50.59 REVIEW COVERSHEET FORM

Station/Unit(s): Oyster Creek

Activity/Document Number: Revision to SER for the On Site Low Level Radioactive Waste Storage Facility / SE-402533-001 **Revision Number:** 6

Title: SER for the On Site Low Level Radioactive Waste Storage Facility

NOTE: For 50.59 Evaluations, information on this form will provide the basis for preparing the biennial summary report submitted to the NRC in accordance with the requirements of 10 CFR 50.59(d)(2).

Description of Activity:
(Provide a brief, concise description of what the proposed activity involves.)

This activity is to revise the existing SER of the On Site Low Level Radioactive Waste Storage Facility (SE 402533-001, revision 5) to reflect the actual configuration of the facility.

SE 402533-001, rev. 5 is a historical document that was developed for the installation and operation of the Oyster Creek Low Level Radioactive Waste Storage Facility. This document was then used to update the Oyster Creek UFSAR to reflect the installation. It was last revised 9/14/2000, by the GPU Nuclear safety review process, which is no longer used at Oyster Creek. This document can be revised using the Exelon review process consistent with LS-AA-104,rev. 7 section 4.6.3 which states:

If new information is discovered that necessitates revision of a 50.59 Review that was completed prior to the effective date of the Exelon 50.59 Review Process, i.e., March 13, 2001, then revise the 50.59 Review using the guidance of this procedure. Only the portions of the 50.59 Review affected by the new information need be revised.

Reason for Activity:
(Discuss why the proposed activity is being performed.)

SE-402533-001 provides information concerning the onsite storage of low-level radioactive material / waste and contaminated equipment and discusses the operation of the LLRW Facility. The facility was originally designed with a dry active waste (DAW) compaction area, which would be used for repackaging of LLRW in the event that a waste container was damaged, or if repackaging of waste was required. To address this requirement, the area was designed to contain a DAW compactor with a ventilation system to inhibit the release of radioactive material during the compactor operation. This capability was found to be unnecessary and the compactor was never installed, however, the ventilation system to support the compactor was. Also, the filter room has been converted to an office space for use in storing radiac sealed sources.

This activity will update the current revision 5 of SE-402533-001 to revision 6 to accurately reflect the current use of the filter room and eliminate the compactor function.

Effect of Activity:
(Discuss how the activity impacts plant operations, design bases, or safety analyses described in the UFSAR.)

The activity is to provide a more detailed description of the Low Level Radwaste Facility, the description of the radioactive materials being stored. SE-402533-001 is being added as a "reference document" to the UFSAR by OC-2013-S-0012 and therefore should reflect the actual configuration of the facility. This does not affect plant operations, design bases, or safety analyses described in the UFSAR.

Summary of Conclusion for the Activity's 50.59 Review:
(Provide justification for the conclusion, including sufficient detail to recognize and understand the essential arguments leading to the conclusion. Provide more than a simple statement that a 50.59 Screening, 50.59 Evaluation, or a License Amendment Request, as applicable, is not required.)

This activity does not result in any change that adversely affects the design function of any SSC as described in the UFSAR. It does not constitute a change to DBLFPB. It does not involve any change to a procedure that adversely affects how any UFSAR described SSC design function is operated or controlled. It does not revise any existing method of evaluation, or introduce any new method of evaluation that is used to establish the design basis or safety analysis for Oyster Creek. This activity does not require any SSC to be operated beyond any design limitations and it does not require a change to the Oyster Creek Technical Specifications or Operating License.

Therefore, a 50.59 Evaluation is not required nor is NRC approval needed to implement this activity.

50.59 REVIEW COVERSHEET FORM

Station/Unit(s): Oyster Creek

Activity/Document Number: Revision to SER for the On Site Low Level Radioactive Waste Storage Facility / SE-402533-001 **Revision Number:** 6

Title: SER for the On Site Low Level Radioactive Waste Storage Facility

Attachments:
Attach all 50.59 Review forms completed, as appropriate.

Attached is the revised SER for the On Site Low Level Radioactive Waste Storage Facility SE-402533, revision 6

Forms Attached: (Check all that apply.)

- ☐ **Applicability Review**
- ☒ **50.59 Screening** **50.59 Screening No.** SE-402533-001 **Rev.** 6
- ☐ **50.59 Evaluation** **50.59 Evaluation No.** ________ **Rev.** 0

SUMMARY OF PAGES REVISED IN REVISION 6:

Page / Section	Change
II-4 / 1.d. II-5 / 1.d.	This section was changed to describe the current arrangement of the compactor area as follows: This area is located adjacent to the Truck Bay and the Dry Active Waste Storage Area. This area was originally designed to house a DAW compactor, with a HEPA exhaust system. The compactor was never installed, since it was not required. Because of this, the HEPA exhaust system (which was installed) and all other equipment associated with compacting DAW are not required. This area is now used for office space and storage of Radiac sealed sources used in radiation monitor calibrations. The use of this space in the manner described does not alter, or impact the building design or any function of required SSCs.
II-7 / 3.	Deleted reference to DAW compactor and HEPA ventilation system.
II-30 / 5.	Deleted details of the HEPA ventilation system, which was installed to support compactor operation.
III-1 / III.A	Deleted section which discussed compaction requirements and filtered ventilation.

50.59 SCREENING FORM

50.59 Screening No. SE-402533-001 **Rev. No.** 6

Activity/Document Number: Revision to SER for the On Site Low Level Radioactive Waste Storage Facility / SE-402533-001 **Revision Number:** 6

Title: SER for the On Site Low Level Radioactive Waste Storage Facility

I. 50.59 Screening Questions (Check correct response and provide separate written response providing the basis for the answer to each question)(See Section 5 of the Resource Manual (RM) for additional guidance):

1. Does the proposed Activity involve a change to an SSC that adversely affects an UFSAR described design function? (See Section 5.2.2.1 of the RM) ☐ YES ☒ NO

SE-402533-001 provides information concerning the onsite storage of low-level radioactive material / waste and contaminated equipment and discusses the operation of the LLRW Facility. The facility was originally designed with a dry active waste (DAW) compaction area, which would be used for repackaging of LLRW in the event that a waste container was damaged, or if repackaging of waste was required. To address this requirement, the area was designed to contain a DAW compactor with a ventilation system to inhibit the release of radioactive material during the compactor operation. This capability was found to be unnecessary and the compactor was never installed, however, the ventilation system to support the compactor was. Also, the filter room has been converted to an office space for use in storing radiac sealed sources.

The Oyster Creek UFSAR section pertaining LLRW Facility is described as follows:

11.4.3 Storage Facilities Storage space has been provided for up to 1360 cubic feet of solidified wastes. The storage area is identified on Drawing 3E-155-02-001.

Concentrated liquid waste is stored in the Concentrated Liquid Waste Tanks prior to processing and shipment. This waste is not stored in the storage area as a matter of normal operating procedure. By processing into a truck mounted liner, in plant, unshielded liner handling is not required. Resin is generally shipped on a yearly schedule. Tables 11.4-7 and 11.4-8 give the expected decay of the solidified waste during a three month storage period.

Additional storage space is provided in the low level Radwaste Storage Facility. The primary purpose of the facility is to house packaged low level radwaste generated at Oyster Creek in a retrievable mode during such time that access to low level radwaste burial sites is not available. A secondary function of the facility is to provide for the temporary storage of reusable radioactive contaminated equipment/materials. The facility can store approximately 81,600 cubic feet of waste in liners and 52,920 cubic feet of waste in boxes.

Additional storage space is provided elsewhere onsite for reusable radioactive contaminated equipment/material. The locations involved are:

The cleaned-out radwaste drum storage area in the Old Radwaste Building; The Scaffold Storage shed attached to the south wall of the New Radwaste Building; Rad material storage freight containers and trailers within the protected area.

This activity is for historical document update to reflect the actual installed configuration and does not involve a change to an SSC. Based on this, the revision of SE-402533 to reflect actual plant configuration does not constitute a change to an SSC that adversely affects a UFSAR described design function.

Implementing these activities does not compromise existing single failure, redundancy, separation requirements, or any building design requirements as they exist for the LLRW facility.

Implementing this temporary change does not cause a design basis limit fission product barrier (DBLFPB) to be exceeded or changed.

2. Does the proposed Activity involve a change to a procedure that adversely affects how UFSAR described SSC design functions are performed or controlled? (See Section 5.2.2.2 of the RM) ☐ YES ☒ NO

   SE-402533-001 provides information concerning the onsite storage of low-level radioactive material / waste and contaminated equipment and discusses the operation of the LLRW Facility. The facility was originally designed with a dry active waste (DAW) compaction area, which would be used for repackaging of LLRW in the event that a waste container was damaged, or if repackaging of waste was required. To address this requirement, the area was designed to contain a DAW compactor with a ventilation system to inhibit the release of radioactive material during the compactor operation. This capability was found to be unnecessary and the compactor was never installed, however, the ventilation system to support the compactor was. Also, the filter room has been converted to an office space for use in storing radiac sealed sources.

   This activity is for historical document update to reflect the actual installed configuration and does not involve a change to a procedure. Based on this, the revision of SE-402533 to reflect actual plant configuration does not involve a change to a procedure that adversely affects how UFSAR described SSC design functions are performed or controlled, since the activity does not change the design function.

3. Does the proposed Activity involve an adverse change to an element of a UFSAR described evaluation methodology, or use of an alternative evaluation methodology, that is used in establishing the design bases or used in the safety analyses? (See Section 5.2.2.3 of the RM) ☐ YES ☒ NO

   SE-402533-001 provides information concerning the onsite storage of low-level radioactive material / waste and contaminated equipment and discusses the operation of the LLRW Facility. The facility was originally designed with a dry active waste (DAW) compaction area, which would be used for repackaging of LLRW in the event that a waste container was damaged, or if repackaging of waste was required. To address this requirement, the area was designed to contain a DAW compactor with a ventilation system to inhibit the release of radioactive material during the compactor operation. This capability was found to be unnecessary and the compactor was never installed, however, the ventilation system to support the compactor was. Also, the filter room has been converted to an office space for use in storing radiac sealed sources.

   This activity is for historical document update to reflect the actual installed configuration and does not involve a change to an element of a UFSAR described evaluation methodology, or use of an alternative evaluation methodology, that is used in establishing the design bases or used in the safety analyses, since the activity does not change the design function, or any methods to produce the design.

4. Does the proposed Activity involve a test or experiment not described in the UFSAR, where an SSC is utilized or controlled in a manner that is outside the reference bounds of the design for that SSC or is inconsistent with analyses or descriptions in the UFSAR? (See Section 5.2.2.4 of the RM) ☐ YES ☒ NO

   SE-402533-001 provides information concerning the onsite storage of low-level radioactive material / waste and contaminated equipment and discusses the operation of the LLRW Facility. The facility was originally designed with a dry active waste (DAW) compaction area, which

50.59 Screening No. SE-402533-001 **Rev. No.** 6

Activity/Document Number: Revision to SER for the On Site Low Level Radioactive Waste Storage Facility / SE-402533-001 **Revision Number:** 6

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would be used for repackaging of LLRW in the event that a waste container was damaged, or if repackaging of waste was required. To address this requirement, the area was designed to contain a DAW compactor with a ventilation system to inhibit the release of radioactive material during the compactor operation. This capability was found to be unnecessary and the compactor was never installed, however, the ventilation system to support the compactor was. Also, the filter room has been converted to an office space for use in storing radiac sealed sources.

This activity is for historical document update to reflect the actual installed configuration and does not involve a test or experiment not described in the UFSAR (as defined in 10CFR50).

5. Does the proposed Activity require a change to the Technical Specifications or Facility Operating License? (See Section 5.2.2.5 of the RM) ☐ YES ☒ NO

SE-402533-001 provides information concerning the onsite storage of low-level radioactive material / waste and contaminated equipment and discusses the operation of the LLRW Facility. The facility was originally designed with a dry active waste (DAW) compaction area, which would be used for repackaging of LLRW in the event that a waste container was damaged, or if repackaging of waste was required. To address this requirement, the area was designed to contain a DAW compactor with a ventilation system to inhibit the release of radioactive material during the compactor operation. This capability was found to be unnecessary and the compactor was never installed, however, the ventilation system to support the compactor was. Also, the filter room has been converted to an office space for use in storing radiac sealed sources.

This activity is for historical document update to reflect the actual installed configuration. The LLRW storage facility is not described the Oyster Creek Technical Specifications. Therefore, no change is required.

50.59 SCREENING FORM

50.59 Screening No. SE-402533-001 **Rev. No.** 6

Activity/Document Number: Revision to SER for the On Site Low Level Radioactive Waste Storage Facility / SE-402533-001 **Revision Number:** 6

Title: SER for the On Site Low Level Radioactive Waste Storage Facility

II. List the documents (e.g., UFSAR, Technical Specifications, other licensing basis, technical, commitments, etc.) reviewed, including sections numbers where relevant information was found (if not identified in the response to each question).

OCNGS UFSAR - Section 11.4.3

III. Select the appropriate conditions:

☒ **If** all questions are answered NO, **then** a 50.59 Evaluation is not required.

☐ **If** question 1, 2, 3, or 4 is answered YES for any portion of an Activity and question 5 is answered NO, **then** a 50.59 Evaluation shall be performed for the affected portion of the Activity.

☐ **If** question 5 is answered YES for any portion of an Activity and questions 1 through 4 are answered NO for the remaining portions of the Activity, **then** a License Amendment is required prior to implementation of the portion of the Activity that requires the amendment; however, a 50.59 Evaluation is **not** required for the remaining portions of the Activity.

☐ **If** question 5 is answered YES for any portion of an Activity and question 1, 2, 3, or 4 is answered YES for any of the remaining portions of the Activity, **then** a License Amendment is required prior to implementation of the portion of the Activity that requires the amendment **and** a 50.59 Evaluation is required for the remaining affected portions of the Activity.

IV. Screening Signoffs:

50.59 Screener: Chris Lefler X4411 (Print name) Sign: Chris Lefler (Signature) Date: 06/05/2013

50.59 Reviewer: Dave Jones (Print name) Sign: Dave Jones (Signature) Date: 06/05/2013

GPU NUCLEAR	Engineering Safety/Environmental Determination and 50.59 Review (Ref. EP-016)	Page 1 of 3 SE No. 402533-001 SE Rev. No. 5

Unit OC Document No. *(If applicable)* *SE-402533-001* Doc. Rev. No 5

Document/Activity Title: *SER in Support of an On Site Low Level Radioactive Waste Storage Facility*

Type of Activity *(modification, procedure, test, experiment, or document: Document*

1. Does this activity/document involve any potential non-nuclear environmental concern? ☐ Yes ☒ No

   To answer this question, review the Environmental Determination (ED) form. Any YES answer on the ED form requires an Environmental Impact Assessment by Environmental Controls, per 1000-ADM-4500.03. If in doubt, consult Environmental Affairs Department for assistance. If all answers are NO, further environmental review is not required. In any event, continue with Question 2, below.

2. Is this activity/document within the nuclear safety scope of Section 2.0 of this procedure? ☒ Yes ☐ No

   If the answer to question 2 is NO, stop here. This procedure is not applicable and no documentation is required. (If this activity/document is listed in Section IV of 1000-ADM-1291, review on a case-by-case basis to determine applicability). If the answer is YES, proceed to question 3.

3. Is this a new activity/document or a substantive revision to an activity/document? (See Exhibit 3, paragraph 3, this procedure for examples of non-substantive changes.) ☒ Yes ☐ No

   If the answer to question 3 is NO, stop here and complete the approval section below. This procedure is not applicable and no documentation is required. If the answer is YES, proceed to answer all remaining questions. These answers become the Safety/Environmental Determination and 50.59 Review.

4. Does this activity/document have the potential to adversely affect nuclear safety or safe plant operation? ☐ Yes ☒ No

5. Does this activity/document require revision of the system/component description in the FSAR or otherwise require revision of the Technical Specifications or any other part of the SAR? The SAR is defined in Exhibit 3. ☐ Yes ☒ No

6. Does this activity/document require revision of any procedural or operating description in the FSAR or otherwise require revision of the Technical Specifications or any other part of the SAR? ☐ Yes ☒ No

7. Are tests or experiments conducted which are not described in the FSAR, the Technical Specifications or any part of the SAR? ☐ Yes ☒ No

   NOTE: IF ANY OF THE ANSWERS TO QUESTIONS, 4, 5, 6 OR 7 ARE YES, PREPARE A WRITTEN SAFETY EVALUATION FORM.

   If the answers to 4, 5, 6, and 7 are NO, this precludes the occurrence of an Unreviewed Safety Question or Technical Specifications change. Provide a written statement in the space provided below (use back of sheet if necessary) to support the determination, and list the documents you checked.

   No, because This is an administrative change that does not affect the type or amount of radioactive material

   Documents checked: stored in the facility; therefore the original safety analysis remains valid.

8. Are the design criteria as outlined in the TMI-1 SDD-T1-000 Div. I or OC-SDD-000 Div. I Plant Level Criteria affected by, or do they affect the activity/document? ☐ Yes ☒ No

   If YES, indicate how resolved:

APPROVALS *(print name and sign)*

Engineer/Originator	G. SEALS [signature]	Date 9/14/00
Section Manager	[signature] W J Cooper	Date 9/15/00
Responsible Technical Reviewer		Date
Other Reviewer(s)		Date

N5047 (8/97)

GPU NUCLEAR	Engineering Safety Evaluation (Ref. EP-016)	Page 2 of 3 SE No. SE- 402533-001 SE Rev. No. 5

Unit *OC* **Document No. (if applicable)** *SE 402533-001* **Doc. Rev. No.** 5

Document/Activity Title: *SER in Support of an On Site Low Level Radioactive Waste Storage Facility*

Type of Activity *Document*

(Modification, procedure, test, experiment, or document)

This Safety Evaluation provides the basis for determining whether this activity/document involves an Unreviewed Safety Question or impacts on nuclear safety.

Answer the following questions and provide reason(s) for each answer per Exhibit 7. A simple statement of conclusion in itself is not sufficient. The scope and depth of each reason should be commensurate with the safety significance and complexity of the proposed change.

1. Will implementation of the activity/document adversely affect nuclear safety or safe plant operations? ☐ Yes ☒ No

   The following questions comprise the 50.59 considerations and evaluation to determine if an Unreviewed Safety Question exists:

2. Is the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the Safety Analysis Report increased? ☐ Yes ☒ No

3. Is the possibility for an accident or malfunction of a different type than any evaluated previously in the Safety Analysis Report created? ☐ Yes ☒ No

4. Is the margin of safety as defined in the basis for any Technical Specification reduced? ☐ Yes ☒ No

   If any answer above is "yes" an impact on nuclear safety or an Unreviewed Safety Question exists. If an adverse impact on nuclear safety exists revise or redesign. If an unreviewed safety question with no adverse impact on nuclear safety exists forward to Licensing with any additional documentation to support a request for NRC approval prior to implementing approval.

5. Specify whether or not any of the following are required, and if "yes" indicate how it was resolved.

	Yes	EDTTS/PFU/OTHER	No
a. Does the activity/document require an update to the FSAR?	☐		☒
b. Does the activity/document require a Technical Specification Amendment?	☐		☒

a. Explain: The FSAR does not include discussion of the LLRWSF accident analysis.

b. Explain: The LLRWSF is not addressed in the Technical Specifications.

		Yes	EDTTS/PFU/OTHER	No
c.	Does the activity/document require a revision to the Quality Classification List (QCL)?	☐		☒

Explain: The activity relates to accident analyses in support of facility operation. No hardware is added or subtracted. The change allows work on contaminated equipment already in storage in the facility.

		Yes		No
d.	Other: (If none, use N/A):	☐		☐

Explain: N/A

This form with the reasons for the answers, together with all applicable continuation sheets constitutes a written Safety Evaluation.

