey (SS) to A. Schwencer (NRC), same subject, dated February 25, 1983

The reference stated the Supply System intention to utilize a portable solid radioactive waste solidification system and committed to provide a Final Safety Analysis Report revision to reflect the use of the portable system. The attached submittal satisfies that commitment and will be incorporated in Amendment 33 to the WNP-2 FSAR.

Should you have any further questions, please contact Mr. P. L. Powell, Manager, WNP-2 Licensing.

Very truly yours,

G C Sorensen

G. C. Sorensen, Acting Manager
Nuclear Safety and Regulatory Programs

PLP/tmh
Attachment

cc: R Auluck - NRC
WS Chin - BPA
A Toth - NRC Site

Aperture Card Dist

B001
1/60 All Encls
Extra Encls To: PM

[illegible]

11.4.2 SYSTEM DESCRIPTION

The system description which follows concerns the permanent WNP-2 Solid Waste Management System. The equipment for this system is presently being stored at the site and installation is scheduled for sometime after commercial operations. In the interim period, from fuel load until the permanent system is installed, a mobile solid waste management system will be utilized by WNP-2.

The mobile solid waste management system will be supplied and operated by Chem-Nuclear Systems Inc. (CNSI) per the requirements of their NRC approved topical report CNSI-2 (4313-01354-01P-A) Revision 2. This topical report was approved by the NRC on April 11, 1983, and WNP-2 will utilize the system as described in the report without deviation. The types and quantities of waste to be processed will be the same as described below. It is anticipated that CNSI Type 6-80 and 14-195H shipping casks and associated liners will be utilized.

System operation will be closely monitored by Supply System personnel. The vendor will be required to submit for review and approval a Process Control Program which interfaces with and meets the intent of the program described in section 11.4.3.

Temporary piping connecting the WNP-2 plant radwaste subsystems is shown on Figures 11.4-1a and 11.4-1b. The temporary piping is installed per Regulatory Guide 1.143 requirements.

The mobile system will be set on a curbed concrete pad adjacent to the Radwaste Building as shown in Figure 11.4-2. The curbed pad and sump are sufficiently sized to contain a spill from a full liner. Should such a spill occur the contaminated liquid will flow into the sump, which is isolated. The contents of the sump can then be pumped back to the radwaste system for processing using a portable sump pump connected to the mobile system plant return line. The sump contains an isolation valve which, by administrative procedure, is closed any time the mobile system is processing radioactive waste. All the radioactive mobile system vents are routed back to the radwaste building HVAC system where they can be filtered and monitored. Accident analysis for the liner spill can be found in the CNSI topical report.

Use of the mobile solidification system means that the systems described in sections 11.4.2.6 and 11.4.2.7 for disposal of concentrated wastes and resin slurries are bypassed, as

shown in Figures 11.4-1a and 11.4-1b, by temporary piping. The functions of those systems discussed in sections 11.4.2.6 and 11.4.2.7 are performed by the mobile solidification system as described in the CNSI topical report. When the permanent radwaste solids handling system is installed the system will function as described in sections 11.4.2.6 and 11.4.2.7.

11.4.2.1 General

The sources of the various radioactive solid waste inputs to the system are shown on Figure 11.2-1. Table 11.2-6 shows the expected frequency of input, the quantities of solids generated, the radioactivity level of the solids after accumulation, and the volume of liquid utilized in sluicing accumulated solids to the solidification equipment. The excess liquid is subsequently returned to the liquid waste management system. These values are based on experience from operational BWR nuclear power stations. Figure 11.4-1 shows the waste packaging portion of the solid waste management system. The phase separation and concentration portions of the system are shown on Figures 3.2-11, 10.4-4, 11.2-2, 11.2-3, and 11.2-4. Tanks containing radioactive waste are provided with overflow connections which direct any overflow to drain sumps.

The solid waste processing areas are locatedin the radwaste building. Both wet and dry solid wastes are porcessed. Wet solid wastes include backwash sludge from the reactor water cleanup system, the condensate filter demineralizer system, the fuel pool filter demineralizers, the floor drain filter and the waste collector filter; spent resin from the floor drain demineralizer, the waste demineralizer, the distillate polishing demineralizer; and concentrated bottoms from the decontamination solution concentrators. Dry solid wastes include items such as rags, paper, small equipment parts and laboratory wastes.

