November 29, 2010

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of	)	
	)	Docket Nos. 52-029-COL
Progress Energy Florida, Inc.	)	52-030-COL
	)	
(Combined License Application for	)	
Levy County Nuclear Plant, Units 1 and 2)	)	ASLBP No. 09-879-04-COL

PROGRESS ENERGY FLORIDA, INC.'S
MOTION FOR RECONSIDERATION OF LBP-10-20

I. INTRODUCTION

Pursuant to 10 C.F.R. § 2.323(e), Progress Energy Florida, Inc. ("Progress" or "PEF") hereby moves the Atomic Safety and Licensing Board ("Board") to reconsider the ruling in its November 18, 2010 Memorandum and Order[1] denying Progress's August 27, 2010 Motion for Summary Disposition of Contention 8A ("Summary Disposition Motion"). Progress requests the Board's leave to file this Motion. Under 10 C.F.R. § 2.323(e), such requests will be granted "upon a showing of compelling circumstances, such as the existence of a clear and material error in a decision, which could not reasonably have been anticipated, that renders the decision invalid."[2]

As explained fully below, the majority's ruling in LBP-10-20 is clearly and materially erroneous because it (1) incorrectly concludes that Progress's long-term plan for managing Class B and C low-level radioactive waste ("LLRW") consists of less than one page and therefore lacks the information sufficient to satisfy 10 C.F.R. § 52.79(a)(3); (2) incorrectly concludes that Progress has not made sufficient enforceable commitments with respect to long-term management of LLRW; and

---

[1] Progress Energy Florida, Inc. (Combined License Application for Levy County Nuclear Power Plant, Units 1 and 2), LBP-10-20, 72 NRC __ (slip op.) (Nov. 18, 2010) ("LBP-10-20").

[2] See also Dominion Nuclear Connecticut, Inc. (Millstone Nuclear Power Station, Unit 2), CLI-03-18, 58 NRC 433, 434 (2003).

(3) incorrectly relies on the assumption that Progress would violate NRC regulations in order to find that an issue of material fact may exist regarding whether Progress could timely construct additional LLRW storage (which finding also relies in part on a misunderstanding of the rate at which Class B and C waste will be generated). The majority's ruling could not have been reasonably anticipated because it results from the majority's misunderstanding of (1) how Chapter 11.4 of the AP1000 Design Control Document ("DCD") and Progress's proposed revisions to its Final Safety Analysis Report ("FSAR") are to be integrated into the FSAR; (2) the quantities of LLRW generated at a nuclear plant that are eventually classified as Class B and C (on average only about one percent); and (3) the timing for Levy's generation and shipment of Class B and C LLRW.

Progress requests that the Board schedule oral argument regarding this Motion. Oral argument is to be granted by the Board when "time permits and the nature of the proceeding and the public interest warrant." 10 C.F.R. § 2.331. At this early stage of the proceeding, there is ample time to conduct oral argument on this issue. Moreover, it would be in the public interest to provide Progress with the opportunity to clarify – by responding directly to questions posed by the Board – any misunderstanding which the majority may have regarding the matters raised in this Motion.

In the event that the Board were to deny this Motion, Progress requests clarification regarding whether the Board intended LBP-10-20 to be a partial initial decision and therefore to relinquish jurisdiction over the issues raised in Contention 8A.

II. PROCEDURAL BACKGROUND

LBP-10-20 describes in detail the procedural background of this proceeding. LBP-10-20 at 2-6. In summary, this proceeding involves Progress's July 28, 2008 Combined Construction Permit and Operating License Application ("COLA") for the proposed Levy County Nuclear Power Plant ("Levy"). Following admission of Joint Intervenors'[3] Contention 8 in this proceeding, Progress submitted responses to the NRC Staff's Request for Additional Information Nos. 11.04-1 and 11.04-2 (the "RAI

[3] The Joint Intervenors are Nuclear Information and Resource Service, the Ecology Party of Florida,

Responses"). The RAI Responses describe Progress's long-term contingency plan for storing Class B and C LLRW at the Levy site if offsite storage or disposal is not available, and the amendments to the COLA address the contingency. Progress's submittal of the RAI Responses led to an agreement between Progress and the Joint Intervenors to dismiss Contention 8, which the Board approved.

The Joint Intervenors subsequently submitted Contention 8A, claiming that the COLA, as revised by the RAI Responses, did not offer sufficient information regarding Progress's plan for long-term management of Class B and C LLRW to satisfy 10 C.F.R. § 52.79(a)(3). The Board admitted Contention 8A over Progress's objection. Progress then submitted its Summary Disposition Motion, which the Board denied in LBP-10-20.

III. DISCUSSION

A. The Board Erred When It Concluded That Progress's LLRW Plan Utterly Lacks Content Regarding The Long-Term Management Of Class B And C LLRW

The Board's Order artificially and incorrectly divides Progress's LLRW management plan into two phases: the "Initial LLRW Plan," which the Board states "covers LLRW management for the initial term (approximately two years)," and the "Extended LLRW Plan," which the Board states covers LLRW management for "the period of time <u>after</u> the initial time-frame." LBP-10-20 at 16 (emphasis in original). According to the Board, the Initial LLRW plan consists of "over fourteen pages of material." LBP-10-20 at 16-17, 22. "Fourteen pages" refers to the number of pages that comprise DCD Chapter 11.4 ("Solid Waste Management"), excluding the tables and a figure associated with that Chapter. Chapter 11.4 of the DCD was included in Progress's Summary Disposition Motion as Attachment D, and is incorporated by reference into the FSAR. The Board found that the details provided in those fourteen pages are sufficient to meet the 10 C.F.R. § 52.79(a)(3) standard for the "initial time period." <u>Id.</u> at 32.

The Board stated that the "Extended LLRW Plan" consists of Progress's RAI Responses, which are found in Attachment B to the Summary Disposition Motion. <u>Id.</u> at 17. According to the Board, the

---

and the Green Party of Florida.

"FSAR Revisions that constitute PEF's Extended LLRW Plan together consume less than one page." Id. at 31. "Less than one page" refers to the length of the additions/revisions to the FSAR that Progress proposed in the RAI Responses. According to the Board, this supposed "contrast between the level of information that PEF has provided for the Initial LLRW Plan and the Extended LLRW Plan confirms that the latter fails to provide sufficient information to satisfy 10 C.F.R. § 52.79(a)." LBP-10-20 at 31. Relying on that analysis, the Board finds that the "Extended LLRW Plan" is "far too general and vague to make a final safety determination" and has an "utter lack of content." Id. at 30, 39.

The majority is simply mistaken that Progress's plan with respect to long-term management of Class B and C LLRW is "less than one page" and therefore utterly lacks content. In fact, both long-term and short-term LLRW management are covered by the fourteen pages that comprise DCD Chapter 11.4 (plus the additional 20 pages of related tables and a figure), as supplemented by the one page of FSAR revisions/additions set forth in the RAI Responses. In order to make this clear, for the Board's convenience Progress has attached to this Motion as Attachment A the Levy LLRW management plan in one document. Attachment A shows how FSAR Section 11.4 will appear once DCD Chapter 11.4 and the FSAR revisions/additions from the RAI Responses are incorporated into the FSAR. The Levy LLRW management plan consists of 35 pages (including tables and a figure), not less than one page.

Judge Baratta understood that the FSAR revisions and DCD Chapter 11.4 were intended to be read together and incorporated into one document. He correctly states in his dissent that long- and short-term LLRW management are both covered by one plan: the fourteen pages of text in DCD Chapter 11.4, the 20 pages of tables and a figure, and Progress's FSAR revisions. Judge Baratta observes:

> The majority's analysis artificially divides PEF's LLRW management plan into two parts: an "initial" and an "extended" LLRW plan. . . . PEF's current LLRW plan is instead a revision of its initial plan that incorporates all processing and storage requirements from the original plan and extends them to cover the time period after the initial two to three years.

LBP-10-20, Judge Baratta dissent at 5 n.10. As Judge Baratta understood, through the FSAR revisions that are set forth in the RAI Responses, Progress has made all of the information that covered the "initial time period" applicable to the "extended time period" by putting in place one comprehensive plan.

Indeed, as Judge Baratta recognizes, Progress has provided sufficient details to determine how waste would be stored and managed onsite should an offsite disposal site not be available.[4] LBP-10-20, Judge Baratta dissent at 9. As he points out, Progress's Summary Disposition Motion stated that "the design of the storage/shipping containers is specified in" Section 11.4.1.3 of the DCD, which references "the governing regulations for shipping and packaging of radioactive material." Id. In addition, Progress's Summary Disposition Motion pointed out that, by incorporating the DCD into the FSAR, the COLA also describes how solid waste will be processed and packed in storage/shipping containers (DCD § 11.4.2.3.3), that waste management will be in buildings (DCD §§ 11.4.2.5.1 and 11.4.2.5.2), that the buildings are part of the nuclear island and therefore within the protected area (COLA, Part 2 § 1.2.2), and that treatment will take place onsite in the buildings using a mobile concentration and/or solidification system (DCD § 11.4.2.4.1). Summary Disposition Motion at 7 and n.8. The majority apparently failed to understand that these sections of the DCD, and all of DCD Chapter 11.4, will be included in the FSAR.

B. The Board Erred When It Found That Progress's FSAR Contains Insufficient Commitments Regarding Long-Term Storage Of Class B And C Waste

The majority repeatedly finds that Progress has made insufficient "commitments" with respect to long-term management of Class B and C LLRW. See LBP-10-20 at 25-29. This erroneous conclusion results from the majority's failure to understand that FSAR Section 11.4 will include all of DCD Chapter 11.4 as supplemented by the COLA, plus the FSAR revisions provided in the RAI Responses. Read correctly as an integrated plan, the FSAR commitments are extensive. It includes all of the commitments for management, storage, and disposal of LLRW, consistent with 10 C.F.R. Part 20

[4] As Progress's RAI Responses state, Progress's plan first relies on offsite storage. Indeed, Progress currently is transferring Class B and C LLRW from its four operating nuclear plants under agreements with an offsite waste processing company for storage in Texas. Progress expects that this same, or another, facility would be utilized for Class B and C LLRW generated by Levy. In fact, current facilities are available in Texas (Class B and C) and Utah (Class A) for storage of LLRW. As Progress has stated throughout this proceeding, the onsite storage contingency plan discussed in this Motion is only applicable in the event that such offsite storage is not available. See RAI Responses (Attachment B to Summary Disposition Motion) at page 4 of 5.

and ALARA, that the Board found sufficient to satisfy 10 C.F.R. § 52.79(a)(3) for the "initial" period. Indeed, all of the items that the Board lists with approval as included in the DCD and thus in the "Initial LLRW Plan" – "a description of the functional and safety design bases of the onsite LLRW management system; the system description including a general description and descriptions of all significant components . . . ; system operational information . . . ; a description of the waste processing facilities, auxiliary building, and radwaste building; and a description of PEF's programs for testing, inspection, and quality assurance relating to LLRW management" (LBP-10-20 at 16) – among other things covered by DCD Chapter 11.4, are commitments that Progress is making with respect to long-term management and storage of Levy LLRW during the period of the COL – not just with respect to some "initial" period. In addition, Progress has committed to expand onsite LLRW storage, if required, pursuant to the integrated FSAR, as permitted by 10 C.F.R. § 50.59. Progress has also committed, with respect to any additional onsite storage, to comply with the design guidance provided in NUREG-0800, Standard Review Plan Chapter 11, Radioactive Waste Management, Appendix 11.4-A, Design Guidance for Temporary Storage of Low-Level Radioactive Waste.

