UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON NUCLEAR WASTE AND MATERIALS
WASHINGTON, D.C. 20555-0001

January 10, 2008

MEMORANDUM TO: ACNW&M Members
ACNW&M Staff

FROM: Antonio Dias, Chief ***/RA/***
ACNW&M Branch

SUBJECT: CERTIFIED MINUTES OF THE 184th MEETING OF THE ADVISORY COMMITTEE ON NUCLEAR WASTE AND MATERIALS (ACNW&M) NOVEMBER 13 – 15, 2007

The proposed minutes of the subject meeting have been certified as the official record of the proceedings for that meeting.

cc: A. Bates, SECY (O-16C1)
S. Jones, NMSS (T-8A23)
D. Pelton, EDO (O-16E15)
J. Mitchell, RES
G. Deagan, FSME

CERTIFIED

Date Issued: 01/10/2008
Date Certified: 01/10/2008

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MINUTES OF THE **184th** ACNW&M MEETING

November 13-15, 2007

APPENDICES

ML073480441

MINUTES OF THE 184TH MEETING OF
THE ADVISORY COMMITTEE ON NUCLEAR WASTE & MATERIALS
NOVEMBER 13-15, 2007
Rockville, Maryland

The **184th** meeting of the Advisory Committee on Nuclear Waste & Materials was held in Conference Room 2B3, Two White Flint North Building, Rockville, Maryland, on **November 13 - 15, 2007**. Notice of this meeting was published in the *Federal Register* on **November 2, 2007** (72 FR **212**) (Appendix I). The purpose of this meeting was to discuss and take appropriate action on the items listed in the meeting schedule and outline (Appendix II). The meeting was open to public attendance.

A transcript of selected portions of the meeting is available in the NRC's Public Document Room at One White Flint North, Room 1F-19, 11555 Rockville Pike, Rockville, Maryland. Copies of the transcript are available for purchase from Neal R. Gross and Co., Inc., 1323 Rhode Island Avenue, NW, Washington, DC 20005. Transcripts are also available at no cost to download from, or review on, the Internet at http://www.nrc.gov/ACRS/ACNW.

ATTENDEES

ACNW&M Members: Dr. Michael T. Ryan (ACNW&M Chairman), Mr. Allen Croff (ACNW&M Vice Chairman), Dr. James H. Clarke, Dr. William J. Hinze, and Dr. Ruth Weiner attended this meeting. For a list of other attendees, see Appendix III.

I. Chairman's Report (Open)

[Note: Mr. Antonio Dias was the Designated Federal Official for this portion of the meeting.]

Dr. Michael T. Ryan, Committee Chairman, convened the meeting at 8:30 A.M. He announced in his opening remarks that the meeting was being conducted in accordance with the provisions of the Federal Advisory Committee Act. In addition, he reviewed the agenda for the meeting and noted that no written comments or requests for time to make oral statements from members of the public had been received. Dr. Ryan also noted that a transcript of the open portions of the meeting was being kept and speakers were requested to identify themselves and speak with clarity and volume. He discussed the items of current interest and administrative details for consideration by the full Committee.

II. Drift Degradation – Staff Review Approach and Capability

[Note: Mr. Neil Coleman was the Designated Federal Official for this portion of the meeting.]

NRC staff representatives from the Office of Nuclear Materials Safety and Safeguards (NMSS) gave a presentation about post-emplacement drift degradation at the Yucca Mountain, NV, proposed high-level waste geologic repository. The purpose of the briefing was to describe the staff's approach and capability to review the Department of Energy's (DOE's) analyses in a potential license application. NRC staff summarized the DOE underground design, as it is currently known, and then discussed the potential causes of failure of underground openings. In-situ stress conditions change because of excavation-induced mechanical stresses, thermal stresses, and earthquakes. Failure may be due to the strength of the rock being exceeded or due to excessive deformation. DOE plans to install ground support to provide stable

underground openings during pre-closure operations. NRC staff will determine the adequacy of ground support design in the context of pre-closure performance objectives. DOE takes no credit for ground support performance beyond the pre-closure period. The staff considers that the uncertainty is high in predicting long-term stability of underground openings under thermal and seismic conditions. Rockfall, drift collapse, and drift degradation could occur during the long regulatory period and impact the engineered barrier mechanical performance.

The NRC staff's review will evaluate whether DOE appropriately considered the following in their application: (1) site characteristics and material properties; (2) conceptual models and failure criteria; (3) calibrated and validated models; and (4) ranges of conditions and parameter distributions to account for uncertainty and variability. The staff review will also consider results of independent analyses regarding effects of static loads, potential drip shield-waste package interaction, and potential for damage under seismic conditions. Abstractions in TPA 5.1 consider the potential long-term impacts of drift degradation due to thermal and seismic stresses on engineered barrier performance. Secondary considerations for potential failure modes include the separation of intact drip shields, individual rockfall impacts upon drip shields, and waste package damage due to faulting events.

III. Final Proposed Design for a Geologic Repository at Yucca Mountain, Nevada

[Note: Mr. Michael Lee was the Designated Federal Official for this portion of the meeting.]

The Committee has been periodically briefed on the maturity of the DOE's geologic repository design to be used for any license application that falls under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 63, "Disposal of High-Level Radioactive Wastes in a Geologic Repository in Yucca Mountain, Nevada." In June 2008, DOE is expected to submit a license application to the NRC to obtain authorization to construct the geologic repository. At its 184th meeting, the ACNW&M was briefed on the final surface facility design to be included in the forthcoming license application. The DOE representative noted that the key features of the geologic repository operations area (GROA) physical plant have been designed around the types of waste forms expected to be received for disposal at the proposed Yucca Mountain geologic repository. The presentation also included an overview of the structural design process. It was noted that, based on updated scientific information derived from the study of additional site characterization data, the seismic design basis ground acceleration has been lowered from 0.7g to 0.5g. The DOE spokesperson noted that during the NRC staff review of the license application, DOE intends to develop a more detailed design for the purpose of establishing a baseline cost estimate. It was also noted that there were some aspects of the GROA design which were unique to a geologic repository and that detailed information on those features' performance and reliability might not be available until after a DOE procurement has been put into place. This would likely be after an NRC construction authorization decision.

Lastly, there was some discussion of the 3.0g design basis to be used by vendors fabricating the transportation-aging-disposal (TAD) canisters. The DOE speaker noted that the 3.0g value was established as a "beyond design basis event" phenomenon and was intend to ensure that dry cask storage systems would not be susceptible to overturning moments as a result of a seismic event. The concern was that TAD systems do not have radiation shielding on either the top or the bottom of the storage containers. In the event of an overturn, attempts to upright the containers could compromise worker safety.

IV. Accounting for Dose Consequence in the State-of-the-Art Reactor Consequence Analyses (SOARCA) Project

[Note: Mr. Neil Coleman was the Designated Federal Official for this portion of the meeting.]

Representatives from NRC's Office of Nuclear Regulatory Research (RES) and the Office of Nuclear Security and Incident Response (NSIR) briefed the Committee about the State-of-the-Art Reactor Consequence Analyses (SOARCA) Project. The goal of SOARCA is to develop an updated, more realistic evaluation of severe accident progression, hypothetical radiological releases, and offsite consequences for dominant accident sequences. The updated analyses would replace older analyses such as those in NUREG/CR-2239, "Technical Guidance for Siting Criteria Development," which was issued in 1982.

The SOARCA project plan would initially include not more than eight power plants that together represent the different reactor and containment design combinations operating in the United States. Full power operation would be assumed, as would existing plant improvements in design, operations, and emergency response. Sensitivity analyses would be used to assess the effectiveness of safety measures. State-of-the-art accident progression modeling would be performed based on 25 years of research to provide a best-estimate for containment performance, time of release, and fission product behavior. More realistic offsite dispersion modeling would be applied. An evaluation of public evacuation would be based on updated site-specific emergency plans.

The presenters emphasized that the hypothetical consequence analyses would need to identify potential early fatalities and also estimate latent cancer fatalities. Various options are being considered for latent cancer fatality estimates. These include: (1) using the linear no threshold (LNT) model; (2) applying a range of biological response thresholds (from 0 to 5 rem); and (3) using an estimated point value as suggested by the Health Physics Society (i.e., 5 rem in one year, 10 rem in a lifetime). No specific modeling analyses were presented to the Committee at this meeting. A Commission paper on SOARCA is currently under staff review.

V. Executive Session

[Note: Mr. Antonio Dias was the Designated Federal Official for this portion of the meeting.]

RECONCILIATION OF ACNW&M COMMENTS AND RECOMMENDATIONS WITH COMMITMENTS TO THE EXECUTIVE DIRECTOR FOR OPERATIONS (EDO)

- During its planning and procedures meeting on November 13, 2007, the Committee considered the response of the EDO, dated November 6, 2007, to comments and recommendations included in the October 2, 2007, ACNW&M letter on, "NRC Plans for Monitoring Disposal Actions for Waste Incidental to Reprocessing at U.S. Department of Energy Facilities at the Idaho National Laboratory and Savannah River Sites." The Committee was satisfied with the EDO response and decided that no follow up action was necessary.

- The Committee also agreed that, instead of writing a rebuttal letter to the EDO's response, dated August 7, 2007, on the June 28, 2007, ACNW&M letter titled, "Working Group Meeting on 10 CFR 20.1406 Minimization of Contamination and Proposed Regulatory Guide 4012," the Members would write a new letter to the Commission on the same topic but with stronger and clearer recommendations.

PROPOSED SCHEDULE FOR THE 185th ACNW&M MEETING

The Committee agreed to consider the following topics during the 185th ACNW&M meeting to be held on December 17-19, 2007:

- EPRI's Report on Drift Degradation at Yucca Mountain
- Update on NRC Rulemaking on Groundwater Protection at In-Situ Leach Uranium Mining Facilities
- Vendor's View on the TAD Performance Specifications
- Status of Operations at the Barnwell LLW Disposal Facility
- NRC 2006 Commercial LLW Strategic Planning Initiative
- Review of Planned Waste Management Activities at U.S. Department of Energy Mixed-Oxide Fuel Fabrication Facility
- Briefing on Tritium Task Force Actions to Revise the Significance Determination Process to Address Spills and Leaks

The Meeting adjourned at 5:00 PM on Thursday, November 15, 2007.

Professor Emeritus of Economics, Pennsylvania State University*

Discussion Item: The Board is examining the extent to which cost sharing impacts participation in Federal research funding opportunities.

3:15 p.m. Roundtable Discussion: Options for Revision to Board Cost Sharing Policy for NSF
Discussion Moderator: Dr. Droegemeier
4:15 p.m. Summary and Next Steps
4:30 p.m. Adjourn

* pending acceptance of invitation

Note: This roundtable discussion will not involve National Science Board deliberations and is not subject to 5 U.S.C. 552b.

Michael P. Crosby,
Executive Officer and NSB Office Director.

[FR Doc. E7–23323 Filed 11–30–07; 8:45 am]

BILLING CODE 7555–01–P

NUCLEAR REGULATORY COMMISSION

Advisory Committee on Nuclear Waste and Materials; Meeting Notice

The Advisory Committee on Nuclear Waste and Materials (ACNW&M) will hold its 185th meeting on December 17–19, 2007, at 11545 Rockville Pike, Rockville, Maryland.

Monday, December 17, 2007, Room T–2B3

8:30 a.m.–8:35 a.m.: Opening Remarks by the ACNW&M Chairman (Open)—The Chairman will make opening remarks regarding the conduct of today's sessions.

8:35 a.m.–10 a.m.: Electric Power Research Institute's Report on Drift Degradation at Yucca Mountain (Open)—A representative from the Electric Power Research Institute will summarize the approach, methods, and conclusions of their 2007 report on drift degradation.