List of Effective Pages

Page No.	Rev. No.	Page No.	Rev. No.	Page No.	Rev. No.
All	5				

APPROVALS *(print name and sign)*

Engineer/Originator	G. Seals [signature]	Date 9/14/00
Section Manager	[signature] W J Cooper	Date 10/5/00
Responsible Technical Reviewer	Samuel R. Greco / [signature]	Date 9/19/00
Independent Safety Reviewer	Robin Brown / [signature]	Date 9/19/00
Other Reviewer(s)		Date

GPU NUCLEAR		DOCUMENT NO. SE No. 402.533.001	
TITLE	SAFETY EVALUATION REPORT IN SUPPORT OF AN ONSITE LOW-LEVEL RADIOACTIVE STORAGE FACILITY AT OYSTER CREEK NUCLEAR GENERATING STATION		
REV	**SUMMARY OF CHANGE**	**APPROVAL**	**DATE**
5	All changes are noted by revision bars. The Safety Evaluation has been changed to allow equipment with smearable contamination to be removed from storage and assembled while in the Low Level Radioactive Waste Storage Facility. This applies to equipment that will be subsequently removed from the Low Level Radioactive Waste Storage Facility.	Originator: [signature] G. Seals RTR: SAMUEL R. CORSO [signature] ISR:	9/14/00 9/19/00

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09/18/00 09:53:23

GPU NUCLEAR

DOCUMENT NO.
SE No. 402.533.001

TITLE SAFETY EVALUATION REPORT IN SUPPORT OF AN ONSITE LOW-LEVEL RADIOACTIVE STORAGE FACILITY AT OYSTER CREEK NUCLEAR GENERATING STATION

REV	SUMMARY OF CHANGE	APPROVAL	DATE
4	All changes are noted by revision bars. The method used to calculate the offsite radiological doses was changed. Doses were determined using the SEEDS Computer Code. Resulting doses as recalculated by SEEDS have been included as charts in the body of the Safety Evaluation. (Section V.B) Adds reference I.D.2 and deletes previous analysis from references. Revised throughout to reflect the following changes in stored waste forms: From solidified to dewatered filter sludge and from concentrated liquid evaporator bottoms to dehydrated (evaporated) evaporator bottoms. (CAP 02000-0042) Revised Section II.A.2 discussion of source term development and to use actual Oyster Creek isotopic mixes from 10CFR61 analyses. Changed crane operating temperature range in Section II.G.3 based on information from the vendor. (Attachment 1) Deleted references to the "Energy Spectrum Center" (Section III.C). Deleted "10 mr/hr Exclusion Zone" (Section III.B) and "temporary restriction zone" (Figure 1), which are not in accordance with site procedures. Corrected to indicate that areas adjacent to LLRWSF are not "unrestricted" to achieve compliance with 10CFR20. (Section III.B) Changed contamination unrestricted release criteria to comply with site Rad Con procedures. (Section V.A) Minor changes throughout to reflect storage strategies due to current LLRW siting efforts. Acknowledges NRC's rescinding of the storage time restriction in Generic Letter 81-38. Sections I.C.1, V.F.	G. SEALS S. R. GRECO / [signature] (RTR) CARL Hager / Carl Hager (ISR)	4/11/00 ~~3/30/00~~ ~~3/31/00~~ 4/11/00 to acknowledge ISR comments 4/11/00

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GPU Nuclear

DOCUMENT NO. SE No: 402533-001

TITLE SER in Support of an Onsite Low-Level Radioactive Waste Storage Facility at Oyster Creek Nuclear Generating Station

REV	SUMMARY OF CHANGE		APPROVAL	DATE
	PAGE/SECTION	CHANGE		
3		All changes are noted by revision bars.	Michael J. Fenske (G/C)	02/25/92
	Table of Contents	Added reference section. Revised and expanded accident analyses categories.	JH Baudin G/C	
			Michael Ross	3/10/92
	I-6, 7	Added references.	Steve Dilz	3/14/92
			J Nagai	11/24/92
	II-2, 19, 25, VII-4	Eliminates the requirement of storing waste in steel over-packs.		
	II-6, 14	Updates revision of reference SDD 3119A.		
	II-31	Provides a reference for analyses to perform activity release calculations.		
	V-1	Revises and expands accident analyses categories.		
	V-3, 4, 5	Revises and expands accident fire analyses.		
	V-7, 9, 11	Revises section identifier characters to allow for an increase in accident analyses categories.		
		Note: Some of the material in Section V has been reorganized for clarity.		
	II-1	Revise for clarity.		

mb 82900

Nuclear

DOCUMENT NO. SE-402533-001

TITLE SER FOR ON SITE Low-Level Radioactive Waste Storage Facility

REV	SUMMARY OF CHANGE	APPROVAL	DATE
2	All changes are as noted by revision bars. This revision allows the storing of reusable material/equipment in the facility and increases the contact dose of DAW packages stored in the DAW Area from 25 mr/hr to 80 mr/hr. DAW packages greater than 80 mr/hr may also be stored in the DAW Area but must be shielded.	G/C SIGNATURES PER PAGE 3 OF THE SAFETY EVALUATION [signature]	9/13/90
		[signature] Y. NAGAI (ISR)	12/6/91

Nuclear

DOCUMENT NO.
SE No. 402-533-001

TITLE SAFETY EVALUATION REPORT IN SUPPORT OF AN ONSITE LOW-LEVEL RADIOACTIVE STORAGE FACILITY AT OYSTER CREEK NUCLEAR GENERATING STATION

REV	SUMMARY OF CHANGE	APPROVAL	DATE
1	Updated SER per as-built documents	ABS for GWL per telecon on 1/10/89	1/10/89

SAFETY EVALUATION REPORT

IN SUPPORT OF AN

ONSITE LOW-LEVEL RADIOACTIVE WASTE STORAGE FACILITY

AT OYSTER CREEK NUCLEAR GENERATING STATION

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I. Introduction

A. Purpose

The purpose of this report is to support the onsite storage of low-level radioactive material/waste and contaminated equipment at the Oyster Creek Nuclear Generating Station and demonstrate the fact that the operation of an onsite low level radwaste storage facility does not involve an unreviewed safety question or a change to the Oyster Creek facility operating license as defined in 10CFR50.59. This report shall supply the necessary information to make this determination and shall subsequently provide for the ultimate concurrence of the staff of the U.S. Nuclear Regulatory Commission.

B. Background and Need

The Oyster Creek Nuclear Generating Station is located on an 800 acre site in Lacey Township, Ocean County, New Jersey along U.S. Highway Route 9 about 60 miles south of the city of Newark, New Jersey. Oyster Creek Nuclear Generating Station is a boiling water reactor operating at a licensed maximum thermal power level of 1,930 megawatts and a design electrical power rating of 650 megawatts – net. Commercial operation of Oyster Creek commenced on December 1, 1969.

At Oyster Creek, as at all other commercially operating nuclear power plants, low level radioactive materials/waste is produced in various forms and predictable amounts depending on plant systems and operation. A normal rate of waste generation is considered to be that produced during steady state operation while maximum generation rates occur during reactor startup, reactor shutdown, maintenance outages and incidents of abnormal equipment leakage.

The bulk of the low level radioactive material/waste generated at Oyster Creek takes the form of spent demineralizer resin, filter sludge, evaporator bottoms and dry active waste (DAW). The standard method for disposing of this low level radwaste has been to ship the radwaste offsite for ultimate disposal to a licensed burial facility. Upon occasion however, limitations have been imposed as to the allotted amounts of low level radwaste that can be shipped from an operating reactor site to the burial sites. While these restrictions remain in effect, the availability of space for low level radwaste becomes less secure and the need for a strategic, time-phased approach to waste management becomes evident. Existing operating facilities must employ their disposal allocations judiciously and must seriously consider the alternatives to immediate ultimate disposal of radwaste. The alternatives include:

1. Participation in a multi-state burial site.

   This is an acceptable long-term course of action but given the political nature of this action and the lack of success of any new low level disposal site, this is a rather uncertain and speculative alternative.

2. Reduce the volume of the present radwaste generated.

   Volume reduction should accompany all future low level radwaste management strategies but it must be in a manner that is economically feasible.

3. Continue to ship radwaste as long as possible.

   Radwaste shipment in accordance with any prescribed allotments should also accompany all low level radwaste management strategies. However, this approach alone will not alleviate the problem if restricted shipping allotments are applied to diminishing offsite space for ultimate waste disposal.

4. Store low level radwaste onsite in a suitable facility in a form which can be readily transferred to an ultimate disposal facility.

   Waste management capability under this strategy would be limited only by the size of the onsite facility. Offsite shipments would continue as prescribed.

Alternatives 1, 2 and 3 are legitimate approaches but rely entirely upon the development of additional offsite waste disposal facilities to alleviate any waste management difficulties. Future inability to ship radwaste offsite and the possible associated consequence of power generation restrictions will always remain a possibility.

Alternative 4 remains as the most desirable alternative. Onsite storage of low level radwaste will afford the opportunity to possess a dependable, convenient low level radwaste storage area which is not immediately affected by changes in policy or regulations with regard to the amounts of low level radwaste that the commercial radwaste disposal facilities will accept. The employment of an onsite storage facility will provide an immediate positive effect on any waste disposal problems of the nuclear power facility and the commercial disposal sites.

With this in mind, GPU Nuclear Corporation constructed a low level radwaste storage facility at the Oyster Creek site. The primary purpose of the facility is to house packaged low level radwaste generated at Oyster Creek in a retrievable mode for long-term storage. The primary operational functions of this facility are 1) to receive the low level radioactive material/waste generated at Oyster Creek, 2) to transfer waste packages within the storage building to an appropriate storage area and 3) to ship the waste to an offsite disposal facility. A secondary function of the facility is to provide for the temporary storage and assembly of reusable radioactive contaminated equipment/materials. In the future, the facility will provide a compaction system for the repackaging of compactible dry active waste (DAW), if needed. The operation of this facility will give Oyster Creek more control of its low level radwaste management program. The facility will also provide Oyster Creek with the ability to deal adequately with further restrictions in offsite shipping allotments.

In addition to the aforementioned advantages of onsite low level radwaste storage, an inherent protection to public health and safety is produced. With low level radwaste being stored onsite for a longer period of time, the amount of radioactivity to be contended with for transportation and dose considerations will be reduced due to radioactive decay. A reduced radiological impact will result on waste transportation activities and on occupational exposures at the ultimate disposal facilities as well.

C. Scope

This report deals specifically with the design and operational characteristics of the low level radwaste storage facility built at the Oyster Creek site. A description of the facility design including attendant systems and components is given, as well as a radiological and environmental assessment of the facility, a safety/accident analysis, a description of facility operation and operational surveillance and a discussion of the quality assurance program and associated requirements. Decommissioning considerations are also discussed.

The regulatory bases for the design and operation of the Oyster Creek low level radwaste storage facility are contained in the following documents:

1. NRC Generic Letter 81-38, "Storage of Low Level Radioactive Wastes at Power Reactor Sites" (11/81)

   This generic letter provides guidance to operating plants similar to that provided for operating license applicants in NUREG-0800 – Standard Review Plan, Section 11.4 – Solid Waste Management Systems, Appendix 11-4A, "Design Guidance for Temporary Storage of Low Level Radioactive Waste". With the knowledge that the NRC would use this document for its compliance review, NRC Generic Letter 81-38 was used as the basis for the design, construction and operation of the Oyster Creek facility. The time restrictions in this letter have since been rescinded by the NRC. As such, these restrictions are no longer considered incumbent on Oyster Creek.

2. 10CFR50 – Domestic Licensing of Production and Utilization Facilities, General Design Criteria 60, 63, and 64.

   Appropriate radioactive monitoring and safety analysis considerations shall be incorporated into this facility to meet the concerns of these design criteria.

3. 10CFR50.59 – Changes, Tests and Experiments.

   This Safety Evaluation Report shall provide sufficient information to indicate that the construction and operation of this facility does not involve an unreviewed safety question or a change to the Oyster Creek facility operating license as defined in this regulation. NRC/OIE Circular No. 80-18, "10CFR50.59 Safety Evaluations for Changes to Radioactive Waste Treatment Systems", will be used as a guide.

4. 10CFR20 – Standards for Protection Against Radiation.

Dose limitations to individuals in plant restricted areas and in unrestricted areas outside the plant will be considered in safety analyses and shielding design. The ALARA principles will be employed as delineated in USNRC Regulatory Guide 8.8, "Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Plant Stations Will Be ALARA".

5. 10CFR71 – Packaging of Radioactive Material for Transport and Transportation of Radioactive Material Under Certain Conditions.

This regulation is used as a guide for packaging requirements since NRC Generic Letter 81-38 suggests that the wastes be stored in a shippable form. Transportation and shipping requirements are not applicable to shipment between Oyster Creek and the storage facility since the storage facility is located onsite.

6. 10CFR100 – Reactor Site Criteria.

Analysis will verify that the radiological consequences of design basis events will be less than ten percent of the whole body dose limitation of this regulation, as suggested in NRC Generic Letter 81-38.

7. 40CFR190 – Environmental Radiation Protection Standards for Nuclear Power Operations.

This regulation provides environmental dose limitations with regard to direct radiation and effluent releases from all sources of the uranium fuel cycle and limitations for radiation doses to the general public.

8. NRC Regulatory Guide 1.86 – Termination of Operating Licenses for Nuclear Reactors.

This regulatory guide will be used as a reference in the discussion of decommissioning activities related to the onsite storage facility.

9. NRC Regulatory Guide 1.143 – Design Guidance for Radioactive Waste Systems, Structures and Components Installed in Light Water Cooled Nuclear Power Plants.

Section C.6 of this guide, Quality Assurance Requirements for Radwaste Management Systems, will be used as a guideline for the quality assurance program associated with the design and construction of the storage facility. The remainder of this regulatory guide is not used as a design basis for the facility.

That function has been provided by the issuance of NRC Generic Letter 81-38.

10. Occupational Safety and Health Administration Regulations.

29CFR1910.22	General Requirements
29CFR1910.23	Guarding Floor and Wall Openings and Holes
29CFR1910.24	Fixed Industrial Stairs
29CFR1910.27	Fixed Ladders
29CFR1910.30	Other Working Surfaces

These regulations will be used as guidance in designing safeguards into working areas and other personnel occupied areas of the facility.

11. New Jersey Uniform Construction Code and Amendments – 1981

Code of the Township of Lacey, Chapter 90

Standards for Soil Erosion and Sediment Control in New Jersey

The applicable construction requirements for the facility are referred to in these regulations. These requirements are met by use of the Uniform Building Code (1982).

D. References

These references are used in the accident analysis Section V, Safety Analysis.

1. WASH-1238, December 1972, "Environmental Survey of Transportation of Radioactive Materials to and from Nuclear Power Plants", USAEC.

2. Radiological Engineering Calculation No. 2820-00-001, "Dose due to Resin/Filter Sludge and Dry Activated Waste (DAW) Fires at the Low Level Rad Waste Storage Facility (LLRWSF)".

II. Facility Design Description

A. General

1. Site/Layout

The Oyster Creek Low Level Radwaste Storage Facility (herein referred to as "the facility" or "the storage facility") is located just north of the existing Oyster Creek Radwaste Building. The site area is within the owner controlled area (see Figure 1). The facility will be lighted to allow for appropriate security surveillance.

The facility is comprised of six functional areas including a cell storage area (for storage of dewatered resins and filter sludge, solidified material, and higher activity DAW and components/materials) and cell deck for DAW and contaminated reusable material/equipment, a warehouse storage area (for storage of DAW and contaminated reusable material/equipment), a service head (for material transfer, treatment and control operations), a DAW compaction area, and a truck bay.

a. Cell Storage Area (see Figures 2, 3 and 4)

Higher activity waste is stored in the Cell Storage Area which is comprised of an arrangement of shielded, covered cells. Each of the two Cell Storage Area modules contains 15 concrete storage cells for the storage of solidified wastes and other appropriately packaged material. Nine (9) cells have an approximate inside dimension of 14'-10" x 15'-6" and are approximately 36 feet in depth. The six (6) perimeter cells are somewhat larger to allow equal storage capacity due to crane hook coverage limits and can be used to store large irradiated components. Each cell will accommodate either 36-80 ft^3 liners, or 16-170 ft^3 liners, or 16-200 ft^3 liners, or 12-322 ft^3 liners, or 42B25 boxes, or 360 – 55-gallon drums, irregular shaped components/material, or a combination thereof.

The outer concrete walls of the perimeter cells as well as the wall adjacent to the DAW Storage Area are three feet thick. Each cell is covered with two overlapping removable concrete cell covers that are approximately two feet in thickness. The cell covers have lifting lugs allowing remote control grappling and handling by the facility overhead bridge crane. Large items, such as heat exchangers, large valves and large pipe may be stored either in the cells or on top of the cells, if adequate cribbing and shielding are provided.

In addition to the large components, the storage of DAW and contaminated reusable material/equipment is permitted both within and on top of the cells. Radioactive waste stored above the cells must be shielded to maintain the external contact dose rate at less than or equal to 80 millirem per hour.

The cells will accommodate various numbers of waste storage liners depending on the size of the liner. As referred to throughout the text, liners are to be considered high integrity containers (HICs) and/or steel overpacks, unless otherwise identified. Steel overpacks for HICs are not required to be utilized in this facility, but their use is not prohibited. The liners will be supported in the cell with intermediate stacking platforms. The stacking platform provides for stability of the liner stack and is designed to support four filled liners in additions to the imposed loads of subsequently placed additional platforms and liners.

A drain trench is located in each cell. Liquid which may be introduced into the cell as the result of container leakage, condensations, fire water or decontamination operations will be channeled into the drain trench and transferred to the Cell Storage Area sump for sampling. The sump contents are transferred to a portable tank or a demineralizer system via a manually valved connection or batch transported to the Oyster Creek Radwaste Building for treatment. The drain trench itself is capable of being sampled, if required, from a small depressed area at the downstream point of each cell floor.

b. Dry Active Waste (DAW) Storage Area (See Figures 2 and 4).

Dry active waste is collected throughout the plant and transported to the storage facility for storage. DAW is volume reduced, if possible, by a compaction process before going to the storage facility. The DAW Storage Area is located adjacent to the Cell Storage Area and the future DAW Compaction Area and encompasses

approximately 4,320 square feet in an open "warehouse" configuration. Storage bays within the DAW Storage Area are divided by trench drains connected to a small sump which leads to the facility sump. Liquids in the small sump may be removed by a portable pump or drained to the main facility sump. The entire area is depressed 6" from adjacent floors to provide for containment of water resulting from sprinkler system (fire protection system) activation (28,000 gallons).

The thickness of the concrete wall adjacent to the cells is three feet and that of the remaining three walls is one foot.

Boxes containing either compacted or non-compactible DAW are stacked and stored in this area. Space for storage of approximately 540 boxes is provided. The warehouse loading configuration will be administratively controlled depending on container radiation levels in order to minimize the shielding requirements, but at no time will individual containers exceed 80 mrem/hr contact unless they are shielded.

The boxes are accessible for storage in this area by a forklift truck maintained within the Truck Bay. Standoff pads are provided for each container to allow forklift truck pickup and to facilitate inspection. Sufficient aisle space will be provided to allow for forklift truck maneuverability in this area.

In addition to the DAW, the storage of contaminated material/equipment is also permitted (not to exceed 80 mrem/hr contact dose rate unless they are shielded).

c. Service Head (See Figures 2 and 4).

The Service Head adjoins both the Cell Storage Area and the Truck Bay and includes those areas required for the control and accountability of the low level radioactive waste to be stored in the facility and for facility personnel access control. Included in the service head are the following areas:

1) Control Room/Records Center

Within the facility control room are maintained the controls for the bridge crane which is used for the transfer and placement of waste containers, the closed circuit television system which is used in conjunction with the bridge crane for remote waste handling capabilities, the radiation monitoring indicators for those detectors located throughout the facility,

the fire annunciator panel and other instrumentation pertinent to remote operation and monitoring of facility components.

Also located adjacent to the control room is an area capable of the storage of radioactive waste storage and shipping records. These records are stored in fire- resistant file units. This area may also accommodate a data base computer system for recording waste receipt and shipment information, such as decay calculations, for shipping purposes.

2) Access Control Area

Access to the waste storage areas is controlled by health physics personnel within the access control area. The health physics personnel frisking/ counting room is located here as well as change areas for both men and women.

A fire service room and a miscellaneous area for protective clothing, monitoring and test instruments, and other health physics and general maintenance supplies are also located here.

3) Mechanical/Electrical Equipment Room

The service head module also maintains a mechanical/electrical equipment room on the floor above the control room.

d. Dry Active Waste Compaction Area (see Figure 2)

This area is located adjacent to the Truck Bay and the Dry Active Waste Storage Area. **This area was originally designed to house a DAW compactor, with a HEPA exhaust system. The compactor was never installed, since it was not required. Because of this, the HEPA exhaust system (which was installed) and all other equipment associated with compacting DAW are not required.** 6

This area is now used for office space and storage of Radiac sealed sources used in radiation monitor calibrations. The use of this space in the manner described does not alter, or impact the building design or any function of required SSCs.

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e. Truck Bay (see Figures 2 and 3)

The Truck Bay is located adjacent to the Cell Storage Area and DAW Compaction Area and is provided for the receipt, shipment, or assembly of the low level radioactive material/equipment/waste to be stored in the facility. The Truck Bay is capable of accepting items up to 16 feet in height. The Truck Bay has a liquid catch basin which leads to the facility sump so that precipitation runoff from the transport vehicle will be contained for analysis prior to transfer to the new Radwaste Building. Normally, liquids will be pumped from the Truck Bay catch basin to a portable tank or a demineralizer system via a manually valved connection. Should decontamination of the transport vehicle be necessitated, it may be performed in the Truck Bay.

Approval from Radwaste Operations is required. Necessary precautions/restriction maybe required by Radiological Controls to ensure protection of the environment and personnel. However, as a rule, decontamination in the facility is to be avoided.

Located on the operating floor above the Truck Bay are a cask cover laydown area for temporary storage of transfer cask covers while waste is being moved into or out of the facility storage area, a forklift truck station for storage and maintenance of the forklift trucks used to transfer and stack DAW storage containers within the facility, and a decontamination area for the facility waste storage containers.

Also located on the Truck Bay operating floor level is an access to the sump and sump pump cubicle. This access allows for removal of the facility sump pump by the overhead bridge crane should maintenance be required.