This is not a commitment to merely a "promise" and "process" as suggested by the majority. See LBP-10-20 at 33-36. The commitment for additional onsite storage of Class B and C LLRW is for a storage facility that meets the design basis requirements for the radwaste building in the DCD and the guidance in NUREG-0800. Attachment A § 11.4.2.5.2 at 11.4-12 to 11.4-13 and § 11.4.6 at 11.4-13 to 11.4-14. This is no different than the commitment, which the Board presumably found sufficient (LBP-10-20 at 22), that waste disposal containers will meet the requirements for radioactive waste transportation in 49 C.F.R. Part 173 and 10 C.F.R. Part 61, as well as specific disposal facility requirements. Attachment A § 11.4.1.3 at 11.4-2 to 11.4-3. It is an enforceable commitment and provides sufficient information for the Commission to make the finding required by 10 C.F.R. § 52.79(a)(3).

C. The Board Incorrectly Assumes That Progress Will Need To Construct Additional Storage For Class B And C Waste Approximately Two Years After Levy Begins Operation

The Board also found that, even if Progress's LLRW management plan satisfied 10 C.F.R. § 52.79(a)(3), an evidentiary hearing would be required to resolve the factual dispute regarding whether any additional storage that would be needed "could be constructed and operational within the initial time frame specified in the FSAR." See, e.g., LBP-10-20 at 40. This conclusion erroneously raises an issue that is not material to resolving the safety contention in question here because there is no risk that Progress would violate its license by generating LLRW without a place to ship or store it. It also relies on the erroneous assumption that Progress's plan for managing Class B and C LLRW consists of approximately two to two-and-a-half years worth of storage, which allegedly gives Progress approximately two years from Levy's initial operation to construct additional storage for Class B and C LLRW. LBP-10-20 at 17 n.19.

The majority correctly states that the Board must assume that Progress will abide by its promises and commitments to the NRC. LBP-10-20 at 25. Those commitments include being able to send LLRW offsite or store it onsite in NRC-approved storage. In the highly unlikely event that it appeared Progress would not be able to ship offsite or store onsite LLRW generated by Levy, Progress could not continue to operate the plant until such time as storage or offsite disposal became available without violating its license. Since the Board cannot assume that Progress would violate its license, it must assume that Progress would implement required measures to manage LLRW, even if that required temporary shut down of the plant. Accordingly, there is simply no safety risk of LLRW being generated at Levy without an approved location for it to be stored or disposed of. Judge Baratta recognizes this, stating that the majority ruling

> assumes PEF would generate greater than two years worth of LLRW prior to determining whether it may ship it offsite or obtain the necessary regulatory authorization to store that amount of LLRW onsite at the Levy plant. In my view, this ruling contradicts the Commission's statement that in the absence of evidence to the contrary, the NRC does not presume that a licensee will violate agency regulations wherever the opportunity arises.

LBP-10-20, Judge Baratta dissent at 8-9 (citations omitted). Accordingly, in raising the "timing" issue as a potential material fact in dispute, the majority erred because it assumed that Progress would violate agency regulations and that – rather than implementing appropriate actions to prevent violation of the license – Levy would generate LLRW without having access to offsite storage or disposal or regulatory authorization to store the LLRW onsite.

On a related issue, the majority correctly notes that the onsite storage facility will have a capacity of approximately 3,900 cubic feet. LBP-10-20 at 17 n.19. It then states that, according to the DCD at Table 11.4-1 (p. 11.4-15), the expected generation of LLRW will be 1,964 cubic feet per year, or 3,928 cubic feet, "an amount that exceeds 3,900 cubic feet," in two years. Id. The majority adds that it is "not sure" how Progress reached the conclusion that the initial onsite storage capacity for LLRW is for greater than two years. Id. The majority's calculations, and therefore its uncertainty, results from its failure to recognize that the volumes of waste listed in Table 11.4-1 include not only Class B and C LLRW – which are the subject of Contention 8A – but also Class A LLRW. See Attachment A, Table 11.4.1 at 11.4-16.

The DCD does not state what portion of the LLRW generated by Levy will be Class A, B and C waste. This is because the breakdown cannot be known until the time the waste is packaged for disposal. COLA, Part 2 (FSAR) § 11.4.6.1 at 11.4-2. Indeed, NRC regulations state that the LLRW is to be classified at the time of disposal according to its concentration of radioactivity (in curies per cubic meter). 10 C.F.R. § 61.55. Nevertheless, based on industry experience it is clear that a very small percentage of the LLRW to be generated by Levy will be Class B and C.

As NRC Regulatory Issue Summary 2008-32, Interim Low Level Radioactive Waste Storage at Reactor Sites (Dec. 30, 2008) ("RIS") – which was included in the Summary Disposition Motion as Attachment F – states, "Class A waste makes up approximately 99 percent of LLRW" produced by a nuclear power plant. RIS at 1. The RIS also notes that all LLRW generators in the United States may ship Class A waste to the LLRW disposal facility in Clive, Utah. RIS at 2; see also RAI Responses at 4 of 5. Accordingly, Levy's initial 3,900 cubic foot onsite storage facility has the capacity to store Class

B and C LLRW alone for a period of time substantially greater than two years. Statements in the DCD and the RAI Responses that storage capacity onsite is available for greater than two years at the expected rate of radwaste generation were conservative and included storage of Class A LLRW – which makes up the vast majority of the volume of LLRW. For these reasons, even if the majority's "timing" concern were a relevant safety issue, it is clear that Progress would have ample time to implement its plan for long-term storage for Class B and C LLRW.

IV. CONCLUSION

The only issue raised by Contention 8A is safe storage of Class B and C LLRW in the event that Progress runs out of onsite storage and has no place to ship it. All aspects of safe management of Class B and C LLRW are addressed through information in the FSAR that is sufficient to meet the requirements of 10 C.F.R. § 52.79(a)(3). Progress has provided an integrated plan for initial and extended Class B and C LLRW storage, as set forth in Attachment A. Progress respectfully requests that the Board grant Progress leave to submit this Motion for Reconsideration, grant the Motion and grant summary disposition of the Joint Intervenors' Contention 8A. Progress also respectfully requests that the Board hold oral argument regarding this Motion.

V. REQUEST FOR CLARIFICATION

In LBP-10-20, the Board states, "Petitions for review of this order may be filed with the Commission pursuant to 10 C.F.R. § 2.341. Such petitions must be filed within fifteen (15) days of the service of this order." LBP-10-20 at 41. It is unclear whether the Board is referring to an appeal as a matter of right pursuant to 10 C.F.R. § 2.341(b) or an interlocutory appeal pursuant to 10 C.F.R. § 2.341(f). If the reference is to appeal as a matter of right under 10 C.F.R. § 2.341(b), that would indicate that LBP-10-20 is intended to be a partial initial decision. A partial initial decision would mean that this Board has relinquished jurisdiction over the issue raised by Contention 8A. In the event that this Board were to deny Progress's Motion for Reconsideration, Progress requests that the Board clarify whether it intended to issue a partial initial decision resolving Contention 8A or whether it intended to retain jurisdiction over this issue.

CERTIFICATION

I certify that I have made a sincere effort to contact the other parties in this proceeding to explain to them the factual and legal issues raised in this Motion, and to resolve those issues. I certify that after this consultation, the NRC Staff has no objection to this Motion, and that the Joint Intervenors plan to oppose it.

Respectfully Submitted,

/signed electronically by Stefanie Nelson George/
John H. O'Neill, Jr.
Michael G. Lepre
R. Budd Haemer
Stefanie Nelson George
Pillsbury Winthrop Shaw Pittman LLP
2300 N Street, NW
Washington, DC 20037
Tel. (202) 663-8148

Dated: November 29, 2010

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of	)		
	)	Docket Nos.	52-029-COL
Progress Energy Florida, Inc.	)		52-030-COL
	)		
(Combined License Application for	)		
Levy County Nuclear Plant, Units 1 and 2)	)	ASLBP No.	09-879-04-COL

CERTIFICATE OF SERVICE

I hereby certify that the foregoing Progress Energy Florida Inc.'s Motion for Reconsideration of LBP-10-20, dated November 29, 2010, was provided to the Electronic Information Exchange for service to those individuals on the service list in this proceeding this 29th day of November 2010.

Office of Commission Appellate
Adjudication
U.S. Nuclear Regulatory Commission
Mail Stop: O-16C1
Washington, DC 20555-0001
E-mail: ocaamail@nrc.gov

Office of the Secretary of the Commission
U.S. Nuclear Regulatory Commission
Mail Stop O-16C1
Washington, DC 20555-0001
Hearing Docket
E-mail: hearingdocket@nrc.gov

Nuclear Information Resource Service
6390 Carroll Avenue, #340
Takoma Park, MD 20912
Michael Mariotte, Executive Director
E-mail: nirsnet@nirs.org

Nuclear Information & Resource Service
P.O. Box 7586
Asheville, NC 28802
Mary Olson,
NIRS Southeast Regional Coordinator
E-mail: nirs@main.nc.us

Alachua County Green Party, Green
Party of Florida
P.O. Box 190
Alachua, FL
Michael Canney, Co-Chair
E-mail: alachuagreen@windstream.net

Ecology Party of Florida
641 SW 6th Avenue
Ft. Lauderdale, FL 33315
Cara Campbell, Chair
Gary Hecker
E-mail: levynuke@ecologyparty.org

Atomic Safety and Licensing Board Panel
U.S. Nuclear Regulatory Commission
Mail Stop T-3F23
Washington, DC 20555-0001

Alex S. Karlin, Chair
Administrative Judge
E-mail: ask2@nrc.gov

Anthony J. Baratta
Administrative Judge
E-mail: ajb5@nrc.gov

William M. Murphy
Administrative Judge
E-mail: William.murphy@nrc.gov,
wmm1@nrc.gov

Ann Hove, Law Clerk
E-mail: ann.hove@nrc.gov

Joshua A. Kirstein, Law Clerk
josh.kirstein@nrc.gov

Eckert Seamans Cherin & Mellott, LLC
600 Grant Street, 44th Floor
Pittsburg, PA 15219
Counsel for Westinghouse Electric Co., LLC
Barton Z. Cowan, Esq.
E-mail: teribart61@aol.com

Office of the General Counsel
U.S. Nuclear Regulatory Commission
Mail Stop O-15D21
Washington, DC 20555-0001
Marian Zobler, Esq.
Sara Kirkwood, Esq.
Jody Martin, Esq.
Michael Spencer, Esq.
Kevin Roach, Esq.
Laura Goldin, Esq.
Joseph Gilman, Paralegal
E-mail:
mlz@nrc.gov
sara.kirkwood@nrc.gov
jcm5@nrc.gov
michael.spencer@nrc.gov
kevin.roach@nrc.gov
laura.goldin@nrc.gov
jsg1@nrc.gov

OGC Mail Center : OGCMailCenter@nrc.gov

/Signed electronically by Stefanie Nelson George/
Stefanie Nelson George

Attachment A

11.0 Radioactive Waste Management

11.4 Solid Waste Management

The solid waste management system (WSS) is designed to collect and accumulate spent ion exchange resins and deep bed filtration media, spent filter cartridges, dry active wastes, and mixed wastes generated as a result of normal plant operation, including anticipated operational occurrences. The system is located in the auxiliary and radwaste buildings. Processing and packaging of wastes are by mobile systems in the auxiliary building rail car bay and in the mobile systems facility part of the radwaste building. The packaged waste is stored in the auxiliary and radwaste buildings until it is shipped offsite to a licensed disposal facility.