1 p.m.–2:30 p.m.: Update on NRC Rulemaking on Groundwater Protection at the In-Situ Leach Uranium Mining Facilities (Open)—NRC staff from the Office of Federal and State Materials and Environmental Management Programs (FSME) will brief the Committee on the status of the rulemaking on groundwater protection at in-situ leach uranium recovery sites.

2:45 p.m.–3:30 p.m.: Vendor's View on the Transportation-Aging Disposal Performance Specifications (Open)—A representative from NAC International, a commercial cask vendor, will brief the Committee on their views on the Transportation-Aging-Disposal (TAD) performance specifications, possible challenges the vendor may be facing, and suggestions for expediting NRC approval of any TAD license application.

3:30 p.m.–5 p.m.: Discussion of ACNW&M Letter Reports (Open)—The Committee will discuss potential and proposed ACNW&M letter reports.

Tuesday, December 18, 2007, Room T–2B3

8:30 a.m.–8:35 a.m.: Opening Remarks by the ACNW&M Chairman (Open)–The Chairman will make opening remarks regarding the conduct of today's sessions.

8:35 a.m.–9:30 a.m.: Status of Operations at the Barnwell Low-Level Radioactive Waste Disposal Facility (Open)—The Barnwell low-level radioactive waste (LLW) disposal facility is scheduled to close to non-compact states in July 2008. A representative of the site's operator, Energy Solutions, will update the Committee on activities at this commercial disposal facility in anticipation of scaled-back operations.

9:45 a.m.–11:30 a.m.: NRC 2006 Commercial LLW Strategic Planning Initiative (Open)—Representatives from the Office of FSME will brief the Committee on their recently-issued Commission Paper (SECY–07–0180) containing specific recommendations on the scope of work to be considered in any future NRC commercial LLW program. This briefing is also expected to include a summary of the public comments received in 2005.

1 p.m.–2 p.m.: Review of Planned Waste Management Activities at U.S. Department of Energy Mixed-Oxide Fuel Fabrication Facility (Open)—NRC staff from the Office of Nuclear Material Safety and Safeguards will brief the Committee on planned waste management activities at U.S. Department of Energy's (DOE) Mixed-Oxide Fuel Fabrication Facility in Aiken, South Carolina.

2 p.m.–3 p.m.: Briefing on Tritium Task Force Actions to Revise the Significance Determination Process to Address Spills and Leaks (Open)—A representative from the Office of Nuclear Reactor Regulation will report on the revisions to its Significance Determination Process to address radioactive liquid spills and leaks in response to an action recommended in the Tritium Task Force Report.

3:15 p.m.–5 p.m.: Discussion of ACNW&M Letter Reports (Open)—The Committee will discuss potential and proposed ACNW&M letter reports.

Wednesday, December 19, 2007, Room T–2B1

8:30 a.m.–8:35 a.m.: Opening Remarks by the ACNW&M Chairman (Open)—The Chairman will make opening remarks regarding the conduct of today's sessions.

8:35 a.m.–3 p.m.: Discussion of ACNW&M Letter Reports (Open)—The Committee will continue discussion of proposed ACNW&M letter reports.

3 p.m.–4 p.m.: Miscellaneous (Open)—The Committee will discuss matters related to the conduct of ACNW&M activities and specific issues that were not completed during previous meetings, as time and availability of information permit. Discussions may include content of future letters and scope of future Committee Meetings.

Procedures for the conduct of and participation in ACNW&M meetings were published in the **Federal Register** on September 26, 2007 (72 FR 54693). In accordance with those procedures, oral or written views may be presented by members of the public. Electronic recordings will be permitted only during those portions of the meeting that are open to the public. Persons desiring to make oral statements should notify Dr. Antonio F. Dias (Telephone 301–415–6805), between 8:15 a.m. and 5 p.m. (ET), as far in advance as practicable so that appropriate arrangements can be made to schedule the necessary time during the meeting for such statements. Use of still, motion picture, and television cameras during the meeting may be limited to selected portions of the meeting as determined by the ACNW&M Chairman. Information regarding the time to be set aside for taking pictures may be obtained by contacting the ACNW&M office prior to the meeting. In view of the possibility that the schedule for ACNW&M meetings may be adjusted by the Chairman as necessary to facilitate the conduct of the meeting, persons planning to attend should notify Dr. Dias as to their particular needs.

Further information regarding topics to be discussed, whether the meeting has been canceled or rescheduled, as well as the Chairman's ruling on requests for the opportunity to present oral statements and the time allotted therefore can be obtained by contacting Dr. Dias.

Video teleconferencing service is available for observing open sessions of ACNW&M meetings. Those wishing to use this service for observing ACNW&M meetings should contact Mr. Theron Brown, ACRS/ACNW&M Audio Visual Assistant (301–415–8066), between 7:30

a.m. and 3:45 p.m., (ET), at least 10 days before the meeting to ensure the availability of this service. Individuals or organizations requesting this service will be responsible for telephone line charges and for providing the equipment and facilities that they use to establish the video teleconferencing link. The availability of video teleconferencing services is not guaranteed.

During the days of the meeting, phone number 301–415–7360 should be used in order to access anyone in the ACNW&M Office.

ACNW&M meeting agenda, meeting transcripts, and letter reports are available through the NRC Public Document Room at *pdr@nrc.gov*, or by calling the PDR at 1–800–397–4209, or from the Publicly Available Records System (PARS) component of NRC's document system (ADAMS) which is accessible from the NRC Web site at *http://www.nrc.gov/reading-rm/adams.html* or *http://www.nrc.gov/reading-rm/doc-collections/acnw* (ACNW&M schedules and agendas).

Dated: November 27, 2007.

Andrew L. Bates,

Advisory Committee Management Officer.

[FR Doc. E7–23331 Filed 11–30–07; 8:45 am]

BILLING CODE 7590–01–P

NUCLEAR REGULATORY COMMISSION

[EA–07–252]

In the Matter of All Licensees Identified in Attachment 1 and All Other Persons Who Seek or Obtain Access to Safeguards Information Described Herein; Order Imposing Fingerprinting and Criminal History Records Check Requirements for Access to Safeguards Information (Effective Immediately)

I

The Licensee identified in Attachment 1 [1] to this Order, holds a license issued in accordance with the Atomic Energy Act (AEA) of 1954, as amended, by the U.S. Nuclear Regulatory Commission (NRC or Commission), authorizing them to engage in an activity subject to regulation by the Commission or Agreement States. On August 8, 2005, the Energy Policy Act of 2005 (EPAct) was enacted. Section 652 of the EPAct amended Section 149 of the AEA to require fingerprinting and a Federal Bureau of Investigation (FBI) identification and criminal history records check of any person who is to be permitted to have access to Safeguards Information (SGI).[2] The NRC's implementation of this requirement cannot await the completion of the SGI rulemaking, which is underway, because the EPAct fingerprinting and criminal history records check requirements for access to SGI were immediately effective upon enactment of the EPAct. Although the EPAct permits the Commission by rule to except certain categories of individuals from the fingerprinting requirement, which the Commission has done (see 10 CFR 73.59, 71 FR 33,989 (June 13, 2006)), it is unlikely that licensee employees or others are excepted from the fingerprinting requirement by the ''fingerprinting relief'' rule. Individuals relieved from fingerprinting and criminal history records checks under the relief rule include Federal, State, and local officials and law enforcement personnel; Agreement State inspectors who conduct security inspections on behalf of the NRC; members of Congress and certain employees of members of Congress or Congressional Committees, and representatives of the International Atomic Energy Agency (IAEA) or certain foreign government organizations. In addition, individuals who have a favorably-decided U.S. Government criminal history records check within the last five (5) years, or individuals who have active federal security clearances (provided in either case that they make available the appropriate documentation), have satisfied the EPAct fingerprinting requirement and need not be fingerprinted again. Therefore, in accordance with Section 149 of the AEA, as amended by the EPAct, the Commission is imposing additional requirements for access to SGI, as set forth by this Order, so that affected licensees can obtain and grant access to SGI. This Order also imposes requirements for access to SGI by any person, from any person,[3] whether or not a Licensee, Applicant, or Certificate Holder of the Commission or Agreement States.

II

The Commission has broad statutory authority to protect and prohibit the unauthorized disclosure of SGI. Section 147 of the AEA grants the Commission explicit authority to issue such Orders as necessary to prohibit the unauthorized disclosure of SGI. Furthermore, Section 652 of the EPAct amended Section 149 of the AEA to require fingerprinting and an FBI identification and a criminal history records check of each individual who seeks access to SGI. In addition, no person may have access to SGI unless the person has an established need-to-know the information and satisfies the trustworthy and reliability requirements described in Attachment 3 to Order EA–07–251.

In order to provide assurance that the Licensees identified in Attachment 1 to this Order are implementing appropriate measures to comply with the fingerprinting and criminal history records check requirements for access to SGI, all Licensees identified in Attachment 1 to this Order shall implement the requirements of this Order. In addition, pursuant to 10 CFR 2.202, I find that in light of the common defense and security matters identified above, which warrant the issuance of this Order, the public health, safety and interest require that this Order be effective immediately.

III

Accordingly, pursuant to Sections 81, 147, 149, 161b, 161i, 161o, 182 and 186 of the Atomic Energy Act of 1954, as amended, and the Commission's regulations in 10 CFR 2.202, 10 CFR parts 30 and 73, it is hereby ordered, effective immediately, that all licensees identified in attachment 1 to this order and all other persons who seek or obtain access to safeguards information, as described above, shall comply with the requirements set forth in this order.

A. 1. No person may have access to SGI unless that person has a need-to-know the SGI, has been fingerprinted or who has a favorably-decided FBI identification and criminal history records check, and satisfies all other applicable requirements for access to SGI. Fingerprinting and the FBI identification and criminal history records check are not required, however, for any person who is relieved from that requirement by 10 CFR 73.59 (71 FR 33,989 (June 13, 2006)), or who has a favorably-decided U.S. Government criminal history records

[1] Attachment 1 contains sensitive information and will not be released to the public.

[2] Safeguards Information is a form of sensitive, unclassified, security-related information that the Commission has the authority to designate and protect under section 147 of the AEA.

[3] Person means (1) any individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, government agency other than the Commission or the Department of Energy, except that the Department of Energy shall be considered a person with respect to those facilities of the Department of Energy specified in section 202 of the Energy Reorganization Act of 1974 (88 Stat. 1244), any State or any political subdivision of, or any political entity within a State, any foreign government or nation or any political subdivision of any such government or nation, or other entity; and (2) any legal successor, representative, agent, or agency of the foregoing.

October 25, 2007

AGENDA
184th ACNW&M MEETING
NOVEMBER 13-15, 2007

TUESDAY, NOVEMBER 13, 2007, CONFERENCE ROOM T-2B3, TWO WHITE FLINT NORTH, ROCKVILLE, MARYLAND

1) 10:00 – 10:05 A.M. **Opening Remarks by the ACNW&M Chairman** (Open) (MTR/AFD)
The Chairman will make opening remarks regarding the conduct of today's sessions.

2) 10:05 – ~~12:00~~ P.M. 12:05 **Drift Degradation – Staff Review Approach and Capability** (Open) (WJH/NMC)
NRC staff representatives from the Office of Nuclear Materials Safety and Safeguards will discuss the issue of post-emplacement drift degradation at Yucca Mountain.