11.4.2.2 Radwaste Disposal System for Reactor Water Cleanup Sludge

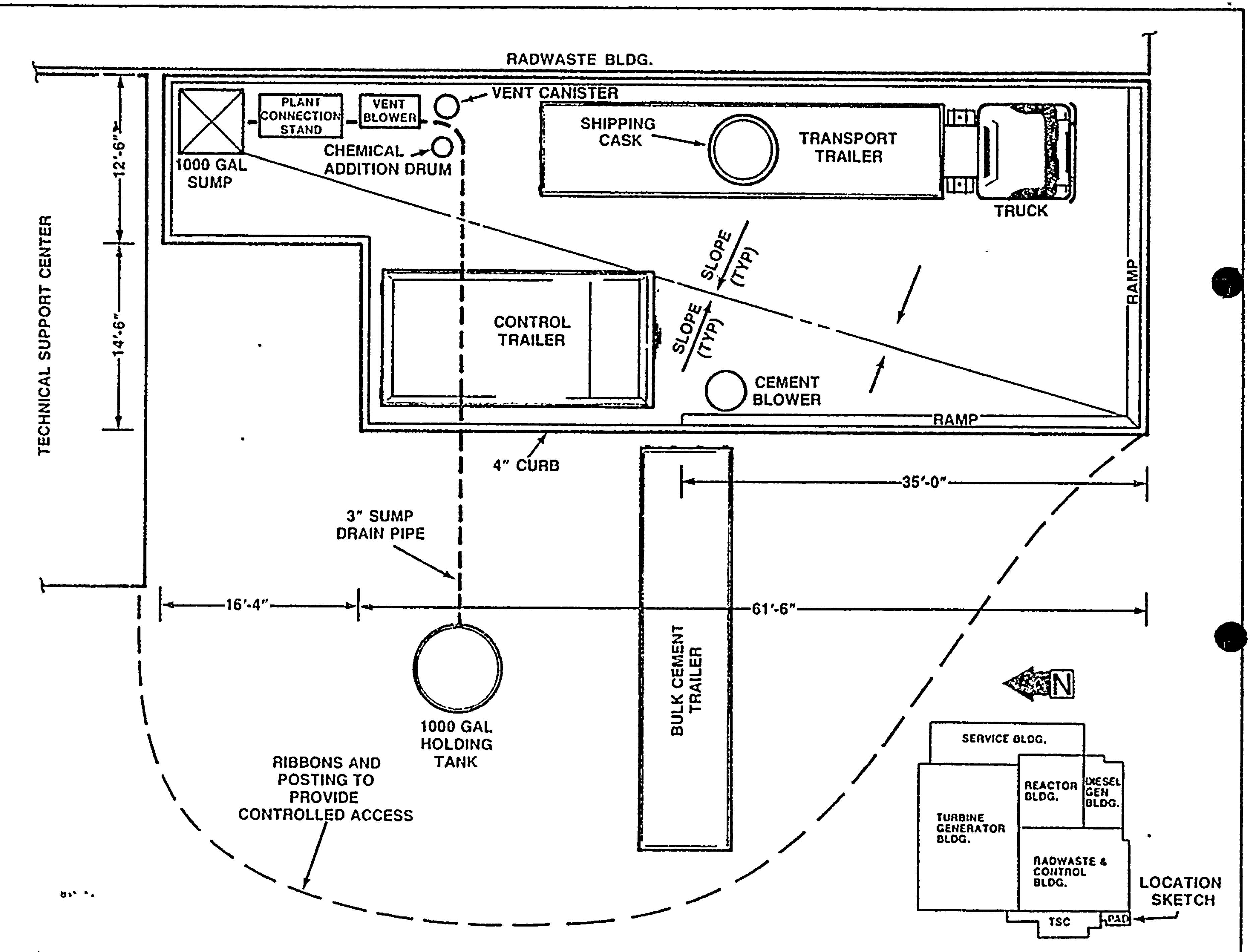
The backwash discharge from the cleanup filter demineralizers is collected and concentrated in two 4,500 gallon cleanup phase separators which are located below the cleanup demineralizers in the radwaste building. After several backwashes are accumulated, the concentrated waste is transferred to either the centrifuges or waste mixing tanks for dewatering.