2. Amounts/Types of Low Level Radioactive Waste to be Stored and Design Source Terms

The facility is sized and designed so that it may be expanded to store all of the DAW and solidified or dewatered low level radioactive wastes that were generated in a 5-year period (based on historical waste generation rates) by Oyster Creek. These wastes may be stored in the facility until they can be shipped to a permanent disposal site. In addition, these waste quantities comply with the requirement in NRC Generic Letter 81-38 of considering volume minimization/reduction techniques as a volume reduction study was conducted for Oyster Creek. (Reference, Gilbert Associates, Inc. (GAI) Report No. GAI-2283, "Technical and Economic Evaluation For A Low Level Radioactive Waste Management Program For TMI-1 And Oyster Creek).

Oyster Creek waste generation rates indicate that the number of containers required to store the amount of waste generated in the historic 5-year period would be as indicated in Table II.A.1, which gives the isotopic composition and total activity of the various waste types. These waste types may include dewatered and solidified filter sludge, solidified evaporator bottoms and evaporator bottoms that have been reduced in volume by evaporation of residual water, dewatered and solidified spent demineralizer resins, compactible DAW (air filters, cleaning rags, protective tape, paper and plastic coverings, discarded contaminated clothing, laboratory wastes, etc.) and non-compactible DAW (tools, equipment, metal parts, contaminated components, etc.).

The source terms of Table II.A.1 were developed by determining the volume of low level radioactive wastes that were generated in a historical five year period and using the typical waste stream isotopic mixes as listed on the Oyster Creek 1998 10CFR61 analysis. A previously developed source term, as found in the GPU System Design Description No. SDD-OC-3119-A Div.1, was used for the facility shielding design.

Radioactive contaminated components and reusable materials/equipment will also be stored in the facility.

3. Design Features of the Oyster Creek Low Level Radwaste Storage Facility

This facility was designed to contain any contaminated leakage which may occur within its boundaries and to facilitate the identification and treatment of any such leakage. The cell storage concept provides for the localization of any spills and leaks in that area.

Should leakage or spillage occur within a cell, individual cell sampling will indicate which cell will require unloading in order to detect the faulty storage container. Curbing around the container survey/swipe decontamination area will contain any liquids resulting from decontamination operations or fire protection system actuation. 6

The configuration of concrete cells covered with shield blocks offers operations flexibility in that it allows for radiological protection to personnel while concurrently providing ready access to the cell Storage Area Operating Floor and the overhead bridge crane for maintenance purposes. In addition, the facility is inherently non-combustible simply from the nature of its structural material.

B. Structures

Cell Storage Area and Truck Bay

The structures below the operating floor consist of reinforced concrete perimeter walls and mat foundations designed to provide shielding as well as to transmit the design loads to the foundation. A common interior reinforced concrete wall separates the Truck Bay and Cell Storage Area proper.

The Cell Storage Area interior below the operating floor consists of an integral gridwork of reinforced concrete columns and beams to form "cells". Removable reinforced concrete cover slabs are provided over each cell for shielding.

The superstructure main framing system above the operating floor consists of structural steel columns and roof misses. The truss-column bents provided rigid framing to resist lateral loads normal to the direction of the crane runway beams. Lateral loads on the endwalls are resisted by cross-bracing in the roof and in the sidewalls parallel to the crane runway beams.

Walls above the operating floor consist of precast panels which provide weather-proofing as well as the required shielding. The precast concrete endwall panels above the operating deck are removable for future expansion. Rigid framing permits the single overhead crane to service the expansion modules.

The overhead bridge crane is supported by shorter steel columns adjacent and tied to the main superstructure support columns.

The roof consists of standard metal deck with three inches of concrete for shielding.

- Dry Active Waste Storage and Compaction Areas

  The Dry Active Waste Storage and Compaction Areas are of standard single story industrial type steel frame construction. Spread footing foundations are provided. The roof steel is connected along one side to the reinforced concrete exterior wall of the Cell Storage Area which is three feet in thickness. Precast concrete wall panels provide weather protection and shielding. The roof consists of standard metal deck with 2 inches of concrete for shielding. The floor consists of concrete slabs on grade.

- Service Head

  The Service Head is a standard two-story steel frame structure with precast exterior wall panels. This building is physically separated from the Cell Storage Area to preclude differential settlement interaction with the more heavily loaded Cell Storage Area.

1. Design Basis Events – Related to Structure

The structural design bases of the facility include loadings attributable to the following Design Basis Events:

a. Earthquake

Seismic loads are determined and applied in accordance with the provisions of the Uniform Building Code – 1982, Section 2312 based on a Horizontal Force Factor, K of 1.33 and an Occupational Importance Factor, 1 of 1.0. Seismic Zone 1 is assumed. The resulting seismic loads envelope the seismic loads determined in accordance with Section 916.0 of the BOCA Code —1981 which would be applicable to the Oyster Creek location.

b. Flood

The maximum probable flood elevation defined in the Oyster Creek Facility Description and Safety Analyses Report is +23 feet msl (mean sea level). Finished grade surrounding the facility is set at approximately +25 feet msl.

Therefore, the facility is protected against flood waters by the final grade being set higher than the maximum probable flood level.

c. Wind

The storage facility structures are designed to withstand wind loads in accordance with the Uniform Building Code – 1982, Section 2311. Design wind pressures are based on a Basic Wind Speed of 110 miles per hour, Exposure "C", and an Occupancy Importance Factor of 1.0.

d. Snow

The storage facility structures are designed to support a uniform snow load of 30 lbs/ft^2. The structures are also checked in accordance with the BOCA Basic Building Code – 1981 for snow loads corresponding to 25 lbs/ft^2 on the ground based on a 100-year mean recurrence interval to account for potentially greater snow loads on lower adjacent roof levels.

e. Fire

The fire protection systems of the storage facility have been designed in accordance with the National Fire Protection Association Fire Codes, and with reference to the Uniform Building Code, Fire separations have been designed to limit the spread of fire between areas.

2. Loads/Load Combinations – Structural

The structural loads and load combinations applicable to the design of the facility are in accordance with the following codes and specifications:

a. American Concrete Institute (ACI) Standard ACI 318-77, "Building Code Requirements for Reinforced Concrete" was used in the design of the concrete structures.

b. American Institute of Steel Construction (AISC) "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings", November 1978 was used for structural steel. The one-third allowable stress increase is included for load combinations involving earthquake or wind loads.

3. Structural Concrete

The concrete used for the facility structures will have a minimum cylinder compressive strength of 3,000 lbs/in^2 when tested at 28 days. For the column and beam cell cover support structures, concrete with 4,000 lbs/in^2 compressive strength when tested at 28 days is used. Lean concrete fill for shielding on the roof deck as well as mud mats will have a minimum compressive strength of 2,000 lbs/in^2 at 28 days. Specifications for concrete supply and placement are based on ACI 301-72, "Specifications for Structural Concrete for Buildings", Revised 1981.

4. Steel

The reinforcing steel used in the facility conforms to the American Society of Testing and Materials (ASTM) Specification ASTM A 615-1981 with a minimum yield strength of 60,000 lbs/in^2. Structural steel conforms to Specification ASTM A 36 with a minimum yield strength of 36,000 lb/in^2.

C. Foundation

1. Foundation Types and Settlement

Mat and footing foundations will be used to support different areas of the storage facility building.

The Cell Storage Area will be supported on a mat foundation. The outer walls of the Truck Bay will be supported on footings, but these walls will be structurally continuous with the Cell Storage Area outer walls, forming on continuous shield wall. The floor mat of the Truck Bay will be tied structurally to the outer walls. For this reason and due to the presence of an interior wall between the Cell Storage Area and the Truck Bay, the combined area will act as a rigid unit.

Consequently, variation of the foundation pressure that will cause settlement of the soils beneath these two areas is assumed to be linear for settlement computations. Specifically, the pressure is assumed to vary from 4.3 ksf at the north edge of the Cell Storage Area to 3.5 ksf at the south edge of the Truck Bay Area.

The DAW Storage and Compaction Areas and the Service Head will be supported on footings. The footings will be taken 4 feet below the finish grade to Elevation 20.0$^{\pm}$ feet msl. The maximum foundation pressure below these footings will not exceed 4.0 ksf, approximately one-third of which will be constituted of snow load. The floor levels in these areas will be 1-1/2 to 6 feet above the finish grade. The maximum floor load, expected to occur in the DAW Storage Area, is estimated to be approximately 600 psf. Furthermore, as dense sand and compacted granular fill will exist between the bottom of the floors and Elevation 5$^{\pm}$ feet, the stresses in subsoils beneath these areas causing significant settlement (i.e. soils below Elevation 5$^{\pm}$ feet) will be distributed uniformly for the most part. Consequently, these areas will settle uniformly, and the differential settlement between footings or between footings and floor slabs in these areas will be negligible or very small.

Settlement of various areas thus estimated are summarized in Table II.C.1.

TABLE II.C.1
ESTIMATED SETTLEMENT
AT CENTERS OF AREAS

	AREA	SETTLEMENT (inch)
1.	Cell Storage Area	2-1/4
2.	Truck Bay	1-3/4
3.	DAW Storage Area	1
4.	DAW Compaction Area	1/4
5.	Service Head	1/4

2. Subsurface and Groundwater Conditions:

The existing ground surface at the proposed site is at Elevation 24.5 5 $\pm$ .5 feet msl. The surface generally slopes towards the south.

Several thousand feet of soil sediments are known to overlie bedrock in the region. The sediments consist primarily of stratified deposits of sand, silt and clay.

Borings were taken to a depth of approximately 200 feet at and in the vicinity of the facility location. Based on these borings, the subsoil stratification at the site can be generated as follows:

G.S. to El. 5±	Cape May Formation (Fine to medium sand, trace to some silt; medium dense to dense)
El. 5 to El. −12±	Upper Clay Layer (Silty clay with thin to thick dense, fine sand inclusions; stiff to very stiff)
El. −12 to El. −27±	Upper Cohansey Formation (Fine to medium or coarse sand, trace to some silt; dense)
El. −27 to El. −70±	Lower Cohansey Formation (Fine to medium sand, trace to some silt; very dense)
El. −70 to El. −83±	Lower "Clay" Layer (Fine to medium sand, trace to some organic silt, with layers or inclusions of very stiff to hard organic clay; dense)
Below El. −83	Kirkwood Formation (Fine to medium sand; very dense)

Based on the data from borings in the areas surrounding the facility location, it is evident that the stratification is uniform in the area and that the strata dip slightly eastward.

The groundwater level at the facility location varied between Elevations +14 feet and +12 feet msl. It is expected to vary seasonally by ± 1 foot to ± 2 feet. Although the groundwater level is expected to vary seasonally by ± 2 feet, it is assumed conservatively to be 5 feet below grade at Elevation 20.5 feet msl for design.

3. Liquefaction Potential for Subsoils

A detailed study of the liquefaction potential for cohesionless soils underlying the site was carried out by Woodward-Clyde Consultants in 1975 for the adjacent existing Radwaste Building (Reference: Geotechnical Study, Proposed Radwaste and Off-Gas Buildings, Oyster Creek Nuclear Power Station, dated February 4, 1975). The study was based both on the Seed-Idriss simplified procedure and on the cyclic shear strength of the soils. Also, it was based on the peak ground acceleration (= .22g) corresponding to the Safe Shutdown Earthquake (SSE). The simplified procedure led to the conclusion that the cohesionless soils underlying the site had no liquefaction potential during the SSE. The minimum factor of safety against the initial liquefaction was equal to 1.37 during the SSE, based on the average cyclic strength. Thus, the subsoils will not liquefy during the design earthquake for the storage facility since the peak ground acceleration during the design earthquake will be smaller than 0.22g.

D. Wall Thickness and Radiation Shielding

The walls, roof and other components of the storage facility which provide radiation shielding were designed in accordance with the dose limitation requirements of 10CFR20, 40CFR190, USNRC Generic Letter 81-38 and the GPU System Design Description (SDD) Division I for Long Term Onsite Radwaste Storage Facility for Oyster Creek (SDD 3119-A Rev. 3). In addition, the shielding requirements are based on the assumption that the area outside the fence surrounding the facility is a Controlled Area as defined by 10CFR20.1003.

1. Cell Outside Wall Thickness

The radiation dose outside the fence surrounding the facility is designed to not exceed 0.25 mr/hr from all internal sources. The design also complies with the dose limits for members of the general public in accordance with 10CFR20.1301. Both skyshine and direct radiation were considered in the design.

The outside cell walls below the cell covers are 36 inches thick and composed of ordinary concrete (2.35 gm/cc).

2. Cell Area Roof Thickness and Above Cell Wall Thickness

The controlling factor for the roof thickness is the skyshine dose rate. The facility roof includes adequate shielding (based on the source terms found in Table II.A.1 and the storage of radioactive contaminated components and reusable materials/equipment with a contact dose rate $\leq$ 80 mrem/hr) to ensure a sufficiently low offsite dose (< 2 mr/yr) to the public due to skyshine during waste transfer (into or out of the storage cells) and storage. The integrated offsite dose to the public for abnormal waste (Table II.A.1 source terms multiplied by 1.5) is less than 3 millirem per year.

The skyshine dose immediately outside the facility when a cell cover is removed is a function of:

- Activity of the exposed waste containers
- Depth in cell of the exposed waste containers
- Distance of the receiver point from the outside wall
- Roof thickness
- Wall thickness above cells
- Distance an open cell is from a wall
- Self shielding of waste form

The roof thickness of three inches of ordinary concrete and an above cell wall thickness of 16 inches (between the cell covers and the bridge crane rails) and 8 inches (above the crane rails) of ordinary concrete provides adequate shielding to maintain the dose rate within the requirements of 10CFR20 and 40CFR190.

3. Cell Wall Thickness Adjacent to the DAW Storage Area

The cell wall thickness between the DAW Storage Area and the Cell Storage Area is three feet of ordinary concrete. The direct dose rate is less than 25 mr/hr in the DAW Storage Area resulting from sources in the Cell Storage Area.

4. Cell Cover Thickness

The cell covers were designed to reduce the dose rate (originating from low-level radioactive material/waste and contaminated equipment stored in the cells) above the cell deck to less than 2.5 mr/hr, when all of the cells are covered. The concrete thickness of each cell cover is two feet.

5. DAW Storage Area Wall Thickness

The walls around the DAW Storage Area are designed such that if all DAW with dose rates of less than or equal to 80 mr/hr is positioned no closer than eight feet from an outside wall, the resulting dose rates will not exceed regulatory guidance and ALARA principles. The wall thickness is one foot of ordinary concrete and the resulting dose rate is $\leq$ 2.5 mr/hr on any external wall.

6. DAW Storage Area Roof Thickness

The controlling factors for the DAW roof thickness is the skyshine dose rate. The facility roof includes adequate shielding (based on the source terms for normal radwaste found in Table II.A.I and the storage of radioactive contaminated components and reusable materials/equipment with a contact dose rate of $\leq$ 80 rem/hr) to ensure a sufficiently low offsite dose (< 2 mr/yr) to the public due to skyshine from stored DAW.

The skyshine dose immediately outside the facility from the DAW is a function of:

- Activity of the DAW
- Distance the receiver point is from the outside wall
- Roof thickness

- Wall thickness
- Volume of DAW
- Position of the DAW with relation to a wall
- DAW geometry

The roof thickness of 2 inches of ordinary concrete provides adequate shielding to maintain the dose rate within the requirements of 10CFR20 and 40CFR190.

E. Sump and Drain System

The primary function of the facility sump and drain system is to ensure containment of any contaminated liquids or potentially contaminated liquids resulting from facility operations or from accident conditions. The system consists primarily of the gravity drains from areas where contaminated liquids may occur, a concrete sump tank, a sump pump and associated piping, valves and controls. All leakage or spillage due to equipment or container malfunction will be contained and collected in such a manner that the potential for the release of radioactivity is kept to a minimum and the amount of radioactivity which may be released in an accident condition is well below regulatory limits. Contaminated liquid resulting from groundwater intrusion is also collected by the drain system and delivered to the sump. Drainage from the container decontamination area and the DAW Compaction Area are routed to the Cell Storage Area sump as well.

The sump and drain system is designed to accommodate the following drainage quantities:

i. Liquid drainage resulting from normal Truck Bay operations – Under normal operating conditions the liquid drainage in the Truck Bay is not contaminated and is sampled and transferred to the new Radwaste Building. Drainage resulting from abnormal operations resulting in contaminated liquids requiring routing to the liquid sump is estimated to be less than 500 gallons per month.

ii. Liquid drainage resulting from a design fire event in the Dry Active Waste Storage Area is estimated to be 25,500 gallons. This volume of water is to be retained in the warehouse area by means of a depressed floor of approximately 6 inches below the loading area floor elevation. Removal of the accumulated water is by the trench drain system in the warehouse area using a portable pump placed in the low point of the drain system.

iii. Liquid drainage resulting from a fire event in one storage cell requires approximately 15,000 gallons of hose stream discharge. (Note: The sump does not have the capacity to retain this entire quantity. The liquid from the fire event would fill the sump and the cell drain piping and would back up into the remaining cells to a depth of approximately four inches. Water at this level in a cell would not come in contact with the storage containers.

iv. Liquid drainage from the DAW Compaction Area resulting from decontamination activities – estimated to be less than 50 gallons per month.

The main sump is a concrete pit measuring 14'-10" by 14'-6" with a depth of 4 feet and having a capacity of approximately 5,000 gallons. The floor of the sump is sloped six inches from three sides to a pump pit which measures 4' by 4' by 2' deep. The sump is basically a small chamber located in the lower area of the facility between the Truck Bay and the initial Cell Storage Module. The sump chamber consists of two-foot thick reinforced concrete perimeter walls and base slab. The inside surfaces of the sump are coated with an epoxy amide coating. The sump walls and base slab are integral with the Cell Storage Area mat and walls. The sump, as well as the integral Cell Storage Area, are non-safety class. The entire Cell Storage Area, including the sump, are designed for seismic loads in accordance with the Uniform Building Code to assure capability to retain any liquids within the sump under postulated seismic events associated with Seismic Zone 2.

The piping and valves (except for the gravity drain piping) are designed to ANSI B31.1, "Power Piping". The sump pump is designed to manufacturers' standards.

Drainage from normally non-contaminated sources such as roof drains will be channeled to the existing storm drainage system.

The cell drainage sump is equipped with a motor driven pump sized for a capacity of 50 gpm at 37 feet total dynamic head (TDH). Pipe velocities are maintained between two and ten feet per second at the maximum rated capacity. The sump pump discharge is manually valved and connected for collection in a portable tank in which the discharge is transported for treatment to the Oyster Creek Radwaste Building. Valved and capped connections are provided in the Truck Bay. The sump pump is manually controlled and interlocked to a low water cut-off device. The pump running indicator light is provided locally and in the facility control room, with pump controls in the control room only.

The storage facility Control Panel located in the facility control room contains level indicators for the sump (50% full-high level alarm, 90% full-high high level alarm, 5% full shutoff-low level alarm) and a pump operation indicator. There is a local pressure indicator on the sump pump discharge.

The sump pump has a low-level interlock which stops the pump when the sump reaches a predetermined minimum level.

F. Storage Containers

The containers which are used in the facility to store low level radwaste are designed to preclude or mitigate the occurrence of an uncontrolled release of radioactive materials resulting form handling, transportation or storage. Structural integrity and containment capability of the waste will be maintained for a period of at least 10 years withstanding chemical and metallurgical attack from building environmental conditions and conditions inside the container.

Dry Active Waste is primarily stored in metal or fire resistant wooden boxes which are designed to be shippable containers or in 55-gallon drums.

Each box filled to capacity with compacted DAW will weigh approximately 3,500 pounds and will have an expected dose rate of less than 80 mr/hr. The boxes may be stacked in bulk fashion on the floor no closer than eight feet from any external wall and are accessible by a forklift truck maintained within the facility. Standoff pads are provided for each container to facilitate forklift truck handling. All containers used to package DAW and contaminated equipment shall meet the packaging requirements for the types and quantitites of activities being packaged pursuant to 49CFR Parts 100-189 and 10CFR71.

Materials stored in polyethylene (or similar plastic based materials) high integrity containers (HICS) at this facility may be contained in steel overpacks, but this storage method is not required.

Variously sized liners will be used for the storage of solidified evaporator bottoms, and solidified or dewatered spent resins, filter sludges, and other low-level wastes.

G. Overhead Bridge Crane

1. Functions

Items to be either stored in or shipped from the Cell Storage Area are transferred to or from the Truck Bay by an overhead bridge crane with a main top-riding 35-ton trolley and a 15-ton auxiliary monorail hoist. The underslung monorail hoist provides the flexibility to operate a drum grapple with a rotating hook and the primary lifting mechanism, individually or simultaneously. Functions of the overhead bridge crane are as follows:

a. To transfer packaged solidified or dewatered waste from the Truck Bay to the storage cells

b. To transfer Dry Active Waste containers from the truck bay to the storage cells (if radiation levels dictate that certain DAW storage containers should be stored in the storage cells) or to the DAW Storage Area.

c. To remove and replace all cell covers

d. To remove shield covers from the truck mounted transport container

e. To retrieve stored material from the laydown area

f. To retrieve Dry Active Waste containers

g. To transfer contaminated components and contaminated reusable materials/equipment from the Truck Bay to the cell cover deck or back to the Truck Bay

h. To transfer individual drums from the drum stacking containers to the shipping pallet

i. To transfer the loaded shipping pallet to the shipping cask

j. To transfer Dry Active Waste containers from cells or from the laydown area to the Truck Bay for shipment

k. To provide hook coverages for equipment maintenance

l. To transfer packaged solidified or dewatered waste from the storage cells to the Truck Bay

m. To transfer wastes of all kinds from one laydown place within the LLRWSF to another

2. Description

The overhead bridge crane is classified as Class D – Heavy Duty (per Crane Manufacturers Association of America, Inc. (CMAA) Specification No. 70, "Specification for Electric Overhead Traveling Cranes for Class D Service"). The crane coverage area encompasses the entire area above the Cell Storage Operating Floor and the Truck Bay. The crane is mounted on rails permitting full access to the Truck Bay and the Cell Storage Area. The center-to-center span of the runway rails is approximately 86 feet.