The use of mobile systems for the processing functions permits the use of the latest technology and avoids the equipment obsolescence problems experienced with installed radwaste processing equipment. The most appropriate and efficient systems may be used as they become available.

This system does not handle large, radioactive waste materials such as core components or radioactive process wastes from the plant's secondary cycle. However, the volumes and activities of the secondary cycle wastes are provided in this section.

11.4.1 Design Basis

11.4.1.1 Safety Design Basis

The solid waste management system performs no function related to the safe shutdown of the plant. The system's failure does not adversely affect any safety-related system or component; therefore, the system has no nuclear safety design basis.

There are no safety related systems located near heavy lifts associated with the solid waste management system. Therefore, a heavy loads analysis is not required.

11.4.1.2 Power Generation Design Basis

The solid waste management system provides temporary onsite storage for wastes prior to processing and for the packaged wastes. The system has a 60-year design objective and is designed for maximum reliability, minimum maintenance, and minimum radiation exposure to operating and maintenance personnel. The system has sufficient temporary waste accumulation capacity based on maximum waste generation rates so that maintenance, repair, or replacement of the solid waste management system equipment does not impact power generation.

11.4.1.3 Functional Design Basis

The solid waste management system is designed to meet the following objectives:

- Provide for the transfer and retention of spent radioactive ion exchange resins and deep bed filtration media from the various ion exchangers and filters in the liquid waste processing, chemical and volume control, and spent fuel cooling systems
- Provide the means to mix, sample, and transfer spent resins and filtration media to high integrity containers or liners for dewatering or solidification as required

11.0 Radioactive Waste Management

- Provide the means to change out, transport, sample, and accumulate filter cartridges from liquid systems in a manner that minimizes radiation exposure of personnel and spread of contamination
- Provide the means to accumulate spent filters from the plant heating, ventilation, and air-conditioning systems
- Provide the means to segregate solid wastes (trash) by radioactivity level and to temporarily store the wastes
- Provide the means to accumulate radioactive hazardous (mixed) wastes
- Provide the means to segregate clean wastes originating in the radiologically controlled area (RCA)
- Provide the means to store packaged wastes for at least 6 months in the event of delay or disruption of offsite shipping
- Provide the space and support services required for mobile processing systems that will reduce the volume of and package radioactive solid wastes for offsite shipment and disposal according to applicable regulations, including Department of Transportation regulation 49 CFR 173 (Reference 1) and NRC regulation 10 CFR 71 (Reference 2)
- Provide the means to return liquid radwaste to the liquid radwaste system (WLS) for subsequent processing and monitored discharge

The solid waste management system is designed according to NRC Regulatory Guide 1.143 to meet the requirements of General Design Criterion (GDC) 60 as discussed in Sections 1.9 and 3.1. The seismic design classifications of the radwaste building and system components are provided in Section 3.2.

Provisions are made in the auxiliary and radwaste buildings to use mobile radwaste processing systems for processing and packaging each waste stream including concentration and solidification of chemical wastes from the liquid waste management system, spent resin dewatering, spent filter cartridge encapsulation and dry active waste sorting and compaction.

The radioactivities of influents to the solid waste management system are based on estimated radionuclide concentrations and volumes. These estimates are based on operating plant experience, adjusted for the size and design differences of AP1000. The influent source terms are consistent with Section 11.1.

The solid waste management system airborne process effluents are released through the monitored plant vent as described as part of the 10 CFR 50 (Reference 3), Appendix I, analysis presented in subsection 11.3.3.

The solid waste management system collects and stores radioactive wastes within shielding to maintain radiation exposure to plant operation and maintenance personnel as low as is reasonably achievable (ALARA) according to General Design Criteria 60 as discussed in Section 3.1 and Regulatory Guide 8.8. Personnel exposures will be maintained well below the limits of 10 CFR 20 (Reference 4). Design features incorporated to maintain exposures ALARA include remote and semi-remote operations, automatic resin transport line flushing, and shielding of components, piping and containers holding radioactive materials. Access to the solid waste storage areas is controlled, to minimize inadvertent personnel exposure, by suitable barriers such as heavy storage cask covers and locked or key-card-operated doors or gates (see Section 12.1).

The solid waste management system conforms with the design criteria of NRC Branch Technical Position ETSB 11-3. Suitable fire protection systems are provided as described in subsection 9.5.1.

Waste disposal containers are to be selected from available designs that meet the requirements of the DOT and NRC. The solid waste management system does not require source-specific waste containers. Waste containers must meet the regulatory requirements for radioactive waste transportation in 49 CFR 173 and for radioactive waste disposal in 10 CFR 61 (Reference 5) as well as specific disposal facility requirements.

11.4.1.4 Compliance with 10 CFR 20.1406

In accordance with the requirements of 10 CFR 20.1406 (Reference 11), the solid radwaste system is designed to minimize, to the extent practicable, contamination of the facility and the environment, facilitate decommissioning, and minimize, to the extent practicable, the generation of radioactive waste. This is done through appropriate selection of design technology for the system, plus incorporating the ability to update the system to use the best available technology throughout the life of the plant.

11.4.2 System Description

11.4.2.1 General Description

The solid waste management system includes the spent resin system. The flows of wastes through the solid waste management system are shown on Figure 11.4-1. The radioactivity of influents to the system are dependent on reactor coolant activities and the decontamination factors of the processes in the chemical and volume control system, spent fuel cooling system, and the liquid waste processing system.

The parameters used to calculate the estimated activity of the influents to the solid waste management system are listed in Table 11.4-1. The estimated expected isotopic curie content of the primary spent resin and filter cartridge wastes to be processed on an annual basis is listed on Table 11.4-2. Table 11.4-3 provides the same information for the estimated maximum annual activities. The AP1000 has sufficient radwaste storage capacity to accommodate the maximum generation rate.

The radioactivity of the dry active waste is expected to normally range from 0.1 curies per year to 8 curies per year with a maximum of about 16 curies per year. This waste includes spent HVAC filters, compressible trash, non-compressible components, mixed wastes and solidified chemical wastes. These activities are produced by relatively long lived radionuclides (such as Cr-51, Fe-55, Co-58, Co-60, Nb-95, Cs-134 and Cs-137), and therefore, radioactivity decay during processing and storage is minimal. These activities thus apply to the waste as generated and to the waste as shipped.

The estimated expected and maximum annual quantities of waste influents by source and form are listed in Table 11.4-1 with disposal volumes. The annual radwaste influent rates are derived by multiplying the average influent rate (e.g. volume per month, volume per refueling cycle) by one year of time. The annual disposal rate is determined by applying the radwaste packaging efficiency to the annual influent rate. The influent volumes are conservatively based on an 18-month refueling cycle. Annual quantities based on a 24-month refueling cycle are less than those for an 18-month cycle. The estimated expected isotopic curie content of the primary spent resin and filter cartridge wastes to be shipped offsite are presented in Table 11.4-4 based on 90 days of decay before shipment. The same information is presented in Table 11.4-5 for the estimated maximum activities based on 30 days of decay before shipment.

Section 11.1 provides the bases for determination of liquid source terms used to calculate several of the solid waste management system influent source terms. The influent data presented in Tables 11.4-2 and 11.4-3 are conservatively based on Section 11.1 design basis (Technical Specification) values.

All radwaste which is packaged and stored by AP1000 will be shipped for disposal. The AP1000 has no provisions for permanent storage of radwaste. Radwaste is stored ready for shipment. Shipped volumes of radwaste for disposal are estimated in Table 11.4-1 from the estimated expected or maximum influent volumes by making adjustments for volume reduction processing by mobile systems and the expected container filling efficiencies. For drum compaction, the overall volume reduction factor, including packaging efficiency, is 3.6. For box compaction, the overall volume reduction factor is 5.4. These adjustments result in a packaged internal waste volume for each waste source, and the number of containers required to hold this volume is based on the container's internal volume. The disposal volume is based on the number of containers and the external (disposal) volume of the containers.

The expected disposal volumes of wet and dry wastes are approximately 547 and 1417 cubic feet per year, respectively as shown in Table 11.4-1. The wet wastes shipping volumes include 510 cubic feet per year of spent ion exchange resins and deep bed filter activated carbon, 20 cubic feet of volume reduced liquid chemical wastes and 17 cubic feet of mixed liquid wastes. The spent resins and activated carbon are initially stored in the spent resin storage tanks located in the rail car bay of the auxiliary building. When a sufficient quantity has accumulated, the resin is sluiced into two 158 cubic feet high-integrity containers in anticipation of transport for offsite disposal. Liquid chemical wastes are reduced in volume and packaged into three 55-gallon drums per year (about 20 cubic feet) and are stored in the packaged waste storage room of the radwaste building. The mixed liquid wastes fill less than three drums per year (about 17 cubic feet per year) and are stored on containment pallets in the waste accumulation room of the radwaste building until shipped offsite for processing.

The two spent resin storage tanks (275 cubic feet usable, each) and one high integrity container in the spent resin waste container fill station at the west end of the rail car bay of the auxiliary building provide more than a year of spent resin storage at the expected rate, and several months of storage at the maximum generation rate.

The expected radwaste generation rate is based upon the following:

- All ion exchange resin beds are disposed and replaced every refueling cycle.
- The WGS activated carbon guard bed is replaced every refueling cycle.
- The WGS delay beds are replaced every ten years.
- All wet filters are replaced every refueling cycle.

11.0 Radioactive Waste Management

- Rates of compactable and non-compactable radwaste, chemical waste, and mixed wastes are estimated using historical operating plant data.