The cleanup phase separators are designed to concentrate the sludge from 0.5% by weight solids to 5% by weight solids by sedimentation and decantation of the slurry. While the working separator is filling, the other previously filled tank is held isolated to allow additional decay of sludge activity.

WASHINGTON PUBLIC POWER
SUPPLY SYSTEM
NUCLEAR PROJECT NO. 2

Schematic CNSI Equipment Layout on Concrete Pad

FIGURE 11.4-2



11.4.3 PROCESS CONTROL PROGRAM

11.4.3.1 Objective

The objectives of the WNP-2 process control program are to characterize and classify radwaste, and assure the complete solidification of all wet wastes, and to ensure that dewatered wet wastes meet the free standing liquid requirements of 10CFR61. To meet these objectives, the process control program has incorporated the recommendations set forth in NUREG-0800, Branch Technical Position - ETSB 11-3 and NUREG-0473.

11.4.3.2 Process Control Program

The solidification processes to be used at WNP-2 are designed to produce freestanding solids with essentially no free liquids. Due to the latitude of waste and cement proportions that will solidify under the influcent of process additives, the solidification system can be operated with mixing ratios that assure solidification will occur with nominal waste stream variations.

To assure that acceptable waste forms are produced for disposal in compliance with the requirements in 10CFR61, the WNP-2 process control (program provides for characterization of individual waste streams, classification of final waste products, and proper verification that waste solidification has been successful. In addition, waste storage, handling and transportation activities take place under the process control program to ensure compliance with all applicable regulations in 10CFR20, 10CFR61, and 10CFR71. The WNP-2 process control program incorporates the following elements:

a. Process Control Systems
b. Waste Characterization
c. Solidification Processes (wet wastes)
d. Control Instrumentation and Sampling Program
e. Solidification Verification
f. Maintenance and Calibration
g. Waste Processing System Capacity
h. Waste Storage Capacity
i. Compliance with ALARA
j. Unanticipated Wastes
k. Waste Classification
l. Waste Packaging and Shipping

WNP-2 Plant Procedures 1.12.1 "Radioactive Waste Management Program" and 1.12.2 "Radioactive Waste Process Cotnrol Program" implement the process control program described briefly in the following subsections.

11.4.3 PROCESS CONTROL SYSTEMS

The transfer of wet solid wastes to the solidification system is monitored and controlled from the WNP-2 Solid Radwaste Control panel. At present, the WNP-2 process control program interfaces with the solidification contractor (Chem-Nuclear System, (CNSI) Inc.) at the plant connection stand, where waste water, air and ventilation are delivered to the contractor.

The WNP-2 process control program provides for waste characterization, sampling, analysis, equipment maintenance, and calibration of process control instrumentation. The program also describes ALARA criteria, waste processing capacity, reserve capacity, etc.

At the interface point, the CNSI Process Control Program as described in the NRC approved topical Report CNSI-2 (4313-01354-01P-A) is implemented without deviation, and is designed to assure that solidified and/or processed waste prepared for burial meet the 10CFR Part 61 criteria. The solidified or processed waste ready for burial is turned back over to the plant for storage, handling and shipping. The WNP-2 specific Process Control Program is the controlling document, although CNSI also has responsibility for shipping and assuring that packages are not contaminated and meet radiation level and other transportation requirements.

The CNSI waste solidification process is monitored by the Supply System Quality Assurance Department to assure that procedures are being followed and that an acceptable end product is formed.