~~12:00~~ – 1:00 P.M. 12:05 *****LUNCH*****

3) 1:00 – ~~4:30~~ P.M. 5:00 **Discussion of ACNW&M Letter Reports** (Open) (All)
Discussion of proposed and potential ACNW&M letter reports on:

3.1) Preclosure Seismic Analysis Evaluation at the Proposed Yucca Mountain, Nevada, Repository (WJH/MPL)
3.2) Revision of NUREG-1854, NRC Staff Guidance for Activities Related to U.S. Department of Energy Waste Determinations – Draft Final Report for Interim Use (AGC/LSH)
3.3) Committee Review of Regulatory Guide Revision Process (MTR/CLB)
3.4) Current Developments on Waste Package Corrosion and Spent Fuel Dissolution in Support of the Total-System Performance Assessment (TPA) Code (RFW/JHC/CLB)
3.5) NRC Revised TPA Code (MTR/NMC)
3.6) Potential Impacts of Drift Degradation on Engineer Barrier Systems (MTR/NMC)
3.7) Draft Proposed Rule/Guidance on Preventing Legacy Sites (JHC/DAW)
3.8) ACNW&M Draft Decommissioning White Paper (JHC/DAW)
3.9) RECONCILIATION: Working Group Recommendations on Draft Regulatory Guide DG-4012 Regarding Implementations of 10 CFR 20.4106, "Minimization of Contamination" (JHC/DAW)

~~4:30~~ P.M. 5:00 **Adjourn**

WEDNESDAY, NOVEMBER 14, 2007, CONFERENCE ROOM T-2B3, TWO WHITE FLINT NORTH, ROCKVILLE, MARYLAND

4) 9:30 – 11:30 A.M. **ACNW&M November 2007 Briefing to the Commission (Room O-1G16)** (Open) (All)
ACNW&M members will brief the Commission on their recent and planned activities. The last Commission briefing was held on December 14, 2006.

11:30 – 1:00 P.M. ***LUNCH***

5) 1:00 – 2:30 P.M. **Final Proposed Design for a Geologic Repository at Yucca Mountain, Nevada** (Open) (WJH/MPL)
A Department of Energy representative will update the Committee on the final design (surface and subsurface facilities) proposed for the forthcoming Yucca Mountain license application.

6) 2:30 – 3:30 P.M. **Discussion of ACNW&M Letter Reports** (Open) (All)
Continued discussion of proposed and potential ACNW&M letter reports listed under Item 3.

3:30 P.M. Adjourn

THURSDAY, NOVEMBER 15, 2007, CONFERENCE ROOM T-2B1, TWO WHITE FLINT NORTH, ROCKVILLE, MARYLAND

7) ~~8:30~~ – 8:35 A.M.
9:15 **Opening Remarks by the ACNW&M Chairman** (Open) (MTR/AFD)
The Chairman will make opening remarks regarding the conduct of today's sessions.

8) ~~8:35~~ – 10:00 A.M.
9:20 – 10:20 **Accounting for Dose Consequence in the State-of-the-Art Reactor Consequence Analysis (SOARCA) Project (~~Closed~~ Open)** (MTR/NMC)
NRC staff representatives from the Office of Nuclear Regulatory Research will discuss the options for assessment of dose thresholds for latent cancer fatalities of the SOARCA project.

[Note: Briefing will be closed pursuant to 5 U.S.C. 552b (c) (9) (B) to discuss pre-decisional documents]

9) ~~10:00~~ – 12:00 P.M.
10:35 **Discussion of ACNW&M Letter Reports** (Open) (All)
Continued discussion of proposed ACNW&M letter reports listed under Item 3.

12:00 – 1:00 P.M. ***LUNCH***

10) 1:00 – 4:30 P.M. **Discussion of ACNW&M Letter Reports** (Open) (All)
Continued discussion of proposed ACNW&M letter reports listed under Item 3.

11) 4:30 – 5:00 P.M. **Miscellaneous** (Open) (All) – The Committee will discuss matters related to the conduct of ACNW&M activities and specific issues that were not completed during previous meetings, as time and availability permit. Discussions may include content of future letters and scope of future Committee Meetings.

5:00 P.M. Adjourn

NOTES:

- Presentation time should not exceed 50 percent of the total time allocated for a given item. The remaining 50 percent of the time is reserved for discussion.
- Thirty five (35) hard copies and one (1) electronic copy of the presentation materials should be provided to the ACNW&M in advance of the briefing.
- During the days of the meeting, phone number 301-415-7360 should be used in order to access anyone in the ACNW&M Office.

ADVISORY COMMITTEE ON NUCLEAR WASTE & MATERIALS
184th FULL COMMITTEE MEETING

November 13 - 15, 2007

PLEASE PRINT CLEARLY

NRC Attendees

TODAY'S DATE: November 13, 2007

	NAME	NRC ORGANIZATION
1	Chris Grossman	NMSS/HLWRS
2	Brittain Hill	NMSS/HLWRS
3	James Rubenstone	NMSS/HLWRS
4	Mysore Nataraja	NMSS/HLWRS
5	Gene Peters	NMSS/HLWRS
6	Bakr Ibrahim	NMSS/HLWRS
7	Mahendra Shah	NMSS/HLWRS
8	Tina Ghosh	NMSS/HLWRS
9	Tim McCartin	NMSS/HLWRS
10	John N. Ridgely	RES/DE/RGB
11	Giorgio Gnusnoci	FSME/DWMEP
12	Banad Jaqannath	NMSS
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ADVISORY COMMITTEE ON NUCLEAR WASTE & MATERIALS
184th FULL COMMITTEE MEETING

November 13 - 15, 2007

PLEASE PRINT CLEARLY

NRC Attendees

TODAY'S DATE: November 14, 2007

	NAME	NRC ORGANIZATION
1	Tae Ahn	NMSS/HLWRS
2	Sheena Whaley	NMSS/HLWRS
3	Albert Wong	NMSS/HLWRS
4	Chris Jacobs	NMSS/HLWRS
5	Tianqing Cao	NMSS/HLWRS
6	Bakr Ibrahim	NMSS/HLWRS
7	Bret Leslie	NMSS/HLWRS
8	Mysore Nataraja	NMSS/HLWRS
9	Yong Kim	NMSS/HLWRS
10	Mahendra J. Shah	NMSS/HLWRS
11	Dave Ditto	OIG
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ADVISORY COMMITTEE ON NUCLEAR WASTE & MATERIALS
184th FULL COMMITTEE MEETING

November 13 - 15, 2007

PLEASE PRINT CLEARLY

NRC Attendees

TODAY'S DATE: November 15, 2007

	NAME	ORGANIZATION
1	Ata Istar	RES/DE/MEIB
2	Scott Burnell	OPA
3	Jimi Yerokun	RES/DSA
4	Jonathan De Jesus Segarra	RES/DSA/SPB
5	Jason Schaperow	RES
6	Vince Holahan	RES
7	Jocelyn Mitchell	RES
8	Thomas Koshy	RES
9	Andrew Nosek	RES/DSA
10	James Vail	NRR
11	R.L. Sullivan	NSIR
12	Robert Prato	RES
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ADVISORY COMMITTEE ON NUCLEAR WASTE & MATERIALS
184th FULL COMMITTEE MEETING

November 13 - 15, 2007

PLEASE PRINT CLEARLY

Visitors

TODAY'S DATE: November 13, 2007

	NAME	ORGANIZATION
1	Barry Nevman	Carter Ledyard & Milburn, LLP Lincoln County
2	E. Von Tiesenhausen	Clark County
3	John H. Pye	NWTRB
4	Norm Henderson	BSC
5	Rod McCullen	NEI
6	Craig A. Muler	Bechtel
	***Via Video Conference:	
7	Ken Chang	CNWRA
8	Asadul Chodhury	CNWRA
9	Xihua He	CNWRA
10	Luis Ibarra	CNWRA
11	Roman Kazban	CNWRA
12	James Mancillas	CNWRA
13	Sitakanta Mohanta	CNWRA
14	Goodluck Ofoegbu	CNWRA
15	Yi-Ming Pan	CNWRA
16	Osvaldo Pensado	CNWRA
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ADVISORY COMMITTEE ON NUCLEAR WASTE & MATERIALS
184th FULL COMMITTEE MEETING

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Visitors

TODAY'S DATE: November 14, 2007

	NAME	ORGANIZATION
1	Barry Nevman	Carter Ledyard & Milburn, LLP Lincoln County
2	Paul Harrington	DOE/RW
3	Mal Knapp	Member of the Public, no offiliation
4	Norm Henderson	BSC
5	E. von Tiesenhausen	Clark County
6	Rod McCullen	NEI
7	Everett Redmond, II	NEI
8	Ray Clark	EPA
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ADVISORY COMMITTEE ON NUCLEAR WASTE & MATERIALS
184th FULL COMMITTEE MEETING

November 13 - 15, 2007

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TODAY'S DATE: November 15, 2007

	NAME	ORGANIZATION
1	Randall Gauntt	Sandia National Labs
2	Ed Lyman	Union of Concerned Scientists
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON NUCLEAR WASTE AND MATERIALS
WASHINGTON, D.C. 20555-0001

November 27, 2007

AGENDA
185th ACNW&M MEETING
DECEMBER 17-19, 2007

MONDAY, DECEMBER 17, 2007, CONFERENCE ROOM T-2B3, TWO WHITE FLINT NORTH, ROCKVILLE, MARYLAND

1) 8:30 – 8:35 A.M. **Opening Remarks by the ACNW&M Chairman** (Open)(MTR/AFD)
The Chairman will make opening remarks regarding the conduct of today's sessions.

2) 8:35 – 10:00 A.M. **Electric Power Research Institute's Report on Drift degradation at Yucca Mountain** (Open) (WJH/NMC)
A representative from the Electric Power Research Institute will summarize the approach, methods, and conclusions of their 2007 report on drift degradation.

12:00 – 1:00 P.M. ***LUNCH***

3) 1:00 – 2:30 P.M. **Update on NRC Rulemaking on Groundwater Protection at In-Situ Leach Uranium Mining Facilities** (Open) (RFW/LSH)
NRC staff from the Office of Federal and State Materials and Environmental Management Programs (FSME) will brief the Committee on the status of the rulemaking on groundwater protection at in-situ leach uranium recovery sites.

2:30 – 2:45 P.M. ***BREAK***

4) 2:45 – 3:30 P.M. **Vendor's View on the Transportation-Aging-Disposal Performance Specifications** (Open) (RFW/CLB)
A representative from NAC International, a commercial cask vendor, will brief the Committee on their views on the Transportation-Aging-Disposal (TAD) performance specifications, possible challenges the vendor may be facing, and suggestions for expediting NRC approval of any TAD license application.

5) 3:30 – 5:00 P.M. **Discussion of ACNW&M Letter Reports** (Open) (All)
Discussion of proposed and potential ACNW&M letter reports on:
5.1) Preclosure Seismic Analysis Evaluation at the Proposed Yucca Mountain, Nevada, Repository (WJH/MPL)
5.2) Potential Impacts of Drift Degradation on Engineer Barrier Systems (WJH/NMC)

5.3) Current Developments on Waste Package Corrosion and Spent Fuel Dissolution in Support of the Total-System Performance Assessment Code (RFW/JHC/CLB)

5.4) Update on Rulemaking on Groundwater Protection at In-Situ Leach Uranium Mining Facilities (RFW/LSH)

5:00 P.M. Adjourn

TUESDAY, DECEMBER 18, 2007, CONFERENCE ROOM T-2B3, TWO WHITE FLINT NORTH, ROCKVILLE, MARYLAND

6) 8:30 – 8:35 A.M. **Opening Remarks by the ACNW&M Chairman** (Open) (MTR/AFD)
The Chairman will make opening remarks regarding the conduct of today's sessions.

7) 8:35 – 9:30 A.M. **Status of Operations at the Barnwell Low-Level Radioactive Waste Disposal Facility** (Open) (MTR/MPL)
The Barnwell low-level radioactive waste (LLW) disposal facility is scheduled to close to non-compact states in July 2008. A representative of the site's operator, Energy Solutions, will update the Committee on activities at this commercial disposal facility in anticipation of scaled-back operations.