The total runway span is approximately 153 feet and the maximum lift from the runway rail to the lowest hook point is approximately 60 feet for both hoists. The hoists, trolley and bridge are all capable of operating at three different speeds: High, Low and Creep.

The lifting devices provided with the main hoist are a liner-stacking container/cell cover lifting device – 40,000 lbs, a grapple for an HN100 liner fitted with remote lifting collar – 25,000 lbs, a load block rotating mechanism – 70,000 lbs, and a 35-ton hook. The auxiliary hoist is provided with a drum grab – 1,000 lbs, a metal box grapple – 6,000 lbs, a cell cover fixture – 20,000 lbs, a drum uprighting device – 1,000 lbs, and a 15-ton hook.

The crane control console is located in the facility control room (floor mounted). The console contains the TV monitors and the controls for the TV cameras and the crane. The control system initiates the actual grasp, pickup, letdown and release functions of the crane hoists and directs the transport from one location to another. Load indicating devices are provided with the console readout. Visual and audible alarms are provided in the facility control room and at the local control area for loss of power and overload conditions. Local control stations are provided for controlling the crane from the Cell Storage Area deck and the Truck Bay. A pendant control station is provided on the crane bridge and travels with the crane. Each of these local control areas allows control of the main hoist, auxiliary hoist, bridge, and trolley direction and speed.

The pendant control allows emergency operation of the crane in the event the programmable controller is out of service or for use in placement of contaminated items on the cell covers. Local control from the Truck Bay and Cell Storage Area deck is through the programmable controller.

A closed circuit television (CCTV) system is located in the main control room to aid the operator during material handling operations. The CCTV system consists of several cameras strategically placed on the crane and in the facility with associated video display units in the facility control room. The cameras are designed to provide full automatic image control with many variations in scene illumination and to withstand a wide range of environmental conditions.

The crane controls consist of five interconnected control systems: 1) remote control from the facility control room, 2) semi-automatic control from the facility control room, 3) automatic control from the facility control room, 4) local control from the Truck Bay and Cell Storage Area, and 5) pendant control that travels with the crane. The controls are defined and listed in order of highest control priority as follows:

a. Pendant: Provides manual operation of the crane (including both hoists) from a control station which retracts and travels with the crane. Pendant control scheme bypasses the programmable control.

b. Local: Provides manual operation of the crane (including both hoists) from either the Truck Bay or the Cell Storage Area, with visual observation of the crane. Safety features remain implemented through the programmable control.

c. Remote: Provides manual operation of the crane (including both hoists) from facility control room with CCTV monitors. Safety features remain implemented through the programmable control.

d. Semi-Automatic: Provides remote semi-automatic operation of the crane (main hoist only) from the facility control room, directed by the programmable control system. Semi-automatic operation implies that motion will stop at each change in direction of the load and wait for the operator to issue a "proceed" or "continue" command.

e. Automatic: Provides remote automatic operation of a sequence of events for the crane (main hoist only) from the facility control room, directed by the programmable control system. The operator shall make the final letdown (inches) and release of the load.

NOTE: Manual control refers to local, remote, and pendant control in which the operator had direct control of all crane operations.

The local, pendant, and remote controls shall include similar controls for both hoists and trolleys. The main difference between the controls for the main and auxiliary hoists is that the auxiliary hoist does not have position indication. Safeguards that use position indications are therefore also not included with the auxiliary hoist controls.

The control system is designed to prevent the crane from colliding with obstacles which may be present on top of the cell covers. When an operator places a component on the cell covers, he must manually input the location of the object to the control system. In the manual, automatic and semi-automatic control modes, the crane will be unable to cross through the area where the object has been placed. The control system software will be programmed to allow the crane to move within a specified distance of a location where an object lies on a cell cover before automatically stopping. First, the operator inputs the proposed location for liner or stacking container placement to the control system. As the crane approaches the restricted area (in any control mode) the safe advance limit is reached and the crane automatically stops. The operator may regain control of the crane by engaging the key override switch in the control room. This switch permits only manual control of the crane.

3. Design Considerations and Testing

The overhead bridge crane is designed for a 40-year operational life. Environmental considerations require that the crane be located indoors and in a heated building (temperature range 50°F - 104°F). American Crane and Equipment Co. has indicated that the LLRWSF crane will operate normally at or above 35°F provided that the equipment's strip heaters and motor heaters are functional. The crane will operate as designed under worst case relative humidity conditions (100% relative humidity). The total integrated dose limitation for the crane and associated systems and components is $4.8x10^5$ rads over the 40-year design life (Refer to Attachment 1).

The crane footwalks and the bridge and trolley bumpers have been designed to meet appropriate Occupational Safety and Health Administration standards. Also, remote operation of the crane from a shielded control room contributes to the 10CFR20 ALARA considerations that have been designed into the storage facility.

The crane is onsite tested to 125% of rated loads. Static and dynamic load, loss of power, and mechanical load brake tests are done. Other testing includes loading and unloading tests, vacuum drum lifting device tests, and drum uprighter tests. Crane maintenance is performed over the top of the cell covers or in the Truck Bay.

H. Contamination Isolation and Decontamination Facilities

Personnel access to all areas within the facility that normally contain radioactive material is controlled with the only point of entry being through a control point in the access control area of the Service Head. All egress is through that same control point except when an emergency would call for the use of the fire escape doors. Radiological Controls personnel are responsible for contamination control in the event that the fire escape doors are used. A protective clothing storage and change areas are also located within the access control area.

The facility complies with NRC Generic Letter 81-38 with regard to contamination isolation and decontamination capabilities. The sump and drain system is designed to collect all contaminated liquids resulting from decontamination activities, container leakage, and fire protection system actuation.

The Cell Storage Area drains consist of five trench drains oriented perpendicular to the Truck Bay such that each row of cells is served by one trench drain. These drains are connected to a common drain header which is routed to the Cell Storage Area (main) sump. There are no valves in the Cell Storage Area piping. Liquids resulting from premature failure of a waste container in the storage cells is collected in the main sump through this trench drain system.

The DAW Storage Area drains consist of three trench drains, oriented parallel to the Cell Storage Area such that one-third of the floor area is secured by each trench drain. The main trench drains are routed to a common trench drain which is provided with a low point sump measuring 2' x 2' x 2'. A four inch drain line is provided from this sump to the main sump. The floor in the DAW Storage Area is depressed 6 inches below the warehouse loading floor. This depressed floor is designed to contain the liquid resulting from fire protection system actuation. Removal of this water would be accomplished by opening the drain line to the main sump or using a portable sump in the low point DAW Storage Area sump.

Since the main sump is sized at 5,000 gallons, liquid collected at greater volumes will back up into the storage cells. The Cell Storage Area, therefore, acts as a reserve sump and provides isolation of potentially large quantities of water which may be contaminated.

The cask and container/swipe decontamination station as well as the DAW Compaction Area are provided with concrete curbs 6 inches high. These curbs prevent the spread of contaminated water during equipment and/or container decontamination operations. The source for decontamination water is from a portable tank and pump which will be brought into the facility when needed.

Direct hands-on decontamination of a storage cell cannot be performed with waste containers in any of the cells. This will be performed as part of the decommissioning effort. Decontamination of a storage cell can be done remotely from the Cell Storage Area operating floor by use of a long handled high pressure water spray device. Prior to any such operations, health physics personnel must determine the extent of the radiological contamination of the Cell Storage Area. If leaking containers are suspected, they should be removed and isolated before decontamination operations begin. By lowering a portable camera and radiation monitor into the cell, operators can establish the extent of contamination and determine which containers are leaking.

The decontamination scenario will include removing a cell cover to obtain access to the Cell Storage Area operating floor, relocating all liners or stacking containers in that cell and in adjacent cells in order to minimize direct radiation, and erecting temporary shielding around the open cell on the operating floor. All these activities will normally be accomplished remotely by use of the overhead bridge crane. Once health physics personnel determine that adequate shielding is in place, personnel will be allowed on the operating floor for decontamination operations.

Decontamination activities resulting from dropped liners in the Cell Storage Area and/or Truck Bay are not expected to occur due to the restrictions placed on the design of the overhead bridge crane and attendant lifting devices. The liners are also limited as to the amount of free standing water which they may contain while in storage (1/2% by volume).

Concrete floor and wall surfaces in areas of potential contamination will be sealed with a hard finish paint compatible with outdoor weather and proven for nuclear service. The coating selection is based on radiation tolerance, waterproofing capability, decontamination ability, chemical resistance and abrasion resistance suitable for hard rubber-tired vehicles.

I. Auxiliary Systems and Components

1. Radiation Monitoring System

Fourteen area gamma radiation monitors are used throughout the facility to measure the normal operating radiation levels and to detect any off-normal occurrences. The monitors have adjustable setpoints that are to be changed as the normal radiation level changes. All the area monitors have a readout indication on the radiation monitoring panel in the facility control room and are recorded on a strip chart multi point recorder. The calibration source is documented and traceable to NBS. These monitors are located in the following areas:

- Four area monitors are mounted above the concrete cells and can be adjusted to set off an alarm when a cell cover is removed and/or any other source of gamma radiation is present. Due to the radionuclides present in the reactor water cleanup resin and the condensate resin, the gamma monitor is best suited to detect the expected radiation.

- Six area monitors are mounted above the DAW Storage Area in the DAW portion of the facility. These monitors also have adjustable setpoints.

- The remaining four area monitors are located in the Truck Bay (2), the DAW Compaction Area, and the control room and will detect high radiation levels at an adjustable setpoint.

Alarms are located throughout the facility which wiil sound in the event of a high radiation trip alarm. These alarms are located in the DAW Storage Area, the Truck Bay, the DAW Compaction Area and the facility control room. Remote alarms are located in the Oyster Creek Radwaste Building control room.

Portable alarmed radiation monitors may be used in lieu of any of the above mounted units. The setpoints of these units should correspond to those of the units taken out of service.

2. Security

The storage facility is located within the Oyster Creek owner controlled area. The area is lighted so that the facility would be clearly visible by a security guard patrol from all points around the building. Facility entrances (control room and Truck Bay) will be enclosed by an industrial fence. The entrance doors will be locked when waste materials are not being shipped to or from the facility and the key will be controlled by the Radwaste Operations Department. The facility will be observed once per working shift by the security guard patrol. Building access will be under the direct control of the Oyster Creek Radwaste Operations Department while access to any high radiation areas within the facility are administratively controlled by the Radiological Controls Department.

3. Fire Protection System

The Fire Protection System is designed in accordance with appropriate National Fire Protection Association (NFPA) National Fire Codes, the Uniform Building Code and with fire insurance underwriter recommendations. This system provides fire detection, audible and visual alarms, fire extinguishing systems incorporating both automatic and manual features, and control of fire spread. Upon fire suppression system actuation, fixed fire extinguishing systems will automatically actuate in certain areas of the facility. Concurrently, audible and visual alarms will be activated locally, in the facility control room and in the New Radwaste Building control room. In addition, a variety of manually operable fire extinguishing equipment will be available for manual control and extinguishing fires involving various classes of hazard.

a. Water Supply System

The water supply system consists of a new connection to the existing fire main. The existing fire main provides adequate water volume and pressure to meet the needs of the facility water extinguishing systems.

b. Sprinkler System

An automatic preaction sprinkler system is provided for the protection of areas where combustibles will be stored or may accumulate including the Service Head, the Truck Bay, the DAW Compaction Area, the DAW Storage Area and the area above the cell covers in the Cell Storage Area.

The sprinkler system design and testing meets the requirements of NFPA 13, "Installation of Sprinkler Systems", for Ordinary Hazard Groups II and III. Those areas where combustibles may accumulate and which are normally unoccupied are designated as Group II (DAW Storage Area and Cell Storage Area above the cell covers). DAW is considered a Class A combustible material. Sprinkler system design is adequate for these areas subject to storage area limitations found in Section VII.4. Those areas where combustibles may accumulate and which are normally occupied are designated as Group III (control room/records storage area, access control area, Truck Bay, DAW Compaction Area).

Activation of the automatic fire detection system or activation of a manual fire alarm system pull box causes the deluge valves for the sprinkler system and the hose station systems (II.I.3.c) to open in the appropriate area. After activation of the deluge valve, the preaction sprinkler piping fills with water and is discharged only by the melting of a fusible link on the sprinkler from the heat generated by a fire. Reduced pressure in the system piping causes an imbalance between the sprinkler system and supply piping at the alarm check valve which will open and actuate the local and remote alarms. The sprinkler system control valves are supervised by position monitor switches which will give trouble annunciation in the facility control room.

Testing of the sprinkler system is accomplished at the inspector test connections. Flows from testing operations are discharged outside the facility.

c. Standpipe and Hose Stations

The facility hose stations are provided for manual control and extinguishing of fires by facility personnel in the Service Head, Truck Bay, Cell Storage Area, DAW Compaction Area, and DAW Storage Area. All areas of the facility are within reach of at least one interior hose line. The hose stations are designed and located in accordance with NFPA 14, "Installation of Standpipe and Hose Stations", to provide coverage for all areas of the facility. The design water flow and duration is 100 gpm for 30 minutes (Class II) in accordance with NFPA 14. Outside stem and yoke gate valves provided for isolation of the standpipe and its risers from the facility fire protection supply system are installed on the upstream side of the deluge valves.

Each hose station is equipped with a 1-1/2 inch pressure restricting angle valve, a 75 foot length of 1-1/2 inch neoprene-lined non-collapsible fire hose, a continuous flow hose reel capable of storing 75 feet of non-collapsible fire hose, a 1-1/2 inch adjustable pattern fog nozzle and a spanner wrench.

d. Fire Extinguishers

Pressurized water, CO_2, and appropriately sized dry chemical fire extinguishers have been located throughout the facility as required by NFPA 10, "Portable Fire Extinguishers".

e. Detection, Alarm, and Control Systems

In addition to the sprinkler system and its associated control initiated alarms and control room annunciations, there are manual pull box-type fire alarms on each floor of the facility with local and remote alarm bells. Flashing red alarm lights and buzzer units are provided to give audible and visual signals at both the facility control room and the New Radwaste Building control room. The system is designed in accordance with NFPA 72D, "Proprietary Protective Signaling Systems".

Ionization-type smoke detectors are provided throughout the facility to automatically detect fires in the incipient stage. Detectors are located in the Service Head, Truck Bay, Cell Storage Area, DAW Compaction Area and DAW Storage Area. Smoke detectors are also located in the facility HVAC system. Activation of any smoke detector will be indicated visually and audibly at the fire protection control panels in both the facility control room and the New Radwaste Building control room.

Located in the facility control room, the fire annunciator panel monitors the power supply and provided all control and supervisory functions required for the sprinkler, standpipe and hose, and fire alarm and detection systems. A common fire or trouble signal will be transmitted to the New Radwaste Building control room from the annunciator panel. The annunciator panel is provided with a battery backup should normal 120-volt AC power be interrupted.

f. Operational Hazards

The application of water on fires in the vicinity of high voltage electrical equipment could constitute a life hazard to personnel due to the electrical conductivity of water. Special fog-only water spray nozzles are installed with the hose stations. These nozzles must be operated at distances in accordance with manufacturer's recommendations from any energized electrical equipment. A positive identification of these limits is included in the administrative control and training of facility personnel.

g. Testing and Maintenance

The fire protection system and associated equipment shall be tested and maintained in accordance with manufacturer's recommendations and National Fire Protection Association standards.

4. Electrical Power Supply

Electrical power to the facility is provided by 480-volt unit substation connected to the existing plant distribution system. Motors rated 480-volt, 3-phase, 60-hertz and other 480/277 volt auxiliary equipment are powered from motor control centers.

The plant DC system provides the 125-volt DC for circuit breaker closing, tripping, and indications. The 120V AC is used for instrumentation and auxiliary relays.

5. HVAC

The HVAC system for the onsite storage facility is designed to maintain the following building temperatures:

Control Rooms, Access Control Area Records Center	72-78°F
Truck Bay/DAW Compaction Area	40-104°F
DAW Storage Area	40-104°F
Cell Storage Area (including cell interior)	40-104°F

The Service Head contains an air handling (conditioning) unit which is provided with an electrical coil heater. The air conditioner is a standard type unit and works in conjunction with an economizer control. The economizer control permits the service head to be cooled by outside air during conditions when the outside air is mild.

Electrical unit heaters are provided for other areas in the storage facility.

Building ventilation is provided by roof ventilators above the Cell Storage Area and the DAW Storage Area. All of the roof ventilators contain motor operated dampers which close when their associated fans are not operating. Fire rated dampers with fusible links are provided for all duct penetrations through rated fire bathers in the Service Head and DAW Compaction Area.

Section Deleted by Revision 6
Section discussed HEPA filtered ventilation monitoring associated with compacting 6

It has been determined that charcoal filtration is not necessary for the safe operation of the. storage facility. For the Oyster Creek facility, the forms of waste which are stored and the containers in which these wastes are stored provide the means of preventing radioactive releases to the environment. Surveillance and monitoring programs are directed toward the waste containers to ensure proper maintenance, function, and integrity.

Analyses were performed using the isotopes listed in Table II.A. 1 and Reference I.D.2 to determine the activity released from packaged solidified or dewatered demineralizer filter sludge, evaporator bottoms, resins, and boxed DAW during various hypothetical accidents. The activity of the released radioisotopes from waste compaction operations was also analyzed. In addition, the activity released from reusable material/equipment with fixed contamination (no container) and reusable equipment/material with smearable contamination (exceeding she release limits) packaged in metal or fire resistant wooden containers, or unpackaged, awaiting assembly, was calculated. This was based on a contact dose rate of 80 mrem/hr, from a Co-60 source.

It was concluded from this analysis that normal operating conditions will not produce contaminated releases within the facility in sufficient quantities to exceed 10CFR50 limitations nor would it be realistic to postulate an accident which would result in contaminated airborne releases in quantities large enough to violate 10% of 10CFR100 criteria. Periodic air sampling during operations in the building, in accordance with Radiological Control Procedures, will be performed.

The analysis also concluded that the resin/filter sludge and DAW fires were the "worst case" accidents in terms of amount of radioactive material released and off site doses. Because the doses from the resin/filter sludge and DAW fires are below 10CFR100 limits, this would also be the case for fires involving other waste forms or components.

J. Codes and Standards

The systems and components within the storage facility have been designed and constructed in accordance with the codes and standards indicated in Table II.J.1. These codes and standards were employed as they specifically apply to the referenced system or component.