11.4.3.4 Waste Characterization

The wet wastes at WNP-2 to be solidified are characterized in individual streams from the four major systems producing the wastes. These systems are:

a. <u>Floor Drain System</u> Wastes from the Turbine Building, Reactor Building, and Radwaste Building Floor Drain sumps are routinely monitored and collected for processing in the floor drain collector tank. The floor drain filter and demineralizer sludges and resins are sampled prior to solidification.

b. Equipment Drain System Wastes from the Turbine Building, Reactor Building, and Radwaste Building Equipment Drain sumps are routinely monitored and collected in the Waste Collector Tank. Sludges and resins from the high purity filters and demineralizers are sampled prior to solidification.

c. Chemical Wastes Wastes from detergent drains, chemical drains, and decontamination solution drains are collected in the Chemical Waste Tanks and sampled prior to concentration or solidification. Concentrated waste is also sampled prior to solidification.

d. Condensate Filter Demineralizer System The condensate polishing filter demineralizers use pressure precoated ion exchange media filters. Sludges are sampled prior to solidification.

The waste streams in the foregoing systems are characterized by an annual sampling and analysis program that will establish plant-specific isotopic correlation factors and relationships for inferring concentrations of all 10CFR61 nuclides from easy-to-measure gamma-emitting species. Until the first annual sampling program at WNP-2 is completed (6 to 12 months following commencement of commercial operations), "default" waste correlation factors will be used based on NRC reviewed operating BWR data now being collected and coordinated by EPRI.

Individual waste stream activities and concentrations will be recorded and analyzed as wastes are produced. Accumulations in colleciton tanks and phase separators will be analytically tracked and adjusted for decay. Trends and correlations will be evaluated to ensure that the waste processing systems are functioning as designed to efficiently collect waste for proper disposal and to detect system upsets. The waste stream characterizations will be used to determine isotopic compositions of solidified waste forms for 10CFR61 classification.

11.4.3.5 Solidification Methods (Wet Wastes)

The wet radioactive wastes at WNP-2 are processed under contract with Chem-Nuclear System, Inc. (CNSI). In their process, CNSI can use two methods to process wet waste, dewatering and solidification.

The dewatered wastes include resin and filter cartridges. At the present time the dewatering method for resin exceeding 1 Ci/cc is not used at WNP-2 because the High Integrity Container (HIC) has not been approved by the State of Washington for burial at the U.S. Ecology site. The resin and sludges that are below this activity level are dewatered in carbon steel containers. Resins exceeding this activity level are currently solidified as described in the following paragraphs.

The solidification method used by CNSI is to combine waste with cement and lime to form a solid end product. Basically, the mobile cement solidification system adds separate feeds of radioactive wastes and dry Portland I Cement into a shipping container and mixes these materials for form a solid mass.

Resin slurries and other solid waste materials are preconditioned and dewatered in the shipping container leaving sufficient moisture, when mixed with dry cement, to form the solidified mass. The normal operation of the system includes the transfer of dry cement from a cement storage truck into the waste container.

Prior to transferring the waste to the shipping container the CNSI process control program is used to determine the quantities of additive and cement required to assure solidification. A sample of the waste is obtained and processed to ensure that solidification will occur. After the correct amounts of waste and additives have been transferred to the waste container, dry Portland cement is transferred to the shipping container using a pneumatic system. The waste, additive and cement are then mixed in the shipping container with a disposable agitator operated with a hydraulic motor. The level of waste in the container, the cement added and the temperature are all monitored during the solidification process. During solidification processing, personnel in WNP-2 solid Radwaste Control room and the CNSI control trailer will be in continuous telephone contact to ensure that good communications are maintained and no accidental discharges occur. This will also help to ensure that the volume of any leaks or spills on the concrete pad outside the radwaste building is minimized, and that post-solidification flushing of the system and transfer piping is effectively and efficiently accomplished.

11.4.3.6 Control Instrumentation and Sampling Program

Processing of radwaste at WNP-2 is conducted using various levels of instrumentation and process control for each batch to ensure that: (1) suitable, well characterized waste products are delivered to the various waste processing subsystems; (2) adequate process control information is provided to system operators to assure adherence to proper operating parameter limits, such as tank levels, flow rates, release concentrations, etc.; and (3) sufficient information is available to limit personnel exposures in conformance with the ALARA philosophy.

