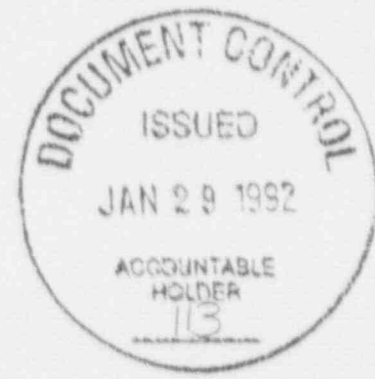


NUCLEAR FUNCTION
ADMINISTRATIVE PROCEDURE
APA-ZZ-01011
PROCESS CONTROL PROGRAM MANUAL (PCP)

RESPONSIBLE DEPARTMENT Chemistry & Radwaste
PREPARED BY G.W. Hamilton DATE 1/27/92
APPROVED BY B. Blasen DATE 1/28/92

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This procedure contains the following:

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RECORD OF REVISIONS

<u>Revision Number</u>	<u>Revision Date</u>	<u>Reason for Revision</u>
<u>Process Control Program (PCP)</u>		
Rev. 0	October 1983	Initial issue.
Rev. 1	February 1984	Incorporation of NRC review comments.
Rev. 2	December 1984	Revised to generic, non-procedural format; updating of formulations for solidification of wastes.
Rev. 3	March 1985	Added solidification nomogram for concentrated borated wastes and renumbered attachments; clarified sample analysis documentation requirements.
Rev. 4	August 1985	Incorporated Class A "unstable" resin solidification formulation (based upon in-plant testing).
Rev. 5	March 1986	Update solidification formulation nomograms; revised coversheet and "preface" portion of document; removed section dealing with solidification agents from document; made formulations proprietary documents.
Rev. 6	April 1986	Incorporated section dealing with control of vendor services for packaging of solid radioactive wastes; revised purpose to agree more closely with wording shown in Technical Specification definition for "Process Control Program"
Rev. 7	June 1987	Revised section dealing with contracted vendor services to clarify type of services involved.

Rev. 8	September 1987	Revised recorded boundary conditions/ratios for batch solidification; revised acceptance criteria for structural stability incorporated wording regarding full scale test solidification; minor text wording changes.
Rev. 9	December 1988	Revised format to reflect actual use of document (program vice procedure); incorporated new section dealing with bulk disposal of wet radioactive waste; revised solidification formula(s) in-installed system solidification based upon vendor recommendation.
<u>APA-ZZ-01011</u>		
Rev. 0	July 1989	Incorporation of Tech. Spec. Amendment OL #1087. Formal controls on PCP placed under Administrative Procedure. Added Commitment Tracking System Numbers (CTSNs).
Rev. 1	August 1991	Removal of installed solidification system (STOCK Solidification System) from text. (System being retired under CMP-1045 and no longer used). Incorporated new section detailing Administrative Controls regarding reporting of major changes to solid radwaste systems and changes to the Process Control Program (PCP) Manual. Added new attachment detailing which vendor topical report/systems approved for use and new attachment listing High Integrity Containers (HICs) authorized for use at Callaway.

Rev 2

January 1992

Incorporation of new process controls text detailing process controls applicable to use of new installed liquid volume reduction system (RVR) for processing liquid wastes; added new Administrative Controls Sections detailing "Reporting of Mishaps" and "PCP Archive Sample Requirements" per requirements found in NRC BTP on Waste Form; added several new commitments to PCP; Minor text wording changes.

PROCESS CONTROL PROGRAM MANUAL (PCP)

- 1.0 PURPOSE AND SCOPE
- 4166 1.1 The purpose of the Process Control
4700 Program (PCP) is to provide reasonable
41638 assurance and documentation that the
 processing and packaging of solid ra-
 dioactive wastes based on demonstrated
 processing of actual or simulated wet
 solid wastes will be accomplished in
 such a way as to assure compliance
 with 10CFR Parts 20, 61 and 71, State
 regulations, burial ground require-
 ments, and other requirements govern-
 ing the disposal of the radioactive
 wastes.
- 2791 1.2 The PCP contains the sampling, tests,
 analyses, determinations and formula-
 tions by which waste classification,
 solidification and/or dewatering of
 radioactive wastes from liquid systems
 is assured. The PCP is implemented by
 Radwaste operating procedures.
- 2.0 DEFINITIONS
- 2.1 Solidification - The conversion of wet
 wastes into a form that meets shipping
 and burial ground requirements.
- 2.2 Waste Classification - The determina-
 tion of waste class as outlined in
 10CFR61 by radionuclide isotopic anal-
 ysis and/or correlation with measured
 nuclides.
- 2.3 Dewatering - The process of removing
 water from a bed of wet solid waste.
 Dewatering processes may be utilized
 to prepare wet solid waste for ship-
 ment without solidification using ce-
 ment or other chemical agents. Dewa-
 tered wastes must meet NRC and burial
 site conditions on maximum drainable
 liquid content.