The maximum radwaste generation rate is based upon the following:

- The ion exchange resin beds are disposed based upon operation with 0.25% fuel defects.
- The WGS activated carbon guard bed is replaced twice every refueling cycle.
- The WGS delay beds are replaced every five years.
- All wet filters are replaced based upon operation with 0.25% fuel defects.
- The expected rates of compactable and non-compactable radwaste, chemical waste, and mixed wastes are increased by about 50%.
- Primary to secondary system leakage contaminates the condensate polishing system and blow down system resins and membranes which are replaced.

The dry solid radwaste includes 1383 cubic feet per year of compactable and non-compactable waste packed into about 14 boxes (90 cubic feet each) and ten drums per year. Drums are used for higher activity compactable and non-compactable wastes. Compactable waste includes HVAC exhaust filter, ground sheets, boot covers, hair nets, etc. Non-compactable waste includes about 60 cubic feet per year of dry activated carbon and other solids such as broken tools and wood. Solid mixed wastes will occupy 7.5 cubic feet per year (one drum). The low activity spent filter cartridges may be compacted to fill about 0.40 drums per year (3 ft^3/year) and are stored in the packaged waste storage room. Compaction is performed by mobile equipment or is performed offsite. High activity filter cartridges fill three drums per year (22.5 cubic feet per year) and are stored in portable processing or storage casks in the rail car of the auxiliary building.

The total volume of radwaste to be stored in the radwaste building packaged waste storage room is 1417 cubic feet per year at the expected rate and 2544 cubic feet per year at the maximum rate. The compactable and non-compactable dry wastes, packaged in drums or steel boxes, are stored with the mixed liquid and mixed solid, volume reduced liquid chemical wastes, and the lower activity filter cartridges. The quantities of liquid radwaste stored in the packaged waste storage room of the radwaste building consists of 20 cubic feet of chemical waste and 17 cubic feet of mixed liquid waste. The useful storage volume in the packaged waste storage room is approximately 3900 cubic feet (10 feet deep, 30 feet long, and 13 feet high), which accommodates more than one full offsite waste shipment using a tractor-trailer truck. The packaged waste storage room provides storage for more than two years at the expected rate of generation and more than a year at the maximum rate of generation. One four-drum containment pallet provides more than 8 months of storage capacity for the liquid mixed wastes and the volume reduced liquid chemical wastes at the expected rate of generation and more than 4 months at the maximum rate.

A conservative estimate of solid wet waste includes blowdown material based on continuous operation of the steam generator blowdown purification system, with leakage from the primary to secondary system. The volume of radioactively contaminated material from this source is estimated to be 540 cubic feet per year. Provisions for processing and disposal of radioactive steam generator blowdown resins and membranes are described in subsection 10.4.8. Note that, although included here for conservatism, this volume of contaminated resin will be removed from the plant within the contaminated electrodeionization unit and not stored as wet waste.

The condensate polishing system includes mixed bed ion exchanger vessels for purification of the condensate as described in subsection 10.4.6. Should the resins become radioactive, the resins are transferred from the condensate polishing vessel directly to a temporary processing unit or to the temporary processing unit via the spent resin tank. The processing unit, located outside of the turbine building, dewaters and processes the resins as required for offsite disposal. Radioactive condensate polishing resin will have very low activity. It will be disposed in containers as permitted by DOT regulations. After packaging, the resins may be stored in the radwaste building. Based on a typical condensate polishing system operation of 30 days per refueling cycle with leakage from the primary system to the secondary system, the volume of radioactively contaminated resin is estimated to be 206 cubic feet per year (one 309 cubic foot bed per refueling cycle). Normal disposal of nonradioactive condensate polishing system resins is described in subsection 10.4.6.

The parameters used to calculate the activities of the steam generator blowdown solid waste and condensate polishing resins are given in Table 11.4-1. Based on the above volumes, the disposal volume is estimated to be 939 cubic feet per year. The expected and maximum activities of the resins as generated are given in Tables 11.4-6 and 11.4-7, respectively. The expected and maximum activities of resins as shipped, based on 90 days decay prior to shipment, are given in Tables 11.4-8 and 11.4-9, respectively.

11.4.2.2 Component Description

The seismic design classification and safety classification for the solid waste management system components are listed in Section 3.2. The components listed are located in the seismic Category I Nuclear Island. Table 11.4-10 lists the solid waste management system equipment design parameters. The following subsections provide a functional description of the major system components.

11.4.2.2.1 Spent Resin Tanks

The spent resin tanks provide holdup capacity for spent resin and filter bed media decay before processing. High-and low-activity resins may be mixed to limit the radioactivity concentration in the waste containers to 10 Ci/ft^3 in accordance with the USNRC Technical Position on Waste Form (Reference 6).

Resin mixing capability is provided by mixing eductors in each tank, and resin dewatering, air sparging and complete draining capabilities are also provided. The ultrasonic level sensors and dewatering screens are arranged for remote removal. The vent and overflow connections have screens to prevent the inadvertent discharge of spent resin.

11.4.2.2.2 Resin Mixing Pump

The resin mixing pump provides the motive force to fluidize and mix the resins in the spent resin tanks, to transfer water between spent resin tanks, to discharge excess water from the spent resin tanks to the liquid waste processing system, and to flush the resin transfer lines.

11.0 Radioactive Waste Management

11.4.2.2.3 Resin Fines Filter

The resin fines filter minimizes the spread of high-activity resin fines and dislodged crud particles by filtering the water used for line flushing or discharged from the spent resin tanks to the liquid waste processing system.

11.4.2.2.4 Resin Transfer Pump

The resin transfer pump provides the motive force for recirculation of spent resins via either one of the spent resin tanks for mixing and sampling, for transferring spent resin between tanks, and for blending high-and low-activity resins to meet the specific activity limit for disposal. The resin transfer pump is also used to transfer spent resins to a waste container in the fill station or in its shipping cask located in the auxiliary building rail car bay.

11.4.2.2.5 Resin Sampling Device

The resin sampling device collects a representative sample of the spent resin either during spent resin recirculation or during spent resin waste container filling operations. A portable shielded cask is provided for sample jar transfer.

11.4.2.2.6 Filter Transfer Cask

The filter transfer cask permits remote changing of filter cartridges, dripless transport to the storage area in the auxiliary building, transfer of the filter cartridges into and out of the filter storage, and loading of the filter cartridges into disposal containers.

11.4.2.3 System Operation

11.4.2.3.1 Spent Resin Handling Operations

Demineralized water is used to transfer spent resins from the various ion exchangers to the spent resin tanks. A demineralized water transfer pump provides the pressurized water flow to transfer the spent resins as described in subsection 9.2.4. Before the transfer operation, it is verified that the selected spent resin tank is aligned as a receiver and has the capacity to accept the bed. It is also verified that the resin mixing pump is aligned to discharge excess transfer water through the resin fines filter to the liquid waste processing system.

During the transfer operation the tank level is monitored and the resin mixing pump is operated, if required, to limit tank water level. The operator stops the transfer when the CCTV camera viewing the sight flow glass indicates on a control panel monitor that the sluice water is clear and the transfer line is, therefore, flushed of resins.

After the bed transfer, the tank solids level can be checked by operating the resin mixing pump to lower the water level below the solids level. The solids level can be determined by the ultrasonic surface detector.

Between bed transfer operations the water level in the spent resin tanks is maintained above the solids level. Demineralized water is supplied for water level adjustment as well as a backup water source for flushing resin handling lines after resin recirculation and waste disposal container filling operations.

The solids bed can be agitated and mixed at any time by using compressed air or by operating the resin mixing pump in the resin mixing mode. In the resin mixing mode, water is drawn from the spent resin tank via resin retention screens. The water is

11.0 Radioactive Waste Management

returned via tank mixing eductors that generate a resin slurry recirculation within the tank equivalent to about four times the flow rate generated by the resin mixing pump. The solids bed is locally fluidized during this operation.

The resin mixing mode is established to fluidize and mix the solids bed in the spent resin tank before waste disposal container filling. The resin transfer pump is then started in the recirculation mode. A resin slurry is drawn from the spent resin tank and returned to the same tank. A representative resin sample may be obtained during recirculation or container filling modes by operating the sampling device.

The portable system's container fill valve is opened to initiate the filling operation. The resin dewatering pump of the portable dewatering system is started to dewater the resin as it accumulates in the container. The resin dewatering pump discharges the water to the recirculation line. The water flows back to the spent resin tank, thereby preserving the water inventory in the system and retaining any resin fines or dislodged crud within the system.

The resin mixing pump can be stopped at any time during the filling operation. When the solids level nears the top of the container, as detected by level sensors and observed by a television camera, the fill valve is closed and cycled to top off the container. Excessive water or solids level automatically closes the fill valve.

When the filling operation is complete, the line flushing sequence controller is manually initiated to automatically operate the pumps and valves to flush the resin transfer lines back to the spent resin tank. The container fill valve is opened for a short time period to flush the remaining resin to the waste container. The resin mixing pump supplies filtered flush water from the spent resin tank. The portable dewatering system's dewatering pump is operated periodically until no further dewatering flow is detected by the pump discharge pressure indicator and/or audible indications from the pump.

11.4.2.3.2 Spent Filter Processing Operations

A filter transfer cask is used to change the higher-activity filters of the chemical and volume control system and spent fuel cooling system. The filter vessel is drained, and the filter cover is opened remotely. The shield plug of the port over the filter is removed and the transfer cask, without its bottom shield cover, is lifted and positioned on the port directly over the cartridge in the filter vessel.

A grapple inside the transfer cask is remotely lowered and connected to the filter cartridge. The cartridge is lifted into the transfer cask, and the cask is transferred over plastic sheeting to the bottom shield cover. The dose rate of the cartridge is measured with a long probe, and the cask is lowered onto and connected to the bottom shield cover. The transfer cask is then moved to the auxiliary building rail car bay.

If recent applicable sample analysis results are available, the filter cartridge can be loaded directly into a disposal container as described in the following paragraph. If analysis is required, a sample of the filter media is obtained through a port in the transfer cask. The filter cartridge is placed in one of nine high-activity filter storage tubes until sample analysis results are available. The transfer cask bottom cover is disconnected, the transfer cask is lifted by the crane and transferred to a position over one of the temporary storage tubes, and the spent filter cartridge is lowered into the tube. After moving the transfer cask away, the crane is used to install a shield plug

11.0 Radioactive Waste Management

onto the storage tube. Any water draining from the filter during storage collects in the storage tube which may be drained to a floor drain for subsequent transfer to the liquid radwaste system.

When sample analysis is complete and packaging requirements are established, the transfer cask is used to retrieve the spent cartridges from storage and deposit them into a waste container via a port in the top of a portable processing and storage cask. Plastic coverings are removed and the container is capped, smear-surveyed, and decontaminated as required, using reach rod tools through a cask port. The dose rate survey is also made through a cask port. Transfer of the filled waste container to the shipping cask, including cask cover handling, is then performed using the rail car bay crane under remote control.