The control instrumentation used at WNP-2 includes in-process instruments, as well as portable radiation monitoring instruments.

The sampling program at WNP-2 is a twofold program. Individual waste streams are characterized and classified by the Health Physics/Chemistry group. This information is transmitted in writing to the Chem-Nuclear Systems, Inc. mobile solidification system operator for the wastes to be solidified.

The sampling for wastes to be solidified is a cooperative effort between WNP-2 and CNSI. The sampling specified by the process control program requires the following:

a. Waste is to be recirculated in the tank volume until through turnover or adequate mixing to achieve a homogeneous mixture is complete. This is to be confirmed by WNP-2 personnel as representative samples are critical to testing for solidification.

b. Any process that changes the tank concentrations such as adding waste to a tank already sampled, stopping recirculation while sampling or transferring material from the tank invalidates the sampling and testing process. If this does occur, the circulation and sampling process must be repeated.

c. A sample (by CNSI process control program) shall be solidified prior to full scale solidification of waste. If for the process stream there is no change in chemical composition of the wastes as verified by WNP-2, test results and full scale solidification will be considered reproducible. Thereafter, a sample solidification will be made prior to processing the tenth batch from the same sources.

11.4.3.7 Solidification Verification

The CNSI process control program uses a sampling and testing method on each waste sample to ensure solidification can be achieved.

This process is controlled by a solidification strategy developed by CNSI. The pH is checked, chemical solubility, ion exchange capacity of resins, oils, etc., to assure that the correct waste to cement/additive ratio is obtained to solidify the waste batch and that solidification will not be inhibited. Test samples of 200 milliliters or less are used to determine the amount of waste to cement, and additives required for solidification of each batch tested.

Chem-Nuclear Systems, Inc. use the following acceptance test criteria to verify solidification:

1. Visual inspection after cement addition to confirm mixture is uniform with no free water on the surface.

2. Visual inspection of the product after hardening proving that the material is a free standing monolith and liquid free.

3. Penetration testing of the end product with a metal probe, pencil size.

If waste batches have been sampled and it is known that the waste stream constituents remain essentially the same, one out of each ten batches is sampled and tested to verify solidification. The determination of the constituents is performed by the Supply System.

The WNP-2 Quality Assurance Department also verifies that the process control used for solidification does produce a liquid free, free standing monolith. They also check to the degree practicable the waste containers in storage and at the time of shipment to ascertain if there is any indication of free standing liquids in the containers.

Independent sampling is also performed by the Supply System to verify that the waste components are compatible with the CNSI system.

11.4.3.8 Maintenance and Calibration

The control of the waste processing system is ensured by a thorough preventative and corrective maintenance program. Programatic control of preventative and corrective maintenance is described in PPM 10.1.5, scheduled Maintenance Systems, and PPM 1.3.7, Maintenance Work Requests, respectively.

The control instrumentation is on an integral part of the process system. The instruments providing the controlling functions are calibrated on a predetermined schedule and after each maintenance activity.

The periodic verification of calibration or recalibration assures that the process control program associated instruments are maintained and that conditions within the system are known.

The maintenance and calibration activities are performed in accordance with written procedures. These activities are performed under a Radiation Work Permit to help limit the exposure received during maintenance.

11.4.3.9 Waste PRocessing System Capacity

The mobile solidifiction system used at WNP-2 has a capacity of 700 ft^3 of wet waste per 5-day week, one shift operation, resulting in approximately 1,400 $ft.^3$ of solidified waste. This gives a 40-week operating capacity of 56,000 $ft.^3$ of solidified waste. The mobile solidification system has the capacity using two shifts per day and more operators to process up to 112,000 $ft.^3$/year.

Dry compatible waste volumes are segregated and monitored to help reduce volumes. The expected volume of compatible radwaste is approximately 20,000 ft.^{3}/year. This volume can be affected upward or downward by tighter controls on materials used in contaminated areas. Forced outages and refueling outages increase volume but can be limited by preplanning material usage.