TABLE II.J.1

CODES AND STANDARDS APPLICABLE TO SYSTEMS AND COMPONENTS RELATED TO THE OYSTER CREEK LOW LEVEL RADIOACTIVE WASTE STORAGE FACILITY

SYSTEM/ COMPONENT	DESIGN AND FABRICATION	MATERIALS	WELDING	INSPECTION AND TESTING
1. Overhead Bridge Crane	- CMAA Spec. 70 - AISC Steel Construction Manual - National Electrical Code 610-1980 - 29CFR1910.179 (OSHA) - ANSI B30.2.0 - ANSI B14.1 - ANSI B17.1 - NEMA MG1, MG2 - AGMA 390.03 - AGMA 421.06	- ICEA S-66-524-174 - ASTM A 27 - ASTM A 36 - ASTM A 53 - ASTM A 108 - ASTM A 148 - ASTM A 236 - ASTM A 325 - ASTM A 434 - ASTM A 576 - ASTM A 668 - ASTM E 84	- AWS D1.1 - AWS D14.1	- IEEE 383 - ASTM A 388 - ASTM E 84 - ASTM E 125 - ASTM E 709 - ANSI B30.2.2 - 29CFR1910.179
2. Sump Pump, Piping and Valves	- Hydraulic Institute Standards - AGMA 260.01	- ASME B&PV Code, Section II, Parts A, B and C - ANSI B31.1 - ANSI B16.11 - ANSI B16.25 - AFBMA, Std. 9 - MSS-SP-55 - ASTM A 36	- ASME B&PV Code, Section IX - MSS-SP-58	- ASME B&PV Code, Section III, Subsection ND
3. Motors (For Sump Pump and Crane)	- ANSI C50.41 - NEMA MG1 - NEMA MG2	- AFBMA, Std. 9	- AWS Stds.	- IEEE 112A - NEMA MG1-12.51

TABLE II.J.1 (Continued)

SYSTEM/ COMPONENT	DESIGN AND FABRICATION	MATERIALS	WELDING	INSPECTION AND TESTING
4. Electrical System	- ANSI C97.1 - ANSI Y14.15 - ANSI S1.2 - ANSI C37 (several stds.) - ANSI C57 (several stds.) - NEMA AB1, PB2, SG3, SG5, ST1, TR1, TR27, 210, and ICS (Industrial Controls and Systems)	- ASTM D635 - NEMA SG5 - ANSI C37.20	- AWS Stds.	- ANSI C57.16 - ANSI S1.2 - ANSI C37.20 - ANSI C37.50 - ANSI C57.12.00, Section 88 - ANSI C57.12.90 - ANSI C57.13 - IEEE 74 - NEMA SG5, TR1, TR27, and ICS
5. Radiation Monitoring	- NEMA 250 - ANSI 13.10 - USNRC Reg. Guide 1.43			
6. Fire Protection				
a. Sprinklers	NFPA 13	NFPA 13	NFPA 13	NFPA 13
b. Standpipe and Hose Stations	NFPA 14	NFPA 14	NFPA 14	NFPA 14
c. Fire Extinguishers	NFPA 10	NFPA 10		NFPA 10
d. Alarm System	NFPA 72D			NFPA 72D
e. Underground Pipe	NFPA 24	NFPA 24	NFPA 24	NFPA 24
f. Fire Doors	NFPA 80			NFPA 80
8. Dry Active Waste Storage Containers				NRC, DOT & Burial Site Regulations

TABLE II.J.1 (Continued)

SYSTEM/ COMPONENT	DESIGN AND FABRICATION	MATERIALS	WELDING	INSPECTION AND TESTING
7. Forklift Truck (For DAW Container Transfer)	- ANSI B56.1 - UL 583		- AWS D1.1	

Initialisms used in Table II.J.1:

AFBMA	Anti-Friction Bearing Manufacturers Association
AGMA	American Gear Manufacturers Association
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
ASME B&PV Code	American Society of Mechanical Engineers Boiler and Pressure Vessel Code
ASTM	American Society for Testing and Materials
AWS	American Welding Society
CFR	Code of Federal Regulations
CMAA	Crane Manufacturers Association of America
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical and Electronics Engineers
MSS	Manufacturers Standardization Society
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
UL	Underwriters' Laboratories

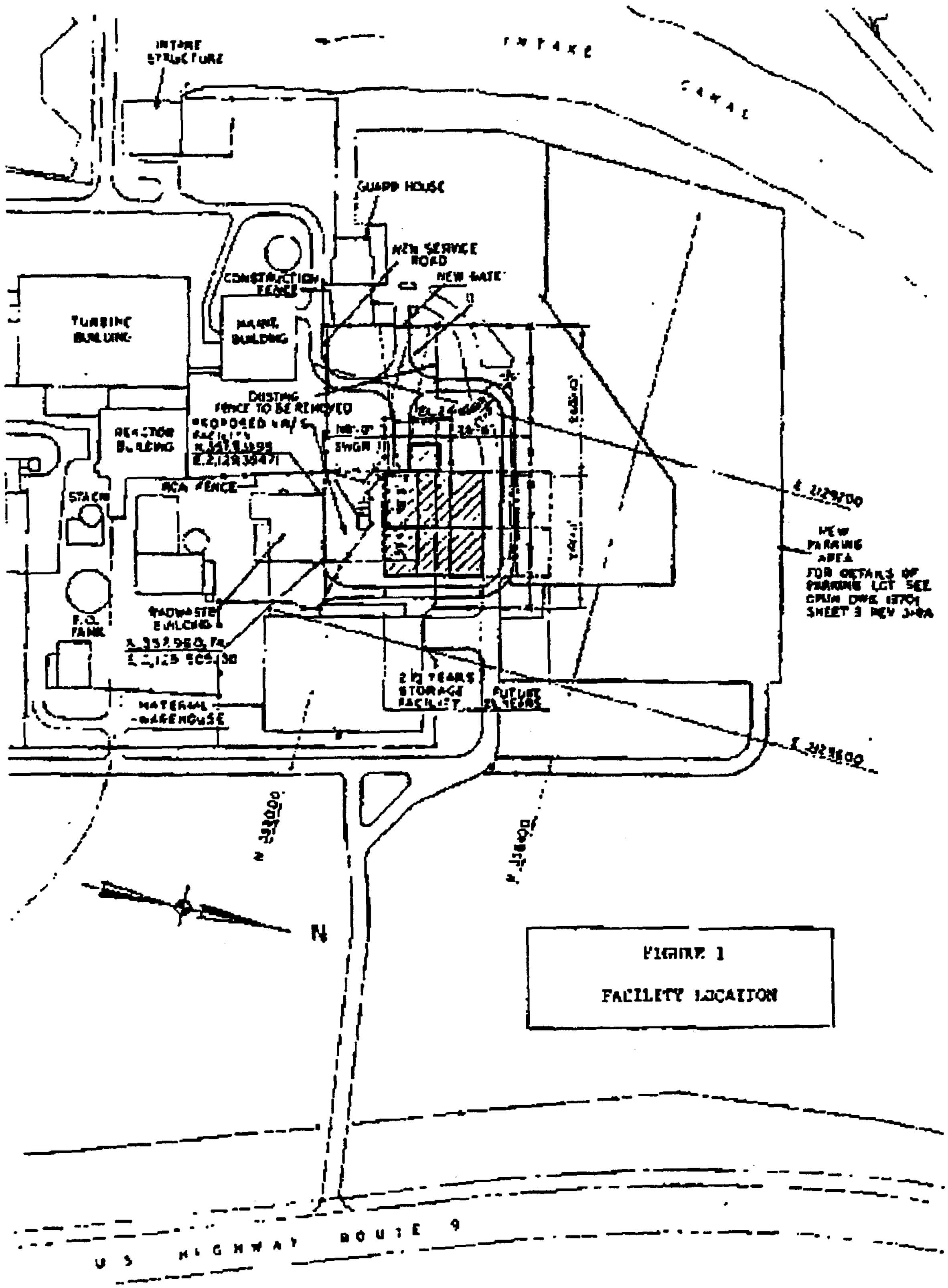
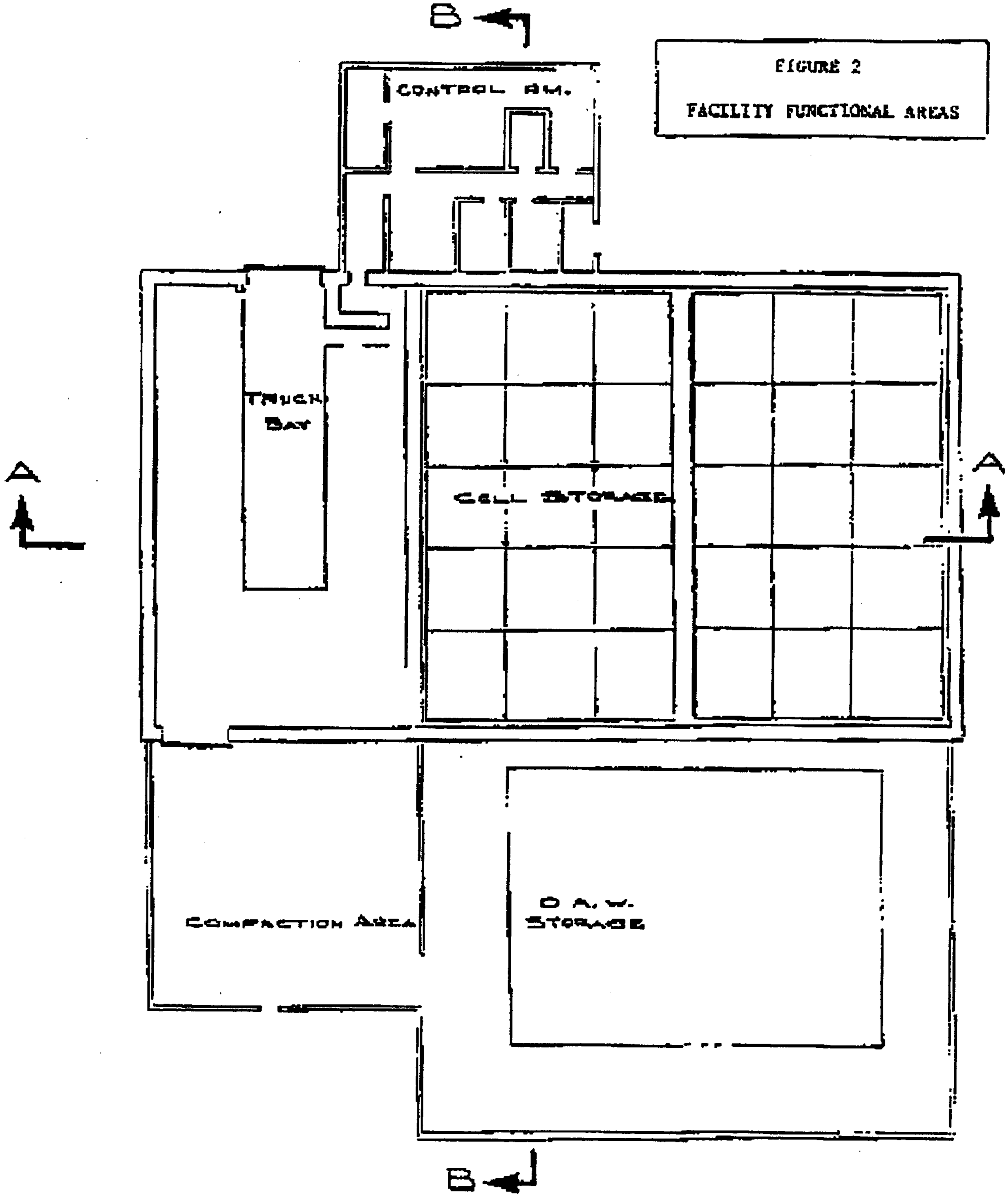


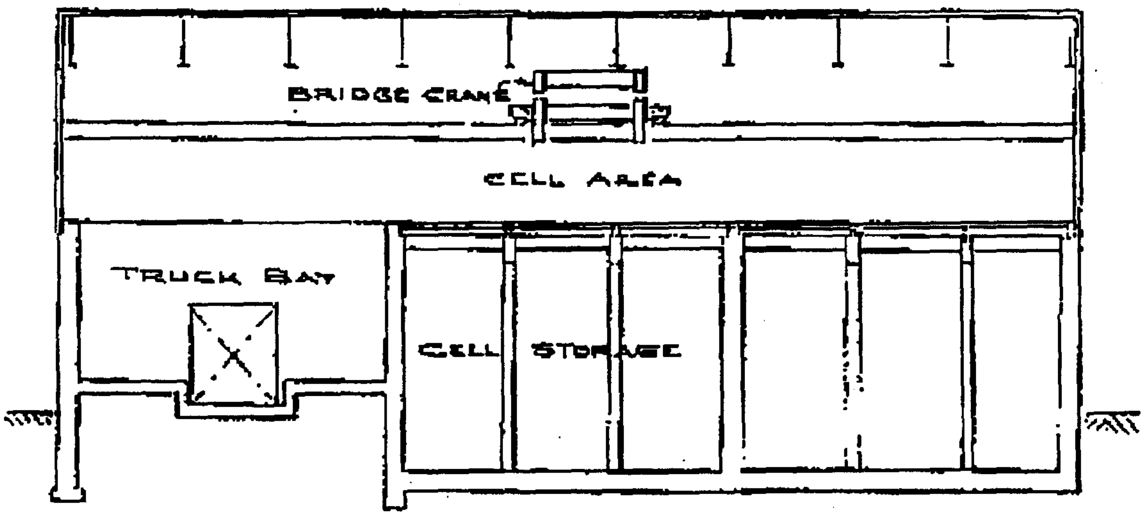
FIGURE 1

FACILITY LOCATION

FIGURE 2

FACILITY FUNCTIONAL AREAS

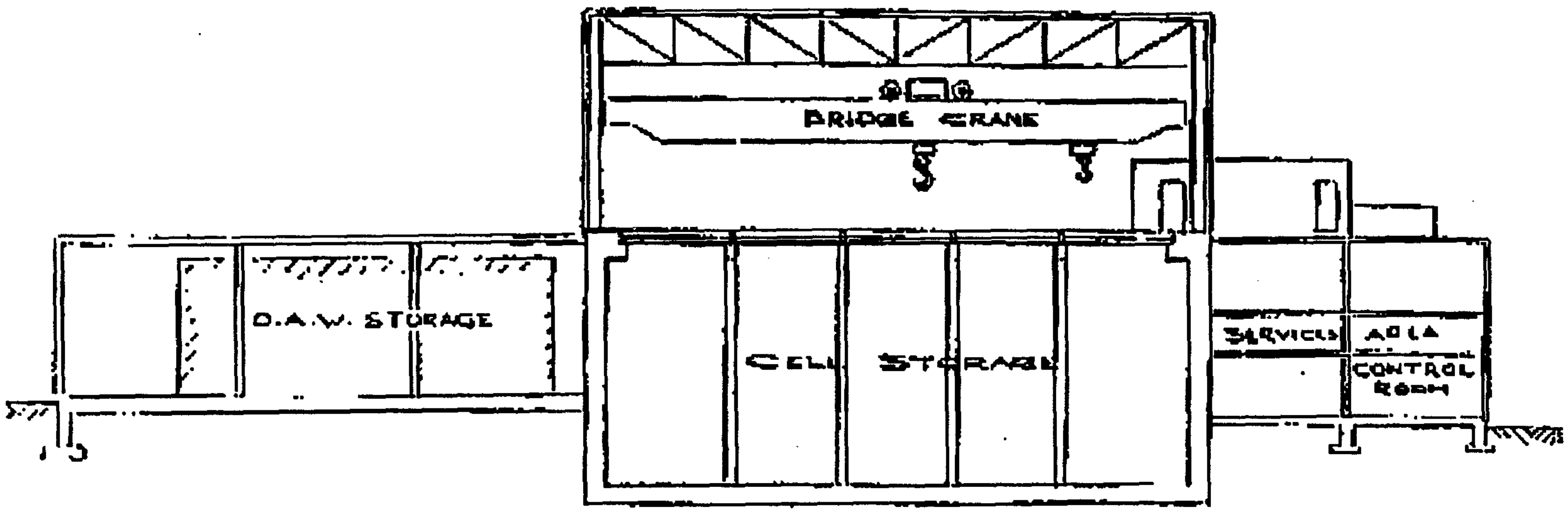




SECTION A-A

FIGURE 3

FACILITY FUNCTIONAL AREAS SECTION A-A

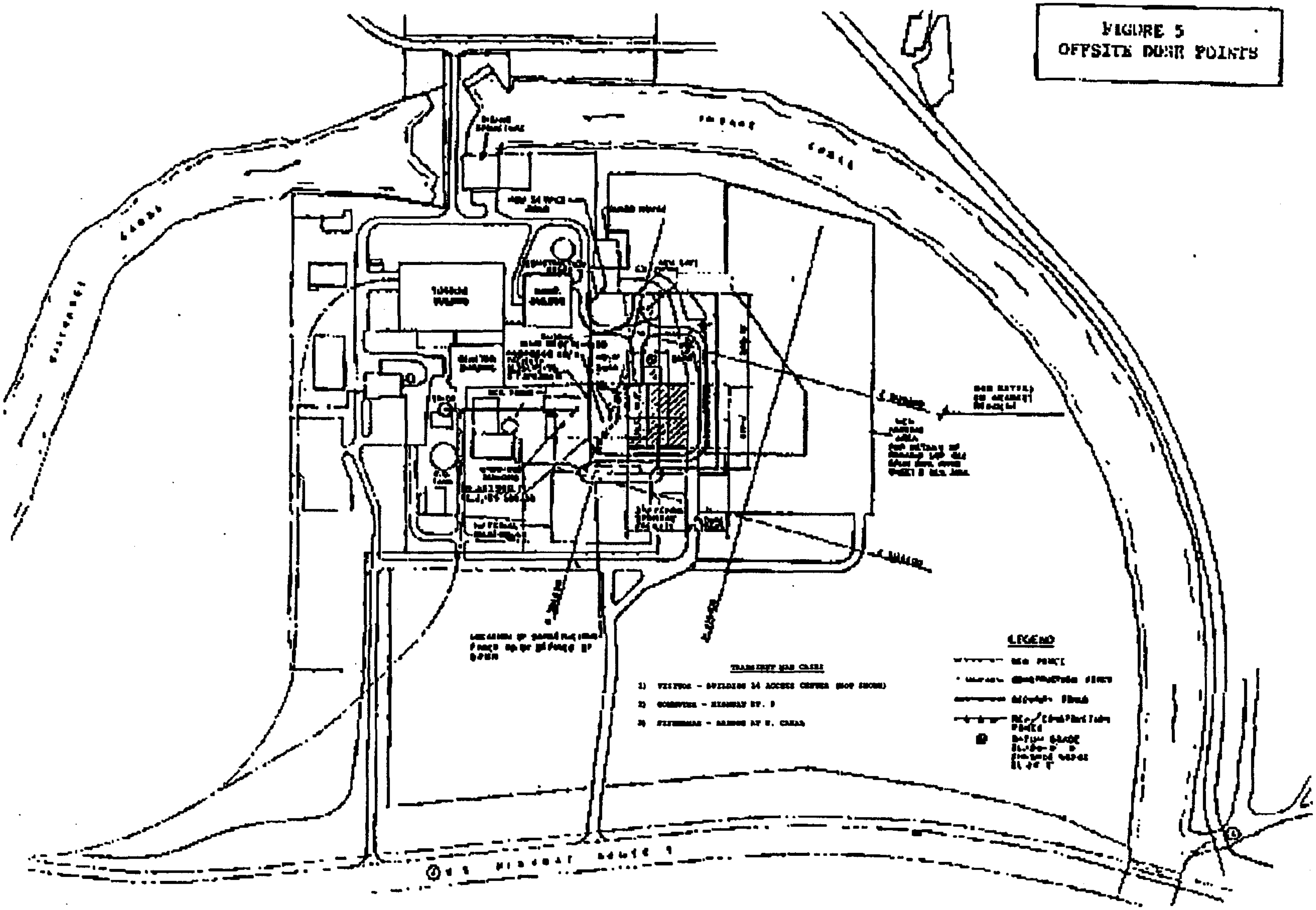


SECTION B-B

FIGURE 4

FACILITY FUNCTIONAL AREAS
SECTION B-3

FIGURE 5
OFFSITE DOSE POINTS



III. Radiological Considerations

A. Radiological Assessment

Due to the nature and types of materials which will be stored in the facility, the storage containers which will contain the materials, and the design of the facility itself the releases of radioactive material during normal operations is considered to be negligible. Contaminated reusable material/equipment not containerized, shall consist of fixed radioactive material (or, during assembly of equipment with smearable contamination, sampling in accordance with Radiation Protection procedures shall be conducted to ensure that radioactive materials releases are minimal). All stored equipment containing oil or fuel shall be in "open containers" capable of maintaining the entire liquid volume. The radioactive release resulting from potential accidents or off-normal occurrences is delineated in Section V of this report, Safety Analysis. The Truck Bay will be the only area in the facility where the processing or handling of non-shippable waste may occur. DAW is normally compacted in the Oyster Creek Radwaste Building and transferred to the storage facility for storage.

SECTION DELETED

Section previously discussed compaction requirements and filtered ventilation 6

B. Occupational Exposure

The storage facility has been designed and will be operated such that no operator will be allowed to exceed a maximum weekly dose of 300 mrem. Radiation zones and stay times established in order to satisfy dose limitations are as follows:

Radiation Zone	Dose Rate Limit	Area	Weekly Stay Time Per Operator
I	≤0.25 mrem/hr	Service Head	Unlimited
II	≤2.5mrem/hr Area Over Cell Covers(assuming waste is in storage and covers are in place)	Truck Bay	120 hrs
III	≤80 mrem/hr Storage Area	Dry Active Waste	3.75 hrs
IV	> 100 mrem/hr	Cell area-below deck	<3 hrs
V	≤80 mrem/hr	Cell area-above deck	3.75 hrs

Administrative controls have been established which will ensure that the 300 mrem/week dose limitation is maintained. These controls generally consist of strategic waste container stacking and storage schemes and the use of personnel or waste shielding.

The facility has been designed and will be operated in accordance with 10CFR20-ALARA principles. Operations involving medium to high activity wastes will be performed under remote control from a shielded control room.

The handling and movement of contaminated components cannot be done remotely since this will require manual rigging. However, these components will have been prepared in accordance with standard health physics procedures. The placement of these components will be monitored and the resulting occupational exposure is expected to be minimal.

The layout of the future DAW compaction equipment will be such that exposure to operating personnel is minimized. Experience with similar compaction processes indicates that a dose rate of < 10 mr/hr is expected for personnel operating the waste compaction equipment.

To minimize radiation exposure to personnel performing maintenance on the roof of the storage facility, the following requirements are necessary:

1. Personnel are not permitted access to the roof during liner loading, transport, or unloading (inside the storage facility).

2. Personnel are not permitted access to the roof when one or more cell covers have been removed from cells containing radioactive material.