Filters with dose rates less than 15 R/hr on contact may be changed from outside of filter vessel shielding by using reach rod tools. The filter vessel is drained, and the cover is removed. Then the spent filter cartridge is grappled and lifted out and into a filter transfer cask.

At the radwaste building, low and moderate activity filter cartridges are deposited into disposal or storage drums. The drums are stored within portable shield casks in the shielded accumulation room, which is serviced by the mobile systems facility crane. Depending on dose rates and analysis results, stabilization may or may not be required. Cartridges not requiring stabilization are loaded into standard, 55 gallon shipping drums with absorbent and may be compacted using a mobile system. When stabilization is required, the cartridges may be loaded into either high integrity containers or standard drums. If standard drums are used, mobile equipment is used to encapsulate the contents of the drums.

The drum covers are manually installed, and the drums are smear surveyed, decontaminated by wiping, if required, weighed, stacked on pallets, and placed in the packaged waste storage room.

When a truck-load quantity of waste containers accumulates, shipment to a low-level waste disposal facility is initiated by loading pallets of drums and other low-level waste containers into a closed van using the scissor lift or onto a flat-bed trailer using the crane. If the activity level is too high for unshielded shipment, the drums are loaded onto a cask pallet and into a shielded shipping cask using the mobile systems facility crane.

Radioactive filters from ventilation exhaust filtration units are bagged and transported to the radwaste building, where they are temporarily stored. The filters are compacted along with other dry active wastes by a mobile system as described in the following subsection.

11.4.2.3.3 Dry Waste Processing Operations

Dry wastes are segregated by measuring the contact dose rate of the wastes to determine the appropriate processing method. The contact dose rates for initial waste segregation are as follows:

Low activity	<5 mR/hr
Moderate activity	5 mR/hr to 100 mR/hr
High activity	>100 mR/hr

These activity levels may be adjusted by the operator to minimize exposures while maximizing processing efficiency.

Wastes from surface contamination areas in the radiologically controlled area are placed in bags or containers and tagged at the point of origin with information on radiation levels, waste type, and destination. The bags or containers are transported to the radwaste building, where they are placed into low-, moderate-, or high-activity storage, segregated by portable shielding as appropriate.

The high-activity wastes (greater than 100 mR/hr) are normally expected to be compacted in drums using a mobile compactor system in the same manner as lower-activity filter cartridges.

Moderate-activity wastes (5 mR/hr to 100 mR/hr) are expected to be sorted in a mobile system to remove reusable items such as protective clothing articles and tools, hazardous wastes, and larger noncompressible items. The remaining wastes are normally compacted by mobile equipment. The packaged wastes may be loaded directly onto a truck for shipment or may be stored in the packaged waste storage room until a truck load quantity accumulates.

Low-activity, dry active waste (less than 5 mR/hr) generally contains a large amount of nonradioactive material. It is expected that these wastes normally will be processed through a mobile radiation monitoring and sorting system to remove non-radioactive items for reuse or local disposal. A radiation survey allows identification and removal of potentially clean items for the clean waste verification. The remaining radioactive wastes are normally compacted or packaged for disposal as appropriate.

Materials that enter the radiologically controlled area are verified as nonradioactive before being released for reuse or disposal. Tools and equipment belonging to personnel and contractors are surveyed at the radiologically controlled area exit in the annex building. If these items cannot be released or decontaminated, they become plant inventory or dry active waste and are handled as described previously.

Other wastes generated in the radiologically controlled area but outside of surface contamination areas are collected in bags or containers and are delivered to the temporary storage location in the radwaste building. These wastes normally are processed through a mobile radiation monitoring system to verify that they are nonradioactive and suitable for disposal in a local waste landfill.

11.4.2.3.4 Mixed Waste Processing Operations

Mixed wastes from the radiologically controlled area are collected in suitable containers and brought to the radwaste building, where separate containment pallets and accumulation drums are provided for solid and liquid mixed wastes. Mixed wastes are normally sent to an offsite facility having mixed-waste processing and disposal capabilities.

11.4.2.4 Waste Processing and Disposal Alternatives

11.4.2.4.1 Portable and Mobile Radwaste Systems Capabilities

Portable or mobile processing and packaging systems can be located in the auxiliary building rail car bay or the radwaste building mobile systems facility. Chemical wastes are normally processed in the radwaste building by a mobile concentration and/or solidification system when a batch accumulates in the chemical waste tank. Mobile

11.0 Radioactive Waste Management

systems are also used to encapsulate high-activity filters, to sort, decontaminate and compact dry active wastes, and to verify nonradioactive wastes.

The spent resin system includes connections in the fill station and rail car bay to allow spent resins to be delivered to a disposal container in either location for dewatering using portable equipment.

Branch Technical Position ETSB 11-3 provides guidance for portable solid waste systems in Section IV. Compliance with the four guidance items is achieved as follows:

IV.I The spent resin tanks are the only tanks that contain a significant volume of wet wastes, and these tanks are permanently installed. Concentrates that may be produced by mobile evaporation systems will be produced and stored by the mobile systems only in small batches prior to being solidified by the mobile systems. As described in subsection 1.2.7, the radwaste building is designed to retain spillage from mobile or portable systems.

IV.2 Permanently installed piping for transport of radioactive wastes to mobile or portable systems is routed close to the mobile or portable systems thereby minimizing the use of flexible interfacing hose. The hydrostatic test requirements of Regulatory Guide 1.143 will be applied to the flexible interfacing hose.

IV.3 Portable or mobile systems will be located in either the rail car bay of the auxiliary building or in the mobile systems facility in the radwaste building. The spent resin waste container fill station or the shipping cask in the auxiliary building collects spillage of spent resin during waste container filling operations. The radwaste and auxiliary buildings contain and drain spillage to the liquid radwaste system via the radioactive waste drain system as described in subsection 1.2.7 and Section 11.2. Portable or mobile systems will, when required, have their own HEPA filtered exhaust ventilation system. HEPA filtered exhaust is required when airborne radioactivity would exceed 10 CFR 20 derived air concentration limits for radiation workers. The mobile systems facility has connections on the exhaust ventilation ducts for connecting exhaust duct from mobile or portable processing systems to the building's exhaust ventilation system.

IV.4 Although the seismic criteria of Regulatory Guide 1.143 are not applicable to structures housing mobile or portable solid radwaste systems, the portable equipment used for spent resin container filling and dewatering and high-activity filter cartridge packaging will be housed within the Seismic Category I auxiliary building. The radwaste building, which provides shelter for mobile or portable radwaste systems, is non-seismic in accordance with Branch Technical Position ETSB 11-3.

11.4.2.4.2 Central Radwaste Processing Facility

As an alternative to the mobile or portable processes for lower-activity wastes, the wastes may be sent to a licensed central radwaste processing facility for processing and disposal. This option requires minimal onsite processing to remove radioactive materials from the waste streams. The wastes are loaded into a cargo container. The mobile systems facility includes a designated laydown area, and the mobile systems facility crane may be used to handle a cargo container.

11.4.2.4.3 Temporary Storage of Low-Level Radioactive Waste

In the event that off-site shipping is disrupted or facilities are not available to accept radwaste when LNP 1 and 2 become operational, as described in DCD Subsection 11.4.2.1 paragraph ten, temporary storage capability on-site is available for greater than two years at the expected rate of radwaste generation and greater than one year at the maximum rate of radwaste generation. During this period, the implementation of additional waste minimization strategies could extend the duration of temporary radwaste storage capability. Since there are no facilities currently licensed by the NRC for disposal of Greater Than Class C (GTCC) LLRW, storage of GTCC would be similar to the methodology used for storage of spent fuel.

If additional temporary radwaste storage is eventually required, then on-site facilities could be constructed utilizing the design guidance provided in NUREG-0800, Standard Review Plan Chapter 11 Radioactive Waste Management Appendix 11.4-A, Design Guidance for Temporary Storage of Low-Level Radioactive Waste.

11.4.2.5 Facilities

11.4.2.5.1 Auxiliary Building

Resin and filtration media transfer lines from the various ion exchangers are routed to the spent resin tanks on elevation 100′-0″ in the southwest corner of the auxiliary building. The spent resin system pumps, valves, and piping are located in shielded rooms near the spent resin tanks.

Liquid radwaste system transfer lines to and from the radwaste building are routed to the south wall of the auxiliary building where they penetrate and enter into a shielded pipe pit in the base mat of the radwaste building.

Accessways in the auxiliary building are used to move the filter transfer casks. This includes filter transfer cask handling from the containment, where the chemical and volume control filters are located, to the auxiliary building rail car bay, where the filter cartridges are stored and subsequently packaged using mobile equipment. These accessways are also used to move dry active waste from various collection locations to the radwaste building. Enclosed access is provided between the auxiliary building and the radwaste building on elevation 100′-0″ (grade level).

11.4.2.5.2 Radwaste Building

The radwaste building, described in Section 1.2, houses the mobile systems facility. It also includes the waste accumulation room and the packaged waste storage room. These rooms are serviced by the mobile systems facility crane.

In the mobile systems facility, three truck bays provide for mobile or portable processing systems and for waste disposal container shipping and receiving. A shielded pipe trench to each of the truck bays is used to route liquid radwaste supply and return lines from the connections in the shielded pipe pit at the auxiliary building wall. Separate areas are reserved for empty (new) waste disposal container storage, container laydown, and forklift charging. An area is available near the door to the annex building for protective clothing dropoff and frisking.

The waste accumulation room (pre-processing) is divided as needed, using partitions and portable shielding to adjust the storage areas for different waste categories as needed to complement the radioactivity levels and volumes of generated wastes. The accumulation room has lockable doors to minimize unauthorized entry and inadvertent exposure.

The packaged waste storage room may be separated into high-and low-activity areas, using portable shielding to minimize exposure while providing operational flexibility. A lockable door is provided to minimize unauthorized entry and radiation exposure.

The heating and ventilating system for the radwaste building is described in subsection 9.4.8.

11.4.3 System Safety Evaluation

The solid waste management system has no safety-related function and therefore requires no nuclear safety evaluation.

11.4.4 Tests and Inspections

Preoperational tests are conducted as described in subsection 14.2.9. Tests are performed to demonstrate the capability to transfer ion exchange resins and deep bed filtration media from the ion exchangers and filters to the spent resin tanks or directly to a waste disposal container. Preoperational tests of the solid waste management system components are performed to prepare the system for operation.

After plant operations begin, the operability and functional performance of the solid waste management system is periodically evaluated according to Regulatory Guide 1.143 by monitoring for abnormal or deteriorating performance during routine operations. Instruments and setpoints are also calibrated on a scheduled basis. The preventive maintenance program includes periodic inspection and maintenance of active components.