9:30 – 9:45 A.M. ***BREAK***

8) 9:45 – 11:30 A.M. **NRC 2006 Commercial LLW Strategic Planning Initiative** (Open) (MTR/MPL)
Representatives from the Office of FSME will brief the Committee on their recently-issued Commission Paper (SECY-07-0180) containing specific recommendations on the scope of work to be considered in any future NRC commercial LLW program. This briefing is also expected to include a summary of the public comments received in 2005.

11:30 – 1:00 P.M. ***LUNCH***

9) 1:00 – 2:00 P.M. **Review of Planned Waste Management Activities at U.S. Department of Energy Mixed-Oxide Fuel Fabrication Facility** (Open) (AGC/LSH)
NRC staff from the Office of Nuclear Material Safety and Safeguards will brief the Committee on planned waste management activities at U.S. Department of Energy's (DOE) Mixed-Oxide (MOX) Fuel Fabrication Facility in Aiken, South Carolina.

10) 2:00 – 3:00 P.M. **Briefing on Tritium Task Force Actions to Revise the Significance Determination Process to Address Spills and Leaks** (Open) (JHC/DAW)
A representative from the Office of Nuclear Reactor Regulation will report on the revisions to its Significance Determination Process (SDP) to address radioactive liquid spills and leaks in response to an action recommended in the Tritium Task Force Report.

3:00 – 3:15 P.M *****BREAK*****

11) 3:15 – 5:00 P.M. **Discussion of ACNW&M Letter Reports** (Open) (All)
Continued discussion of proposed and potential ACNW&M letter reports listed under Item 5 and:
- 11.1) Status of Operations at the Barnwell LLW Disposal Facility (MTR/MPL)
- 11.2) NRC 2006 Commercial LLW Strategic Planning Initiative (MTR/MPL)
- 11.3) Review of Planned Waste Management Activities at DOE's MOX Fuel Fabrication Facility (AGC/LSH)
- 11.4) Briefing on Tritium Task Force Actions to Revise the SDP to Address Spills and Leaks (JHC/DAW)

5:00 P.M. **Adjourn**

WEDNESDAY, DECEMBER 19, 2007, CONFERENCE ROOM T-2B1, TWO WHITE FLINT NORTH, ROCKVILLE, MARYLAND

12) 8:30 – 8:35 A.M. **Opening Remarks by the ACNW&M Chairman** (Open) (MTR/AFD)
The Chairman will make opening remarks regarding the conduct of today's sessions.

13) 8:35 – 11:30 A.M. **Discussion of ACNW&M Letter Reports** (Open) (All)
Continued discussion of proposed and potential ACNW&M letter reports listed under Items 5 and 11.

11:30 – 1:00 P.M. *****LUNCH*****

14) 1:00 – 3:00 P.M. **Discussion of ACNW&M Letter Reports** (Open) (All)
Continued discussion of proposed and potential ACNW&M letter reports listed under Items 5 and 11.

15) 3:00 – 5:00 P.M. **Miscellaneous** (Open) (All) – The Committee will discuss matters related to the conduct of ACNW&M activities and specific issues that were not completed during previous meetings, as time and availability permit. Discussions may include content of future letters and scope of future Committee Meetings.

5:00 P.M. **Adjourn**

NOTES:

- Presentation time should not exceed 50 percent of the total time allocated for a given item. The remaining 50 percent of the time is reserved for discussion.

- Thirty five (35) hard copies and one (1) electronic copy of the presentation materials should be provided to the ACNW&M in advance of the briefing.

- During the days of the meeting, phone number 301-415-7360 should be used in order to access anyone in the ACNW&M Office.

LIST OF DOCUMENTS PROVIDED TO THE COMMITTEE
184th ACNW&M MEETING
November 13 - 15, 2007

MEETING HANDOUTS

AGENDA ITEM #	DOCUMENTS/HANDOUTS LISTED IN ORDER
1.	Opening Remarks by the ACRS Chairman
2.	Drift Degradation – Staff Review Approach and Capability 1. Drift Degradation and its Impacts on Engineered Barrier System Performance (Slides from Dr. Mysore Nataraja, NRC)
4.	ACNW&M Briefing to the Commission 2. Slides from the ACNW&M Committee Members
5.	Final Proposed Design for a Geologic Repository at Yucca Mountain, Nevada 3. Status of Yucca Mountain Repository Design (Slides from Paul Harrington, DOE/Office of Civilian Radioactive Waste Mngmt.
8.	Accounting for Dose Consequence in the State-of-the-Art Reactor Consequence Analysis (SOARCA) Project 4. State-of-the-Art Reactor Consequence Analyses (Slides from NRC/RES & NRC/NSIR, Bob Prato & Randy Sullivan)

**Copies of most of the handouts can be obtained through the transcript copy found in the Agency Document Management System (ADAMS) or a complete set can be requested by calling the ACRS office of the NRC.

[Note: Some documents listed herein may have been provided or prepared for the Committee use only. These documents must be reviewed prior to release to the public.]

Drift Degradation and its Impacts on Engineered Barrier System Performance

Review Approach and Capability

Briefing To ACNW&M

Dr. Mysore Nataraja (EB/TRD/HLWRS)
301-492-3149, msn1@nrc.gov
Contributors: Dr. Goodluck Ofoegbu and Dr. Luis Ibarra (CNWRA)

November 13, 2007

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Outline

- Purpose
- Background
- Significance of Drift Degradation
- Related Staff Activity
- Current Understanding of DOE Approach
- Alternate Modeling Scenarios
- Staff Review Approach
- Staff Review Capability
- Recap
- Summary and Conclusions

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Purpose

- Present Current Staff Understanding of Drift Degradation Process in the Context of Mechanical Disruption of Engineered Barrier System

- Describe Staff Approach and Capability to Review DOE's Analyses in a Potential License Application for a HLW Repository at Yucca Mountain

Background

- Key Technical Issue (KTI) Agreements
- Drift Degradation Analysis Model Report (AMR)
- Detailed Staff Review of AMR
- Independent Analyses by Staff to Risk-Inform Understanding of Drift Degradation Process and its Potential Impacts on Engineered Barriers System (EBS) Performance

Background – Recent Activities

- NRC-CNWRA Workshop (March 2006)
- Summary of Current Understanding of Drift Degradation and its Effects on Performance (Report, August 2006)
- Independent Analyses of Drift, Drip Shield and Waste Package Mechanical Performance
- Review Approach Development
- Development of Parameter Distributions for Abstractions in NRC TPA Code
- NRC-DOE Interaction (October 2007)

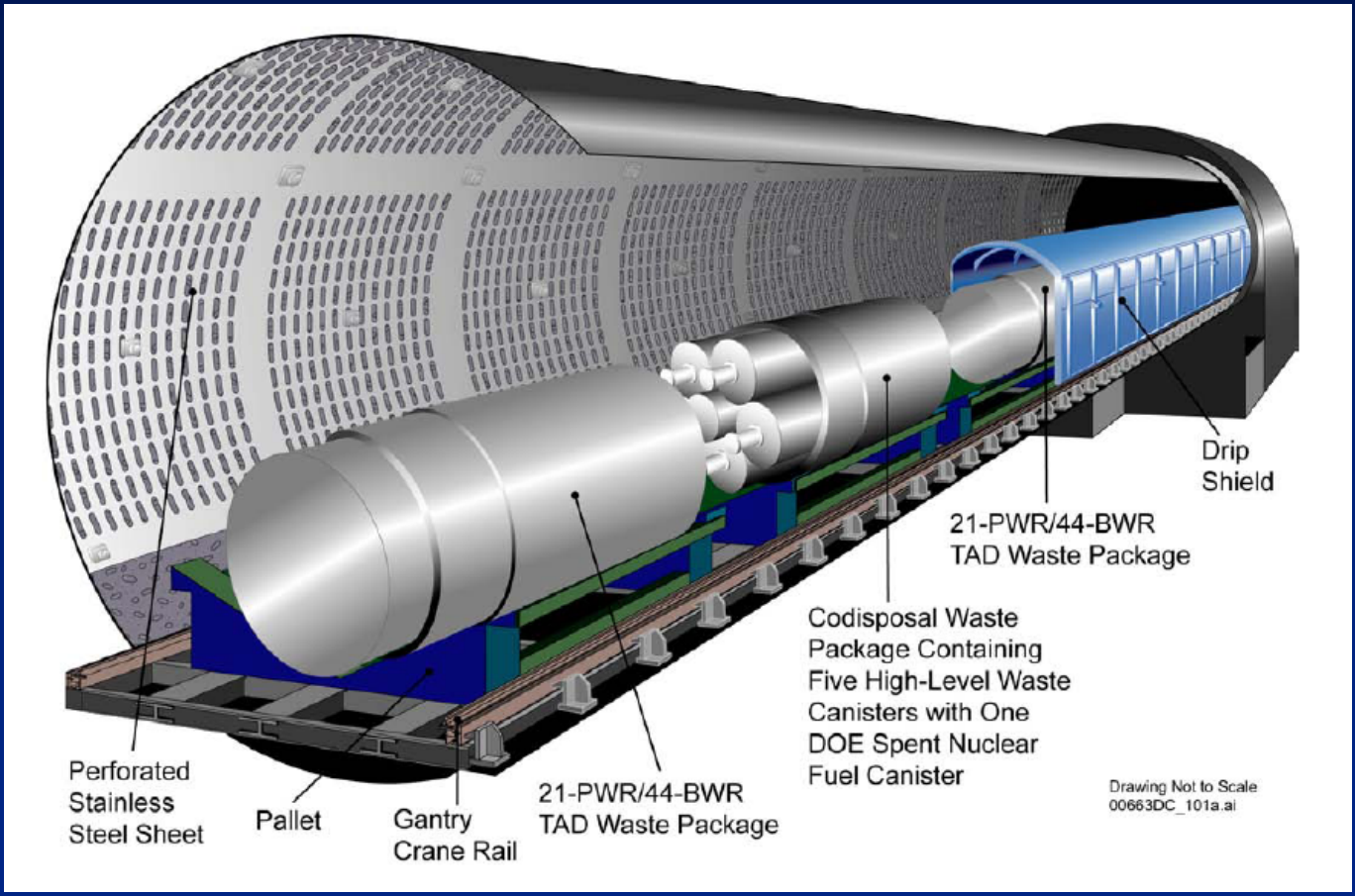
Background – Disciplines Involved

- Geology
- Seismology
- Rock Mechanics and Mining Engineering
- Structural Mechanics and Earthquake Engineering
- Materials Science
- Performance Assessment

Background – DOE Design

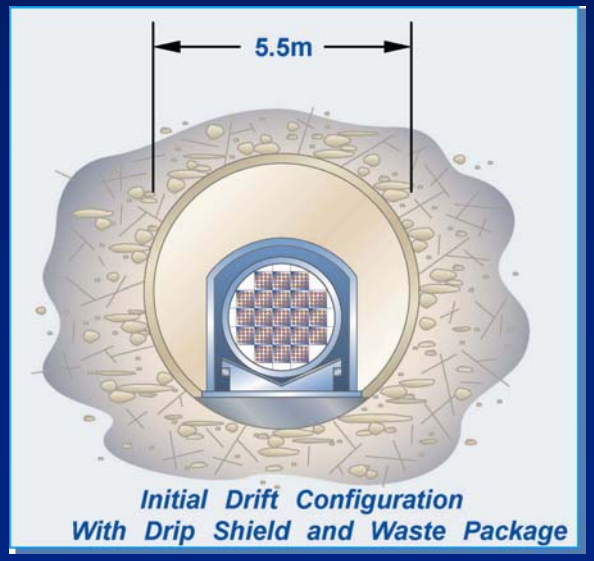
- Excavation by Tunnel Boring Machine (TBM)
- Stainless Steel Bolts and Perforated Sheets Provide Ground Support During Pre-closure Period
- The Drip Shield Protects the Waste Package from Impacts of Falling Rock and Contact by Dripping Water During Pos-tclosure Period
- Waste Package Consists of an Exterior Cylinder Made of Alloy 22 and an Internal Stainless Steel Cylinder
- The Waste Package Rests on a Pedestal (Pallet)
- The EBS is Supported on a Crushed Tuff Bed (Invert)

