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AUTH.NAME AUTHOR AFFILIATION
VAN BRUNT,E.E. Arizona Public Service Co.
RECIP.NAME RECIPIENT AFFILIATION
KNIGHTON,G. Licensing Branch 3

SUBJECT: Forwards response to 830415 request for addl info re solid waste process control program.Package waste will be segregated by container activity level into high level or low storage area.

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	NRR/DSI/AEB	26	1	1	NRR/DSI/ASB		1	1
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Arizona Public Service Company
P.O. BOX 21666 • PHOENIX, ARIZONA 85036

June 30, 1983
ANPP 24215-WFQ/MAJ

Director of Nuclear Reactor Regulation
Attention: Mr. George Knighton, Chief
Licensing Branch No. 3
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: Palo Verde Nuclear Generating Station
(PVNGS) Units 1, 2 and 3
Docket Nos. STN-50-528/529/530
File: 83-056-026; G.1.01.10

References: NRC letter from G. W. Knighton, NRC to
E. E. Van Brunt, Jr., APS dated 4/15/83.
Request for Additional Information-Solid
Waste Process Control Program.

Dear Mr. Knighton:

The referenced letter requested additional information from Arizona Public Service Company (APS) concerning the Palo Verde Nuclear Generating Station Units 1, 2 and 3 (PVNGS) Solid Waste Process Control Program.

Attached are the APS responses to the NRC request for additional information.

If you have any questions, please call me.

Very truly yours,

E. E. Van Brunt

E. E. Van Brunt, Jr.
APS Vice President,
Nuclear Projects
ANPP Project Director

EEVBJr/MAJ/dh
Attachment

cc: A. C. Gehr (w/a)
E. Licitra (w/a)

A001
1/1

STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

I, Edwin E. Van Brunt, Jr., represent that I am Vice President Nuclear Projects of Arizona Public Service Company, that the foregoing document has been signed by me on behalf of Arizona Public Service Company with full authority so to do, that I have read such document and know its contents, and that to the best of my knowledge and belief, the statements made therein are true.

Edwin E. Van Brunt, Jr.

Sworn to before me this 30th day of June, 1983.

Notary Public

My Commission expires:

May 5, 1984

RESPONSES TO METB QUESTIONS ON PCP FOR PALO VERDE
UTILIZING THE HITTMAN CEMENT SOLIDIFICATION SYSTEM*

1. Describe how you propose to comply with the interface requirements spelled out in the Hittman topical report HN-R-1109, Rev. 4, for their Cement Solidification System.

Response: Compliance with Hittman interface requirements is described as follows:

I. General Radioactive Waste Facility Criteria

a) The facility should be located at grade elevation.

Compliance: The Radwaste Building and Solid Radwaste System are located at grade level as shown in PVNGS FSAR Figure 1.2-5.

b) The facility should include provisions for placement of a truck or trailer adjacent to the radioactive waste storage areas. Floor space requirements for a trailer and tractor are 60 feet by 12 feet and minimum requirements for a trailer are 44 feet by 12 feet.

Compliance: Sufficient floor space has been provided for a trailer adjacent to the waste storage areas as shown in PVNGS FSAR Figure 1.2-5.

c) The facility should be serviced to the extent practical by an overhead bridge crane. The maximum load on this crane should correspond to the weight of the heaviest shipping cask to be used, in the loaded condition.

Compliance: The overhead bridge crane services the radwaste storage areas, packaging area, cement feed tanks and the truck loading bay. The maximum design load of the crane is 30 tons. The heaviest shipping cask (80 cubic feet liner) weight is 24 tons.

d) The bridge crane hook height should be compatible with loading the maximum size disposable container into a shipping cask mounted on a standard flatbed trailer.

Compliance: The bridge crane hook has a vertical travel range from the 100 foot level (grade level) to the 125 foot level. This 25 foot lifting range is adequate for lifting the maximum size disposable container into a shipping cask mounted on a standard flatbed trailer.

*Enclosure 1 to NRC Letter, G. Knighton to E.E. Van Brunt, Jr., April 15, 1983.

e) Separate storage areas should be provided for compacted rubbish and packaged process waste.

Compliance: The solid radwaste storage area is segregated into high level and low level storage areas as stated in PVNGS FSAR Section 11.4.2.4.

f) Shielding in the packaging and storage areas should be compatible with the requirements of Regulatory Guide 8.8, based on the expected activity levels of packaged waste under normal conditions of plant operations.

Compliance: Shielding in the packaging and storage areas is compatible with the requirements of Regulatory Guide 8.8 as described in PVNGS FSAR Section 12.1.

g) Radioactive waste holdup tanks should be placed in shielded enclosures accessible via ladders or labyrinths. Radwaste pumps shall be located in separate shielded enclosures accessible for maintenance, adjacent to or beneath the tanks such that pump suction piping can be either vertical or connected via long radius bends.

Compliance: Equipment placement meets this criteria and is described in PVNGS FSAR Section 11.4. The use of long radius elbows in pump suction piping runs in lieu of pipe bends is not expected to compromise system operations but will be reviewed during startup testing.

h) The operator shall have the capability of visually monitoring all activities in the packaging and process waste storage areas, from outside the shield walls.

Compliance: The packaging and process waste storage areas are monitored by three remote operated cameras. The cameras are positioned such that the crane hoist, the crane travel, and the handling and packaging of radwaste material can be monitored from outside the shield walls.

i) Packaging, handling and operating procedures shall be compatible with the requirements of Regulatory Guide 8.8.

Compliance: Packaging, handling and operating procedures are compatible with the requirements of Regulatory Guide 8.8 as described in PVNGS FSAR Section 11.4 and Chapter 12.

j) All radioactive waste storage areas should be located as close as practicable to the truck station.

Compliance: The storage areas are located adjacent to the truck station as shown in PVNGS FSAR Figure 1.2-5.

II. Radioactive Waste Packaging Stations Criteria

a) The radioactive waste packaging station should be accessible to the overhead bridge crane to the maximum extent practicable. As a minimum, the crane shall have access to a load-in/load-out position.

Compliance: Radwaste storage areas, packaging area (including load in/load out position), cement feed tank and tractor-trailer area are serviceable by the overhead bridge crane.

b) Where large disposable containers are used, the space available at the packaging station shall be compatible with handling the largest disposable container used for process radioactive waste packaging.

Compliance: Adequate space has been provided for the largest disposable container, an 80 ft^3 liner.

c) Where large disposable containers are used, provisions should be included for packaging processed radioactive waste within a shielded shipping cask. Alternatively, the packaging system should include provisions for packaging in a truck mounted shipping cask.

Compliance: The solidification system has the capability for loading a large disposable container into a truck mounted shipping cask.

d) All functions from container load-in through load-out for storage or shipment should be performed at the packaging station. As a minimum, those functions should include filling, capping and radiation monitoring. Provisions for container decontamination and swiping should be considered on an individual facility basis.