2.4 Batch - A specified quantity of liquid wastes/sludges requiring solidification or dewatering (ie., the amount of waste content within a tank, or, the amount of waste content within two or more tanks if the contents of the tanks are to be solidified or dewatered together within a common container) any portion of which would have the same physical and chemical characteristics as the whole. If new material is added to a tank's contents which is currently being processed, a new batch is created and further sampling must be performed prior to solidification or dewatering.

3.0 ADMINISTRATIVE CONTROLS

3.1 MAJOR CHANGES TO SOLID RADWASTE TREATMENT SYSTEMS

NOTE Union Electric Co. may choose to submit the information called for in this section as part of the annual FSAR update.

3.1.1 Licensee-initiated major changes to the Solid Radwaste Treatment System:

3.1.1.1 Shall be reported to the commission in the Semiannual Radioactive Effluent Release Report for the period in which the evaluation was reviewed by the On-Site Review Committee (ORC). The discussion of each change shall contain:

3.1.1.1.1 A summary of the evaluation that led to the determination that the change could be made in accordance with 10 CFR 50.59.

3.1.1.1.2 Sufficient detailed information to totally support the reason for the change without benefit of additional or supplemental information;

- 3.1.1.1.3 A detailed description of the equipment, components and processes involved and the interfaces with other plant systems;
 - 3.1.1.1.4 An evaluation of the change, which shows the predicted releases of radioactive materials in and/or quantity of solid waste that differ from those previously predicted in the License application and amendments thereto;
 - 3.1.1.1.5 An evaluation of the change, which shows the expected maximum exposures to a MEMBER OF THE PUBLIC in the UNRESTRICTED AREA and to the general population that differ from those previously estimated in the License application and amendments thereto;
 - 3.1.1.1.6 A comparison of the predicted releases of radioactive materials in solid waste, to the actual releases for the period prior to when the changes are to be made;
 - 3.1.1.1.7 An estimate of the exposure to plant operating personnel as a result of the change; and
 - 3.1.1.1.8 Documentation of the fact that the change was reviewed and found acceptable by the ORC.
- 2781 3.1.1.2 Shall become effective upon review and approval by the ORC in accordance with Technical Specification 6.5.3.1.
- 2814 3.2 CHANGES TO THE PROCESS CONTROL PROGRAM
20174 (PCP)
- 3.2.1 All changes to the PCP shall be completed pursuant to Technical Specification 6.13 and approved as per APA-ZZ-00101, Preparation, Review, Approval and Control of Procedures.
 - 3.2.2 Documentation of the change(s) shall include:

- 3.2.2.1 Sufficient information to support the change together with the appropriate analyses or evaluations justifying the change(s); and
- 3.2.2.2 A determination that the change will maintain the overall conformance of the solidified waste product to existing requirements of federal, state, or other applicable regulations.
- 3.2.3 Cross Disciplinary Review for each revision of the PCP must include as a minimum Radwaste and Quality Assurance.
- 3.2.4 All changes shall be reviewed and approved by the ORC and approved by the Manager, Callaway Plant PRIOR to implementation.
- 3.3 REPORT OF SOLID WASTE RELEASED FROM THE PLANT
- 2805 3.3.1 The Semiannual Radioactive Effluent Release Report covering the operation of Callaway Plant during the previous 6 months of operation shall include a summary of the quantities of solid radioactive waste released from the plant as outlined in Regulatory Guide 1.21, Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants, "Revision 1, June 1974, with data summarized on a quarterly basis following the format of Appendix B thereof.
- 3.3.1.1 For solid wastes, the format for Table 3 in Appendix B shall be supplemented with three additional categories; class of solid waste (as defined by 10 CFR Part 60), type of container (e.g., ISA, Type A, Type B, Large Quantity), and SOLIDIFICATION agent or absorbent (e.g., cement, urea formaldehyde).