11.4.5 Quality Assurance

The quality assurance program for design, installation, procurement, and fabrication issues of the solid waste management system is in accordance with the overall quality assurance program described in Chapter 17. *Since the impact of radwaste systems on safety is limited, the extent of control required by Appendix B to 10 CFR Part 50 is similarly limited. Thus, a supplemental quality assurance program applicable to design, construction, installation and testing provisions of the solid radwaste system is established by procedures that complies with the guidance presented in Regulatory Guide 1.143.*

11.4.6 Combined License Information for Solid Waste Management System Process Control Program

The Combined License applicant will develop a process control program in compliance with 10 CFR Sections 61.55 and 61.56 for wet solid wastes and 10 CFR Part 71 and DOT regulations for both wet and dry solid wastes. Process control programs will also be provided by vendors providing mobile or portable processing or storage systems. It will be the plant operator's responsibility to assure that the vendors have appropriate process control programs for the scope of work being contracted at any particular time. The process control program will identify the operating procedures for storing or processing wet solid wastes. The mobile systems process control program will include a discussion of conformance to Regulatory Guide 1.143 (Reference 7), Generic Letter GL-80-009 (Reference 8), and Generic Letter GL-81-039 (Reference 9) and, information of equipment containing wet solid wastes in

11.0 Radioactive Waste Management

the nonseismic Radwaste Building. In the event additional onsite storage facilities are a part of Combined License plans, this program will include a discussion of conformance to Generic Letter GL-81-038 (Reference 10).

A Process Control Program (PCP) is developed and implemented in accordance with the recommendations and guidance of NEI 07-10A (Reference 12). The PCP describes the administrative and operational controls used for the solidification of liquid or wet solid waste and the dewatering of wet solid waste. Its purpose is to provide the necessary controls such that the final disposal waste product meets applicable federal regulations (10 CFR Parts 20, 50, 61, 71, and 49 CFR Part 173), state regulations, and disposal site waste form requirements for burial at a low level waste (LLW) disposal site that is licensed in accordance with 10 CFR Part 61. Waste processing (solidification or dewatering) equipment and services may be provided by the plant or by third-party vendors. Each process used meets the applicable requirements of the PCP. No additional onsite radwaste storage is required beyond that described in the DCD.

Table 13.4-201 provides milestones for PCP implementation.

All packaged and stored radwaste will be shipped to offsite disposal/storage facilities and temporary storage of radwaste is only provided until routine offsite shipping can be performed. Accordingly, there is no expected need for permanent on-site storage facilities at LNP 1 & 2.

If additional storage capacity for Class B and C waste is required, further temporary storage would be developed in accordance with NUREG-0800, Standard Review Plan 11.4, Appendix 11.4-A. To the extent that additional storage could be needed sometime in the future, the existing regulatory framework would allow Progress Energy to conduct written safety analyses under 10 CFR 50.59. If the additional storage does not satisfy 10 CFR 50.59, a license amendment would be required.

11.4.6.1 Procedures

Operating procedures specify the processes to be followed to ship waste that complies with the waste acceptance criteria (WAC) of the disposal site, 10 CFR 61.55 and 61.56, and the requirements of third party waste processors. Each waste stream process is controlled by procedures that specify the process for packaging, shipment, material properties, destination (for disposal or further processing), testing to verify compliance, the process to address non-conforming materials, and required documentation. Where materials are to be disposed of as non-radioactive waste (as described in DCD Subsection 11.4.2.3.3), final measurements of each package are performed to verify there has not been an accumulation of licensed material resulting from a buildup of multiple, non-detectable quantities. These measurements are obtained using sensitive scintillation detectors, or instruments of equal sensitivity, in a low-background area. Procedures document maintenance activities, spill abatement, upset condition recovery, and training. Procedures document the periodic review and revision, as necessary, of the PCP based on changes to the disposal site, WAC regulations, and third party PCPs.

11.4.6.2 Third Party Vendors

Third party equipment suppliers and/or waste processors are required to supply approved PCPs. Third party vendor PCPs describe compliance with Regulatory Guide

11.0 Radioactive Waste Management

1.143, Generic Letter 80-09, and Generic Letter 81-39. Third party vendor PCPs are referenced appropriately in the plant PCP before commencement of waste processing.

11.4.7 References

1. "Shippers-General Requirements for Shipments and Packagings," 49 CFR 173.

2. "Packaging and Transportation of Radioactive Material," 10 CFR 71.

3. "Domestic Licensing of Production and Utilization Facilities," 10 CFR 50.

4. "Standards for Protection Against Radiation," 10 CFR 20.

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

6. "USNRC Technical Position on Waste Form," Rev. 1, January 1991.

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

8. USNRC Generic Letter GL-80-009, "Low Level Radioactive Waste Disposal," dated January 29, 1980.

9. USNRC Generic Letter GL-81-039, "NRC Volume Reduction Policy (Generic Letter No. 81-39)," dated November 30, 1981.

10. USNRC Generic Letter GL-81-038, "Storage of Low-Level Radioactive Wastes at Power Reactor Sites," dated November 10, 1981.

11. USNRC, "Minimization of Contamination," 10 CFR 20.1406.

12. NEI 07-10A, “Generic FSAR Template Guidance for Process Control Program (PCP),” Revision 0, March 2009.

11.0 Radioactive Waste Management

Table 11.4-1
ESTIMATED SOLID RADWASTE VOLUMES

Source	Expected Generation (ft^3/yr)	Expected Shipped Solid (ft^3/yr)	Maximum Generation (ft^3/yr)	Maximum Shipped Solid (ft^3/yr)
Wet Wastes				
Primary Resins (includes spent resins and wet activated carbon)	400[(2)]	510	1700[(4)]	2160
Chemical	350	20	700	40
Mixed Liquid	15	17	30	34
Condensate Polishing Resin[(1)]	0	0	206[(5)]	259
Steam Generator Blowdown[(1)(6)] Material (Resin and Membrane)	0	0	540[(5)]	680
Wet Waste Subtotals	**765**	**547**	**3176**	**3173**
Dry Wastes				
Compactable Dry Waste	4750	1010	7260	1550
Non-Compactable Solid Waste	234	373	567	910
Mixed Solid	5	7.5	10	15
Primary Filters (includes high activity and low activity cartridges)	5.2[(3)]	26	9.4[(3)]	69
Dry Waste Subtotals	**4994**	**1417**	**7846**	**2544**
TOTAL WET & DRY WASTES	**5759**	**1964**	**11,020**	**5717**

Notes:
1. Radioactive secondary resins and membranes result from primary to secondary systems leakage (e.g., SG tube leak).
2. Estimated activity basis is ANSI 18.1 source terms in reactor coolant.
3. Estimated activity basis is breakdown and transfer of 10% of resin from upstream ion exchangers.
4. Reactor coolant source terms corresponding to 0.25% fuel defects.
5. Estimated activity basis from Table 11.1-5, 11.1-7 and 11.1-8 and a typical 30 day process run time, once per refueling cycle.
6. Estimated volume and activity used for conservatism. Resin and membrane will be removed with the electrodeionization units and not stored as wet waste. See subsection 10.4.8.

11.0 Radioactive Waste Management

Table 11.4-2 (Sheet 1 of 2)
EXPECTED ANNUAL CURIE CONTENT OF PRIMARY INFLUENTS

Isotope	Primary Resin Total Ci/yr	Primary Filter Total Ci/yr
Br-83	---	---
Br-84	1.98E-01	1.98E-02
Br-85	---	---
I-129	---	---
I-130	---	---
I-131	1.42E+02	1.42E+01
I-132	1.04E+01	1.04E+00
I-133	5.29E+01	5.29E+00
I-134	6.89E+00	6.89E-01
I-135	3.49E+01	3.49E+00
Rb-86	---	---
Rb-88	9.72E-01	9.72E-02
Rb-89	---	---
Cs-134	3.06E+02	3.06E+01
Cs-136	3.16E+00	3.16E-01
Cs-137	4.64E+02	4.64E+01
Cs-138	---	---
Ba-137m	4.44E+02	4.44E+01
Cr-51	3.21E+01	3.21E+00
Mn-54	1.04E+02	1.04E+01
Mn-56	---	---
Fe-55	1.04E+02	1.04E+01
Fe-59	5.00E+00	5.00E-01
Co-58	2.05E+02	2.05E+01
Co-60	9.59E+01	9.59E+00
Zn-65	3.02E+01	3.02E+00
Sr-89	2.67E+00	2.67E-01
Sr-90	1.13E+00	1.13E-01
Sr-91	1.72E-01	1.72E-02
Sr-92	---	---
Ba-140	6.29E+01	6.29E+00
Y-90	---	---
Y-91m	---	---
Y-91	3.74E-06	3.74E-07

11.0 Radioactive Waste Management

Table 11.4-2 (Sheet 2 of 2)
EXPECTED ANNUAL CURIE CONTENT OF PRIMARY INFLUENTS

Isotope	Primary Resin Total Ci/yr	Primary Filter Total Ci/yr
Y-92	---	---
Y-93	---	---
La-140	---	---
Zr-95	2.80E-04	2.80E-05
Nb-95	---	---
Mo-99	---	---
Tc-99m	---	---
Ru-103	5.35E-03	5.35E-04
Ru-106	6.37E-02	6.37E-03
Rh-103m	---	---
Rh-106	---	---
Te-132	---	---
Te-125m	---	---
Te-127m	---	---
Te-127	---	---
Te-129m	1.36E-04	1.36E-05
Te-129	---	---
Te-131m	---	---
Total:	2.11E+03	2.11E+02

Note: Values shown as "---" Ci/yr are those calculated to be lower than 1.0E-10 Ci/yr, and thus considered to have insignificant contributions to total.