Compliance: The following functions will be performed at the packaging station from container load-in through load-out: filling, capping, swiping, radiation monitoring and decontamination of 55 gallon drums.

e) At PWR's, the packaging station should include provisions for transfer and packaging of spent filter cartridge assemblies.

Compliance: Provisions have been provided and are described in PVNGS FSAR Section 11.4.2.3.3, "Filter Handling and Disposal".

f) The packaging station should be located adjacent to the processed waste storage area.

Compliance: The packaging station is located adjacent to the processed waste storage area as shown in PVNGS FSAR Figure 1.2-5.

III. Process Waste Storage Criteria

a) The capacity of the storage area should as a minimum be compatible with accumulating the processed radioactive waste produced during a 90 day period under normal operating conditions.

Compliance: The capacity of the storage area is stated in PVNGS FSAR Section 11.4.2.4 and is sufficient to allow a 30 day decay, consistent with the requirements of Branch Technical Position ETSB 11-3, of the expected annual waste volumes.

b) Where disposable containers taller than 55 gallon drums are used, stacking of containers should be avoided.

Compliance: Solidified waste containers will be stored in accordance with PVNGS FSAR Section 11.4.2.4.

c) The layout should be compatible with cycling packaging waste on a first-in/first-out basis.

Compliance: The layout is compatible with the proposed cycling as shown in PVNGS FSAR Figure 1.2-5.

d) Packaged waste should be segregated to the extent practicable by waste type and/or container activity level.

Compliance: Packaged waste will be segregated by container activity level into either a high-level or a low-level storage area.

e) All positions in the storage area should be accessible by the overhead bridge crane.

Compliance: All positions required for 30 day storage in the storage area are accessible by the overhead bridge crane.

f) The minimum clearance between individual large containers within the storage area should be 6".

Compliance: Sufficient clearance between individual large containers within the storage area will be maintained to ensure safe storage and crane transport of containers.

g) The storage layout should provide for access to individual containers by remote means.

Compliance: Containers in high-level and low-level storage areas are remotely accessible.

h) The shield wall thickness in the storage area should be a minimum of two feet of concrete.

Compliance: The high level storage area has concrete walls two feet thick. The low level storage area has concrete walls one and two feet thick for the inside and outside facing walls, respectively.

i) The height of the shield walls around the storage area should be a minimum of one disposable container height above the highest container elevation in the storage area plus one foot.

Compliance: The height of the shield walls around the high level storage area is a minimum of one disposal container height above the highest container elevation in the storage area plus one foot.

j) Where elevations require a cutout in the storage area shield walls for removal of packaged waste, the bottom of the cutout shall be a minimum of three feet above the height of the highest container elevation height. The maximum width of the cutout should be the width of the largest cask or disposal container plus one foot.

Compliance: There are no cutouts in the waste storage areas, nor are any cutouts required.

k) Where segregation includes storage of substantial numbers of drums of low activity levels (less than 100 mrem contact), provisions should be made for forklift truck access via a door or labyrinth.

Compliance: Provisions exist for forklift truck access via a door as shown in PVNGS FSAR Figure 1.2-5.

2. Provide tables showing how the utility equipment, components, structures and services that interface with the Hittman cement system comply with the applicable criteria for Regulatory Guide 1.143, Rev. 1, October 1979, "Design Guidance for Radioactive Waste Management Systems, Structures and Components Installed in Light - Water - Cooled Nuclear Power Plants," and BTP ETSB 11-3, Rev. 2, July 1981, "Design Guidance for Solid Radioactive Waste Management Systems Installed in Light - Water - Cooled Nuclear Power Plants."

Response: Palo Verde compliance with Regulatory Guide 1.143, Rev. 1, October 1979 is described in response 11A.1 to NRC Question 460.1 provided in Appendix 11A to the PVNGS FSAR. PVNGS complies with the position of BTP ETSB 11-3, Rev. 2, July 1981 as described in Section 11.4 of the PVNGS FSAR.

3. Describe how the plant design, as it relates to the Cement Solidification System, reflects consideration of the following design features intended to maintain occupational radiation exposures ALARA:

   (a) Minimizing the length of piping runs.

   (b) Avoiding low points and dead legs in piping.

   (c) Using larger diameter piping to minimize plugging.

   Response: Equipment has been installed per Hittman's recommended locations, thereby minimizing the length of piping runs, and avoiding low points and dead legs in piping. Large diameter piping has been used to minimize plugging.

4. Clarify whether heat tracing has been incorporated for tanks that contain evaporator concentrates that are likely to solidify at ambient temperatures.

   Response: Liquid Radwaste System concentrate monitor tanks LRN-T03A and B are provided with heat tracing as shown on Figure 11.2-2, PVNGS FSAR. Waste Feed Tank SRN-T01 is provided with heat tracing as shown on Figure 11.4-2, PVNGS FSAR.

5. Describe the equipment, components or structure and services you provide for containing radioactive spills that may occur in the portable system.

   Response: The use of a portable system for the SRS at PVNGS is not currently a design feature.

6. If within the utilities scope of supply, describe the plant inspection program to ensure that cement and/or conditioning chemicals are maintained at proper quality during the time they are stored.

   Response: The manufacturers of the Portland cement and the dry chemical additive (anhydrous sodium meta silicate "METSO" beads) do not require inspection programs. The cement will be stored in the cement silo and the cement feed tanks. The silo and tanks are water tight, carbon steel containers where cement is stored at atmospheric pressure. The METSO beads are stored in the additive feed tank. The additive feed tank has three psig of nitrogen continuously supplied. The dry nitrogen is used to provide a slight positive pressure inside the

additive feed bin, thereby preventing the infiltration of air and the possibility of caking of the additive material. Neither the cement nor the METSO beads are directly exposed to the environment prior to usage. A visual inspection will be performed when filling the cement feed tanks and the additive feed bin.

7. Describe how the curie content and identification of radionuclides in each container are determined prior to shipment.

   Response: Samples of the waste feed tank will be analyzed for curie content and identification of radionuclides. From these samples and the known amount of waste in each container, the package contents will be calculated.

8. Revise the writeup of the PCP for Palo Verde, Units 1-3, addressing comments given in Enclosure 2.

   Response: The PCP will be revised to include the changes as indicated in this document.

RESPONSES TO COMMENTS ON PROCESS CONTROL PROGRAM FOR
PALO VERDE, UNITS NOS. 1, 2, AND 3*

Comment: 1. The PCP for Palo Verde, Unit Nos. 1, 2, and 3, should be consistent with Reference 1** which has been referred to in Reference 5. If however, the PCP for Palo Verde is based on Reference 2, then it should be spelled out, i.e., the document number of Reference 2 should be identified and a copy of Reference 2 should be provided as an additional enclosure.

Response: Portions of the PCP for PVNGS are based upon sections of Reference (1) Hittman Radwaste Solidification System (Cement) Topical Report HN-R1109-NP, Revision 4, April 1977, as described herein.