The radwaste processing capacity at WNP-2 is sized to provide the needed capacity for anticiapted occurrences and normal operation. This includes the wet wastes, the liquids, and solid wastes. Table 11.4-1 lists some of the major flowrates and capacities for several of the WNP-2 waste processes. Table 11.4-2 tabulates the major equipment items in the permanently installed WNP-2 waste processes.

11.4.3.10 Waste Storage Capacity

The waste storage capacity of the Radwaste Building for liquids is segregated by the waste processing subsystems. The tank capacities of the subsystems are as follows: equipment drain 115,000 gallons, floor drain systems 40,000 gallons, chemical waste 33,900 gallons and auxiliary equipment is 1,610 gallons.

The EDR and FDR systems are interconnected with cross tie piping to allow flexibility in processing. This helps ensure that the system capacity is able to handle variable levels of waste. As these subsystems are all enclosed in the radwase building, the change for inadvertent release during storage has been greatly reduced. The chemical waste incorporates two parallel processing paths. Cross connections between the two process paths allows individual components to serve in the other process path. this method of operation ensure that component inoperability does not limit plant operation.

The solid waste storage area was designed to store seventy-two 50 ft^3 liners containing dewatered or solidified waste. This storage space is available for the mobile waste solidification system to store liners of 70 ft^3 or 100 ft^3 capacity. Storage is not anticipated to be a problem as sufficient casks and transport packages have been factored into the planning to allow shipment of solidified radwaste at a rate to preclude storage problems.

11.4.3.11 Compliance with ALARA

1. Facility Layout for Chem-Nuclear Systems, Inc. The Mobile Cement Solidification System (MCSS) of CNSI is designed to meet Regulatory Guide 8.8, ALARA Considerations. The waste container filling, capping, and decontamination operation are all performed remotely from a shielded control area. The system operator can view these operations using a television monitoring system. Overfilling the waste container is precluded by disposable waste level sensors that provide warning alarms and shut-off waste flow at a predetermined level. The system has provisions to remotely cap and monitor the filled waste container.

The mobile system is designed to limit the length of piping between the WNP-2 processing system and the mobile system. The piping system is designed to minimize the accumulation of crud deposits in the system. Piping and pumps are designed to allow complete flushing and when possible piping is flushed prior to maintenance. In addition to shielding of the control area, the control area is located in a low radiation area. Equipment with clean components is segregated from the areas containing waste except in the solidification area. This allows maintenance on equipment in the cement/additive area to be performed in low radiation areas. The placement of the mobile solidification system outside the west wall of the radwaste building at the 441 foot elevation limits the length of piping between the Supply System components and CNSI components. A lined, diked concrete pad is provided under the Chem-Nuclear Systems processing equipment to collect spills or leak that may occur.

The placement of the mobile system was determined based on emergency needs and criteria from Regulatory Guide 8.8 on ALARA and quality assurance provisions from Regulatory Guide 1.143.

The area around the mobile solidification system will be administratively controlled access area using radiation ribbons and posting to preclude unauthorized entry and inadvertent exposure. The layout in the corner of the radwaste building and Technical Support Center provides a controlled access boundary that is clearly visible and can be easily monitored.

2. Plant Layout for ALARA. The WNP-2 radwaste processing was designed for remote operation from the Radwaste Control Room in the 467 foot elevation of the radwaste building. The control room is designed with mimicking of the processes being controlled. This allows for visual indication of the stream processing progress of the systems in use.

The control room is designed to control liquid and gaseous processing through the liquid subsystems.

3. Exposure Control. The operator controls the processing of radioactive waste from the Radwaste Control Room that is located in a low radiation area.

Components and systems can be remotely aligned from the Radwaste Control Room without going into the radiation areas. This allows flexibility of operation and ensures processing capacity is maintained with reduced exposure to personnel. The systems and components can be flushed remotely from the Control Room reducing radiation levels for maintenance activities, also helping meet the ALARA concept.

The installed systems at WNP-2 are sized with the capacity to process peak volumes of waste to reduce the effluents offsite, meeting criteria of 10CFR50, Appendix I. The subsystems are all designed to process their individual waste streams so that no wastes are discharged from the plant without processing.