3. Personnel are not permitted access to the roof while the DAW compaction unit it operating.

The transportation of radioactive waste to the storage facility through uncontrolled plant areas is governed by existing plant Radiation Protection/ALARA procedures and requirements.

1. As per existing site procedures, radwaste packages with greater than 100 mr/hr on contact dose rates are to be escorted by radiological control technician(s).

2. In accordance with existing policies and procedures, radwaste packages are to be moved such that individual and collective exposure is minimized.

3. An area monitoring program is in place, which monitors exposure to personnel not wearing dosimetry. This program ensures that dose to unmonitored personnel from all sources, including movement of radwaste packages, is maintained at less than 50 mrem per year.

4. The criteria in this safety evaluation apply only to radwaste package movement within owner controlled areas.

5. Surface contamination levels on radwaste packages to be transported to the storage facility shall not exceed:

   For Oyster Creek (Procedure No. 351.15)

   - Smearable: 1000 dpm/cm^2 beta-gamma and 20 dpm/100 cm^2 for alpha

C. Doses to Public Access Areas

The dose to a public access area is governed by 40CFR190, Environmental Radiation Protection Standards for Nuclear Power Operation. This regulation indicates that the maximum total whole body dose from all sources of the fuel cycle must be less than 25 mrem/yr. Further guidance in NRC Generic Letter 81-38 indicates that the offsite dose to the public resulting from the operation of an onsite low level radwaste storage facility should be less than a small fraction of the total allowable amount.

Two categories of radiation exposure to the public were examined to determine public access requirements and compliance with 40CFR190. The two categories are transient man and permanent resident, whose locations are shown on Figure 5.

Three cases of transient man were analyzed.

- A visitor at the Building 14 Access Center, four hours per day, one day per month.
- A fisherman on the deck by the Route 9 bridge near the North Canal – one day per week, four hours per day.
- A commuter on Route 9 – one minute per day, 270 days per year.

The permanent resident (living in a house) was assumed to be 960 meters from the plant stack independent of direction. The dwelling is assumed to provide no shielding.

The offsite public dose resulting from the operation of the storage facility from sources listed in Table II.A.1 with the following exception, are as follows (abnormal sources are a factor of 1.5 greater than normal sources). The DAW data in the Table II.A.1 was conservatively replaced with a total of 1695 B-25 boxes (stacked three high) with a contact dose rate of 80 mrem/hr, based on a 100% Co-60 homogenous source.

Visitor	1.61×10^{-1} millirem/yr (normal waste)
	2.42×10^{-1} millirem/yr (abnormal waste)
Fisherman	2.73×10^{-1} millirem/yr (normal waste)
	4.10×10^{-1} millirem/yr (abnormal waste)
Commuter	2.90×10^{-2} millirem/yr (normal waste)
	4.34×10^{-2} millirem/yr (abnormal waste)
Residential	2.00 millirem/yr (normal waste)
House	3.00 millirem/yr (abnormal waste)

Those doses are well within the 40CFR190 requirement of 25 millirem per year whole body. The thyroid dose is negligible.

D. 10CFR50 Appendix I Evaluation

Offsite release of radioactive materials in gaseous and liquid effluents produced during normal storage facility operations, including expected operational occurrences pursuant to 10CFR50 Appendix I were determined for the following three effluent releases:

1. Radioactive material above background in liquid effluents to be released to unrestricted areas.

2. Radioactive material above background in gaseous effluents released to the atmosphere.

3. Radioactive material in particulate form and radioactive iodine above background released to the atmosphere.

Case #1

The facility is designed to contain leakage which may occur within its boundaries and facilitate the identification and treatment of any such leakage (see Sections II.A.3, II.E, II.H).

Storage containers which are used in the facility to store low level radioactive waste are designed to preclude or mitigate the occurrence of an uncontrolled release of radioactive material resulting from handling, transportation or storage (see Section II.F). Since most of the waste stored in the building is in shippable form (dewatered and/or solidified filter sludge, solidified evaporator bottoms, and dewatered and/or solidified resins), liquid radioactive waste quantities are minute. All radioactive contaminated materials which are stored without containers shall consist of fixed radioactive material to preclude any release; or, during assembly of components with smearable contamination, sampling shall be conducted in accordance with Radiation Protection procedures to ensure that radioactive material releases are negligible. All stored equipment containing oil or fuel will be in "open containers" capable of maintaining the entire liquid volume. As a result, during normal operations, including expected operational occurrences; no radioactive liquid effluents will be released to unrestricted areas.

Cases #2 & #3

The DAW compaction system includes its own HEPA filtered ventilation system to collect any airborne contamination which might result from trash consolidation processes. Building ventilation, provided by roof ventilators, includes dampers to seal the building in the event of a radioactive particulate release within the facility (see Section II.I.5). Fourteen area gamma radiation monitors are used throughout the facility to measure the normal operating levels and to detect any off-normal occurrences.

Storage containers which are used in the facility to store low level radioactive waste are designed to preclude or mitigate the occurrence of an uncontrolled release of radioactive material resulting from handling, transportation, and storage (see Section II.F). Since most of the waste stored in the building is in shippable form (dewatered and/or solidified filter sludge, solidified evaporator bottoms, and dewatered and solidified resins) gaseous and air particulate waste quantities are minute. All radioactive contaminated materials which are stored without containers shall consist of fixed radioactive material to preclude any release; or, during assembly of components with smearable contamination, sampling shall be conducted in accordance with Radiation Protection procedures to ensure that radioactive material releases are negligible and as far below the limits of 10CFR20, Appendix B, Table 2 as reasonably achievable.

As a result, during normal operations, including expected operational occurrences; no radioactive gaseous and/or particulate effluents will be released to the atmosphere.

A cost-benefit analysis for the reduction in dose to the population reasonably expected to be within 50 miles of the facility, based on a value of $1000 per total body man-rem and $1000 per man-thyroid rem was not calculated because of the insignificant quantities of radioactive materials released from the storage facility during normal operations, including expected operational occurrences.

IV. Environmental Assessment

The storage facility will be operated in accordance with all applicable health and safety regulations on the Federal, state, and local levels. The facility is located well within the Oyster Creek site boundary and should therefore offer no conflicts with regard to offsite land use. As such, the environmental assessment deals with the effect of facility operation on site personnel and the effect of airborne and liquid facility emissions on the general public.

No significant effect on air or water quality is expected to occur during the operation of the facility. No dust, particulate, chemical, or radioactive emissions will be beyond acceptable release limits and safety levels as the result of normal operations or accident conditions (see Section V – Safety Analysis for discussion of airborne radioactivity releases).

Soil erosion and sedimentation control will be accomplished by ground cover consisting of bituminous concrete pavement, aggregate cover, or seeding and mulching.

All potentially radioactive liquids will be monitored and transferred to the Radwaste Building for further treatment.

Noise generated as a result of the operation of the facility will be minimal and will have little or no effect on operating personnel or the general public.

V. Safety Analysis

Due to facility and container design and strict operational controls, the possibility of a major component malfunction or a human error which would cause a serious accident is remote. However, a safety analysis has been performed to demonstrate that the consequences of postulated failures or accidents are minimal. The accidents are divided into five categories: (1) handling and storage accidents, (2) fire, (3) degradation of containers and/or waste, (4) flooding and (5) other accidents.

A. Handling and Storage Accidents

Handling and storage accidents include accidents or collisions involving cranes, lifting slings/cables, transport vehicles, cell covers, liners, drums, DAW storage boxes, or radioactive contaminated components, materials, or equipment.

The potential for drop accidents is minimal due to the operating and design features which are incorporated into the crane design. Container lifting devices are designed to remain engaged until an operator initiates an electrical or mechanical force to release them. The control switches which activate and deactivate the lifting devices are totally segregated from those that position the trolley and crane, thus reducing the possibility for operator error. In addition, lifting heights, travel times and travel distances will be minimized to further reduce the possibility of a drop accident.

If the contents of a storage container are spilled, all normal materials handling activities will be stopped. Cleanup operations will be performed in accordance with established procedures.

Overhead crane and transport vehicle collisions are not expected to occur due to the slow travel speeds of the crane.

For the main and auxiliary hoists, positive lock on load is maintained on loss of electrical power. Redundant hoist drives are available to restore the crane to a safe condition if a primary hoist drive fails. The redundant drives enable the operator to lay down the load in a safe area and move the crane to the Truck Bay for repair. Bridge rail end stops limit the travel of the crane bridge so that the load cannot hit the end walls. The crane also has an electronic control system which permits the programming of preset index points and interference blocks. A readout indication of load weight is provided on the control panel with overload protection interlocks incorporated.

Transport vehicle collision with the storage facility is possible. However, no impact is anticipated on the structural integrity or the shielding capabilities of the facility due to the strength of the building structure and the slow speeds which will be maintained by the transporter vehicle as it approaches the Truck Bay.

System failures within the facility, though not anticipated, would not impair the overall integrity of the facility. Failure of normally operating systems, such as lighting, ventilation or electrical systems, would not affect the safe storage capability of the facility. However, a storage cell could be uncovered for some period of time while failed services are being restored. In this situation, the maximum possible offsite dose rate at the nearest residence is well within 10CFR100 criteria.

The design of the material handling system and the method of storage and support of the waste containers within the concrete storage cells make it unlikely that an event would occur involving the rupture to a waste container. However, two types of events have been postulated to occur within the confines of the facility. Event #1 involves the rupture of a single liner in the Truck Bay area or on top of the cell covers. Event #2 involves the rupture of six (6) liners in a cell below the cell covers. It is assumed that the lifting device has failed for each event. Review of the isotopic composition of the radwaste (Table II.A.1) suggests that volatilization of the radioisotopes will not occur at the ambient environmental conditions which exist at Oyster Creek. Any airborne activity would result from the dust created during liner rupture.

For Event #1, the spillage (solidification is not assumed) would be localized in a small area of the facility. The spilled radwaste would be collected and repackaged by use of established plant Radiological Controls procedures and temporary shielding as necessary for storage. The local area would then be decontaminated.

For Event #2, the spillage (solidification is not assumed) would be contained within the Cell Storage Area and not released to the environment. The cell would be covered immediately to minimize skyshine radiation and a subsequent decontamination plan would be developed after visual inspection by a remote camera. The design of specialized lifting grapples may be required to remove the damaged liners. This activity would be performed as convenience allows. Repackaging of the radioactive waste would be accomplished by the use of established plant procedures and temporary shielding as necessary.

Any flushing or washing operation required in the decontamination effort will result in the water being deposited in the facility sump. This water will be monitored, sampled and disposed of accordingly.

Based on the radwaste isotopic composition, design of the facility, and the distance to the nearest residence, the radiological consequences of the two proposed accidents are only a small fraction of the limits of the Oyster Creek Technical Specification for radiological effluents and 10CFR100.

B. Fire

The occurrence of a fire in the storage facility is very unlikely because (1) most of the DAW is stored in the fire resistant containers; (2) dewatered resins and/or filter sludge contain approximately 50% water by weight as inter lattice water and require excess oxygen and an established fire with supplemental fuel to burn; (3) solidified radioactive waste is fire resistant; and, (4) dewatered filter sludge is fire resistant. In addition, the facility is equipped with a fire protection system as delineated in Section II.1.3 of this report. Because some radioactive material/equipment may not be containerized and some equipment may contain fuel or oil, a fire accident analysis was performed. It should be noted, if water or other fire fighting equipment is used in the event of a fire, the resulting liquid is contained within the facility, sampled, and disposed of according to its activity.

To demonstrate that there are no adverse offsite radiological consequences, two types of accidents due to an unspecified fire event were conservatively evaluated.

1. Cell Fire

The first accident assumes that approximately 440 (twice the anticipated 5 year storage requirement) liners of reactor water cleanup resins and filter sludge, located in the Cell Storage Area, are affected by a fire. No credit was taken for the mitigating effects of the fire suppression system. The total activity available for release is 8,370 curies. Assuming that a fraction (1E-4, which is 10 times the release rate identified in Table 9 of Reference 1.D.1) of the available activity is released, the total airborne activity released to the environment is 0.837 curies.

A calculation (Reference I.D.2) was performed to determine the maximum total dose commitments for various organs in four age groups (infant, child, teen and adult). The doses were determined using the Simplified Effluent Environmental Dosimetry System (SEEDS) computer code. SEEDS was used because it is the GPUN-approved code employed in performing the annual effluent dose report as submitted to the NRC.

It was conservatively assumed that the radioactive material released due to the fire is immediately available for a ground level release to the environment and no credit was taken for plateout, fallout, deposition or radioactive decay during transit.

The atmospheric diffusion coefficient (X/Q) at the Exclusion Area Boundary (EAB) used by SEEDS was adjusted by a factor of 100 to conform to the peak, short term accident, ground level release as given in Section 2.3.4 of the Oyster Creek FSAR (4.1E-03 sec/m3).

The committed doses at the site boundary are shown in the chart below.

ORGAN	TOTAL DOSE COMMITMENT (mRem)			
	INFANT	CHILD	TEEN	ADULT
BONE	9.45E+03	2.36E+04	3.00E+04	2.85E+04
LIVER	2.92E+03	7.18E+03	8.30E+03	7.39E+03
TOTAL BODY	4.62E+02	1.15E+03	1.39E+03	1.31E+03
THYROID	2.36E-04	4.11E-04	4.64E-04	4.61E-04
KIDNEY	2.42E+03	5.68E+03	8.37E+03	7.90E+03
LUNG	2.51E+03	3.70E+03	4.16E+03	2.45E+03
GI-LLI	1.52E+00	4.43E+00	1.16E+01	1.25E+01

The doses shown are less than 10% of the dose limitations of 10CFR100 (25 Rem whole body and 300 Rem thyroid).

2. DAW Fire

The second accident assumes a total of 686 containers of DAW are stored in the facility and are affected by a fire, with no mitigation from the fire protection system. Each container holds 0.144 curies as determined by the RADMAN Package Characterization computer program, assuming a contact dose rate of 80 mR/hr. The total activity is 98.8 curies.

Of this, 2.5% or 2.47 curies actually becomes airborne (Reference 1.D.1, Table 10). Sn113, identified in the characterization report, has been omitted from the dose commitment calculation because of low abundance and short half life.

A similar calculation using SEEDS was performed assuming a release of 2.47 curies during a DAW fire as discussed above. The committed doses at the site boundary are shown in the table below.

DAW FIRE

ORGAN	TOTAL DOSE COMMITMENT (mRem)			
	INFANT	CHILD	TEEN	ADULT
BONE	5.20E+02	1.28E+03	1.53E+03	1.44E+03
LIVER	1.31E+02	2.89E+02	3.38E+02	2.96E+02
TOTAL BODY	2.36E+01	5.83E+01	7.46E+01	7.54E+01
THYROID	2.22E-03	3.46E-03	3.64E-03	3.33E-03
KIDNEY	8.49E+01	2.08E+02	2.98E+02	2.77E+02
LUNG	9.35E+02	1.46E+03	1.78E+03	1.20E+03
GI-LLI	6.50E+00	1.90E+01	5.09E+01	5.58E+01

These doses are less than 10% of the 10CFR 100 limits.

C. Degradation of Containers and/or Waste

An evaluation of the potential for accidental release and/or container failure resulting from container or solidified waste degradation was made. The evaluation considered:

- Physical, chemical, and radiological characteristics of the waste.

- Changes in the physical and chemical characteristics of the waste which might be expected to occur (decomposition, gas generation, acid production, etc.).

- Physical and chemical characteristics of the container material.

- Compatibility of the container material to the waste forms and environmental conditions external to the containers.

Of the various types of radwaste and radioactive contaminated material/equipment stored in the facility, the degradation of resins would result in the worst case scenario. Due to the varieties of different synthetic organic resins used in condensate and reactor water cleanup systems, an average resin was used for the analysis. The resins are assumed to have the following properties:

- Deep bed demineralizers (reactor water cleanup and condensate) are 50% anion and 50% cation ion exchange resins.

- Dewatered spent resins are 44.5% water by weight. (This water is trapped inside the resin beads and is released if the beads are broken.)

- The amount of water that is free standing in the dewatered resins is ½% by volume.

- Resin compositions are:

  anion: dry weight – 45 lbm/ft^3, quarternary ammonium polystyrene.

  cation: dry weight – 45 lbm/ft^3, sulfuric polystyrene.

Based on the worst case liner, including abnormal waste, the integrated dose to the resins was calculated to be:

INTEGRATED DOSE FROM BETA AND GAMMA

TIME (YRS)	DOSE RATE (RADS)
1	$\leq 1.5 \times 10^6$
5	$\leq 4.6 \times 10^6$
10	$\leq 7.8 \times 10^6$

These dose rates are less than the threshold value where significant resin degradation occurs (approximately 1.0×10^8 rads). There will be no significant gas production and no production of freestanding water with a partially high acidic content, thus precluding the possibility of an explosive gas mixture or corrosion problems.

The threshold for perceptible damage to the liners (assuming polyethylene) is 1.0×10^8 rads. The absence of any significant quantities of freestanding water in the spent resins precludes the likelihood of internal acid attack.

In the improbable event that a liner did leak during the time that it was stored in a concrete cell, the leakage would be contained and detected in the sump and drain system. The liners within a cell can be transported remotely from the cell to just outside the local control room where they can be visually inspected for damage, degradation or leakage without significant dose to the operator.

D. Flood Analysis

The maximum probable flood elevation defined in the Oyster Creek Facility Description and Safety Analysis Report (FDSAR) is +23 feet msl (mean sea level). Finished grade surrounding the facility is set at approximately +25 feet msl. Therefore, the facility is protected against floodwaters by the final grade being set higher than the maximum probable flood level. As a result, the radiological consequences of a flood are negligible.

E. Other Accidents

The radiological consequences from other design basis events (tornado, seismic, roof collapse due to snow loading) were not analyzed for the following reasons:

(a) The probability of occurrence is very low.

(b) In the event of a tornado, it is assumed that only the DAW and radioactive contaminated material/equipment stored in the DAW Storage Area and on the Cell Deck would be released from the facility as a radiation source (liners would remain intact in the Cell Storage Area). Administrative controls require that only DAW ≤80 mr/hr contact dose rate be stored in the DAW Storage Area and on the cell deck, unless shielded.

From Table II.A.I, based on a five year capacity, the total curies available for release is 464.5 curies, which consists of 686 boxes of compactible radwaste and 64 boxes of non-compactible radwaste. Of the total of 750 boxes of DAW, approximately 78 percent have a contact dose rate less than 10 mr/hr.

In addition to the 750 boxes, radioactive contaminated material/equipment, with a contact dose rate not exceeding 80 mrem/hr is also available for release.

The number of curies released to the environment and the area over which the radwaste would be distributed is dependent upon the following factors:

1. Number of containers removed form the facility and breached/ruptured

2. Amount of radioactive contaminated material/equipment removed from the facility

3. Tornado duration

4. Tornado intensity

5. Tornado path

Integrated dose would be dependent upon the following factors:

1. The number of DAW containers or radioactive contaminated material/equipment present

2. Radwaste dose rate

3. Time spent by an individual in the area of the radwaste or radioactive contaminated material/equipment

It is highly unlikely that after an accident of this magnitude, the radwaste would be allowed to remain in this state for the time required for an individual to accumulate an appreciable dose. Therefore, it is concluded that the radiological consequences of a tornado are less severe than the limitations of 10CFR100.

(c) In the event of a seismic occurrence, it is postulated that the following will occur:

- The roof and walls above the cell covers of the Cell Storage Area could collapse as well as a number of cell covers. The exterior 36 inch walls of the building would remain intact.

- The roof and walls of the DAW storage area could collapse.

Due to the nature of the stored waste and container design, it is highly improbable that a significant amount of radioactive material could become airborne and carried offsite, since there is not mechanism to produce the airborne material. Therefore, it is concluded that the radiological consequences of a seismic event are insignificant.

(d) In the event of a roof collapse due to snow loading, it is postulated that the following will occur:

- The roof and walls above the cell covers of the Cell Storage Area could collapse as well as a number of cell covers. The exterior 36 inch walls of the building would remain intact.

- The roof and walls of the DAW storage area could collapse.

Due to the nature of the stored waste and container design, it is highly improbable that a significant amount of radioactive material could become airborne and carried offsite, since there is no mechanism to produce the airborne material. Therefore, it is concluded that the radiological consequences of a roof collapse due to snow loading are insignificant.

F. 10CFR50.59 Evaluation

NRC Generic Letter 81-38 states that a licensee may provide additional low level radwaste storage under 10CFR50.59 (without applying for a license) if (1) existing license conditions or technical specifications do not prohibit increased storage, (2) no unreviewed safety question exists, and (3) the increased storage capacity does not exceed the generated waste projected for a five-year period (this last criteria having been subsequently withdrawn by the NRC). The facility at Oyster Creek meets these three requirements.

NRC-OIE Circular No. 80-18 provides guidance for performing safety evaluations for changes to radioactive waste treatment systems. This circular is used as a guide for the 10CFR50.59 evaluation of this facility.