Comment: 2. The following wording is suggested for Section 1.0, "Purpose"

"1.1 Purpose

The purpose of the Process Control Program (PCP) for Palo Verde, Unit Nos. 1, 2, and 3, is to establish a set of process parameters which provide reasonable assurance of complete solidification of various liquid radioactive "wet wastes" including resin slurries, evaporator bottoms, and filter sludges, in accordance with applicable Department of Transportation (DOT) and Arizona State regulations, and Nuclear Regulatory Commission (NRC) and licensed burial facilities acceptance criteria for solidification, packaging and shipment to an approved offsite burial site. Towards this purpose, the PCP ensures that the solidified substance is a monolith having no free standing liquid and is within the limits, as set forth in the above mentioned regulations and acceptance criteria.

1.2 Applicability

The Process Control Program shall be used by all personnel operating the Hittman Cement Solidification System."

Response: The purpose will be changed to read:

The purpose of the Process Control Program (PCP) for Palo Verde, Unit Nos. 1, 2, and 3 is to establish a set of process parameters which will provide reasonable assurance of complete solidification of various liquid radioactive "wet wastes" including resin slurries, evaporator bottoms, filter

*Enclosure 2 to NRC letter, G. Knighton to E.E. Van Brunt, Jr., April 15, 1983.
**References from Enclosure 2 are listed on the final page of these responses.

sludges, and chemical drains in accordance with applicable Department of Transportation (DOT), Nuclear Regulatory Commission (NRC), and licensed burial facilities acceptance criteria for solidification, packaging, and shipment to an approved offsite burial site. There are no Arizona State regulations currently applicable to PVNGS. Towards this purpose, the PCP ensures that the solidified substance is a monolith having no free standing liquid, and is within the limits, as set forth in the above mentioned regulations and acceptance criteria. Also this PCP will ensure solidification will be performed to maintain any potential radiation exposure to plant personnel to "as low as reasonably achievable" ALARA levels.

Statement 1.2 "Applicability" will not be included in "Purpose" because of the Radiation Protection Technician as the Radwaste Operator is directed to comply with the PCP in section 4.5. The responsibilities of all personnel that will interface with the PCP are specified in section 4.0 RESPONSIBILITIES.

Comment: 3. Under Section 2.0, "References" of your PCP, include the following additional entries:

a. Applicable chapters of the FSAR for Palo Verde, Unit Nos. 1, 2, and 3, (spell out the chapter and section numbers);

b. Arizona Public Service Company's ALARA plan for Palo Verde, Unit Nos. 1, 2, and 3;

c. Palo Verde Quality Assurance Program applicable to PCP.

d. Standard Review Plan 11.4, Revision 2, July 1981, "Solid Waste Management Systems".

e. Branch Technical Position ETSB 11-3, Rev. 2, July 1981, "Design Guidance for Solid Radioactive Waste Management Systems Installed in Light-Water Cooled Nuclear Power Plants";

f. NRC Regulatory Guide 1.143, Rev. 1, October 1979, "Design Guidance for Radioactive Waste Management Systems, Structures and Components Installed in Light-Water Cooled Nuclear Power Plants;"

g. Hittman Operating Procedures for Cement Solidification Units (spell out the document number);

h. Hittman Operation and Maintenance Manual for Cement Solidification System, Volume 1 (spell out the document numbers);

i. Arizona Public Service Company's responses to METB questions on PCP for Palo Verde - XXX (yet to be provided - spell out document number);

and

j. 10 CFR 61, "Licensing Requirements for Land Disposal of Radioactive Waste."

Response: The following references will be included in the PCP reference list:

1. Hittman Radwaste Solidification (cement) Topical Report HN-R1109-NP, Revision 4, April 1977, Section VII, "Cement Solidification Process Chemistry."

2. Palo Verde Nuclear Generating Station Final Safety Analysis Report, Sections 11.4, 12.1 and 12.3.

3. 75PR-9ZZ03, "ALARA Program".

4. 60PR-0ZZ01, "Operational Quality Assurance Program".

5. Standard Review Plan 11.4, Revision 2, July 1981, "Solid Waste Management Systems".

6. Branch Technical Position ETSB 11-3, Rev. 2, July 1981, "Design Guidance for Solid Radioactive Waste Management Systems Installed in Light Water Cooled Nuclear Power Plants."

7. 10 CFR 61, "Licensing Requirements for Land Disposal of Radioactive Waste."

The following references will not be included in the reference list:

1. NRC Regulatory Guide 1.143, Rev. 1, October 1979, "Design Guidance for Radioactive Waste Management Systems, Structures and Components Installed in Light-Water Cooled Nuclear Power Plants."

Reason: Position covered in PVNGS FSAR Appendix 11A, Question 11A.1.

2. Hittman Operating Procedures for Cement Solidification Units (no document number).

Reason: Not used in the development of this program.

3. Hittman Operation and Maintenance Manual for Cement Solidification System, Volume 1 (Document Number unknown).

Reason: Not used in the development of this program.

4. Arizona Public Service Company's responses to METB Questions on PCP for Palo Verde.

Reason: The comments will be included in the PCP as herein indicated but the reference is not needed.

Comment: 4. Provide commitment in the body of the writeup of your PCP that you will implement the applicable interface requirements identified in References 1 and 3.

Response: The writeup of the PVNGS PCP will be revised to include commitments to compliance statements as reflected in our answers to question 1 of METB Questions on Process Control Program for the Hittman Cement Solidification Program.

Comment: 5. Integrate the information that you will be providing as responses to staff questions on solidification of "wet wastes" in the body of the PCP writeup.

NOTE: For items 4 and 5, referencing to the responses you will be providing in Reference 6 will be adequate.

Response: The PCP will be revised to include the changes as indicated in this document.

Comment: 6. State explicitly that the PCP will comply with applicable DOT and Arizona State regulations, NRC and burial facilities' acceptance criteria, and 10 CFR Part 61 for solidification, packaging and shipment to an approved offsite burial site. Also, make it clear that the implementation of the PCP for solidification of the "wet wastes" will be in accordance with applicable portions of a) 10 CFR Part 50, Appendix I, b) Palo Verde Quality Assurance Program, and c) Arizona Public Service Company's ALARA Plan for Palo Verde, Unit Nos. 1, 2, and 3. For those items mentioned above for which compliance with applicable acceptance criteria and/or regulations has already been stated in the FSAR for Palo Verde, a reference to the FSAR in this regard will be adequate.

Response: a) The following information will be added to the PCP:

The PCP will comply with applicable DOT, NRC and burial facilities' acceptance criteria, and 10 CFR Part 61 for solidification, packaging and shipment to an approved offsite burial site. The implementation of the PCP for solidification of the "wet wastes" will be in accordance with applicable portions of Palo Verde Quality Assurance Program and Arizona Public Service Company's ALARA Plan for Palo Verde, Unit Nos. 1, 2 and 3.

b) 10 CFR Part 50, Appendix I is not applicable to the PCP and will not be added to the PCP.