The processing control from a remote control room and the ability to process all waste streams meets the intent of ALARA for both onsite and offsite.

11.4.3.12 Unanticipated Wastes

The waste streams at WNP-2 have been characterized for normal expected waste components. This is based on BWR industry data and does cover most instances. Periodically, there may be waste produced from operations such as decontamination or cleaning that have not been characterized.

These wastes are classified and solidified based on the practical experience of the waste process contractor, Chem-Nuclear Systems, Inc. It is unlikely that any wastes will be produced at WNP-2 that cannot be solidified. When changes in the system or process do occur that are out of the ordinary, solidification requirements will be determined on a case-by-case basis. Records of these unanticipated wastes are retained and results of laboratory testing retained for future use.

11.4.3.13 Waste Classification

Waste classification at WNP-2 to determine if wastes are Class A, B, or C is a multifaceted program. The individual waste stream will be sampled and analyzed for nuclides in Tables 1 and 2 of 10CFR Part 61 to establish the waste classification. This analysis process may in many instances use scaling factors to tie beta emitting nuclides to more easily identify gamma emitting nuclides. The scaling factors used initially will be consistant with those from NUREG 0782 with Plant specific scaling factor being developed as waste is generated. Dependent on the waste stream and the feed to that stream, the scaling analysis may be performed once to classify the type of waste with an annual reverification of scaling factors.

11.4.3.14 Waste Packaging and Shipping

The waste shipped from WNP-2 is shipped in DOT and NRC approved waste packaging containers. The containers used for shipping waste are based on the types and activities of waste. Waste will be sent to the NRC-licensed U.S. Ecology waste disposal site approximately 12 miles from WNP-2.

Table 11.4-1

WNP-2 Waste Processing Systems Capacities

1. Liquid Waste Flowrates and Capacities

   a) EDR subsystem - 14,500 GPD to 104,000 GPD
   b) EDR storage - 115,000 gal.
   c) FDR subsystem - 5,700 GPD to 55,300 GPD
   d) FDR storage - 40,000 gal.
   e) Chemical Waste Subystem - 1,500 GPD to 20,600 GPD
   f) Chemical Waste Storage - 33,900 gal.
   g) Aux. Eq. Storage - 1,610 gal.

2. Filter Sludge and Chemiucal Waste Concentrates Rates and Capacities:

   a) Normal - 8,000 $feet^3$/year
   b) Processed volume for dispoal - 16,000 ft^3/year

3. Mobile Solidification System Rates and Capacities

   a) Normal - 56,000 ft^3/40-week cycle*1
   b) Maximum - 112,000 ft^3/year*2
   c) Storage - 72-50 ft^3 liners

4. Dry Compatible Waste Production Rate

   a) Compatible radwaste - 20,000 ft^3/year

---

*1 Figured on 700 $ft.^3$ per week at single shift, five day week.

*2 Figured on two shifts with increase in personnel.

TABLE 11.4-2

SOLID WASTE MANAGEMENT SYSTEM MAJOR EQUIPMENT ITEMS

Cleanup Phase Separatyors - 2 Required

Construction: Stainless steel shell and internals. Atmospheric design pressure. 250°F design temperature. Capacity - 4,500 gallons/each.

Cleanup Sludge Discharge Mixing Pump - 1 Required

Construction: Stainless steel. Design pressure - 150 psig. Design temperature - 150°F. Capacity - 210 gpm at 170 feet TDH.

Cleanup Decant Pump - 1 Required

Construction: Stainless steel. Design pressure - 150 psig. Deisgn temperature - 150°F. Capacity - 53 gpm at 50 feet TDH.

Condensate Backwash Receiving Tank - 1 Required

Construction: Stainless steel shell and internals. Atmospheric design pressure. 150°F design temperature. Capacity - 19,000 gallons.

Condensate Backwash Transfer Pump - 1 Required

Construction: Stainless steel. Design temperature - 150°F. Capacity - 450 gpm at 50 feet TDH.

Condensate Phase Separator - 2 Required

Construction: Epoxy-coated carbon steel shell, stainless steel internals. Atmospheric design pressure. 250°F design temperature. Capacity - 23,500 gallons/each.