42377 3.4

REPORTING OF MISHAPS INVOLVING WASTE
STABILIZATION AND HIGH INTEGRITY CON-
TAINERS

- 3.4.1 As per the requirements of the NRC Branch Technical Position paper on Waste Form, dated 1/24/91, information on misuse or failure of waste forms or containers used to meet the stability requirements of 10CFR61 shall be provided to the Commission. Such mishaps include, but are not necessarily limited to, the following:
 - 3.4.1.1 The failure of high integrity containers used to ensure structural stability. Such failure may be evidenced by changed container dimensions, cracking or injury from mishandling (e.g., dropping or impacting against another object).
 - 3.4.1.2 The misuse of high integrity containers, as evidenced by quantity of free liquid greater than one percent of container volume, or an excessive void space within the container; (such use is in violation of 10CFR61.56(a)).

3.4.1.3

The production of a solidified Class E or C waste form that has any of the following characteristics:

1. greater than 0.5 percent volume of free liquid.
2. concentrations of radionuclides greater than the concentrations demonstrated to be stable in the waste form in qualification testing accepted by the regulatory agency.
3. greater or lessor amounts of solidification media than were used in qualification testing accepted by the regulatory agency.
4. contains chemical ingredients not present or accounted in qualification testing accepted by the regulatory agency.
5. shows instability evidenced by crumbling, cracking, spalling, voids, softening, disintegration, nonhomogeneity, or change in dimensions.
6. evidences processing phenomena that exceed the limiting processing conditions identified in applicable topical reports or process control programs, such as foaming, excessive temperature, premature or slow hardening, production of volatile material, etc.

3.4.2

Waste form mishaps should be reported to the NRC's Director of the Division of Low-Level Waste Management and Decommissioning and the designated State disposal site regulatory authority within 30 days of knowledge of the incident.

3.4.3 For any such waste form mishap occurrence, the affected waste form should not be shipped off-site until approval is obtained from the disposal site regulatory authority.

3.4.3.1 Either adequate mitigation of the potential effects on the waste form or an acceptable justification concerning the lack of any potential significant effects of the affected waste form on the overall performance of the disposal facility must be provided to the disposal site authority and other regulatory agencies, as appropriate, prior to the waste form being shipped to a disposal facility.

NOTE The reason for this is that the low-level waste generators and processors are required by 10CFR 20.311 to certify that their waste forms meet all applicable requirements of 10CFR Part 61, and waste forms that are subject to the types of mishaps mentioned above may not possess the required long-term structural stability.

4.0 10CFR61 COMPLIANCE METHODOLOGY

2713 4.1 All packaged radioactive wastes
2720 generated at the Callaway Plant shall
42371 meet the requirements of Title 10 Code
42372 of Federal Regulations Part 61
(10CFR61). As a minimum, all radioactive waste stream sources must be sampled and analyzed on an annual basis for development of applicable radionuclide correlations for determining waste classification and packaging requirements.

- 2715 4.2 Waste Classification (10CFR61.55)
2728 requirements shall be met by the
2731 methodology established in plant oper-
ating procedure(s) governing Waste
Classification. Waste Characterization
(10CFR61.56) requirements shall be met
by a combination of the methodology
stated in the Process Control Program
and related Callaway Plant Operating
Procedures. Stability requirements
stated in 10CFR61.56 (b) and by burial
site shall be met and ensured prior to
shipping packaged radioactive waste
offsite for burial.
- 4.3 Additionally, the use of NRC-approved
topical reports may be utilized in
meeting specific requirements of
10CFR61. (See Attachment 1, Topical
Reports Applicable to Callaway Plant
PCP).
- 5.0 PROCESS CONTROLS
- 5.1 ADMINISTRATIVE REQUIRMENTS
- 5.1.1 All samples must be handled in accor-
dance with applicable Callaway Plant
procedures and in keeping with ALARA
principles. Test samples containing
radioactive waste and contaminated
disposable labware utilized in the
performance of the methods described
in the PCP should be disposed of as
radioactive waste.
- 5.1.2 Administrative controls governing the
use and disposal of oils, greases and
chelating agents should be utilized as
a means to control and/or limit the
production of wastes containing these
substances. In the event that chemical
analysis of process wastes for these
substances is impractical due to phys-
ical restrictions or analytical con-
straints, determination of their pres-
ence (or absence) may be made utiliz-
ing appropriate evaluation techniques.