Comment: 7. Your program description given under Item 5 of your current writeup should include the following additional information:

a) The crud tank wastes and residues resulting from dry cleaning operations in Item 5.1;

Response: a) Crud tank wastes will be added to the indicated section of the PCP.

Residues from the dry cleaning operation will not be drained into any place that could end up in the solidification system. Residues will be locally hand mixed on a small batch basis.

Comment: 7. b) Discussion of the process or steps you would follow for dewatering the resins, if applicable (spent resin tank and/or waste feed tank);

Response: PVNGS does not plan to solidify dewatered resins. Resins will be solidified as a resin-water slurry.

Comment: 7. c) List of the candidate tanks, the contents of which will be solidified using the Hittman Cement Solidification System;

Response: Inputs to the waste feed tank are identified in the PVNGS FSAR Figure 11.4-2 and will be included in the PCP.

Comment: 7. d) The process parameters for solidification of the various types of "wet wastes" - if these happen to be the same as those given in Reference 1 and/or Reference 2, reference to these references, in this regard, will be adequate;

Response: The PVNGS PCP is based on parameters given in the Hittman Radwaste Solidification (cement) Topical Report HN-R1109, Revision 4, April 1977.

Comment: 7. e) i) operation, ii) mixer speed, and iii) waste to cement ratio for the various types of wastes.

Response: The verification of solidification subsection of the PCP will have a step added to reflect that during solidification of waste, the waste feed pump, cement feeder, and additive feeder are adjusted to provide the specific mixing ratios needed for the type of waste being solidified. The mixing ratios are chosen based on solidification tests, laboratory samples and the Hittman Nuclear and Development Corporation Topical Report, Section VII "Cement Solidification Process Chemistry."

Comment: 7. f) Elaboration on Item 5.2.3 of your current writeup that deals with waste recirculation (e.g., you should state how many times you propose to recirculate prior to drawing a representative sample for testing);

Response: The PCP will state that a minimum of three tank volumes will be recirculated through the waste feed pump prior to sampling.

Comment: 7. g) Elaboration on Section 5.3, "Verification of Solidification" (e.g., you should state that (i) you will not add additional waste into the applicable tank after recirculation has commenced, (ii) you will secure recirculation while drawing a sample for verification, and (iii) you will not shift from a recirculation mode to a transfer mode until recirculation mode is fully complete);

Response: i. The PCP will state there will be no additions to the waste feed tank while the tank is being recirculated for sampling or processing.

ii. The waste feed pump will not be stopped during sampling. The sample point is on the recirculation line such that if recirculation is stopped for sampling the contents could settle out and a representative sample would not be obtained.

iii. A statement will be added to the PCP that a minimum recirculation of three waste feed tank volumes will be accomplished prior to shifting to fill container mode of operation.

Comment: 7. h) Reference to the document number that gives the preoperational solidification tests performed by Hittman for their solidification under Subsection 5.3.1;

Response: A reference to the Hittman Topical Report will be added to this subsection of the PCP.

Comment: 7. i) The following wording is suggested under Subsection 5.3.1: "For waste types containing concentrations of chemicals that do not lie within the bounds of chemical concentrations, for which pre-operational solidification tests have been performed by Hittman Nuclear and Development Corporation, acceptable base data for test solidifications shall be developed and utilized appropriately."; and

Response: The suggested wording will be added to the PCP.

Comment: 7. j) Deletion of the note given under Subsection 5.3.2 of your current writeup of the PCP.

Response: The "Note" given under subsection 5.3.2 will remain to maintain the "ALARA" concept in the process control program. The Chemistry Department has the capability of analyzing a small sample of the subject material for major constituents and for reproducing a non-radioactive material with the same chemical constituents in the appropriate proportions.

Comment: 8. Describe the radiological precautions you will undertake in the implementation of your PCP. For this purpose, the staff suggests that you have a separate subsection in your PCP.

Response: Radiological precautions are covered by the "Radiation Protection Program," PVNGS program number 75PR-0ZZ01. The "Radiation Protection Program" will be added as a Reference to the PCP and a statement will be added to the Program Description portion of the PCP stating that radiological precautions necessary for implementing the PCP shall be followed and are covered in the "Radiation Protection Program."

Comment: 9. Provide a table listing the equipment you would require for testing samples. Note that this list should be consistent with the equipment listed for the above purpose in Reference 1 and/or Reference 2, as appropriate.

Response: The following is a table listing the equipment required for testing samples:

1. Suitable laboratory balance
2. Mechanical laboratory stirrer
3. Miscellaneous labware, typically:

    a. One liter beaker
    b. 500 ml graduated cylinder
    c. scoop
    d. droppers
    e. spoon
    f. spatula
    g. waxed cardboard lids

4. Other equipment if required.

This table will not be included in the PCP as it is part of implementing the program and is not a part of the program.

Comment: 10. Provide the format for the following:

a) For all waste types you will be solidifying, provide information sheets for sample and full scale solidification;

b) Process summary worksheets for all waste types you will be solidifying; and

c) Record on dewatering completion if applicable.

Response: a) The PCP shall state that a solidification test data sheet with unique identifying number shall be maintained for each solidification test which has actually been used for wet waste processing. The solidification test data sheet shall give the waste type, data, chemical constituents of waste (if known), test parameters and test results.

b) The PCP shall state that a feed rate determination sheet with a batch number shall be completed for each solidification. The feed rate determination sheet shall give the waste type, date of solidification, feed, additive and cement addition rates and the identifying number of the solidification test used as basis for the solidification.

c) The Hittman solidification system is not compatible with packaging dewatered resins therefore this record is not applicable.

Comment: 11. Provide information on liner and cask utilized for solidification. This information should include such items as identification, height, diameter, volume, usable volume, weight, payload, ft^3/inch, etc.

Response: The liner is 40 inches maximum height, 72 3/8 inches diameter, estimated volume 85.7 ft^3, estimated usable volume 80 ft^3, estimated weight 1125 pounds, estimated full weight 13,125 pounds, 2.22 ft^3/inch.

When cask shipment is required PVNGS will use a standard vendor supplied shipping cask.

Comment: 12. Provide the layouts and location of the system. If this has already been provided in your FSAR, reference in this regard will be adequate.

Response: Layouts and location of the system are given in PVNGS FSAR Figures 1.2-5 and 1.2-6.

References

1. Hittman Radwaste Solidification System (Cement) Topical Report HN-R1109-NP, Revision 4, April 1977.

2. Hittman Operation and Maintenance Manual for Cement Solidification System, Volume 1.

3. NRC Staff's Evaluation of Topical Report HN-R1109-NP, Revision 4, "Radwaste Solidification System (Cement)," TAC No. 4657, March 1978 (Copy is attached as Enclosure 3).

4. Palo Verde Nuclear Generating Station Manual, Solid Radwaste Process Control Program, Procedure No. 75PR-9ZZ02, Revision 0, November 1982.