Background – Waste Emplacement Drift

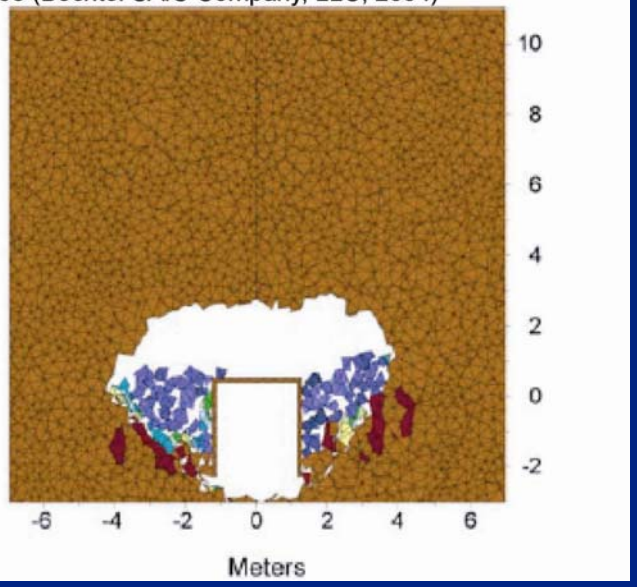


Background – Drift Configurations

- Initial and Potential Long-Term Emplacement Drift Configurations



A Long-Term Drift Configuration With Accumulated Rubble from Figure 6-162(b), p. 6-212, Drift Degradation Analysis Rev 03 (Bechtel SAIC Company, LLC, 2004)



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Background – Causes of Failure of Underground Openings

- In-Situ Stress Conditions Change Because of:
  - Excavation (Mechanical Stresses)
  - Heat (Thermal Stresses)
  - Earthquakes (Seismic Stresses)
- Any one Stress by Itself or in Combination with Others may Cause Rock “Failure”
- Failure May be due to Strength being Exceeded or due to Excessive Deformation

Background – Terminology

- Rockfall (Individual Pieces of Rocks – Small and Large – Falling from Exposed Surfaces of Underground Excavation
- Drift Collapse (Massive Failure of Large Volume of Rock Crashing Down)
- Drift Degradation (Gradual Change in Drift Configuration from Thermal Spalling and/or Seismic Shaking
- All of the Above Result in Rubble Accumulation

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Significance of Drift Degradation Pre-closure period

- DOE Plans to Install Ground Support to Provide Stable Underground Openings During Pre-closure Operations
- Adequacy of Ground Support Design to be Determined in the Context of Pre-closure Performance Objectives
- DOE Takes No Credit for Ground Support Performance Beyond Pre-closure Period.

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Significance of Drift Degradation Post-closure Period

- Ground Support not Relied upon for Long-Term Stability
- Uncertainty in Predicting Long-Term Stability of Underground Openings Under Thermal and Seismic Conditions is High
- Rockfall, Drift Collapse and Drift Degradation Could Occur During the Long Regulatory Period and Impact the EBS Mechanical Performance
- Focused Staff Review may be Needed Because of the Potential Significance to Overall Performance

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Staff Activity Related to LA Review Preparation

- Pre-licensing Review of DOE Reports
- Limited Independent Analyses Focused on Areas of High Potential Importance and/or High Uncertainty
- Development of Stepwise Review Approach
- Development of Abstraction Models and Parameter Distributions for NRC TPA Code

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Current Understanding of DOE Approach

- Emplacement Drifts Remain Stable for a Long Time Under Expected Mechanical and Thermal Conditions
- Drifts May Collapse Under Strong Seismic Events
- Drip Shields can Withstand the Potential Rock Impacts and Accumulated Rubble (i.e., Static Loading) Under the Expected Thermal and Chemical Environment
- Generalized Corrosion Could Decrease Drip Shield Capacity

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Current Understanding – Cont.

- Drip Shields May Collapse and Mechanically Interact With Waste Packages Due to Very Strong Seismic Events
- The Main Failure Mechanism Contributing to Waste Package Damage is Dynamic Interaction with Other Engineered Barriers During Seismic Events Under Stable Drip Shields

Alternate Modeling Scenarios

- Independent Interpretation of Data and Alternate Conceptual Models Suggest:
  - Thermal Stresses Could Exceed Rock Strength and Result in Spalling of Thin Layers of Rock Around the Emplacement Drifts
  - Accumulated Rubble Load Could Lead to Structural Instability of Drip Shields
  - Demands During Seismic Events May be Several Times Larger Than the Drip Shield Capacity

Alternate Modeling Scenarios – Cont.

- Independent Interpretation of Data and Alternate Conceptual Models Suggest:
  - A Collapsed Drip Shield Leads to Drip Shield-Waste Package Mechanical Interaction and May Result in:
    - Localized Corrosion of Waste Packages
    - Waste Package Mechanical Damage Under Strong Seismic Events.
  - Creep, General Corrosion, Temperature Effects and Pallet/Invert Degradation May Further Adversely Impact EBS Mechanical Performance

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Staff Review Approach

- Check if DOE:
  - Appropriately Considers Site Characteristics (Joints, Fractures, Voids), Material Properties (Stress-Strain Characteristics and Strength Parameters)
  - Considers Appropriate Conceptual Models and Failure Criteria
  - Employs Reasonably Calibrated/Validated Models
  - Considers Reasonable Ranges of Conditions and Parameter Distributions to Account for Uncertainty and Variability

Staff Review Approach – Consideration of Independent Analyses

- Process Level:
  - Potential for Buckling of Drip Shields Under Static Loads Due to Rubble Accumulation
  - Potential for Drip Shield-Waste Package Interaction
  - Potential for Waste Package Damage Under Seismic Events
- TPA Abstractions:
  - Potential Long-Term Impacts of Drift Degradation – Both Due to Thermal and Seismic Stresses – on EBS Performance

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Staff Review Approach – Secondary Considerations

- Separation of Intact Drip Shields as a Potential Failure Mode
- Individual Rockfall Impacts as a Potential Failure Mode for Drip shield
- Waste Package Damage due to Faulting Events

Review Approach – Summary

- Rock Degradation and Rubble Accumulation →
- Load Distribution From Rubble Accumulation →
- Drip Shield Structural Performance and Potential Drip Shield Failure →
- Potential Load Transfer to Waste Packages →
- Potential Waste Package Damage →
- Potential Consequences?

Review Capability

- Between the NRC and CNWRA Extensive Knowledge and Experience in:
  - Analytical Methods and Numerical Modeling of Continuous and Discontinuous Media
  - Rock Mechanics and Mining Engineering
  - Structural Mechanics and Earthquake Engineering
  - Licensing Reviews and Hearings

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Recap

- Provided Background
- Discussed Significance of Drift Degradation in the Context of EBS Performance
- Summarized Current Understanding of DOE Approach
- Discussed Highlights of Independent Analyses
- Presented Review Approach and Staff Capability

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Summary and Conclusion

- Staff Understands DOE Approach of Considering the Effects of Drift Degradation on EBS Mechanical Performance
- Staff Continues to Perform Limited Independent Analyses to Focus Review Efforts and Enhance Review Capability
- Staff Review Approach is Flexible and Considers Alternate Conceptual Models and a Range of Reasonable Conditions Both at the Process Level and at the Abstraction Level

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Protecting People and the Environment

ACNW&M MEETING WITH THE U. S. NUCLEAR REGULATORY COMMISSION

November 14, 2007

OVERVIEW

Michael T. Ryan

Accomplishments

- 17 Letter Reports
- 4 Working Group Meetings
- Issued:
  - Low-Level Waste NUREG
  - Igneous Activity White Paper
  - Reprocessing White Paper

Accomplishments (cont'd)

- In development
  - White Paper on Seismic issues (Yucca Mountain)
  - White Paper on Decommissioning

ACNW&M Charter

- Expanded Charter to include Materials Safety
- The Committee will continue to study:
  - *In-situ* Leach Mining
  - Enrichment Facilities
  - Transportation
  - Storage and Disposal Facilities
  - Waste Determinations

ACNW&M Charter (cont'd)

- Health Effects
- Decommissioning
- Materials Safety
- Application of Risk-Informed, Performance-Based Regulations

2007/2008 Action Plan

- Joint ACRS/ACNW&M Subcommittees
- Review of Regulatory Guides and SRP Chapters

Future Activities

- Working Group Meetings
  - Low Activity Radioactive Waste
  - Modeling Landscape Evolution for Performance Assessment
  - Low Dose Radiation Effects

ICRP's RECOMMENDATIONS

Michael T. Ryan

ICRP's Recommendations

- The Committee has reviewed previous drafts of the ICRP recommendations
- The Committee continues to closely follow ICRP's work

ACNW&M Conclusion

- The Committee concurs with the NRC staff that “there may be no compelling public health and safety argument to change NRC regulations”
- ICRP publication 103 is expected soon

CURRENT ISSUES - LOW-LEVEL WASTE

Michael T. Ryan

Status of LLW Disposal

- Barnwell will likely close to out-of-Compact waste in June 2008
- Northwest and Rocky Mountain Compacts are unchanged
- Energy Solutions will continue to receive Class A LLW
- Storage of LLW will increase

IGNEOUS ACTIVITY AT THE PROPOSED YUCCA MOUNTAIN REPOSITORY

William J. Hinze

Recent Activities

- Working Group on Igneous Activity
- Published White Paper on Igneous Activity – June 2007
- Monitored DOE expert elicitation update on volcanism probability and NRC staff's reports

Technical Basis for Decisionmaking

- Review and analysis of views
  - What could happen?
  - How likely is it?
  - What are the potential consequences?
- Evaluation of hypothetical extrusive and intrusive scenarios

Extrusive Scenario

- Inhalation of dispersed respirable ash ejected from molten rock erupting through the repository
- Maximum effect during first thousand years after closure
- Current analysis indicates risk is a small fraction of proposed standard

Intrusive Scenario

- Waste from canisters destroyed by intruding molten rock is carried by ground water to nearby aquifers
- Maximum effect not anticipated for tens of thousands of years due to slow groundwater movement
- Current analysis indicates risk is a small fraction of proposed standard

Evaluation of Scenarios

- Considers:
  - Nature
  - Likelihood
  - Consequences
- White Paper presents range of credible views

Nature of Possible Igneous Event

- Characteristics similar to most recent volcano in region – Lathrop Wells
  - Small volume, single episode eruptive event that disperses ash over surrounding region
  - General agreement

Likelihood of Igneous Event

- Forecasting from previous events
- Volcanism is waning
- 1 chance in a billion to 1 chance in ten million per year of an event intersecting the repository
- Ongoing DOE expert elicitation will update probability estimates in 2008

Source Term Resulting From an Extrusive Event

- Number of waste packages involved
- Quantity of radioactive material released
- Fraction of material that is respirable
- Wide range of views

Consequences of an Extrusive Event

- Relatively mature models
- Evolving consideration of
  - Range of waste particle size
  - Fraction of waste in ash vs. lava flows
  - Preferential remobilization of respirable ash by water and wind

Consequences of an Intrusive Event

- Less well understood and no natural analogs lead to differing views
- Range of views on
  - Interaction of molten rock with waste packages and repository
  - Governing molten rock properties
  - Number of waste canisters affected and potential for secondary vents from repository