Condensate Sludge Discharge Mixing Pump - 1 Required

Construction: Stainless steel. Design pressure - 150 psig. Design temperature - 150°F. Capacity - 420 gpm at 160 feet TDH

TABLE 11.4-2 (Continued)

Condensate Decant Pump - 1 Required

Construction: Stainless steel. Design pressure - 150 psig. Design temperature - 150°F. Capacity - 450 gpm at 50 feet TDH.

Waste Sludge Phase Separator Tank - 1 Required

Construction: Epoxy-coated carbon steel, stainless steel internals. Atmospheric deisgn pressure. 150°F design temperature. Capacity - 13,000 gallons.

Waste Decant Pump - 1 Required

Construction: Stainless steel. Design pressure - 150 psig. Design temperature - 150°F. Capacity- 53 gpm at 50 feet TDH.

Waste Sludge Discharge Mixing Pump - 1 Required

Construction: Stainless steel. Design pressure - 150 psig. Design temperature - 150°F. Capacity - 210 gpm at 105 feet TDH.

Spent Resin Tank - 1 Required

Construction: Stainless steel shell and internals. Atmospheric design pressure. 150°F design temperature. Capacity - 1,200 gallons.

Spent Resin Pump - 1 Required

Construction: Stainless steel. Design pressure 150°F. Capacity - 21 gpm at 105 feet TDH.

Decontamination Solution Concentrated Waste Tank - 2 Required

Construction: Stainless steel shell and internals. Atmospheric design pressure. 150°F design temperature. Capacity - 700 gallons/each.

Decontamination Solution Concentrate Waste Pump - 1 Required

Construction: Stainless steel. Design pressure - 150 psig. Design temperature - 150°F. Capacity - 30 gpm at 70 feet TDH.

TABLE 11.4-2 (Continued)

Concentrated Waste Measuring Tank - 1 Required

Construction: Stainless steel. Atmospheric design pressure. 150°F design temperature. Capacity - 400 gallons.

Centrifuge - 2 Required

Type - Solid bowl, horizontal, continuous feed. Removal efficiency of solids - 98%
Solids discharge - 40% to 60% by weight.

Waste Mixing Tank - 2 Required

Construction: Stainless steel. Capacity - 80 cubic feet. Equipped with mixer and spray header.

Waste Feed Pump - 2 Required

Construction: Stainless steel. Capacity - 10 to 18.7 gpm at 20 psig.

Dewatering Pump - 2 Required

Construction: Stainless steel. Capacity - 40 gpm at 15 psig.

Sample Pump - 2 Required

Construction: Stainless steel. Capacity - 7.5 gpm at 25 psig.

Sodium Silicate Storage Tank - 6 Required

Construction: Aluminum. Capacity - 550 gallons/each.

Solium Silicate Day Tank - 1 Required

Construction: Carbon steel. Capacity - 250 gallons.

Chemical Addition - 2 Required

Construction: Polypropylene. Capacity - 100 gallons/each.

Sodium Silicate Transfer Pump - 1 Required

Construction: Carbon steel. Capacity - 8 gpm at 20 psig.

TABLE 11.4-2 (Continued)

Sodium Silicate Feed Pump - 1 Required

Construction: Stainless steel. Capacity - 1 to 2 gpm at 20 psig.

Chemical Addition Pump - 2 Required

Construction: Stainless steel. Capacity - 0.05 to 2.0 gpm at 50 psig.

Waste Mixing Pump - 1 Required

Construction: Stainless steel. Capacity - 30 gpm at 10 psig.

Bulk Cement Storage Silo - 1 Required

Construction: Carbon steel. Capacity - 1,000 cubic feet. Equipped with pneumatic transporter system to convey cement from storage silo to cement day tank.

Cement Day Tank - 1 Required

Construction: Carbon steel. Capacity - 50 cubic feet. Equipped with vibrating screw feeder to waste mixing pump.

Transfer Dolly - 1 Required

Track riding dolly for transfer to 50 cubic foot containers between processing stations.