5. Final Safety Analysis Report for Palo Verde Nuclear Generating Station, Unit Nos. 1, 2, and 3.

6. Arizona Public Service Company (applicant) responses to METB questions on PCP for Palo Verde utilizing the Hittman Cement Solidification System (yet to be provided).

Arizona Public Service Company
P.O. BOX 21666 • PHOENIX, ARIZONA 85036

June 30, 1983
ANPP 24215-WFQ/MAJ

Director of Nuclear Reactor Regulation
Attention: Mr. George Knighton, Chief
Licensing Branch No. 3
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: Palo Verde Nuclear Generating Station
(PVNGS) Units 1, 2 and 3
Docket Nos. STN-50-528/529/530
File: 83-056-026; G.1.01.10

References: NRC letter from G. W. Knighton, NRC to
E. E. Van Brunt, Jr., APS dated 4/15/83.
Request for Additional Information-Solid
Waste Process Control Program.

Dear Mr. Knighton:

The referenced letter requested additional information from Arizona Public Service Company (APS) concerning the Palo Verde Nuclear Generating Station Units 1, 2 and 3 (PVNGS) Solid Waste Process Control Program.

Attached are the APS responses to the NRC request for additional information.

If you have any questions, please call me.

Very truly yours,

E. E. Van Brunt

E. E. Van Brunt, Jr.
APS Vice President,
Nuclear Projects
ANPP Project Director

EEVBJr/MAJ/dh
Attachment

cc: A. C. Gehr (w/a)
E. Licitra (w/a)

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PDR ADOCK 05000528
A PDR

B001
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STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

I, Edwin E. Van Brunt, Jr., represent that I am Vice President Nuclear Projects of Arizona Public Service Company, that the foregoing document has been signed by me on behalf of Arizona Public Service Company with full authority so to do, that I have read such document and know its contents, and that to the best of my knowledge and belief, the statements made therein are true.

Edwin E. Van Brunt, Jr.

Sworn to before me this 30th day of June, 1983.

Notary Public

My Commission expires:

May 5, 1984

RESPONSES TO METB QUESTIONS ON PCP FOR PALO VERDE
UTILIZING THE HITTMAN CEMENT SOLIDIFICATION SYSTEM*

1. Describe how you propose to comply with the interface requirements spelled out in the Hittman topical report HN-R-1109, Rev. 4, for their Cement Solidification System.

Response: Compliance with Hittman interface requirements is described as follows:

I. General Radioactive Waste Facility Criteria

a) The facility should be located at grade elevation.

Compliance: The Radwaste Building and Solid Radwaste System are located at grade level as shown in PVNGS FSAR Figure 1.2-5.

b) The facility should include provisions for placement of a truck or trailer adjacent to the radioactive waste storage areas. Floor space requirements for a trailer and tractor are 60 feet by 12 feet and minimum requirements for a trailer are 44 feet by 12 feet.

Compliance: Sufficient floor space has been provided for a trailer adjacent to the waste storage areas as shown in PVNGS FSAR Figure 1.2-5.

c) The facility should be serviced to the extent practical by an overhead bridge crane. The maximum load on this crane should correspond to the weight of the heaviest shipping cask to be used, in the loaded condition.

Compliance: The overhead bridge crane services the radwaste storage areas, packaging area, cement feed tanks and the truck loading bay. The maximum design load of the crane is 30 tons. The heaviest shipping cask (80 cubic feet liner) weight is 24 tons.

d) The bridge crane hook height should be compatible with loading the maximum size disposable container into a shipping cask mounted on a standard flatbed trailer.

Compliance: The bridge crane hook has a vertical travel range from the 100 foot level (grade level) to the 125 foot level. This 25 foot lifting range is adequate for lifting the maximum size disposable container into a shipping cask mounted on a standard flatbed trailer.

*Enclosure 1 to NRC Letter, G. Knighton to E.E. Van Brunt, Jr., April 15, 1983.

e) Separate storage areas should be provided for compacted rubbish and packaged process waste.

Compliance: The solid radwaste storage area is segregated into high level and low level storage areas as stated in PVNGS FSAR Section 11.4.2.4.

f) Shielding in the packaging and storage areas should be compatible with the requirements of Regulatory Guide 8.8, based on the expected activity levels of packaged waste under normal conditions of plant operations.

Compliance: Shielding in the packaging and storage areas is compatible with the requirements of Regulatory Guide 8.8 as described in PVNGS FSAR Section 12.1.

g) Radioactive waste holdup tanks should be placed in shielded enclosures accessible via ladders or labyrinths. Radwaste pumps shall be located in separate shielded enclosures accessible for maintenance, adjacent to or beneath the tanks such that pump suction piping can be either vertical or connected via long radius bends.

Compliance: Equipment placement meets this criteria and is described in PVNGS FSAR Section 11.4. The use of long radius elbows in pump suction piping runs in lieu of pipe bends is not expected to compromise system operations but will be reviewed during startup testing.

h) The operator shall have the capability of visually monitoring all activities in the packaging and process waste storage areas, from outside the shield walls.

Compliance: The packaging and process waste storage areas are monitored by three remote operated cameras. The cameras are positioned such that the crane hoist, the crane travel, and the handling and packaging of radwaste material can be monitored from outside the shield walls.

i) Packaging, handling and operating procedures shall be compatible with the requirements of Regulatory Guide 8.8.

Compliance: Packaging, handling and operating procedures are compatible with the requirements of Regulatory Guide 8.8 as described in PVNGS FSAR Section 11.4 and Chapter 12.

j) All radioactive waste storage areas should be located as close as practicable to the truck station.

Compliance: The storage areas are located adjacent to the truck station as shown in PVNGS FSAR Figure 1.2-5.

II. Radioactive Waste Packaging Stations Criteria

a) The radioactive waste packaging station should be accessible to the overhead bridge crane to the maximum extent practicable. As a minimum, the crane shall have access to a load-in/load-out position.

Compliance: Radwaste storage areas, packaging area (including load in/load out position), cement feed tank and tractor-trailer area are serviceable by the overhead bridge crane.

b) Where large disposable containers are used, the space available at the packaging station shall be compatible with handling the largest disposable container used for process radioactive waste packaging.

Compliance: Adequate space has been provided for the largest disposable container, an 80 ft^3 liner.

c) Where large disposable containers are used, provisions should be included for packaging processed radioactive waste within a shielded shipping cask. Alternatively, the packaging system should include provisions for packaging in a truck mounted shipping cask.

Compliance: The solidification system has the capability for loading a large disposable container into a truck mounted shipping cask.

d) All functions from container load-in through load-out for storage or shipment should be performed at the packaging station. As a minimum, those functions should include filling, capping and radiation monitoring. Provisions for container decontamination and swiping should be considered on an individual facility basis.

Compliance: The following functions will be performed at the packaging station from container load-in through load-out: filling, capping, swiping, radiation monitoring and decontamination of 55 gallon drums.

e) At PWR's, the packaging station should include provisions for transfer and packaging of spent filter cartridge assemblies.