Consequences of an Igneous Event

- Continuing analysis will reduce uncertainties, but credible alternative views are likely to remain with regard to:
  - Source term in extrusive scenario
  - Interaction of molten rock, waste packages, and the repository in the intrusive scenario
- Current analysis indicates risk is a small fraction of proposed standard

TRANSPORTATION

Ruth F. Weiner

Transportation

- Met with staff and stakeholders
  - Moderator Exclusion
  - Burnup Credit
    - Commercial spent fuel
- Moderator exclusion and burnup credit are related

Burnup Credit

- Burnup credit is not precluded by regulation
- Full burnup credit would allow fewer shipments of spent fuel
- NRC has approved one application for actinide burnup credit and partial credit for fission product poisoning

Moderator Exclusion

- Moderator exclusion is regulated by Part 71 and staff guidance
- NRC has not yet approved shipments that rely on moderator exclusion – applications are expected

Moderator Exclusion

- 10 CFR 71.55
  - (c) provides basis for moderator exclusion
  - (e) and Interim Staff Guidance 19 provide for moderator exclusion under accident conditions

Recommendations

- Use existing regulations for moderator exclusion
- Risk-inform regulatory guidance on burnup credit and moderator exclusion

In-Situ Leach Uranium Recovery Activities

Ruth F. Weiner

OBJECTIVES

- Advise the Commission on Rulemaking
  - Environmental protection issues
  - Resolution of issues associated with *in-situ* leach mining and groundwater contamination

Proposed Rulemaking Recommendations

- Rule should be risk informed and provide:
  - Location of the point of compliance
  - Groundwater monitoring requirements
  - Methods of demonstrating compliance
  - Financial surety

Proposed Rulemaking Recommendations (Cont'd)

- Rule should provide:
  - Measures to reduce the likelihood of contaminant release
  - Groundwater remediation
  - Establishing pre-mining background or baseline groundwater quality

Proposed Rulemaking Recommendations (Cont'd)

- Rule should consider:
  - Groundwater use
  - Onsite effluent disposal
  - Decommissioning and license termination requirements

Next Steps

- Review staff progress regarding Rulemaking
- Evaluate NRC staff resolution of public comments on the draft rule

ABBREVIATIONS

ACNW&M	Advisory Committee on Nuclear Waste and Materials
ACRS	Advisory Committee on Reactor Safeguards
CFR	Code of Federal Regulations
DOE	Department of Energy, U.S.
ICRP	International Commission on Radiological Protection
LLW	Low-Level Waste
NRC	Nuclear Regulatory Commission, U.S.
NUREG	NRC Technical Report Designation (Nuclear Regulatory Commission)
SRP	Standard Review Plan

U.S. Department of Energy

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT

Status of Yucca Mountain Repository Design

Presented to:
Advisory Committee on Nuclear Waste and Materials

Presented by:
Paul Harrington
Director, Office of the Chief Engineer
Office of Civilian Radioactive Waste Management
U.S. Department of Energy

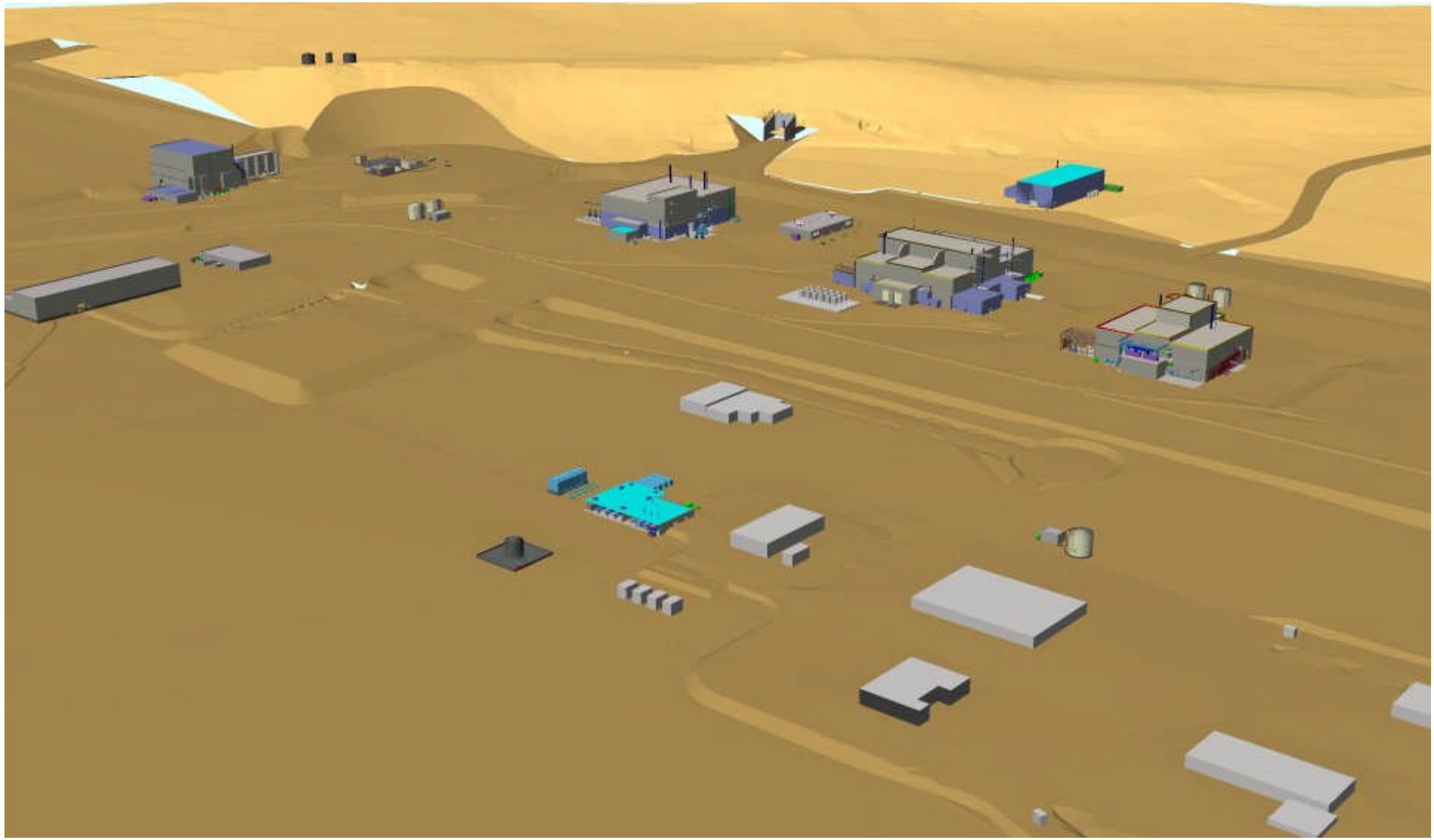
November 14, 2007
Rockville, Maryland

Acronyms

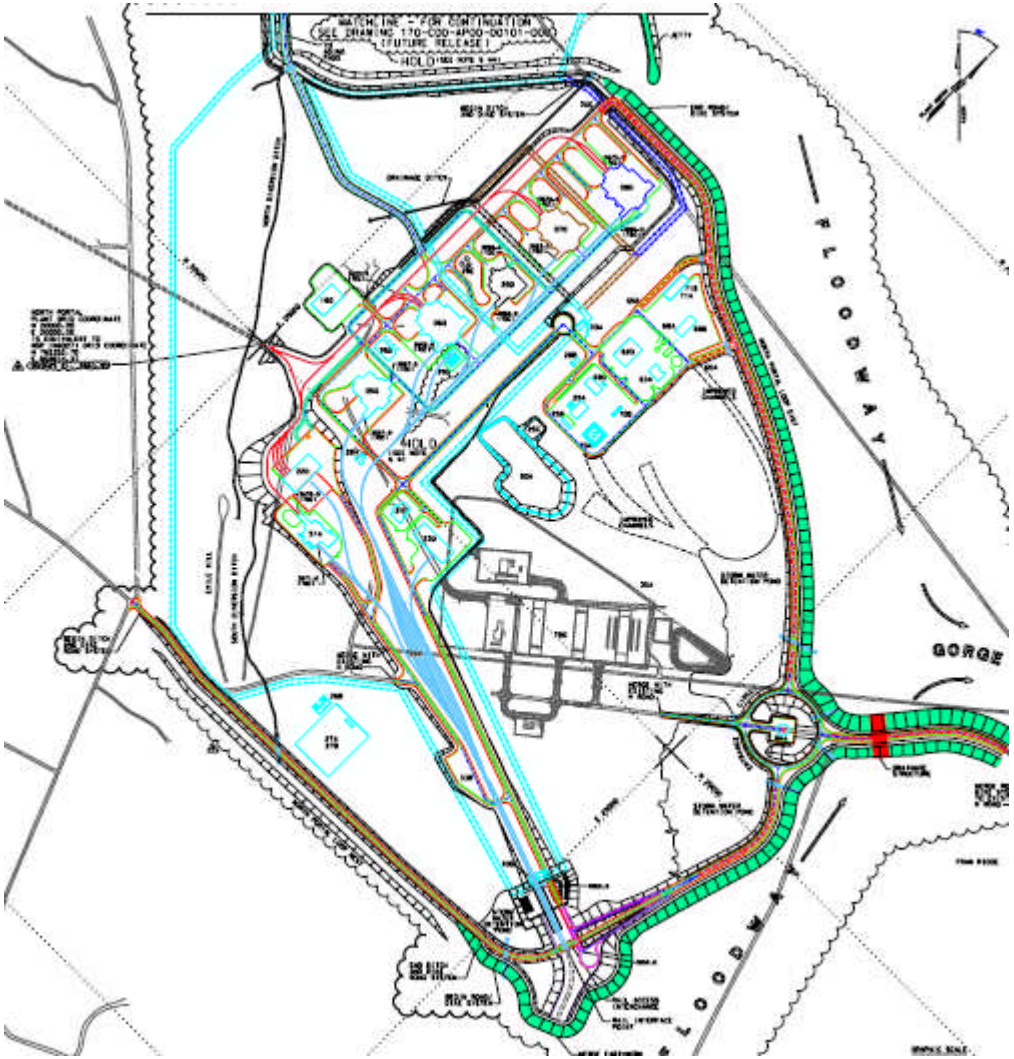
BWR	Boiling water reactor
CRCF	Canister receipt and closure facility
CSNF	Commercial spent nuclear fuel
HLW	High level radioactive waste
GROA	Geologic repository operations area
HEPA	High efficiency particulate air (filter)
IHF	Initial Handling Facility
ITS	Important to safety
MCO	Multi-canister overpack
PWR	Pressurized water reactor
RF	Receipt Facility
TAD	Transportation, aging, and disposal
WHF	Wet Handling Facility