It can be determined from the description of the Oyster Creek facility and its associated systems and from the safety analysis portion of this report that the operation of this facility does not involve an unreviewed safety question. No safety-related components are related to or affected by the operation of the storage facility. No testing or experimentation will be performed that will in any way differ or be less conservative than any previously described in the Oyster Creek Facility Description and Safety Analysis Report. The facility is intended solely for the storage of low level radioactive waste or radioactive contaminated components, materials and equipment; no processing (other than assembly of contaminated equipment to be removed from the facility or compaction of DAW) or experimentation will be performed. Therefore, there is no probability to increase the occurrence or the consequences of an accident or malfunction of equipment important to safety; nor is there a possibility for an accident or malfunction of a different type than previously evaluated in the SAR.

The potential for safety hazards has been minimized by the design of the facility. Remote control operation of the cell storage area provides for personnel safety as well as minimal radiological exposure. The overhead crane is designed to preclude a drop accident in the event of power loss or drive mechanism failure (see Section V.A). Stacking platforms and standoff pads for the liners and the DAW containers provide stability during transfer and storage within the facility. The only possible source of airborne radioactive contamination would result from future waste compaction operations within the DAW Compaction Area. This contamination will be controlled by a filtered ventiiation system. All possible contaminated liquid will be collected, monitored and process by the facility sump and drain system (see Section II.E) prior to discharge.

The actions taken in the design of the facility to preclude, mitigate, or control potential hazards include:

1. Shielding (building, internal walls and cell covers).

2. A majority of the waste containers are in a shippable form and are suitable for burial at an ultimate waste repository.

3. Shielded control room.

4. Remote operating capability in Cell Storage Area (overhead bridge crane, CCTV).

5. Stacking platforms and standoff pads for waste containers (handling and storage stability).

6. Sump and drain system (to retain all possible contaminated liquids within the facility until appropriately sampled).

7. Ventilation system associated with the waste compaction equipment.

8. Fire Protection System.

9. Radiation Monitoring System

10. Contamination Isolation and Decontamination Facilities

11. Building Structure (Design Basis Events, Section II.B.1)

Preceding discussions in this Section of this report demonstrate that technical specification limits for normal radioactive releases are not approached by even the worst case accidents that are postulated for the storage facility. The operation of this facility would in no way reduce the margin of safety defined in the basis of any Oyster Creek Technical Specification.

With regard to the seismic qualification of onsite low level radwaste storage facilities, NRC Generic Letter 81-38 states that, "while structures are not required to meet seismic criteria, protection should be afforded to ensure that radioactivity is contained safely by use of good engineering judgement". "Good engineering judgment" is implemented here by evaluating the present and future uses of the facility. Since the facility is only intended for the storage of dry low level radwaste, (stored equipment containing fuel or oil is minimal and this equipment will be in "open containers" capable of maintaining the entire liquid volume), it is felt that the modal seismic analysis that was performed for the facility (see Section II.B.1.a of this report) is sufficient to meet the intent of NRC Generic Letter 81-38.

As indicated in Section V.B.1, the waste containers were investigated for potentially explosive conditions. It was concluded that there are no sources of explosive material within the facility and that gas generation rates from the stored resin are negligible. It should also be noted from the Safety Analysis section of this report that the offsite radiological consequences of worst case unexpected accidents within the facility represent a very small fraction of the 10CFR100(<10%) offsite dose criteria.

Radiation doses to facility operating personnel will be kept to a minimum since operations involving the handling of medium to high activity wastes will be accomplished remotely from a shielded control room. After incorporating all of the 10CFR20 ALARA considerations that have been designed into the facility (shielding, remote operation, access control) along with the implementation of appropriate administrative controls, it is expected that the maximum allowable weekly dose of 300 mrem will not be exceeded.

This report is to be reviewed for 10CFR50.59 applicability according to the appropriate items included in Section 6 – Administrative Controls of the Oyster Creek Technical Specifications. The record of the 10CFR50.59 evaluation will be retained for the duration of the Oyster Creek Facility Operating License.

In conclusion, it is noted (1) that review of the Oyster Creek facility operating license including technical specifications has revealed that no conditions of the Oyster Creek operating license exist that prohibit the increased storage of low level radwaste onsite, and (2) that the Preceding discussion indicates that the operation of the storage facility dose not involve an unreviewed safety question. As such, a safety evaluation made pursuant to 10CFR50.59 is appropriate and documentation of this safety evaluation is represented by this report.

VI. Decommissioning

The low level radwaste storage facility will be considered for decommissioning in conjunction with the Oyster Creek plant-wide decommissioning effort. The reasons are as follows:

1. With the present questionable outlook for the development of additional offsite radwaste disposal facilities, it is anticipated that a continued need for onsite storage may become evident.

2. If allotted space at offsite disposal facilities becomes large enough large that extended onsite storage of low level radwaste is not needed, the onsite storage facility could be converted into strictly a short-term handling/volume reduction/transfer facility.

3. During the decontamination and disposal efforts involved with final plant-wide decommissioning operations, the onsite storage facility could be used to prepare the low level radwaste generated as part of the decommissioning effort for shipment. If the availability of offsite disposal space is a problem at the time of plant decommissioning, the onsite storage facility could retain it temporary storage status. The decommissioning effort would therefore be able to continue without imminent concern about a repository for low level radwaste. The only limitation would be the capacity of the storage facility.

After all of the low level radwaste is retrieved from the nuclear generating plant, the storage facility will be considered for decommissioning. The three options for decommissioning will be:

a. The facility could be left in its existing state.

The facility may still require periodic radiation monitoring and protection by a security force. This would be the most costly alternative in the long term. However, it would be the only option available if, after plant decommissioning, some of the remaining low level radwaste was required to remain onsite due to the lack of available offsite disposal space.

b. Any remaining radioactivity could be entombed (using a high density material) within the facility.

This facility would require a lesser degree of continued surveillance and security protection. The structure would be non-reusable and permanent.

c. Complete decontamination and/or dismantlement of the facility.

This can be done if (1) there is no low level radwaste left in the facility or (2) any remaining low level radwaste is shipped to another storage or disposal facility with sufficient storage or disposal capability.

The decontamination effort would follow the guidelines of Regulatory Guide 1.86 – Termination of Operating Licenses for Nuclear Reactors, Section C, Regulatory Position, Item 4.

Decontamination for Release for Unrestricted Use. This would eliminate further radiation surveillance requirements and the need for security protection.

After the facility has been completely decontaminated, it could be dismantled or used for another purpose (e.g., warehouse storage).

These three options represent adequate methods for decommissioning. Option c would represent the most desirable result because it would allow for future use of either the building or the land on which it was situated. However, the actual method to be used need not be chosen at this time.

VII. Facility Operation and Operational Surveillance

A. Organization and Administration of Facility

Operation of the low level radwaste storage facility will play an important role in the radwaste management program at Oyster Creek and will therefore be considered an integral part of plant operation. The personnel required to perform storage facility related activities will be provided by the Oyster Creek Radwaste Shipping Department. At this time, it is assumed that a crew of five persons will be needed to operate the facility including a Group Radwaste Shipping Supervisor, A Radwaste Operator, A Radwaste Materials Handler, a health physicist and a maintenance or lab man. This is the suggested crew makeup if the storage facility is in full operation. Fewer personnel will be required during periods of limited activity.

There is no need to reorganize plant management and operating staff or to create new management positions in order to operate the facility. Management and staff will be provided by the Oyster Creek Radwaste Operations and Radwaste Shipping Departments. The provision of staff personnel for the operation of the storage facility will in no way compromise the staff requirements for operation of the Oyster Creek reactor (See Oyster Creek Technical Specifications, Figure 6.2.2 – Onsite Organization).

Previous experience in the handling of low level radwaste provides evidence that the operating staff at Oyster Creek is capable of conducting the operation of the storage facility in a safe manner and in accordance with regulatory requirements. The skills required to operate the storage facility (crane operation, forklift operation) are not complicated in nature and therefore require no special personnel qualification requirements. Training specifically geared toward the operation of the low level radwaste storage facility will be incorporated into the existing Oyster Creek Radwaste Operator Training Procedures. Crane operators will be instructed and certified separately. All plant personnel receive adequate health physics training and are aware of the actions and precautions which are to be taken when working in a contaminated or potentially contaminated area. Trained members of the plant fire brigade will be instructed as to the locations and types of fire fighting equipment located in the facility. Fire fighting strategies and procedures will be developed for use in the storage facility by the plant fire brigade.

The storage facility is located within the owner controlled area and will be maintained under the surveillance of the security force on a shift basis. The facility itself has a limited effect on the safe operation of the Oyster Creek reactor.

Radiation monitoring, sampling and protection activities associated with the storage facility will be incorporated into the duties of the plant Radiological Control Department. The storage facility presents no possible hazards which are not already controlled by existing Oyster Creek contamination control procedures.

An emergency plan is in effect and is maintained for the Oyster Creek Nuclear Generating Station. This plan will cover any emergency related situation which may be encountered at the storage facility. The facility is connected to the site paging system to provide communication to facility operating personnel in the event of a site emergency.

B. Facility Operations and Procedures

The materials handling system for the Oyster Creek onsite storage facility is capable of remote handling of low level radwaste and contaminated material/equipment with the intention of keeping operator exposures as low as possible. The facility is located in close proximity to the existing Oyster Creek Radwaste Building so as to minimize material handling and transfer times and consequent radiation exposures. The following is a discussion of the normal operations involved in transportation of radwaste to, storage of radwaste in and shipment of waste from the facility.

1. Solidified and Dewatered Wastes

Liquid and resin waste are solidified or dewatered and packaged within the existing Oyster Creek radwaste building in large (up to 322 cubic feet) disposable liners. Prior to transfer of solidified waste to the low level radwaste storage facility, the proportions of solidification agents and waste required to produce a satisfactory monolith are verified by Oyster Creek process control procedures. After this verification, if applicable, and other appropriate container surveys are made, the filled liners are placed in a shielded transporter using appropriate procedures and handling devices.

Once loaded, the transporter proceeds to the storage facility. The transporter is backed into the Truck Bay and the Truck Bay door is closed.

The crane operator, having selected a storage location and removed the appropriate cell covers, moves the main hoist (or 15-ton auxiliary hoist) with the appropriate lifting device to a point over the transporter. Prior to the operator removing the transporter shield cover, exterior warning lights and alarm horn are manually activated from the facility control room, as required. Activation of the warning lights and alarm horn is required only for the higher activity containers to prevent personnel exposure outside the storage facility during materials handling.

At this point, depending on the activity levels (up to 50 mr/hr contact dose level) of the waste, control of the crane will be transferred to the local control station in the Truck Bay for manual operation. Appropriate administrative restrictions are enacted at this time to ensure that radiation doses to operations personnel are kept as low as possible after removal of the transporter shield cover and during transfer to the appropriate cell location. If the dose rate is too high for local manual operation, remote operation using the closed circuit TV (CCTV) would be activated. In either case, the operator would lower the main 35 ton hoist and engage the transporter shield cover. Once engaged, the cover would be raised and transported to the laydown area in the Truck Bay and stored.

The operator, having removed the transporter shield cover, positions the 15-ton auxiliary hoist or the 35-ton main hoist, depending on liner size, over the liner with the liner lifting device and engages the liner. Once the liner is engaged, it is hoisted to a fully raised position. The crane semi-automatically moves to the predetermined location and lowers the liner into the cell. Between each layer of liners is a stacking platform. The bridge crane and main hoist are used to pick up a stacking platform, return to the cell and lower it into position in the cell. After all activities have been performed, the cell cover is replaced.

Removal of the liner from the cell for shipment offsite is the reverse of the storage procedure.

2. Dry Active Waste

Dry Active Waste is normally received at the storage facility prepackaged in boxes loaded on an open flatbed or stake body truck. The truck is backed into the loading dock and the Truck Bay door is closed. The boxes containing DAW with a contact dose rate of less than or equal to 80 mr/hr are removed by forklift truck, driven to the DAW Storage Area, and stacked three high or are stored on the cell deck utilizing the 15-ton auxiliary hoist. DAW boxes with a contact dose rate of greater than 80 mr/hr are stored in the Cell Storage Area.

Retrieval of the DAW from the DAW Storage Area for truck loading and offsite shipment is the reverse of this procedure.

The containers transported to the storage facility are segregated according to their radioactivity level. Stacking height for containers is not to exceed a nominal 12 feet. The higher level (greater than 80 mr/hr) material is placed and stored in waste containers sized to fit into a cell stacking container. The containers are moved to the Truck Bay loading dock where the 35-ton hoist with stacking container grapple is used to transfer them into a storage cell.

3. Other Wastes

Items such as heat exchangers, large valves and large pipe sections may be stored either in the cells or on top of the cells in shielded containers to provide for a contact dose rat of less than or equal to 80 mr./hr. After arriving at the Truck Bay, the 15/35-ton hook is attached to the item with the appropriate bridge crane lifting beam and sling. The item is lifted by the crane and placed either in a cell or on the Cell Storage Area deck. Adequate support will be provided for those items stored on top of the cells. The maximum allowable load on the cell covers is 350 pounds per square foot. Appropriate administrative controls will be implemented in order to limit doses to facility personnel from the stored items.

4. Storage Arrangement/Limitations

To maintain facility storage arrangements within the design capabilities of the installed fire suppression systems for the DAW Area and area above the cell storage covers, the following storage limitations are imposed for these areas.

Stacked storage beyond a nominal 12 feet in height is not permitted in the DAW Storage Area or above the cell storage covers in the Cell Storage Area.

Polyethylene (or similar plastic based) high integrity containers (HICs) stored at this facility are not required to be contained in steel overpacks.

Limited quantities of flammable/combustible liquids associated with mechanical equipment is permitted provided "open containers" are utilized to contain any leakage.

Bulk storage (55 gallon drums) of flammable/combustible liquids will not be stored within this structure.

Idle wooden pallets shall be limited to a stacking height of 6 feet with a 4 stack pile separated from other piles by at least 8 feet.

Stacked storage piles do not exceed a nominal 12 feet in width, with adequate access aisles (8 feet minimum) maintained around the perimeter of adjacent piles.

Access to all Fire Protection Equipment is unobstructed.

Explosive materials will not be stored in this facility.

5. Reusable Material/Equipment

Reusable contaminated (smearable above site release limits) material/equipment shall be placed in metal or fire resistant wooden containers except during assembly or movement in or out of the facility. Reusable fixed contaminated materials/equipment may be stored without being containerized. Reusable contaminated material/equipment may be stored in the DAW Storage Area and Cell Deck Area
($\leq$ 80 mrem/hr unless shielded) or in the Cell Storage Area.

6. Onsite Radwaste Transfer

Transportation of the prepackaged radwaste and radioactive contaminated reusable materials and equipment from the existing Oyster Creek Radwaste Building to the storage facility is not required to meet the U.S. Department of Transportation criteria since it remains under plant operator control inside the site boundary. However, the requirements of 10CFR20, Regulatory Guide 8.8, Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Station will be As Low As Reasonably Achievable (ALARA), and 40CFR190 dictate that shielding and special precautions similar to DOT requirements be applied as necessary to minimize personnel exposure (see Section III of this SER for further details on the radiological assessment of onsite transfer).

7. Offsite Shipment

The packaged radwaste is transported to the Truck Bay from the Cell and DAW Storage Areas by performing the reverse of the installation procedures. The radwaste is then shipped offsite under the direction of the Radwaste Shipping Department by use to the appropriate existing radwaste offsite shipping procedures.

8. Records Maintenance

The Oyster Creek Radwaste Shipping Department will be responsible for record keeping. A records storage area is maintained within the Oyster Creek storage facility Service Head adjacent to the facility control room. The following records will be maintained with regard to radwaste storage:

1) Date of Storage

2) Type of Waste Stored

3) Amount of Waste Stored

4) Identification of the Particular Waste Container

5) Location of the Waste Container/material/equipment

6) Radiation Level

7) Date of Shipment or approximate length of storage

Maintenance of this information is important not only from an inventory standpoint but from a health physics standpoint when considering optimum storage configurations to limit personnel exposures. Records of periodic container inspection and evaluation will also be maintained in this area. The records will be kept in fire-resistant file units.

9. Surveillance and Monitoring

Sufficient surveillance and monitoring activities will be performed to ensure that operation of the facility has little or no effect on the health and safety of the public. These activities are also intended to promote operations personnel safety and to maintain occupational doses as low as is reasonably achievable.

Contamination control at the storage facility involves:

1) personnel monitoring and access control (designation of radiation area, Radiation Work Permits – RWP),

2) facility contamination monitoring (surface, air, sump/liquids, waste containers), and

3) decontamination (surface, equipment waste container, waste transporters).

The Radwaste Operations Department will also supervise the integrity monitoring of the radwaste containers. A representative sample of DAW storage containers and solidified and dewatered waste storage containers will be examined quarterly for signs of swelling, breach or corrosion. Containers will be inspected manually or via the closed circuit television system depending on radiation levels. It is expected that the contents of and storage conditions related to the waste storage containers will have little or no effect on safe storage capability for both DAW and solidified or dewatered waste. Operations and controls with regard to waste solidification and dewatering packaging of solidified/dewatered material at Oyster Creek are delineated in Section 11.4 of the Oyster Creek UFSAR.

The sump and drainage system has been designed with the capability for manual sampling of chemical content and radioactivity levels. The sump contents will be sampled and properly disposed of when a level of one-half full or more is indicated. Sump level indication and alarms are provided locally and in the facility control room to indicate this condition. Contaminated liquids will be pumped to a portable tank or a demineralizer system in the Truck Bay. The tank will then be transported for processing of its contents to the nearby Oyster Creek Radwaste Building. Non-Contaminated liquids will be released to the normal site drainage discharge system.

The sump level is continuously displayed via local indication in the facility's control room. The sump level system continuously monitors the sump to detect a high level condition (> 90% full). If sump level increases over 90% full, an alarm will annunciate in the New Radwaste Building Control Room.

Overhead bridge crane and forklift maintenance and surveillance is performed according to the manufacturers recommendations. The crane system is accessible for maintenance and repair in the Truck Bay where personnel exposure will be minimized.

Routine patrols by facility operations personnel or by security personnel (when the facility is not in use) will provide adequate fire surveillance to complement the facility fire detection system. In addition, fire detection system alarms will sound in the Oyster Creek Radwaste Building control room as well as in the facility control room.

Fire protection system and radiation monitoring system equipment surveillance will be performed in a manner and on a schedule similar to that performed on like systems in the plant.

The existing Oyster Creek environmental monitoring program will provide sufficient information to determine the environmental effects of the low level radwaste storage facility on the surrounding area.

C. 10CFR50 Appendix A Evaluation

As discussed in NUREG-0800 Appendix 11.4.A, "Design guidance for Temporary Onsite Storage of Low Level Radioactive Material" and NRC Generic Letter 81-38, "Storage of Low Level Radioactive Wastes at Power Reactor Sites", all potential release pathways of radionuclides shall be controlled if feasible and monitored per 10CFR50 Appendix A, specifically General Design Criteria 60 & 64. Surveillance programs should incorporate adequate methods for monitoring breach of container integrity or accident releases.

Due to the nature of the waste material which will be stored in the facility, the storage containers which will contain most of the radwaste material and the design of the facility itself, the releases of radioactive material during normal operations, expected operational occurrences, and accidental or off-normal occurrences is considered to be negligible.

The DAW Compaction Area and Truck Bay are the only areas in the facility where the processing or handling of non-shippable waste may occur. In order to mitigate the release of radiation from DAW manipulation activities, a filtered (HEPA) ventilation system is installed to collect air particulates which may be generated during the DAW compaction process.

The radwaste material, stored in shippable form, consists of solidified and/or dewatered filter sludge, solidified evaporator bottoms, dewatered and/or solidified resins, and compactible and non-compactible DAW.

The containers which are used in the facility to store low level shippable radioactive waste are designed to preclude or mitigate the occurrence of an uncontrolled release of radioactive materials resulting from handling, transportation, or storage. Structural integrity and containment capability of the waste will be maintained for a period of at least 10 years withstanding chemical and metallurgical attack from building environmental conditions and conditions inside the container.

Section V.B.2, Safety Analysis for the Degradation of Containers and/or Waste, evaluates the potential for accidental release and/or container failure.

Reusable fixed radioactive contaminated equipment/material and components may be temporarily stored in the facility without being containerized. Reusable (smearable > site release limits) contaminated equipment/material will be placed in metal or fire resistant wooden containers except during assembly or movement in or out of the facility. All stored equipment containing oil or fuel will be in "open containers" capable of maintaining the entire liquid volume.

This facility was designed to contain any contaminated leakage which may occur within its boundaries and to facilitate the identification and treatment of any such leakage. The cell storage concept provides for the localization of any spills and leaks in that area. Should leakage or spillage occur within a cell, individual cell sampling will indicate which cell will require unloading in order to detect the faulty storage container.

Storage bays within the DAW Storage Area are divided by trench drains connected to a small sump which leads to the facility sump. Liquids in the small sump may be removed by a portable pump or drained to the main facility sump. The entire area is depressed 6" from adjacent floors to provide for containment of water.

The truck bay has a liquid catch basin that leads to the facility sump so that precipitation runoff from the transport vehicle will be contained for analysis. Alternately, the liquid will be sampled and pumped into a portable tank or a demineralizer system and transferred to the new radwaste building. Should decontamination of the transport vehicle be necessary, it can be performed in the Truck Bay.