Compliance: Provisions have been provided and are described in PVNGS FSAR Section 11.4.2.3.3, "Filter Handling and Disposal".

f) The packaging station should be located adjacent to the processed waste storage area.

Compliance: The packaging station is located adjacent to the processed waste storage area as shown in PVNGS FSAR Figure 1.2-5.

III. Process Waste Storage Criteria

a) The capacity of the storage area should as a minimum be compatible with accumulating the processed radioactive waste produced during a 90 day period under normal operating conditions.

Compliance: The capacity of the storage area is stated in PVNGS FSAR Section 11.4.2.4 and is sufficient to allow a 30 day decay, consistent with the requirements of Branch Technical Position ETSB 11-3, of the expected annual waste volumes.

b) Where disposable containers taller than 55 gallon drums are used, stacking of containers should be avoided.

Compliance: Solidified waste containers will be stored in accordance with PVNGS FSAR Section 11.4.2.4.

c) The layout should be compatible with cycling packaging waste on a first-in/first-out basis.

Compliance: The layout is compatible with the proposed cycling as shown in PVNGS FSAR Figure 1.2-5.

d) Packaged waste should be segregated to the extent practicable by waste type and/or container activity level.

Compliance: Packaged waste will be segregated by container activity level into either a high-level or a low-level storage area.

e) All positions in the storage area should be accessible by the overhead bridge crane.

Compliance: All positions required for 30 day storage in the storage area are accessible by the overhead bridge crane.

f) The minimum clearance between individual large containers within the storage area should be 6".

Compliance: Sufficient clearance between individual large containers within the storage area will be maintained to ensure safe storage and crane transport of containers.

g) The storage layout should provide for access to individual containers by remote means.

Compliance: Containers in high-level and low-level storage areas are remotely accessible.

h) The shield wall thickness in the storage area should be a minimum of two feet of concrete.

Compliance: The high level storage area has concrete walls two feet thick. The low level storage area has concrete walls one and two feet thick for the inside and outside facing walls, respectively.

i) The height of the shield walls around the storage area should be a minimum of one disposable container height above the highest container elevation in the storage area plus one foot.

Compliance: The height of the shield walls around the high level storage area is a minimum of one disposal container height above the highest container elevation in the storage area plus one foot.

j) Where elevations require a cutout in the storage area shield walls for removal of packaged waste, the bottom of the cutout shall be a minimum of three feet above the height of the highest container elevation height. The maximum width of the cutout should be the width of the largest cask or disposal container plus one foot.

Compliance: There are no cutouts in the waste storage areas, nor are any cutouts required.

k) Where segregation includes storage of substantial numbers of drums of low activity levels (less than 100 mrem contact), provisions should be made for forklift truck access via a door or labyrinth.

Compliance: Provisions exist for forklift truck access via a door as shown in PVNGS FSAR Figure 1.2-5.

2. Provide tables showing how the utility equipment, components, structures and services that interface with the Hittman cement system comply with the applicable criteria for Regulatory Guide 1.143, Rev. 1, October 1979, "Design Guidance for Radioactive Waste Management Systems, Structures and Components Installed in Light - Water - Cooled Nuclear Power Plants," and BTP ETSB 11-3, Rev. 2, July 1981, "Design Guidance for Solid Radioactive Waste Management Systems Installed in Light - Water - Cooled Nuclear Power Plants."

Response: Palo Verde compliance with Regulatory Guide 1.143, Rev. 1, October 1979 is described in response 11A.1 to NRC Question 460.1 provided in Appendix 11A to the PVNGS FSAR. PVNGS complies with the position of BTP ETSB 11-3, Rev. 2, July 1981 as described in Section 11.4 of the PVNGS FSAR.

3. Describe how the plant design, as it relates to the Cement Solidification System, reflects consideration of the following design features intended to maintain occupational radiation exposures ALARA:

   (a) Minimizing the length of piping runs.

   (b) Avoiding low points and dead legs in piping.

   (c) Using larger diameter piping to minimize plugging.

   Response: Equipment has been installed per Hittman's recommended locations, thereby minimizing the length of piping runs, and avoiding low points and dead legs in piping. Large diameter piping has been used to minimize plugging.

4. Clarify whether heat tracing has been incorporated for tanks that contain evaporator concentrates that are likely to solidify at ambient temperatures.

   Response: Liquid Radwaste System concentrate monitor tanks LRN-T03A and B are provided with heat tracing as shown on Figure 11.2-2, PVNGS FSAR. Waste Feed Tank SRN-T01 is provided with heat tracing as shown on Figure 11.4-2, PVNGS FSAR.

5. Describe the equipment, components or structure and services you provide for containing radioactive spills that may occur in the portable system.

   Response: The use of a portable system for the SRS at PVNGS is not currently a design feature.

6. If within the utilities scope of supply, describe the plant inspection program to ensure that cement and/or conditioning chemicals are maintained at proper quality during the time they are stored.

   Response: The manufacturers of the Portland cement and the dry chemical additive (anhydrous sodium meta silicate "METSO" beads) do not require inspection programs. The cement will be stored in the cement silo and the cement feed tanks. The silo and tanks are water tight, carbon steel containers where cement is stored at atmospheric pressure. The METSO beads are stored in the additive feed tank. The additive feed tank has three psig of nitrogen continuously supplied. The dry nitrogen is used to provide a slight positive pressure inside the

additive feed bin, thereby preventing the infiltration of air and the possibility of caking of the additive material. Neither the cement nor the METSO beads are directly exposed to the environment prior to usage. A visual inspection will be performed when filling the cement feed tanks and the additive feed bin.

7. Describe how the curie content and identification of radionuclides in each container are determined prior to shipment.

   Response: Samples of the waste feed tank will be analyzed for curie content and identification of radionuclides. From these samples and the known amount of waste in each container, the package contents will be calculated.

8. Revise the writeup of the PCP for Palo Verde, Units 1-3, addressing comments given in Enclosure 2.

   Response: The PCP will be revised to include the changes as indicated in this document.

RESPONSES TO COMMENTS ON PROCESS CONTROL PROGRAM FOR
PALO VERDE, UNITS NOS. 1, 2, AND 3*

Comment: 1. The PCP for Palo Verde, Unit Nos. 1, 2, and 3, should be consistent with Reference 1** which has been referred to in Reference 5. If however, the PCP for Palo Verde is based on Reference 2, then it should be spelled out, i.e., the document number of Reference 2 should be identified and a copy of Reference 2 should be provided as an additional enclosure.

Response: Portions of the PCP for PVNGS are based upon sections of Reference (1) Hittman Radwaste Solidification System (Cement) Topical Report HN-R1109-NP, Revision 4, April 1977, as described herein.