- 41885 5.1.3
1911 With solidification or dewatering not meeting disposal site and shipping and transportation requirements, shipment of the inadequately processed wastes shall be suspended. Additionally, the Process Control Program, its implementing procedures and/or the Solid Waste System shall be corrected, as necessary, to prevent recurrence.
- 41885 5.1.4
1911 With solidification or dewatering not performed in accordance with the Process Control Program, the improperly processed waste in each container, as applicable, shall be tested to ensure that it meets burial ground and shipping requirements. Appropriate administrative actions shall be taken to prevent recurrence.
- 4166 5.1.5 Prior to batch solidification of wastes to be solidified, waste classification and acceptability for near-surface disposal shall be determined. This will involve calculating the activity within the projected waste container using the isotopic analysis of the batch and the actual solidification formulas to be used.
- 5.1.6 Prior to packaging of wastes using other processes (e.g., immobilization or dewatering, etc.), waste classification and acceptability, of process method chosen for near-surface disposal must be determined. This will involve calculating the activity within the projected waste container using the isotopic analysis of the waste to be processed and packaged.
- 5.2 COLLECTION AND ANALYSIS OF SAMPLES
- 5.2.1 General Requirements (applicable to cement solidified wastes only)
- 41886 5.2.1.1 The PCP shall be used to verify the solidification of at least one representative test sample from at least every tenth batch of each type of wet radioactive waste solidified.

- 41886 5.2.1.2 If any test sample fails to solidify, solidification of the batch under test shall be suspended until such time as additional test samples can be obtained, alternative solidification parameters can be determined in accordance with the Process Control Program, and a subsequent test verifies solidification. Solidification of the batch may then be resumed using the alternative solidification parameters determined.
- 41886 5.2.1.3 If the initial test sample from a batch of waste fails to verify solidification, then representative test samples shall be collected from each consecutive batch of the same type of waste until three (3) consecutive initial test specimens demonstrate solidification.
- 5.2.1.4 For high activity wastes, where handling samples could result in personnel radiation exposures which are inconsistent with ALARA principles, representative non-radioactive samples may be test solidified. These samples must be as close to the actual waste and chemical properties as possible. Typical unexpended mixed bead resin may be used to simulate the spent bead resin.
- 5.2.1.5 Where practical, all chemicals used to condition or solidify waste (or simulated waste) in solidification tests must be identical to the actual chemicals to be used in full scale solidification.
- 5.2.2 PCP ARCHIVE SAMPLE REQUIREMENTS
- 5.2.2.1 As per the Appendix to the NRC Branch Technical Position paper on Waste Form, dated 1/24/91, archiving of PCP test sample specimen must be performed for all Class B and C wastes that are stabilized using cement.

- 5.2.2.2 These specimens are to be tested and evaluated at 6 and 12 month intervals after the actual stabilization.
- 5.2.2.2.1 Testing must encompass a verification of compressive strength \geq 60 lbs after immersion in water for at least 14 days.
- 43777 5.2.2.3 If a tested specimen does not meet the acceptance test above, it shall be presumed that all containers of waste packaged per that PCP formulation do not meet 10CFR61 stabilization requirements.
 - 5.2.2.3.1 Reporting of failure of tested specimen to meet acceptance criteria shall be made to the Commission as well as to the burial facility where the packaged waste had been disposed.
 - 5.2.2.3.2 Any containers of material packaged with this formulation on site will need to be retested or otherwise repackaged to ensure 10CFR61 stability requirements are adhered to.
- 5.2.3 Collection Of Samples
 - 5.2.3.1 Sample Analysis Documentation
 - 5.2.3.1.1 For wastes that are to be solidified, pertinent information on the characteristics of test sample solidification must be recorded in order to verify solidification of subsequent batches of similar waste without retesting. If waste pretreatment is necessary prior to actual batch solidification, the agent used and amount added must be recorded.

- 5.2.3.1.2 The test sample data for waste must include, but is not limited to: the type of wastes solidified; percent total solids; pH; amount of oil in the sample. Additionally, recorded information should include the batch number, waste type, waste classification, total wastes received, total binding agent(s) added and the date solidified.
- 5.2.3.2 Taking Samples
- 5.2.3.2.1 A sample(s) of the waste tank's contents to be processed/packaged must be taken in order to determine the actual process formulation for solidification, any pretreatment of the waste needed prior to solidification or other process and packaging method, and the waste classification of the final packaged waste product.
- 5.2.3.2.2 Sample sizes, as determined by the Radwaste Department, should be compatible with the standard size samples used for radioactivity and chemical analysis. If the radioactivity levels are too high to permit full size samples to be taken, then smaller samples should be taken with the results corrected accordingly.
- 5.2.3.2.3 Sufficient sampling lead time should be allotted prior to planned waste solidification of a batch to allow adequate time to complete the required testing and verification of solidification, as applicable. The contents of the waste tanks that are to be processed/packaged must be recirculated (mixed) prior to sampling to ensure that a representative sample is obtained.