11.0 Radioactive Waste Management

Table 11.4-3 (Sheet 1 of 2)
MAXIMUM ANNUAL CURIE CONTENT OF PRIMARY INFLUENTS

Isotope	Primary Resin Total Ci/yr	Primary Filter Total Ci/yr
Br-83	7.03E+00	7.03E-01
Br-84	3.42E-01	3.42E-02
Br-85	3.74E-03	3.74E-04
I-129	3.44E-03	3.44E-04
I-130	9.00E+00	9.00E-01
I-131	5.45E+03	5.45E+02
I-132	1.97E+02	1.97E+01
I-133	1.66E+03	1.66E+02
I-134	7.31E+00	7.31E-01
I-135	3.81E+02	3.81E+01
Rb-86	2.97E+01	2.97E+00
Rb-88	2.52E+01	2.52E+00
Rb-89	9.83E-01	9.83E-02
Cs-134	9.57E+03	9.57E+02
Cs-136	1.72E+03	1.72E+02
Cs-137	9.14E+03	9.14E+02
Cs-138	1.06E+01	1.06E+00
Ba-137m	8.66E+03	8.66E+02
Cr-51	3.95E+01	3.95E+00
Mn-54	1.18E+02	1.18E+01
Mn-56	4.75E+01	4.75E+00
Fe-55	1.14E+02	1.14E+01
Fe-59	5.84E+00	5.84E-01
Co-58	3.03E+02	3.03E+01
Co-60	2.45E+02	2.45E+01
Zn-65	---	---
Sr-89	4.56E+01	4.56E+00
Sr-90	1.09E+01	1.09E+00
Sr-91	1.16E+00	1.16E-01
Sr-92	9.96E-02	9.96E-03
Ba-140	1.19E+01	1.19E+00
Y-90	1.07E+01	1.07E+00
Y-91m	3.48E-01	3.48E-02
Y-91	5.48E-01	5.48E-02

11.0 Radioactive Waste Management

Table 11.4-3 (Sheet 2 of 2)
MAXIMUM ANNUAL CURIE CONTENT OF PRIMARY INFLUENTS

Isotope	**Primary Resin Total Ci/yr**	**Primary Filter Total Ci/yr**
Y-92	4.19E-02	4.19E-03
Y-93	9.07E-05	9.07E-06
La-140	1.07E+01	1.07E+00
Zr-95	---	---
Nb-95	---	---
Mo-99	---	---
Tc-99m	---	---
Ru-103	---	---
Ru-106	---	---
Rh-103m	---	---
Rh-106	---	---
Te-132	---	---
Te-125m	---	---
Te-127m	---	---
Te-127	---	---
Te-129m	---	---
Te-129	---	---
Te-131m	---	---
Total:	3.78E+04	3.78E+03

Note: Values shown as "---" Ci/yr are those calculated to be lower than 1.0E-10 Ci/yr, and thus considered to have insignificant contributions to total.

11.0 Radioactive Waste Management

Table 11.4-4 (Sheet 1 of 2)
EXPECTED ANNUAL CURIE CONTENT OF SHIPPED PRIMARY WASTES

Isotope	Primary Resin Total Ci/yr	Primary Filter Total Ci/yr
Br-83	---	---
Br-84	---	---
Br-85	---	---
I-129	---	---
I-130	---	---
I-131	6.04E-02	6.04E-03
I-132	---	---
I-133	---	---
I-134	---	---
I-135	---	---
Rb-86	---	---
Rb-88	---	---
Rb-89	---	---
Cs-134	2.81E+02	2.81E+01
Cs-136	2.61E-02	2.61E-03
Cs-137	4.61E+02	4.61E+01
Cs-138	---	---
Ba-137m	4.61E+02	4.61E+01
Cr-51	3.37E+00	3.37E-01
Mn-54	8.50E+01	8.50E+00
Mn-56	---	---
Fe-55	9.75E+01	9.75E+00
Fe-59	1.23E+00	1.23E-01
Co-58	8.51E+01	8.51E+00
Co-60	9.29E+01	9.29E+00
Zn-65	2.34E+01	2.34E+00
Sr-89	8.05E-01	8.05E-02
Sr-90	1.13E+00	1.13E-01
Sr-91	---	---
Sr-92	---	---
Ba-140	4.80E-01	4.80E-02
Y-90	1.13E+00	1.13E-01
Y-91m	---	---
Y-91	4.03E-04	4.03E-05

11.0 Radioactive Waste Management

Table 11.4-4 (Sheet 2 of 2)

EXPECTED ANNUAL CURIE CONTENT OF SHIPPED PRIMARY WASTES

Isotope	Primary Resin Total Ci/yr	Primary Filter Total Ci/yr
Y-92	---	---
Y-93	---	---
La-140	5.52E-01	5.52E-02
Zr-95	1.09E-04	1.09E-05
Nb-95	1.31E-04	1.31E-05
Mo-99	---	---
Tc-99m	---	---
Ru-103	1.10E-03	1.10E-04
Ru-106	5.38E-02	5.38E-03
Rh-103m	1.11E-03	1.11E-04
Rh-106	5.38E-02	5.38E-03
Te-132	---	---
Te-125m	---	---
Te-127m	---	---
Te-127	---	---
Te-129m	2.10E-05	2.10E-06
Te-129	1.37E-05	1.37E-06
Te-131m	---	---
Total:	1.60E+03	1.60E+02

Note: Values shown as "---" Ci/yr are those calculated to be lower than 1.0E-10 Ci/yr, and thus considered to have insignificant contributions to total.

11.0 Radioactive Waste Management

Table 11.4-5 (Sheet 1 of 2)
MAXIMUM ANNUAL CURIE CONTENT OF SHIPPED PRIMARY WASTES

Isotope	Primary Resin Total Ci/yr	Primary Filter Total Ci/yr
Br-83	---	---
Br-84	---	---
Br-85	---	---
I-129	3.44E-03	3.44E-04
I-130	---	---
I-131	4.10E+02	4.10E+01
I-132	---	---
I-133	6.27E-08	6.27E-09
I-134	---	---
I-135	---	---
Rb-86	9.76E+00	9.76E-01
Rb-88	---	---
Rb-89	---	---
Cs-134	9.31E+03	9.31E+02
Cs-136	3.47E+02	3.47E+01
Cs-137	9.13E+03	9.13E+02
Cs-138	---	---
Ba-137m	9.13E+03	9.13E+02
Cr-51	1.86E+01	1.86E+00
Mn-54	1.10E+02	1.10E+01
Mn-56	---	---
Fe-55	1.12E+02	1.12E+01
Fe-59	3.66E+00	3.66E-01
Co-58	2.26E+02	2.26E+01
Co-60	2.42E+02	2.42E+01
Zn-65	---	---
Sr-89	3.06E+01	3.06E+00
Sr-90	1.09E+01	1.09E+00
Sr-91	---	---
Sr-92	---	---
Ba-140	2.35E+00	2.35E-01
Y-90	1.09E+01	1.09E+00
Y-91m	---	---
Y-91	3.90E-01	3.90E-02

11.0 Radioactive Waste Management

Table 11.4-5 (Sheet 2 of 2)
MAXIMUM ANNUAL CURIE CONTENTS OF SHIPPED PRIMARY WASTES

Isotope	Primary Resin Total Ci/yr	Primary Filter Total Ci/yr
Y-92	---	---
Y-93	---	---
La-140	2.70E+00	2.70E-01
Zr-95	---	---
Nb-95	---	---
Mo-99	---	---
Tc-99m	---	---
Ru-103	---	---
Ru-106	---	---
Rh-103m	---	---
Rh-106	---	---
Te-132	---	---
Te-125m	---	---
Te-127m	---	---
Te-127	---	---
Te-129m	---	---
Te-129	---	---
Te-131m	---	---
Total:	2.91E+04	2.91E+03

Note: Values shown as "---" Ci/yr are those calculated to be lower than 1.0E-10 Ci/yr, and thus considered to have insignificant contributions to total.

11.0 Radioactive Waste Management

Table 11.4-6 (Sheet 1 of 2)
EXPECTED ANNUAL CURIE CONTENT OF SECONDARY WASTE AS GENERATED

Isotope	Secondary Resin Total Ci/yr
Na-24	1.83E-02
Cr-51	4.29E-02
Mn-54	2.95E-02
Fe-55	2.35E-02
Fe-59	4.49E-03
Co-58	7.78E-02
Co-60	1.03E-02
Zn-65	9.56E-03
Br-84	2.22E-05
Rb-88	8.99E-05
Sr-89	2.24E-03
Sr-90	2.37E-04
Sr-91	2.11E-04
Y-90	2.06E-04
Y-91	2.53E-04
Y-91m	1.82E-04
Y-93	9.80E-04
Zr-95	6.53E-03
Nb-95	5.19E-03
Nb-95m	4.74E-03
Mo-99	1.52E-02
Tc-99m	1.41E-02
Ru-103	1.13E-01
Ru-106	1.65E+00
Rh-103m	1.39E-01
Rh-106	2.11E+00
Ag-110	2.12E-02
Ag-110m	2.45E-02
Te-129	2.29E-03
Te-129m	2.79E-03
Te-131	1.14E-03
Te-131m	1.42E-03
Te-132	4.74E-04

11.0 Radioactive Waste Management

Table 11.4-6 (Sheet 2 of 2)
EXPECTED ANNUAL CURIE CONTENT OF SECONDARY WASTE AS GENERATED

Isotope	Secondary Resin Total Ci/yr
I-131	1.70E-01
I-132	7.93E-03
I-133	5.23E-02
I-134	1.18E-03
I-135	2.56E-02
Xe-131m	---
Xe-133	---
Xe-135	---
Cs-134	2.50E-01
Cs-135	4.70E-10
Cs-136	1.48E-02
Cs-137	3.39E-01
Ba-136m	1.39E-02
Ba-137m	3.42E-01
Ba-140	1.17E-01
La-140	1.47E-01
Ce-141	2.13E-03
Ce-143	2.91E-03
Ce-144	7.35E-02
Pr-143	2.04E-03
Pr-144	6.37E-02
Total:	5.96E+00

Note: Values shown as "---" Ci/yr are those calculated to be lower than 1.0E-10 Ci/yr, and thus considered to have insignificant contributions to total.

11.0 Radioactive Waste Management

Table 11.4-7 (Sheet 1 of 2)
MAXIMUM ANNUAL CURIE CONTENT OF SECONDARY WASTE AS GENERATED

Isotope	Secondary Resin Total Ci/yr
Na-24	4.62E-04
Cr-51	5.17E-01
Mn-54	3.55E-01
Mn-56	2.24E-01
Fe-55	2.78E-01
Fe-59	5.88E-02
Co-58	9.25E-01
Co-60	1.23E-01
Br-83	3.73E-02
Br-84	1.41E-03
Br-85	1.64E-06
Kr-83m	---
Kr-85	---
Kr-85m	---
Rb-88	4.56E-02
Rb-89	1.53E-03
Sr-89	9.10E-01
Sr-90	5.00E-02
Sr-91	2.13E-02
Sr-92	7.25E-04
Y-90	4.60E-02
Y-91	4.34E-02
Y-91m	2.11E-02
Y-92	2.66E-03
Y-93	1.04E-03
Zr-95	7.74E-02
Nb-95	8.25E-02
Nb-95m	5.52E-02
Mo-99	1.52E+01
Tc-99m	1.68E+01
Ru-103	6.28E-02
Ru-103m	3.87E-02
Rh-103m	6.29E-02
Rh-106	5.95E-02

11.0 Radioactive Waste Management

Table 11.4-7 (Sheet 2 of 2)
MAXIMUM ANNUAL CURIE CONTENT OF SECONDARY WASTE AS GENERATED

Isotope	Secondary Resin Total Ci/yr
Ag-110	1.34E-02
Ag-110m	2.24E-01
Te-129	1.19E+00
Te-129m	1.10E+00
Te-131	2.35E+00
Te-131m	2.01E-01
Te-132	6.75E+00
Te-134	1.49E-03
I-130	1.19E-01
I-131	1.37E+02
I-132	6.77E+00
I-133	2.51E+01
I-134	4.99E-02
I-135	3.99E+00
Xe-131m	---
Xe-133	---
Xe-135	---
Cs-134	6.90E+02
Cs-135	6.16E-08
Cs-136	5.15E+02
Cs-137	5.00E+02
Cs-138	3.41E-02
Ba-136m	6.35E+02
Ba-137m	5.14E+02
Ba-140	2.83E-01
La-140	3.31E-01
Ce-141	6.42E-02
Ce-143	4.94E-03
Ce-144	6.33E-02
Pr-143	4.63E-02
Pr-144	6.33E-02
Total:	3.08E+03

Note: Values shown as "---" Ci/yr are those calculated to be lower than 1.0E-10Ci/yr, and thus considered to have insignificant contributions to total.