Comment: 2. The following wording is suggested for Section 1.0, "Purpose"

"1.1 Purpose

The purpose of the Process Control Program (PCP) for Palo Verde, Unit Nos. 1, 2, and 3, is to establish a set of process parameters which provide reasonable assurance of complete solidification of various liquid radioactive "wet wastes" including resin slurries, evaporator bottoms, and filter sludges, in accordance with applicable Department of Transportation (DOT) and Arizona State regulations, and Nuclear Regulatory Commission (NRC) and licensed burial facilities acceptance criteria for solidification, packaging and shipment to an approved offsite burial site. Towards this purpose, the PCP ensures that the solidified substance is a monolith having no free standing liquid and is within the limits, as set forth in the above mentioned regulations and acceptance criteria.

1.2 Applicability

The Process Control Program shall be used by all personnel operating the Hittman Cement Solidification System."

Response: The purpose will be changed to read:

The purpose of the Process Control Program (PCP) for Palo Verde, Unit Nos. 1, 2, and 3 is to establish a set of process parameters which will provide reasonable assurance of complete solidification of various liquid radioactive "wet wastes" including resin slurries, evaporator bottoms, filter

*Enclosure 2 to NRC letter, G. Knighton to E.E. Van Brunt, Jr., April 15, 1983.
**References from Enclosure 2 are listed on the final page of these responses.

sludges, and chemical drains in accordance with applicable Department of Transportation (DOT), Nuclear Regulatory Commission (NRC), and licensed burial facilities acceptance criteria for solidification, packaging, and shipment to an approved offsite burial site. There are no Arizona State regulations currently applicable to PVNGS. Towards this purpose, the PCP ensures that the solidified substance is a monolith having no free standing liquid, and is within the limits, as set forth in the above mentioned regulations and acceptance criteria. Also this PCP will ensure solidification will be performed to maintain any potential radiation exposure to plant personnel to "as low as reasonably achievable" ALARA levels.

Statement 1.2 "Applicability" will not be included in "Purpose" because of the Radiation Protection Technician as the Radwaste Operator is directed to comply with the PCP in section 4.5. The responsibilities of all personnel that will interface with the PCP are specified in section 4.0 RESPONSIBILITIES.

Comment: 3. Under Section 2.0, "References" of your PCP, include the following additional entries:

a. Applicable chapters of the FSAR for Palo Verde, Unit Nos. 1, 2, and 3, (spell out the chapter and section numbers);

b. Arizona Public Service Company's ALARA plan for Palo Verde, Unit Nos. 1, 2, and 3;

c. Palo Verde Quality Assurance Program applicable to PCP.

d. Standard Review Plan 11.4, Revision 2, July 1981, "Solid Waste Management Systems".

e. Branch Technical Position ETSB 11-3, Rev. 2, July 1981, "Design Guidance for Solid Radioactive Waste Management Systems Installed in Light-Water Cooled Nuclear Power Plants";

f. NRC Regulatory Guide 1.143, Rev. 1, October 1979, "Design Guidance for Radioactive Waste Management Systems, Structures and Components Installed in Light-Water Cooled Nuclear Power Plants;"

g. Hittman Operating Procedures for Cement Solidification Units (spell out the document number);

h. Hittman Operation and Maintenance Manual for Cement Solidification System, Volume 1 (spell out the document numbers);

i. Arizona Public Service Company's responses to METB questions on PCP for Palo Verde - XXX (yet to be provided - spell out document number);

and

j. 10 CFR 61, "Licensing Requirements for Land Disposal of Radioactive Waste."

Response: The following references will be included in the PCP reference list:

1. Hittman Radwaste Solidification (cement) Topical Report HN-R1109-NP, Revision 4, April 1977, Section VII, "Cement Solidification Process Chemistry."

2. Palo Verde Nuclear Generating Station Final Safety Analysis Report, Sections 11.4, 12.1 and 12.3.

3. 75PR-9ZZ03, "ALARA Program".

4. 60PR-0ZZ01, "Operational Quality Assurance Program".

5. Standard Review Plan 11.4, Revision 2, July 1981, "Solid Waste Management Systems".

6. Branch Technical Position ETSB 11-3, Rev. 2, July 1981, "Design Guidance for Solid Radioactive Waste Management Systems Installed in Light Water Cooled Nuclear Power Plants."

7. 10 CFR 61, "Licensing Requirements for Land Disposal of Radioactive Waste."

The following references will not be included in the reference list:

1. NRC Regulatory Guide 1.143, Rev. 1, October 1979, "Design Guidance for Radioactive Waste Management Systems, Structures and Components Installed in Light-Water Cooled Nuclear Power Plants."

Reason: Position covered in PVNGS FSAR Appendix 11A, Question 11A.1.

2. Hittman Operating Procedures for Cement Solidification Units (no document number).

Reason: Not used in the development of this program.

3. Hittman Operation and Maintenance Manual for Cement Solidification System, Volume 1 (Document Number unknown).

Reason: Not used in the development of this program.

4. Arizona Public Service Company's responses to METB Questions on PCP for Palo Verde.

Reason: The comments will be included in the PCP as herein indicated but the reference is not needed.

Comment: 4. Provide commitment in the body of the writeup of your PCP that you will implement the applicable interface requirements identified in References 1 and 3.

Response: The writeup of the PVNGS PCP will be revised to include commitments to compliance statements as reflected in our answers to question 1 of METB Questions on Process Control Program for the Hittman Cement Solidification Program.

Comment: 5. Integrate the information that you will be providing as responses to staff questions on solidification of "wet wastes" in the body of the PCP writeup.

NOTE: For items 4 and 5, referencing to the responses you will be providing in Reference 6 will be adequate.

Response: The PCP will be revised to include the changes as indicated in this document.

Comment: 6. State explicitly that the PCP will comply with applicable DOT and Arizona State regulations, NRC and burial facilities' acceptance criteria, and 10 CFR Part 61 for solidification, packaging and shipment to an approved offsite burial site. Also, make it clear that the implementation of the PCP for solidification of the "wet wastes" will be in accordance with applicable portions of a) 10 CFR Part 50, Appendix I, b) Palo Verde Quality Assurance Program, and c) Arizona Public Service Company's ALARA Plan for Palo Verde, Unit Nos. 1, 2, and 3. For those items mentioned above for which compliance with applicable acceptance criteria and/or regulations has already been stated in the FSAR for Palo Verde, a reference to the FSAR in this regard will be adequate.

Response: a) The following information will be added to the PCP:

The PCP will comply with applicable DOT, NRC and burial facilities' acceptance criteria, and 10 CFR Part 61 for solidification, packaging and shipment to an approved offsite burial site. The implementation of the PCP for solidification of the "wet wastes" will be in accordance with applicable portions of Palo Verde Quality Assurance Program and Arizona Public Service Company's ALARA Plan for Palo Verde, Unit Nos. 1, 2 and 3.

b) 10 CFR Part 50, Appendix I is not applicable to the PCP and will not be added to the PCP.

Comment: 7. Your program description given under Item 5 of your current writeup should include the following additional information:

a) The crud tank wastes and residues resulting from dry cleaning operations in Item 5.1;

Response: a) Crud tank wastes will be added to the indicated section of the PCP.