- 5.2.3.2.4 If the contents of more than one tank or container are to be packaged in the same container, then representative samples of each tank (container) should be drawn. These samples should be of a sufficient composition that if "X" percent of the total waste to be packaged is to be taken from one of the tanks, then the sample taken from that tank should be the same percentage in the composite sample. The samples taken of each should be mixed in the proper proportions to yield a standard size sample.
- 5.2.4 Chemical Analysis Of Waste Samples
- 5.2.4.1 Evaporator bottoms and chemical wastes must be analyzed for total solids, oil content, boric acid concentration and pH. Spent resin beads and charcoal to be solidified must be characterized by analyzing the water surrounding the beads and charcoal for oil content and pH. (Chemical analysis of resins/charcoal is not required for packaging via dewatering).
- 5.2.4.2 Results of chemical analysis must be documented.
- 5.2.5 Radiochemical Analysis Of Waste Samples
- 5.2.5.1 A gamma isotopic analysis must be performed on each batch of waste to be packaged. This analysis is used in determining an acceptable packaging method as well as waste classification of the packaged waste.
- 5.2.5.2 Samples are drawn from the evaporator bottoms tank(s) for performing this batch analysis.
- 5.2.5.3 Sampling of individual demineralizers/charcoal adsorbers is performed during vessel changeouts. These samples are composited to determine the batch sample for gamma isotopic analysis.

- 5.2.5.4 The results of the gamma isotopic analysis must be recorded on/attached to the documentation package.
- 5.3 TEST SOLIDIFICATION AND ACCEPTANCE CRITERIA
- 5.3.1 Waste Conditioning
- 5.3.1.1 Prior to test sample solidification, the pH of the tank must be adjusted to a range of 5 to 9 pH. Should adjustment be necessary, the agent and quantity used must be recorded.
- 5.3.1.2 If oil is present in quantities greater than 1% by volume, dilution of the batch to below 1% is required prior to solidification.
- 5.3.2 Test Solidification
- 5.3.2.1 Whenever pretreatment of a batch is necessary, the tank contents must have the required pretreatment accomplished prior to pulling the sample for test solidification analysis.
- 5.3.2.2 A test solidification container should be prepared with a mixing device.
- 5.3.2.3 The appropriate proportional amount of portland cement and sodium metasilicate and/or other solidification media per the applicable test solidification procedure must be added. A known representative volume of the waste must be transferred to the test solidification container.

5.3.2.4 Mixing of the waste, portland cement and/or other solidification media is then initiated. After appropriate mixing or when a homogenous mixture is obtained, the cement/waste mixture must be allowed to stand for a specified time period. Any free liquid observed on the top of the test solidification must be decanted into a clear volumetric beaker (cylinder). The amount of liquid decanted is used to calculate the percent free liquid. Results of this analysis must be documented.

5.3.3 Test Solidification Acceptability

- 2720 5.3.3.1 The test sample solidification shall be considered acceptable from a free liquid standpoint if the amount of free liquid is the lessor of either 1% by volume or burial site limits.
- 5.3.3.2 The test sample solidification shall be considered acceptable from a solid mass standpoint (i.e., structural stability) if the surface of the sample resists penetration when probed with a spatula or comparable firm object.
- 5.3.3.3 If either or both of the above checks fail to meet the stated criteria, the waste sample analysis and/or the sample solidification formula must be verified as being correct. If this verification shows an error in waste sample analysis or sample solidification formula, a corrected solidification formula must be obtained and sample solidification performed using this corrected formula.
- 5.3.3.4 In the event that the analysis and formula previously derived and used are correct, alternative solidification parameters must be determined before solidification can proceed.

- 41886 5.3.3.5 If the initial test solidification of a batch is unacceptable, then a representative sample shall be test solidified on each subsequent batch of the same type of waste until three consecutive test samples demonstrate solidification.
- 5.3.3.6 If a test sample fails to provide acceptable solidification of waste, equal volumes of dry cement and water should be mixed to ensure that the problem is not due to a bad batch of cement.
- 6.0 RADIOACTIVE WASTE PROCESSING USING INSTALLED LIQUID VOLUME REDUCTION SYSTEM
- 6.1 General Requirements
- 6.1.1 The installed radioactive waste liquid volume reduction (RVR) System will be used to process most aqueous wastes (i.e., evaporator concentrates, floor drain and sump sludges, etc.) from plant radioactive systems. Liquid wastes from other than installed Power Block drain systems may be processed in the RVR System but must be evaluated for compatibility with materials of construction used in fabrication of the RVR System.
- 6.1.2 A simplified system processing flowchart and system description of the RVR System is detailed in chapter 11.0 of the Callaway Plant FSAR.
- 6.1.3 All containers used for packaging wastes processed using the RVR System must be inspected prior to use to ensure they are free from defects.
- 2713 6.1.4 The RVR System process produces a resulting waste product that will not meet 10CFR61 stability requirements. The RVR shall only be used for processing/packaging wastes that will result in a waste classification of Class A.