Site Overview

3D Repository Model Looking West



Site Overview



<u>New Facilities</u>

IHF - Initial Handling Facility

WHF - Wet Handling Facility

CRCF 1 - Canister Receipt and Closure Facility 1

CRCF 2 - Canister Receipt and Closure Facility 2

CRCF 3 - Canister Receipt and Closure Facility 3

RF - Receipt Facility

LLWF - Low Level Waste Facility

EDGF (26D) - Emergency Diesel Generator Facility

<u>Previous Facilities</u>

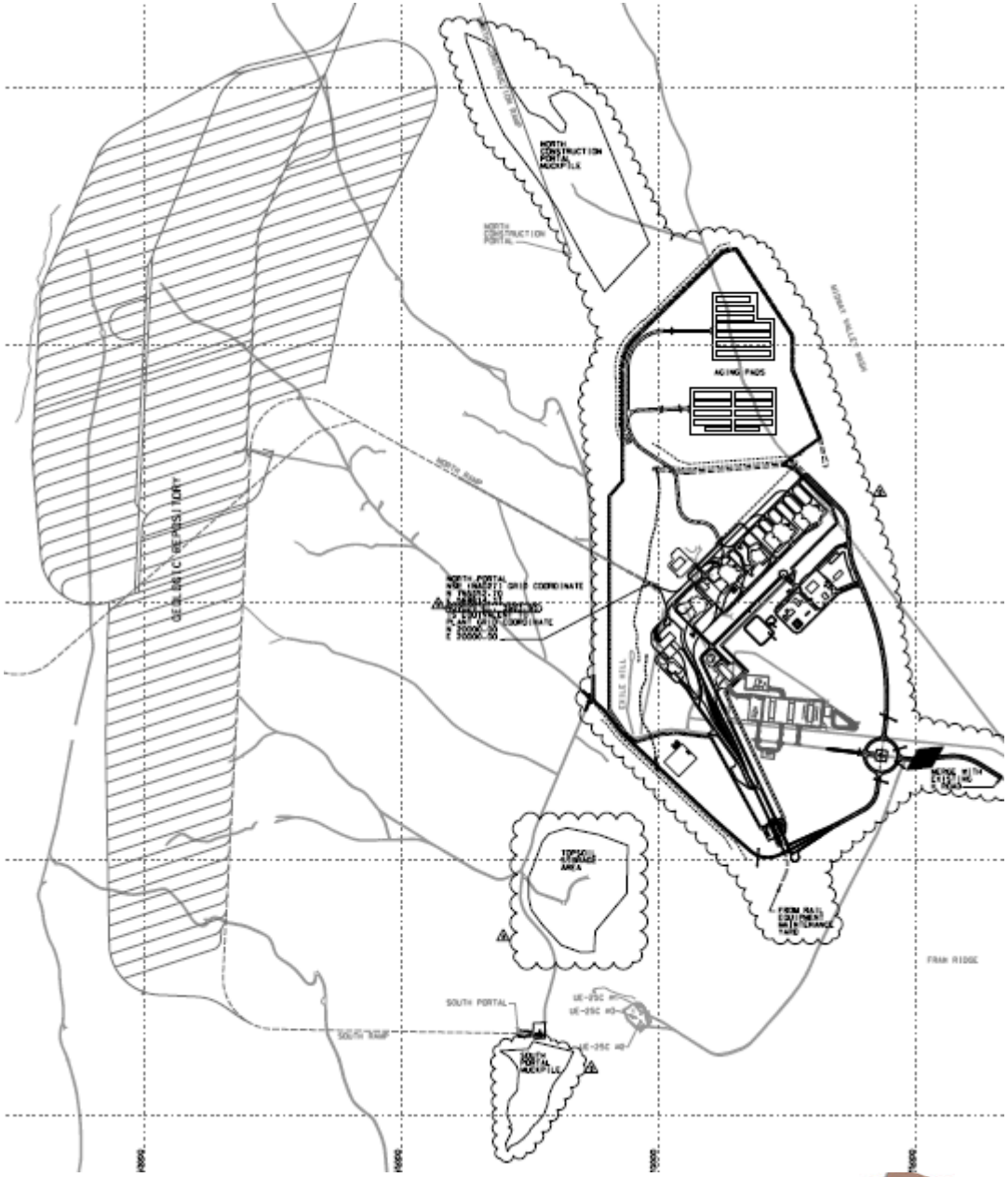
HEMF - Heavy Equipment Maintenance Facility

CCCF - Central Control Center Facility

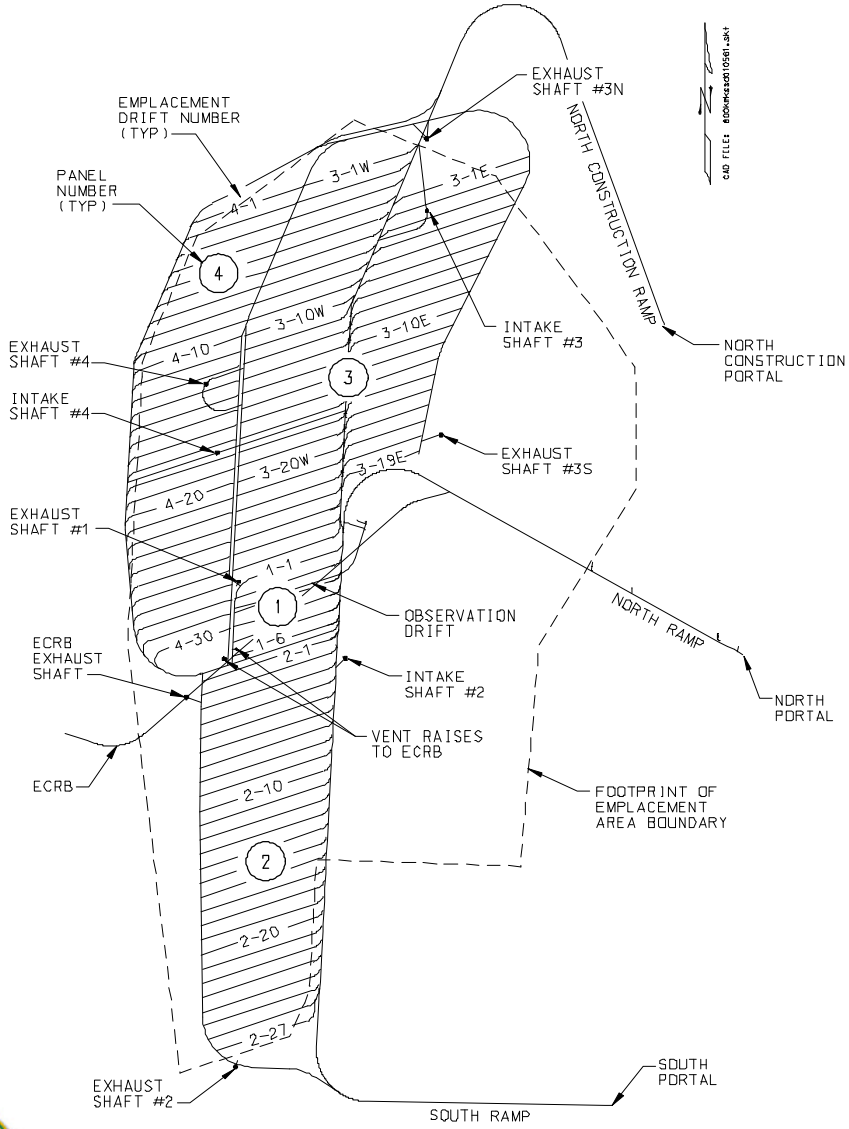
WNNRF - Warehouse and Non-Nuclear Receipt Facility

Utility, Security, and Administration Facilities

Site Overview



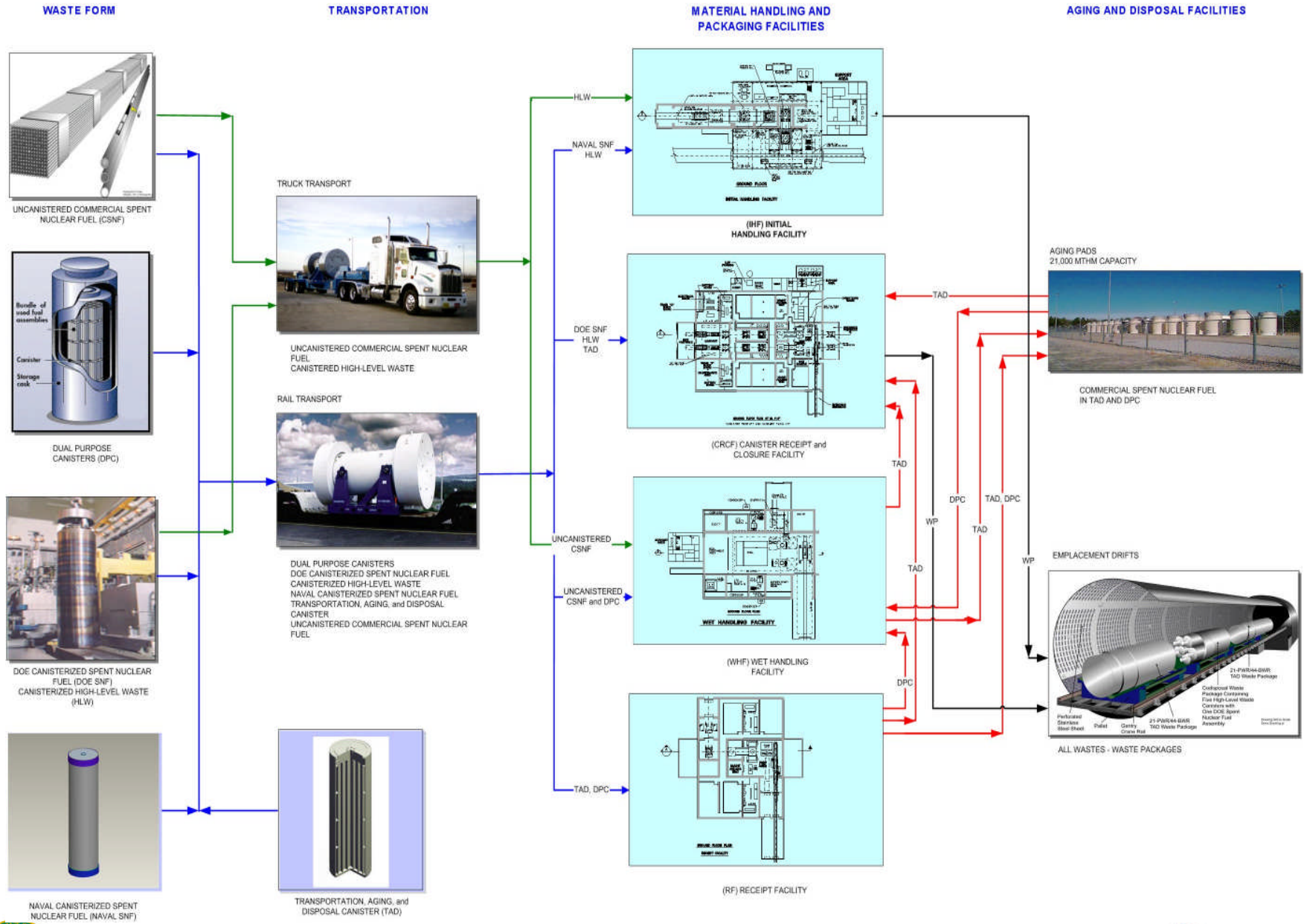
Subsurface Layout



- **Panel numbers represent the proposed construction & emplacement sequence**
- **Sequence:**
  - **6 drifts in Panel 1**
  - **27 drifts in Panel 2**
  - **45 drifts in 3E & 3W**
  - **30 drifts in Panel 4**
- **Total emplacement length available is approximately 41 miles (66 km)**