11.0 Radioactive Waste Management

Table 11.4-8 (Sheet 1 of 2)
EXPECTED ANNUAL CURIE CONTENT OF SHIPPED SECONDARY WASTES

Isotope	Secondary Resin Total Ci/yr
Na-24	---
Cr-51	4.55E-03
Mn-54	2.40E-02
Fe-55	2.19E-02
Fe-59	1.14E-03
Co-58	3.25E-02
Co-60	9.95E-03
Zn-65	7.42E-03
Br-84	---
Rb-88	---
Sr-89	6.86E-04
Sr-90	2.36E-04
Sr-91	---
Y-90	2.31E-04
Y-91	6.71E-09
Y-91m	---
Y-93	---
Zr-95	2.52E-03
Nb-95	4.06E-03
Nb-95m	2.32E-03
Mo-99	---
Tc-99m	---
Ru-103	2.34E-02
Ru-106	1.38E+00
Rh-103m	2.87E-02
Rh-106	1.77E+00
Ag-110	1.66E-02
Ag-110m	1.92E-02
Te-129	3.44E-04
Te-129m	4.48E-04
Te-131	---
Te-131m	---

11.0 Radioactive Waste Management

Table 11.4-8 (Sheet 2 of 2)
EXPECTED ANNUAL CURIE CONTENT OF SHIPPED SECONDARY WASTES

Isotope	**Secondary Resin Total Ci/yr**
Te-132	---
I-131	7.32E-05
I-132	---
I-133	---
I-134	---
I-135	---
Xe-131m	---
Xe-133	---
Xe-135	---
Cs-134	2.31E-01
Cs-135	4.86E-10
Cs-136	1.56E-04
Cs-137	3.36E-01
Ba-136m	1.47E-04
Ba-137m	3.40E-01
Ba-140	8.97E-04
La-140	1.05E-03
Ce-141	3.13E-04
Ce-143	---
Ce-144	5.91E-02
Pr-143	2.38E-05
Pr-144	5.12E-02
Total:	4.38E+00

Note: Values shown as "---" Ci/yr are those calculated to be lower than 1.0E-10Ci/yr, and thus considered to have insignificant contributions to total.

11.0 Radioactive Waste Management

Table 11.4-9 (Sheet 1 of 2)
MAXIMUM ANNUAL CURIE CONTENT OF SHIPPED SECONDARY WASTES

Isotope	Secondary Resin Total Ci/yr
Na-24	---
Cr-51	5.47E-02
Mn-54	2.89E-01
Mn-56	---
Fe-55	2.60E-01
Fe-59	1.50E-02
Co-58	3.87E-01
Co-60	1.19E-01
Br-83	---
Br-84	---
Br-85	---
Kr-83m	---
Kr-85	---
Kr-85m	---
Rb-88	---
Rb-89	---
Sr-89	2.79E-01
Sr-90	4.96E-02
Sr-91	---
Sr-92	---
Y-90	5.12E-02
Y-91	1.12E-06
Y-91m	---
Y-92	---
Y-93	---
Zr-95	2.98E-02
Nb-95	5.19E-02
Nb-95m	2.70E-02
Mo-99	2.72E-09
Tc-99m	3.04E-09
Ru-103	1.30E-02
Ru103m	3.27E-02

11.0 Radioactive Waste Management

Table 11.4-9 (Sheet 2 of 2)
MAXIMUM ANNUAL CURIE CONTENT OF SHIPPED SECONDARY WASTES

Isotope	Secondary Resin Total Ci/yr
Rh-103m	1.30E-02
Rh-106	5.03E-02
Ag-110	1.05E-02
Ag-110m	1.76E-01
Te-129	1.92E-01
Te-129m	1.77E-01
Te-131	---
Te-131m	---
Te-132	2.90E-08
Te-134	---
I-130	---
I-131	5.94E-02
I-132	2.36E-08
I-133	---
I-134	---
I-135	---
Xe-131m	---
Xe-133	---
Xe-135	---
Cs-134	6.35E+02
Cs-135	6.36E-08
Cs-136	5.42E+00
Cs-137	4.98E+02
Cs-138	---
Ba-136m	6.69E+00
Ba-137m	5.11E+02
Ba-140	2.18E-03
La-140	2.87E-03
Ce-141	9.41E-03
Ce-143	---
Ce-144	5.08E-02
Pr-143	4.75E-04
Pr-144	5.08E-02
Total:	1.66E+03

Note: Values shown as "---" Ci/yr are those calculated to be lower than 1.0E-10Ci/yr, and thus considered to have insignificant contributions to total.

11.0 Radioactive Waste Management

Table 11.4-10 (Sheet 1 of 2)
COMPONENT DATA – SOLID WASTE MANAGEMENT SYSTEM (NOMINAL)

Tanks	
Spent resin tank	
Number	2
Total volume (ft^3)	300
Type	Vertical, conical bottom, dished top
Design pressure (psig)	15
Design temperature (°F)	150
Material	Stainless steel
Pumps	
Resin mixing pump	
Number	1
Type	Pneumatic diaphragm
Design pressure (psig)	125
Design temperature (°F)	150
Design flow rate (gpm)	120
Design head (ft)	160
Air supply pressure (psig)	100
Air consumption (scfm)	130
Material	Stainless steel housing, Buna N diaphragms
Resin transfer pump	
Number	1
Type	Material handling positive displacement
Design pressure (psig)	125
Design temperature (°F)	150
Design flow rate (gpm)	100
Material	Stainless steel housing, Buna N flexible parts

11.0 Radioactive Waste Management

Table 11.4-10 (Sheet 2 of 2)
COMPONENT DATA – SOLID WASTE MANAGEMENT SYSTEM (NOMINAL)

Filters	
Resin fines filter	
Number	1
Type	Filter cartridge for inside to outside flow
Design pressure (psig)	150
Design temperature (°F)	150
Design flowrate (gpm)	120
Filtration rating	10 microns
Material	Stainless steel housing and pleated polypropylene cartridge with stainless steel screen outer jacket
Sampler	
Resin sampling device	
Number	1
Type	Inline sampler, positive displacement sample collection and portable pig for sample jar
Material	Stainless steel and EPDM wetted parts

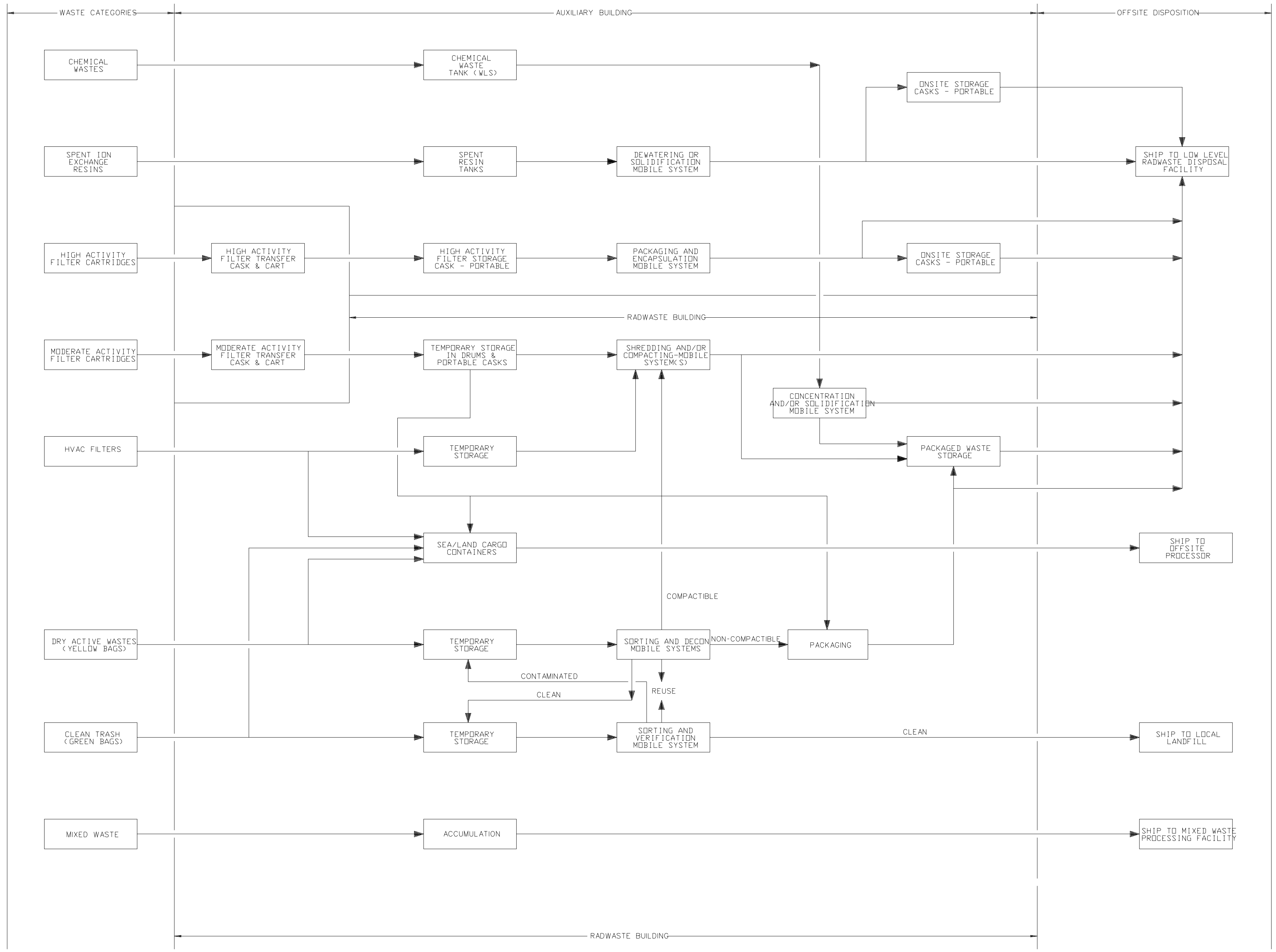

Figure 11.4-1

Waste Processing System Flow Diagram