- 6.2 Waste Sampling
- 6.2.1 Representative samples of liquid wastes to be processed by the RVR System must be obtained and analyzed for chemical and radiochemical content, as appropriate.
- 6.2.1.1 Chemical analyses required include as a minimum; total solids, oil content and pH.
- 6.2.1.2 A gamma isotopic analysis must be performed on each batch of waste to be processed. An appropriate concentration factor must be applied to the analysis results in order to derive the waste classification of the resulting packaged waste.
- 6.2.1.2.1 Gamma isotopic analysis performed on processed waste discharged from the RVR do not require application of a concentration correction factor.
- 6.2.2 Samples are drawn from the evaporator bottoms tank(s) or from individual containers of liquid waste sludges for performing this batch analysis.
- 6.2.3 Results of chemical analyses and gamma isotopic analyses must be recorded on/attached to the applicable batch documentation package.
- 6.3 Process Controls
- 6.3.1 Operation of the installed RVR System must be performed and documented per approved plant operating procedures.
- 6.3.2 In order to ensure production of a waste product meeting desired "dryness" prior to final packaging, process parameters must be controlled and monitored during all stages of system operation (i.e., filling, drying, mixing and final pumpout of waste product).

- 6.3.3 Key operating parameters such as operating temperatures and pressures within the RVR System's blender/dryer must be monitored and recorded.
- 6.3.4 A final material dryness "endpoint" must be met prior to considering the material dry within the blender/dryer. This "endpoint" is met through a sequence of system manipulations where the RVR blender/dryer contents are cycled above saturation temperature several times to drive off remaining water from the contents. The sequence of steps to do this is detailed in system operating procedures.
- 6.3.5 Following the "endpoint", parafin may be added to the blender/dryer for mixing with the dried processed waste powder to immobilize the powder and keep it from readily dispersing in the air.
- 2713 6.3.6 Should packaged wastes be created that exceed a waste classification of Class A, the resulting packaged waste container shall be placed into an over-pack container capable of meeting 10CFR61 stability requirements prior to shipment offsite for disposal.
- 7.0 RADIOACTIVE WASTE PROCESSING USING BULK DISPOSAL METHODS
- 7.1 RADIOACTIVE WASTE PROCESSING USING CONTRACTED VENDOR SERVICES
- 7.1.1 Processing and Packaging of Primary and Radwaste System Wastes
- 7.1.1.1 General Requirements
- 41886 7.1.1.1.1 Contracted vendor services shall be provided to process and package radioactive wastes to the required waste form to satisfy the applicable transportation and disposal requirements for those instances when the installed solid radioactive waste system is incapable of processing these wastes.

41886 7.1.1.1.2 Contracted vendor services will be established for the packaging of wet radioactive wastes by vendor solidification and/or dewatering. Contracted vendor services may be exercised when, in the opinion of plant management, any of the following conditions exist:

- a. The installed system is declared out-of-service thereby reducing or eliminating the capability of Callaway Plant to efficiently and legally package radioactive wastes in accordance with all applicable requirements governing the disposal of the wastes; or,
- b. The installed system is incapable of packaging these wastes in accordance with any of the applicable requirements (e.g., 10CFR61.) governing the disposal of these wastes; or,
- c. When processing and packaging economics show an increased cost efficiency of vendor processing versus installed system processing.

4018 7.1.1.1.3 Specific programmatic controls for these services will be handled in accordance with the vendor's Quality Assurance program. This program shall be approved by Union Electric Quality Assurance prior to implementation of the contracted services.

7.1.1.2 Control Of Vendor Procedures And Documentation

7.1.1.2.1 Vendor procedures covering equipment setup, operation, and removal must be reviewed and approved in accordance with plant administrative procedures prior to implementation.