Curbing around the container survey/swipe decontamination area will contain any liquids resulting from decontamination operations and/or the fire protection system. Contaminated material will be collected in the drain system and be delivered to the sump.

The primary function of the facility sump and drain system is to ensure containment of any contaminated liquids or potentially contaminated liquids resulting from facility operations or from accident conditions. The system consists of gravity drains, a concrete sump tank, a sump pump, and associated piping, valves, and controls. All leakage or spillage due to equipment or container malfunction will be contained and collected in such a manner that the potential for the release of radioactivity is kept to a minimum and the amount of radioactivity which may be released in an accident condition is well below regulatory limits. A more detailed account is described in Section II.E, Facility Design Description – Sump and Drain System.

Building ventilation is provided by roof ventilators above the Cell and DAW Storage Area. A HEPA filtered ventilation system is provided for the DAW Compaction Area. It has been determined that charcoal filtration is not necessary for the safe operation of the storage facility due to the forms of waste which are stored and the containers which prevent radioactive releases to the environment.

The radiation monitoring system consists of 14 area radiation monitors located throughout the facility to measure normal and off-normal occurrences. Alarms are located throughout the facility which will sound in the event of a high radiation trip. Remote alarms are located in the radwaste building control room.

Based on the preceding analysis, the 10CFR50 Appendix I Evaluation (Section III.D), and the Safety Analysis (Section V), the requirements of 10CFR50 Appendix A, whose intent is described in NUREG 0800 and NRC Generic Letter 81-38, have been fulfilled.

VIII. Quality Assurance

A quality assurance program has been established to provide overall quality assurance for the design, procurement, manufacturing, installation or construction, and initial startup and test phases of the Oyster Creek Nuclear Generating Station Low Level Radwaste Storage Facility. The scope of the program includes these structures, systems components and activities which ensure that the facility performs its intended function.

Since the impact of this facility on safety is limited, the extent to which 10CFR50 Appendix B has been applied has been similarly restricted. In particular, the requirements of Regulatory Position C.6 of USNRC Regulatory Guide 1.143, "Design Guidance for Radioactive Waste Management Systems, Structures and Components Installed in Light Water Cooled Nuclear Power Plants", will be applied to the contaminated waste water sump system. The remainder of the facility is maintained under standard industrial quality assurance requirements.

To meet the above commitments to Reg. Guide 1.143, the excavation, forming, rebar placement, pouring and backfilling of the LLRW Storage Facilities foundations (including the facilities sump) were conducted under the supervision of a GPUN sit construction manager, as well as having these activities surveilled by a GPUN site QC inspector. These QC inspections/testing were accomplished to insure that the contractors work when accomplished met or exceeded the highest commercial standards.

The balance of the facility was constructed using the contractor's commercial quality standards under the supervision of the GPUN site construction manager.

TABLE II.A.1 Page 1 of 6
DESIGN STORAGE REQUIREMENTS FOR OYSTER CREEK

WASTE TYPE: DEWATERED FILTER SLUDGE

CONTAINERS		
VOL. (ft3)	VOL. (ml)	NO.
170	4814400	178
80	2265600	6

COMPOSITION µCi/ml	
H-3	1.07E-02
Fe-55	1.95E+00
Ni-59	1.82E-04
Ni-63	2.66E-02
Sr-90	8.92E-04
Tc-99	3.78E-04
Mn-54	2.70E-01
Co-58	1.95E-02
Co-60	1.52E+00
Zn-65	1.42E-02
Pu-238	2.56E-02
Pu-239/240	8.36E-03
Am-241	5.15E-02
Cm-243/244	3.36E-02
U-234	3.21E-02
Cs-134	9.22E-03
Cs-137	6.35E-01
Co-57	6.32E-04

ISOTOPE	TOTAL ACT. (µCi	TOTAL ACT. (Ci)
H-3	9.31E+06	9.31E+00
Fe-55	1.70E+09	1.70E+03
Ni-59	1.58E+05	1.58E-01
Ni-63	2.32E+07	2.32E+01
Sr-90	7.77E+05	7.77E-01
Tc-99	3.29E+05	3.29E-01
Mn-54	2.35E+08	2.35E+02
Co-58	1.70E+07	1.70E+01
Co-60	1.32E+09	1.32E+03
Zn-65	1.24E+07	1.24E+01
Pu-238	2.23E+07	2.23E+01
Pu-239/240	7.28E+06	7.28E+00
Am-241	4.48E+07	4.48E+01
Cm-243/244	2.93E+07	2.93E+01
U-234	2.79E+07	2.79E+01
Cs-134	8.03E+06	8.03E+00
Cs-137	5.53E+08	5.53E+02
Co-57	5.50E+05	5.50E-01
TOTALS:	4.01E+09	4.01E+03

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TABLE II.A.1 Page 2 of 6
DESIGN STORAGE REQUIREMENTS FOR OYSTER CREEK

WASTE TYPE: DEWATERED RESINS

CONTAINERS		
VOL. (ft3)	VOL. (ml)	NO.
170	4814400	31
80	2265600	6

COMPOSITION µCi/ml	
H-3	2.74E-02
Fe-55	6.14E-01
Ni-59	7.09E-05
Ni-63	8.05E-03
Sr-90	3.32E-04
Tc-99	3.78E-04
Mn-54	3.96E-02
Co-58	1.85E-03
Co-60	2.42E-01
Fe-59	8.13E-04
Pu-238	8.19E-03
Pu-239/240	3.07E-03
Am-241	1.73E-02
Cm-243/244	4.94E-03
U-234	1.14E-02
Cs-134	9.64E-04
Cs-137	7.72E-02

ISOTOPE	TOTAL ACT. (µCi)	TOTAL ACT. (Ci)
H-3	4.46E+06	4.46E+00
Fe-55	1.00E+08	1.00E+02
Ni-59	1.15E+04	1.15E-02
Ni-63	1.31E+06	1.31E+00
Sr-90	5.41E+04	5.41E-02
Tc-99	6.16E+04	6.16E-02
Mn-54	6.45E+06	6.45E+00
Co-58	3.01E+05	3.01E-01
Co-60	3.94E+07	3.94E+01
Fe-59	1.32E+05	1.32E-01
Pu-238	1.33E+06	1.33E+00
Pu-239/240	5.00E+05	5.00E-01
Am-241	2.82E+06	2.82E+00
Cm-243/244	8.04E+05	8.04E-01
U-234	1.86E+06	1.86E+00
Cs-134	1.57E+05	1.57E-01
Cs-137	1.26E+07	1.26E+01
TOTALS:	1.72E+08	1.72E+02

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TABLE II.A.1 Page 3 of 6
DESIGN STORAGE REQUIREMENTS FOR OYSTER CREEK

WASTE TYPE: COMPACTED DRY ACTIVE WASTE

CONTAINERS		
VOL. (ft3)	VOL. (ml)	NO.
100	2832000	686

COMPOSITION (mCi) 1 BOX		
ISOTOPE	COL1*	COL2*
H-3	7.63E-01	1.31E+01
Fe-55	2.12E+01	3.64E+02
Ni-59	8.62E-03	1.48E-01
Ni-63	1.01E+00	1.73E+01
Sr-90	2.85E-01	4.89E+00
Cr51	8.46E+00	1.45E+02
Mn-54	5.80E+00	9.95E+01
Co-58	2.94E+00	5.04E+01
Co-60	7.87E+01	1.35E+03
Zn-65	1.66E+00	2.85E+01
Pu-238	9.55E-03	1.64E-01
Pu-239/240	3.61E-03	6.19E-02
Am-241	1.31E-02	2.25E-01
Cm-243/244	1.30E-02	2.23E-01
Ag110m	1.88E+00	3.22E+01
Cs-134	4.37E-01	7.50E+00
Cs-137	2.00E+01	3.43E+02
Co-57	5.57E-02	9.55E-01
Sr89	1.91E-01	3.28E+00
Sn113	5.63E-03	9.66E-02
Ce141	1.35E-01	2.32E+00
Cm242	2.12E-03	3.64E-02
Ce144	1.42E-01	2.44E+00
Pu241	2.08E-01	3.57E+00
	1.44E+02	2.47E+03

ISOTOPE	TOTAL ACT. (Ci)
H-3	1.31E-02
Fe-55	3.64E-01
Ni-59	1.48E-04
Ni-63	1.73E-02
Sr-90	4.89E-03
Cr51	1.45E-01
Mn-54	9.95E-02
Co-58	5.04E-02
Co-60	1.35E+00
Zn-65	2.85E-02
Pu-238	1.64E-04
Pu-239/240	6.19E-05
Am-241	2.25E-04
Cm-243/244	2.23E-04
Ag110m	3.22E-02
Cs-134	7.50E-03
Cs-137	3.43E-01
Co-57	9.55E-04
Sr89	3.28E-03
Sn113	9.66E-05
Ce141	2.32E-03
Cm242	3.64E-05
Ce144	2.44E-03
Pu241	3.57E-03
TOTAL:	2.47E+00

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TABLE II.A.1 Page 4 of 6
DESIGN STORAGE REQUIREMENTS FOR OYSTER CREEK

WASTE TYPE: NONCOMPACTABLE DRY ACTIVE WASTE

CONTAINERS		
VOL. (ft3)	VOL. (ml)	NO.
100	2832000	82

COMPOSITION µCi/ml		
ISOTOPE	COL1*	COL2*
H-3	1.07E-02	4.62E-03
Fe-55	1.95E+00	8.42E-01
Ni-59	1.82E-04	7.86E-05
Ni-63	2.66E-02	1.15E-02
Sr-90	8.92E-04	3.85E-04
Tc-99	3.78E-04	1.63E-04
Mn-54	2.70E-01	1.17E-01
Co-58	1.95E-02	8.42E-03
Co-60	1.52E+00	6.57E-01
Zn-65	1.42E-02	6.13E-03
Pu-238	2.56E-02	1.11E-02
Pu-239/240	8.36E-03	3.61E-03
Am-241	5.15E-02	2.22E-02
Cm-243/244	3.36E-02	1.45E-02
U-234	3.21E-02	1.39E-02
Cs-134	9.22E-03	3.98E-03
Cs-137	6.35E-01	2.74E-01
Co-57	6.32E-04	2.73E-04

ISOTOPE	TOTAL ACT. (µCi	TOTAL ACT. (Ci)
H-3	1.07E+06	1.07E+00
Fe-55	1.96E+08	1.96E+02
Ni-59	1.83E+04	1.83E-02
Ni-63	2.67E+06	2.67E+00
Sr-90	8.95E+04	8.95E-02
Tc-99	3.79E+04	3.79E-02
Mn-54	2.71E+07	2.71E+01
Co-58	1.96E+06	1.96E+00
Co-60	1.52E+08	1.52E+02
Zn-65	1.42E+06	1.42E+00
Pu-238	2.57E+06	2.57E+00
Pu-239/240	8.39E+05	8.39E-01
Am-241	5.17E+06	5.17E+00
Cm-243/244	3.37E+06	3.37E+00
U-234	3.22E+06	3.22E+00
Cs-134	9.25E+05	9.25E-01
Cs-137	6.37E+07	6.37E+01
Co-57	6.34E+04	6.34E-02

TOTALS:	4.62E+08	4.62E+02

* The values in Column 1 are from the 1998 10CFR61 analysis for filter sludge, which has a density of approximately 1 gm/cc. The Column 2 value is adjusted based on the ratio of the density of filter sludge to the assumed density of noncompactable waste, which is 27 lbs/cu.ft. or 0.432 gm/cc. Densities on pages 4, 5 and 6 are based on historical weights and volumes of materials shipped and/or packaged.

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TABLE II.A.1 Page 5 of 6
DESIGN STORAGE REQUIREMENTS FOR OYSTER CREEK

WASTE TYPE: CONTAMINATED EQUIPMENT

CONTAINERS		
VOL. (ft3)	VOL. (ml)	NO.**
100	2832000	125

COMPOSITION µCi/ml		
ISOTOPE	COL1*	COL2*
H-3	1.07E-02	7.71E-03
Fe-55	1.95E+00	1.41E+00
Ni-59	1.82E-04	1.31E-04
Ni-63	2.66E-02	1.92E-02
Sr-90	8.92E-04	6.43E-04
Tc-99	3.78E-04	2.73E-04
Mn-54	2.70E-01	1.95E-01
Co-58	1.95E-02	1.41E-02
Co-60	1.52E+00	1.10E+00
Zn-65	1.42E-02	1.02E-02
Pu-238	2.56E-02	1.85E-02
Pu-239/240	8.36E-03	6.03E-03
Am-241	5.15E-02	3.71E-02
Cm-243/244	3.36E-02	2.42E-02
U-234	3.21E-02	2.31E-02
Cs-134	9.22E-03	6.65E-03
Cs-137	6.35E-01	4.58E-01
Co-57	6.32E-04	4.56E-04

ISOTOPE	TOTAL ACT. (µCi	TOTAL ACT. (Ci)
H-3	2.73E+06	2.73E+00
Fe-55	4.98E+08	4.98E+02
Ni-59	4.65E+04	4.65E-02
Ni-63	6.79E+06	6.79E+00
Sr-90	2.28E+05	2.28E-01
Tc-99	9.65E+04	9.65E-02
Mn-54	6.89E+07	6.89E+01
Co-58	4.98E+06	4.98E+00
Co-60	3.88E+08	3.88E+02
Zn-65	3.62E+06	3.62E+00
Pu-238	6.53E+06	6.53E+00
Pu-239/240	2.13E+06	2.13E+00
Am-241	1.31E+07	1.31E+01
Cm-243/244	8.58E+06	8.58E+00
U-234	8.19E+06	8.19E+00
Cs-134	2.35E+06	2.35E+00
Cs-137	1.62E+08	1.62E+02
Co-57	1.61E+05	1.61E-01
TOTALS:	1.18E+09	1.18E+03

* The values in Column 1 are from the 1998 10CFR61 analysis for filter sludge, which has a density of approximately 1 gm/cc. The Column 2 value is adjusted based on the ratio of the density of filter sludge to the assumed density of contaminated equipment, which is 45 lbs/cu.ft. or 0.721 gm/cc. As a conservative assumption, the contamination was assumed to be dispersed througout the equipment.
** Some equipment may not be in containers.

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TABLE II.A.1 Page 6 of 6
DESIGN STORAGE REQUIREMENTS FOR OYSTER CREEK

WASTE TYPE: EVAPORATOR BOTTOMS

CONTAINERS		
VOL. (ft3)	VOL. (ml)	NO.
7.35	208152	100

COMPOSITION µCi/ml		
	COL. 1*	COL. 2*
H-3	1.07E-02	2.32E-02
Fe-55	1.95E+00	4.22E+00
Ni-59	1.82E-04	3.94E-04
Ni-63	2.66E-02	5.76E-02
Sr-90	8.92E-04	1.93E-03
Tc-99	3.78E-04	8.18E-04
Mn-54	2.70E-01	5.85E-01
Co-58	1.95E-02	4.22E-02
Co-60	1.52E+00	3.29E+00
Zn-65	1.42E-02	3.07E-02
Pu-238	2.56E-02	5.54E-02
Pu-239/240	8.36E-03	1.81E-02
Am-241	5.15E-02	1.11E-01
Cm-243/244	3.36E-02	7.27E-02
U-234	3.21E-02	6.95E-02
Cs-134	9.22E-03	2.00E-02
Cs-137	6.35E-01	1.37E+00
Co-57	6.32E-04	1.37E-03

ISOTOPE	TOTAL ACT. (µCi)	TOTAL ACT. (Ci)
H-3	4.82E+05	4.82E-01
Fe-55	8.79E+07	8.79E+01
Ni-59	8.20E+03	8.20E-03
Ni-63	1.20E+06	1.20E+00
Sr-90	4.02E+04	4.02E-02
Tc-99	1.70E+04	1.70E-02
Mn-54	1.22E+07	1.22E+01
Co-58	8.79E+05	8.79E-01
Co-60	6.85E+07	6.85E+01
Zn-65	6.40E+05	6.40E-01
Pu-238	1.15E+06	1.15E+00
Pu-239/240	3.77E+05	3.77E-01
Am-241	2.32E+06	2.32E+00
Cm-243/244	1.51E+06	1.51E+00
U-234	1.45E+06	1.45E+00
Cs-134	4.15E+05	4.15E-01
Cs-137	2.86E+07	2.86E+01
Co-57	2.85E+04	2.85E-02
TOTALS:	2.08E+08	2.08E+02

* The values in Column 1 are from the 1998 10CFR61 analysis for filter sludge, which has a density of approximately 1 gm/cc. The Column 2 value is adjusted based on the ratio of the density of filter sludge to the assumed density of dehydrated evaporator bottoms (inorganic salts with some metallic oxides at 2.165 gm/cc).

Only 208 Curies are available for release; therefore, accidents involving evaporator bottoms bounded by the filter sludge/resin scenarios.

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ATTACHMENT I

American Crane & Equipment Corp.
531 Old Swede Road, Douglassville, PA 19518
610 385-6061 FAX: 610 385-4876

Statement of Minimum Operating Temperature for ACECO Crane #1755 – GPU Nuclear Oyster Creek LLRW Storage Facility

TO: Sam Greco, System Engineer
GPU Nuclear
FAX: 609 971-4651

FROM: R. Matt Keller, Electrical Engineer
American Crane & Equipment Co.

Sam;

I used the original work order (#4778) electrical bill of material and electrical drawings to research the minimum operating temperature. The results of this research is as follows:

1) The computer, resolver electronics, weigh scale elctronics, and most of the control devices are in the operator's room which is climate controlled. This eliminates the control console from low temperature.
2) The two (2) motor control enclosures, cabinet numbers 2 & 3, have most of the motion contactors in them. These two enclosures are heated with a thermostatically controlled strip heater. This heater keeps the interior temperature warmer than the outside air temperature.
3) The Protective Panel, cabinet #1, has most of the circuit breakers in it. This enclosure are heated with a thermostatically controlled strip heater. This heater keeps the interior temperature warmer than the outside air temperature.
4) The Remote I/O cabinet #5 has all of the IMAC's input and out cards in it. This enclosure are heated with a thermostatically controlled strip heater. This heater keeps the interior temperature warmer than the outside air temperature.
5) All of the motors used to move the crane and trolley have internal strip heaters in them. These warm up the motor assembly prior to movement. The motor's temperature raises during normal use.
6) The other electrical equipment, limit switches, cable reels, pendant, local control station, CCTV cameras & tilt units, cable tender systems, and the cable itself are designed to operate at 35 degrees F and above.

American Crane & Equipment Co. states that crane #1755 can operate normally at or above 35 degrees F provided that the strip heaters and the motor heaters are functional.

R. Matt Keller, ACECO Engineering

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Remote User

U999MMJ

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06/05/13 02:36 PM

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Agenda

Oyster Creek Plant Health Committee

June 11, 2013

Attendees:

Sponsor & Chair:	Russell Peak (**)	Shift Ops. Superintendent:	Eric Swain
Coordinator:	Walter Trombley (**)	Ops. Support Manager:	S. Johnston
Operations (*):	Mike Ford (**)	Ops. Services Manager:	Joe Costic
Engineering (*):	George Malone (**)	Ops. Sr. Manager Support & Services:	Gary Flesher
Maintenance (*):	Jeff Dostal (**)	RadPro Manager:	Tony Farenga
Work Management (*):	Dave DiCello (**)	SM Design Engineering:	Howie Ray
Project Management (*):	Jay Vaccaro (**)	Eng. Programs Manager:	Cal Taylor
		Outage Manager:	Pete Bloss
(*) Required Department		Elec. Maintenance Manager:	Rick Skelskey
(**) Primary Member		Inst. Maintenance Manager:	Dave Olszewski
		Mech. Maintenance Manager:	Mike Johnson
		Maintenance CMO Manager	Phil Scallon
		Chemistry Manager	John Renda
		Environmental Supervisor	Jack Bills
		Business Operations:	Dana Ivan
		Supply Management:	John Makar

Quorum requirements states that all primary members attend.
Substitutes are discouraged. Primary members: Plant Manager, Senior Manager, Plant Engineering, Manager, Project Management, and all Directors with the exception of the Training Dept. Three Dept. Heads may substitute (Director or Manager).

Purpose: To establish actions for Plant Health Issues that are **not** being acted on satisfactorily by existing processes (i.e., Work Management, Corrective Action Program, etc.) and to ensure satisfactory resolution. *Reference: ER-AA-2001, Revision 16.*

Topics

1. Establish Quorum: PHC Coordinator, Approved by Chairman — 9:15

Remind Personnel to Secure Pagers, Cell Phones, Blackberries, etc.

2. Technical Conscience Principle Discussion (Work Management) — 9:20
3. Significant Work List Review (Tom Powell) — 9:25
4. Reactivity Management Update (Jim Frank) — 9:30
5. SSPV/SDC/LF Semi Annual Presentation (Christian Williams) — 9:35
6. 2014 Buried Pipe Inspection Program Review (Marty McAllister) — 9:45
7. Top Ten List Review (Russ Smith) — 10:10
8. PHC Excellence Review (Walt Trombley) — 10:20
9. New Plant Health Issues/Closing Discussion/Review of Actions — 10:25
10. Meeting Critique/PHC Monthly Grading Evaluation Review (Walt Trombley) — 10:30

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