Residues from the dry cleaning operation will not be drained into any place that could end up in the solidification system. Residues will be locally hand mixed on a small batch basis.

Comment: 7. b) Discussion of the process or steps you would follow for dewatering the resins, if applicable (spent resin tank and/or waste feed tank);

Response: PVNGS does not plan to solidify dewatered resins. Resins will be solidified as a resin-water slurry.

Comment: 7. c) List of the candidate tanks, the contents of which will be solidified using the Hittman Cement Solidification System;

Response: Inputs to the waste feed tank are identified in the PVNGS FSAR Figure 11.4-2 and will be included in the PCP.

Comment: 7. d) The process parameters for solidification of the various types of "wet wastes" - if these happen to be the same as those given in Reference 1 and/or Reference 2, reference to these references, in this regard, will be adequate;

Response: The PVNGS PCP is based on parameters given in the Hittman Radwaste Solidification (cement) Topical Report HN-R1109, Revision 4, April 1977.

Comment: 7. e) i) operation, ii) mixer speed, and iii) waste to cement ratio for the various types of wastes.

Response: The verification of solidification subsection of the PCP will have a step added to reflect that during solidification of waste, the waste feed pump, cement feeder, and additive feeder are adjusted to provide the specific mixing ratios needed for the type of waste being solidified. The mixing ratios are chosen based on solidification tests, laboratory samples and the Hittman Nuclear and Development Corporation Topical Report, Section VII "Cement Solidification Process Chemistry."

Comment: 7. f) Elaboration on Item 5.2.3 of your current writeup that deals with waste recirculation (e.g., you should state how many times you propose to recirculate prior to drawing a representative sample for testing);

Response: The PCP will state that a minimum of three tank volumes will be recirculated through the waste feed pump prior to sampling.

Comment: 7. g) Elaboration on Section 5.3, "Verification of Solidification" (e.g., you should state that (i) you will not add additional waste into the applicable tank after recirculation has commenced, (ii) you will secure recirculation while drawing a sample for verification, and (iii) you will not shift from a recirculation mode to a transfer mode until recirculation mode is fully complete);

Response: i. The PCP will state there will be no additions to the waste feed tank while the tank is being recirculated for sampling or processing.

ii. The waste feed pump will not be stopped during sampling. The sample point is on the recirculation line such that if recirculation is stopped for sampling the contents could settle out and a representative sample would not be obtained.

iii. A statement will be added to the PCP that a minimum recirculation of three waste feed tank volumes will be accomplished prior to shifting to fill container mode of operation.

Comment: 7. h) Reference to the document number that gives the preoperational solidification tests performed by Hittman for their solidification under Subsection 5.3.1;

Response: A reference to the Hittman Topical Report will be added to this subsection of the PCP.

Comment: 7. i) The following wording is suggested under Subsection 5.3.1: "For waste types containing concentrations of chemicals that do not lie within the bounds of chemical concentrations, for which pre-operational solidification tests have been performed by Hittman Nuclear and Development Corporation, acceptable base data for test solidifications shall be developed and utilized appropriately."; and

Response: The suggested wording will be added to the PCP.

Comment: 7. j) Deletion of the note given under Subsection 5.3.2 of your current writeup of the PCP.

Response: The "Note" given under subsection 5.3.2 will remain to maintain the "ALARA" concept in the process control program. The Chemistry Department has the capability of analyzing a small sample of the subject material for major constituents and for reproducing a non-radioactive material with the same chemical constituents in the appropriate proportions.

Comment: 8. Describe the radiological precautions you will undertake in the implementation of your PCP. For this purpose, the staff suggests that you have a separate subsection in your PCP.

Response: Radiological precautions are covered by the "Radiation Protection Program," PVNGS program number 75PR-0ZZ01. The "Radiation Protection Program" will be added as a Reference to the PCP and a statement will be added to the Program Description portion of the PCP stating that radiological precautions necessary for implementing the PCP shall be followed and are covered in the "Radiation Protection Program."

Comment: 9. Provide a table listing the equipment you would require for testing samples. Note that this list should be consistent with the equipment listed for the above purpose in Reference 1 and/or Reference 2, as appropriate.

Response: The following is a table listing the equipment required for testing samples:

1. Suitable laboratory balance
2. Mechanical laboratory stirrer
3. Miscellaneous labware, typically:

    a. One liter beaker
    b. 500 ml graduated cylinder
    c. scoop
    d. droppers
    e. spoon
    f. spatula
    g. waxed cardboard lids

4. Other equipment if required.

This table will not be included in the PCP as it is part of implementing the program and is not a part of the program.

Comment: 10. Provide the format for the following:

a) For all waste types you will be solidifying, provide information sheets for sample and full scale solidification;

b) Process summary worksheets for all waste types you will be solidifying; and

c) Record on dewatering completion if applicable.

Response: a) The PCP shall state that a solidification test data sheet with unique identifying number shall be maintained for each solidification test which has actually been used for wet waste processing. The solidification test data sheet shall give the waste type, data, chemical constituents of waste (if known), test parameters and test results.

b) The PCP shall state that a feed rate determination sheet with a batch number shall be completed for each solidification. The feed rate determination sheet shall give the waste type, date of solidification, feed, additive and cement addition rates and the identifying number of the solidification test used as basis for the solidification.

c) The Hittman solidification system is not compatible with packaging dewatered resins therefore this record is not applicable.

Comment: 11. Provide information on liner and cask utilized for solidification. This information should include such items as identification, height, diameter, volume, usable volume, weight, payload, ft^3/inch, etc.

Response: The liner is 40 inches maximum height, 72 3/8 inches diameter, estimated volume 85.7 ft^3, estimated usable volume 80 ft^3, estimated weight 1125 pounds, estimated full weight 13,125 pounds, 2.22 ft^3/inch.

When cask shipment is required PVNGS will use a standard vendor supplied shipping cask.

Comment: 12. Provide the layouts and location of the system. If this has already been provided in your FSAR, reference in this regard will be adequate.

Response: Layouts and location of the system are given in PVNGS FSAR Figures 1.2-5 and 1.2-6.

References

1. Hittman Radwaste Solidification System (Cement) Topical Report HN-R1109-NP, Revision 4, April 1977.

2. Hittman Operation and Maintenance Manual for Cement Solidification System, Volume 1.

3. NRC Staff's Evaluation of Topical Report HN-R1109-NP, Revision 4, "Radwaste Solidification System (Cement)," TAC No. 4657, March 1978 (Copy is attached as Enclosure 3).

4. Palo Verde Nuclear Generating Station Manual, Solid Radwaste Process Control Program, Procedure No. 75PR-9ZZ02, Revision 0, November 1982.

5. Final Safety Analysis Report for Palo Verde Nuclear Generating Station, Unit Nos. 1, 2, and 3.

6. Arizona Public Service Company (applicant) responses to METB questions on PCP for Palo Verde utilizing the Hittman Cement Solidification System (yet to be provided).