- 7.1.1.2.2 Vendor procedures detailing the vendor's Process Control Program (PCP) in addition to the review and approval mentioned above must also be reviewed and approved by the Onsite Review Committee prior to implementation. The vendor PCP must provide for the sampling, tests, analyses and formulation determination, as required by the Calaway Plant PCP.
- 4955 7.1.1.2.3 Results of all testing and analyses shall be documented, as necessary, to ensure compliance with the vendor PCP and all applicable transportation and burial ground requirements governing the disposal of these wastes.
- 4955 7.1.1.2.4 Copies of all documentation attesting to compliance with the requirements of the vendor PCP as well as any plant operating procedures utilized in support of the contracted vendor service shall be retained by the plant for inclusion in plant files. Documentation containing proprietary information should be appropriately handled and controlled to ensure the required degree of confidentiality is met.
- 7.1.2 Processing and Packaging of Secondary and Support System Wastes
- 7.1.2.1 General Requirements
- 7.1.2.1.1 Contracted vendor services must be provided to process and package radioactive wastes to the required waste form to satisfy the applicable transportation and disposal requirements for wastes which are generated outside the RCA/Power Block of the plant or where expertise in handling same is not available at Union Electric.

- 7.1.2.1.2 These contracted vendor services may be established and exercised for processing and packaging of any of the following contaminated wastes:
- a. Contaminated Sewage Treatment Plant sludges and similar aqueous-based solutions.
 - b. Mixed wastes (i.e., waste exhibiting characteristic hazardous material which have become radioactively contaminated.)
- 4618 7.1.2.1.3 specific programmatic controls for these services will normally be handled in accordance with the vendor's Quality Assurance Program. This program shall be approved by Union Electric Quality Assurance prior to implementation of the contracted services.
- 7.1.2.1.4 For those cases where the vendor service is not performed per an established, acceptable vendor Quality Assurance Program, applicable requirements of the Union Electric Quality Assurance Program are to be implemented.
- 7.1.2.1.5 Control of vendor procedures and/or documentation utilized or created in support of the contracted service must be handled per applicable guidance found in step 7.1.1.2 of this procedure.

7.2 RADIOACTIVE WASTE PROCESSING USING
IN-HOUSE BULK DISPOSAL OPTIONS

7.2.1 General Requirements

7.2.1.1 All containers used for solidification or dewatering must be inspected to ensure they are free from defects. Steel containers used for dewatering must be inspected to ensure that their internals are intact and undamaged. High Integrity Containers (HICs) must be inspected to ensure that they are in compliance with their Certificate of Compliance as well as ensuring that their internals are intact and undamaged.

2720 7.2.1.2 All wastes dewatered in steel containers shall be dewatered in accordance with approved procedures for which testing has demonstrated that the one-half of one percent (0.5%) drainable liquid criteria can be met. All wastes to be dewatered in HICs shall be dewatered in accordance with approved procedures for which testing has demonstrated that the one percent (1%) drainable liquid criteria can be met. Test data to ensure compliance may be based upon container supplier testing.

7.2.2 Waste Sampling

7.2.2.1 Representative samples of wastes to be processed by bulk disposal means must be obtained and analyzed for chemical and radiochemical content, as appropriate. Based upon this analysis, the packaging process as well as the container to be utilized will be determined.

7.2.2.2 Results of all analyses must be documented, as necessary, to ensure compliance with all applicable packaging, transportation and burial ground requirements governing the disposal of these wastes.

- 7.2.3 Packaging Of Spent Filter Cartridges
- 7.2.3.1 Packaging of spent filter cartridges will be performed in either steel drums and Low Specific Activity (LSA) boxes or in High Integrity Containers (HICs), dependent upon waste classification of the spent filter cartridge(s) involved.
- 7.2.3.2 Determination of waste classification will be performed based upon dose to curie correlations of the spent filter cartridges. The methodology involved must be covered in approved plant operating procedures.
- 2720 7.2.3.3 Spent filter cartridges which meet the requirements of Class A waste may be packaged in common 17H drums with up to 12 filter cartridges per drum or packaged in LSA boxes. Absorbent media shall be utilized to absorb twice the volume of any incidental liquid within the container. Packaging methods governing this process must be covered in approved plant operating procedures. (See attachment 2, High Integrity Containers (HICs) Authorized for Use at Callaway).
- 42376 7.2.3.4 Spent filter cartridges requiring stabilization per the requirements of 10CFR61 or having concentration exceeding 1 μ Ci/cc for radionuclides with half lives greater than 5 years shall be packaged in HICs. Specific radiation and curie content limitations for use of the HIC, as identified on the applicable Certificate of Compliance, must be met and ensured prior to disposal of the waste. Packaging and dewatering of the HIC contents must be performed and documented using approved procedures.

- 42375 7.2.3.5 HICs purchased for use in packaging spent filter cartridges shall be designed to meet the applicable requirements found in the NRC Branch Technical Position paper on Waste Form dated 1/24/91.
- 7.2.3.6 Common packaging of spent filter cartridges and spent ion exchange bead resin may be performed in HICs provided for that purpose, with specific instructions for loading and dewatering covered in approved plant procedures.
- 7.2.4 Packaging Of Spent Ion Exchange Bead Resin
- 7.2.4.1 Spent resin to be packaged should be sampled prior to sluicing in order to ensure the proper container required for packaging the resin is utilized.
- 41638 7.2.4.2 Packaging of spent ion exchange bead resin may be performed utilizing dewatering processes in lieu of solidification. Class A Unstable wastes may be dewatered in steel containers, while Stable wastes, regardless of class, shall be dewatered in HIC's.
- 7.2.4.3 High Integrity Containers must be used for the disposal of unsolidified spent ion exchange bead resin when the concentration of radionuclides with half lives greater than 5 years exceeds 1 $\mu\text{Ci/cc}$. (See Attachment 2).
- 42375 7.2.4.4 HICs purchased for use in packaging spent ion exchange bead resin shall be designed to meet the applicable requirements found in the NRC Branch Technical Position paper on Waste Form dated 1/24/91.

7.2.4.5 Procedures governing the sluicing of spent resins from demineralizer beds and/or storage tanks must be written and approved for use prior to commencing sluicing operations. Applicable radiological controls (i.e., shielding) should be utilized to ensure the process is ALARA.

42374 7.2.4.6 Dewatering processes utilized must be performed and qualified using approved plant procedures. Appropriate methods shall be employed to ensure the applicable drainable liquid criteria of 10CFR61 is met prior to final sealing of the container for disposal.

8.0 REFERENCES

- 8.1 10CFR20
8.2 10CFR61
8.3 10CFR71
8.4 Reg. Guide 8.8, Revision 3
8.5 Callaway Plant FSAR Chapter 11.4
8.6 Technical Specification 6.13.1 (CTSN #20174)
8.7 Technical Specification 6.13.2 (CTSN #2814)
8.8 APA-22-00101, Preparation, Review, Approval and Control of Procedures
8.9 NRC BTP on Waste Form (dated 1/24/91)
8.10 Reg. Guide 1.21, Revision 1, June 1974

TOPICAL REPORTS APPLICABLE TO
CALLAWAY PLANT PROCESS CONTROL PROGRAM (PCP)

The Following vendor topical reports have been reviewed and incorporated, as appropriate, into procedures which implement the Callaway Plant Process Control Program (PCP).

1. WMG 102-NP-A, RADMAN-A Computer Code to Classify and Document Packaged LLW In Accordance with 10CFR Part 61 Regulations; Waste Management Group, Inc.
2. WF-C-01-NP, Topical Report for Chem-Nuclear Systems, Inc. 10CFR61 Waste Form Certification-Cement; Chem Nuclear Systems, Inc.
3. 4313-01354-01-A, Topical Report for Chem-Nuclear Systems, Inc. Mobile Cement Solidification System; Chem-Nuclear System, Inc.
4. DW-11118-01-NP-A, Topical Report for Chem-Nuclear Systems, Inc. Dewatering Control Process Containers; Chem Nuclear System, Inc.
5. STD-R-05-011NP-A, Topical Report for Westinghouse Hittman Mobile Incontainer Dewatering and Solidification System (MDSS); Westinghouse Hittman Nuclear, Inc.

HIGH INTEGRITY CONTAINERS (HICs) AUTHORIZED FOR USE AT
CALLAWAY PLANT

The following High Integrity Containers (HICs) have been authorized for use in packaging Callaway Plant wastes. Applicable requirements for their use, as defined in their individual Certificates of Compliance, are detailed in plant operating procedures.

HIC CERTIFICATION #	DESCRIPTION	VENDOR/SUPPLIER
DHEC-HIC-PL-004	RADLOK-55	Westinghouse Hittman or SEG
DHEC-HIC-PL-014	RADLOK-500	Westinghouse Hittman or SEG
DHEC-HIC-PL-001	CNSI-PL6-80	Chem Nuclear Systems, Inc.
DHEC-HIC-PL-010	NUHIC-120F	TFC Nuclear Associates, Inc.