Waste Handling Functions

CONCEPT OF OPERATIONS - NUCLEAR FACILITIES

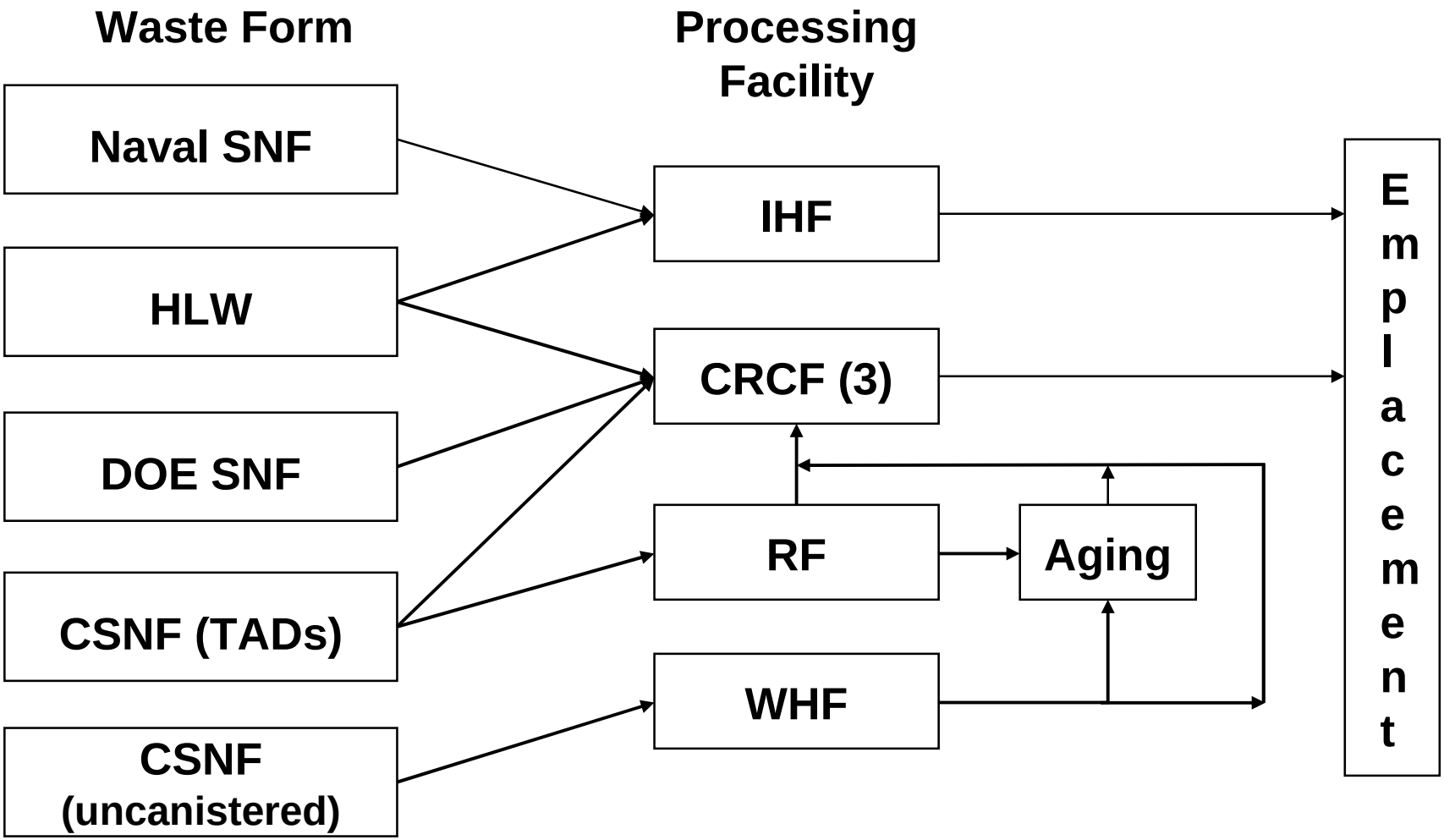


Functional Matrix

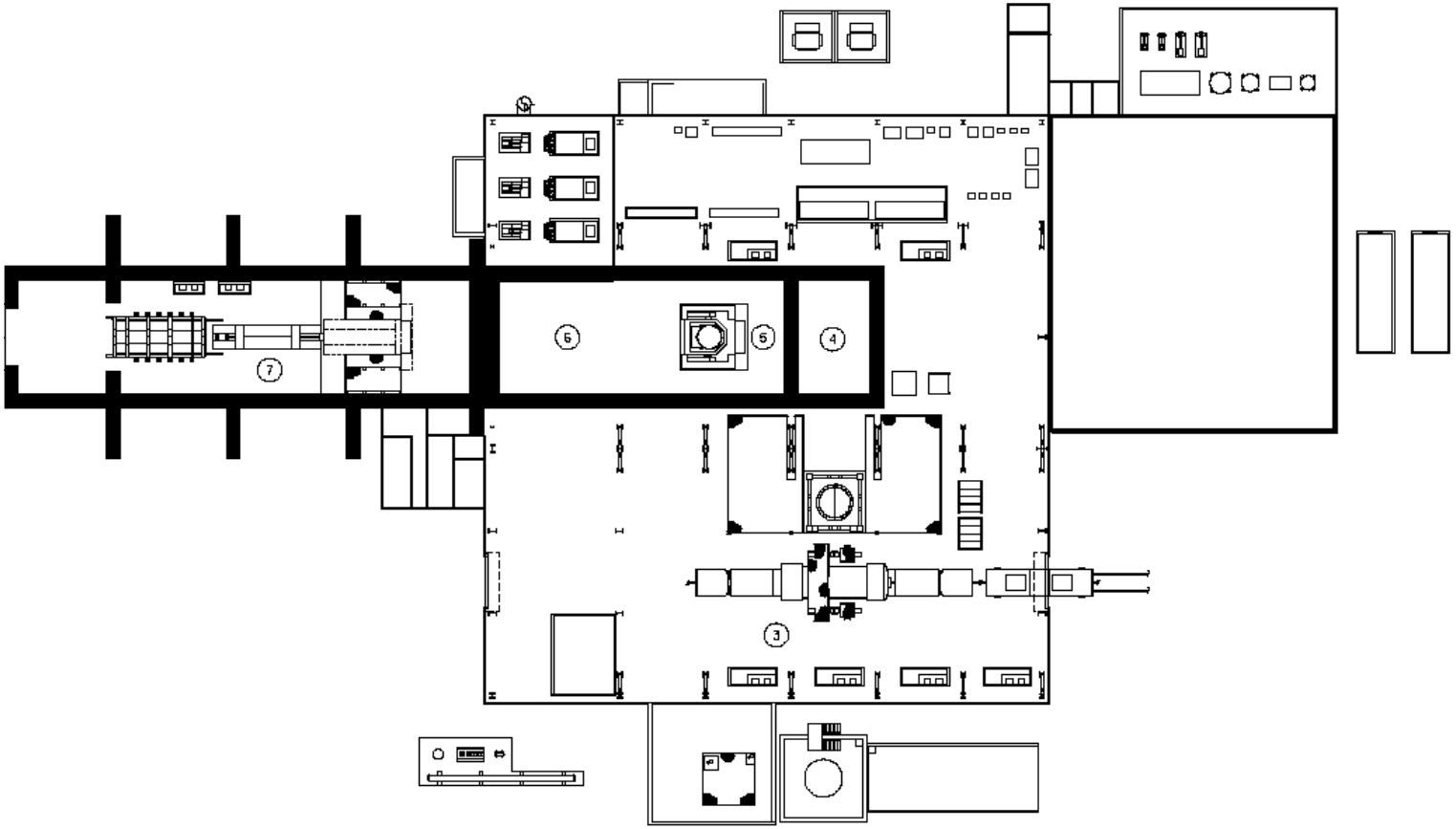
		Facilities			
		Initial Handling Facility (IHF)	Canister Receipt and Closure Facility (CRCF)	Wet Handling Facility (WHF)	Receipt Facility (RF)
Waste Forms					
HLW	Canister	X	X		
Naval SNF	Canister	X			
DOE SNF	Canister		X		
CSNF	Uncanisterd			X	
CSNF	TAD		X	X	X
Phase 1					
Phase 2					
Features					
WP Loading and Closure		X	X		
ITS Seismic Structure		X	X	X	X
ITS Mechanical Handling		X	X	X	X
ITS Confinement			X	X	X
ITS HEPA Exhaust			X	X	X
ITS Emergency Power			X	X	X
Remediation Capability		Dry	Dry	Wet and Dry	Dry

Note: Phases 3 and 4 add CRCF-2 and CRCF-3, respectively

Waste Form Processing Overview



Waste Handling Facilities

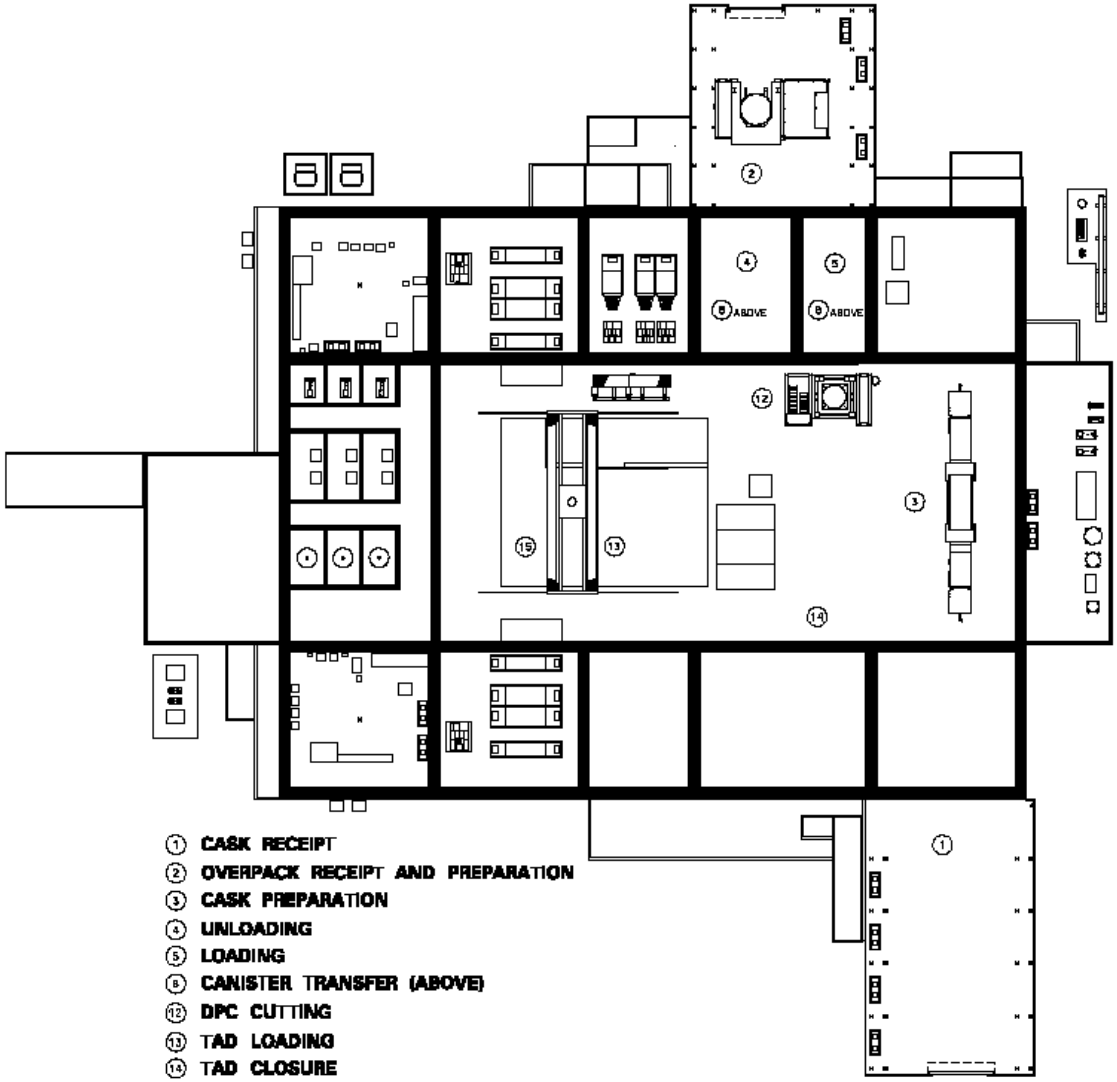


3 CASK PREPARATION
4 UNLOADING
5 LOADING
6 WP POSITIONING
7 WP LOADOUT

GROUND FLOOR PLAN

INITIAL HANDLING FACILITY

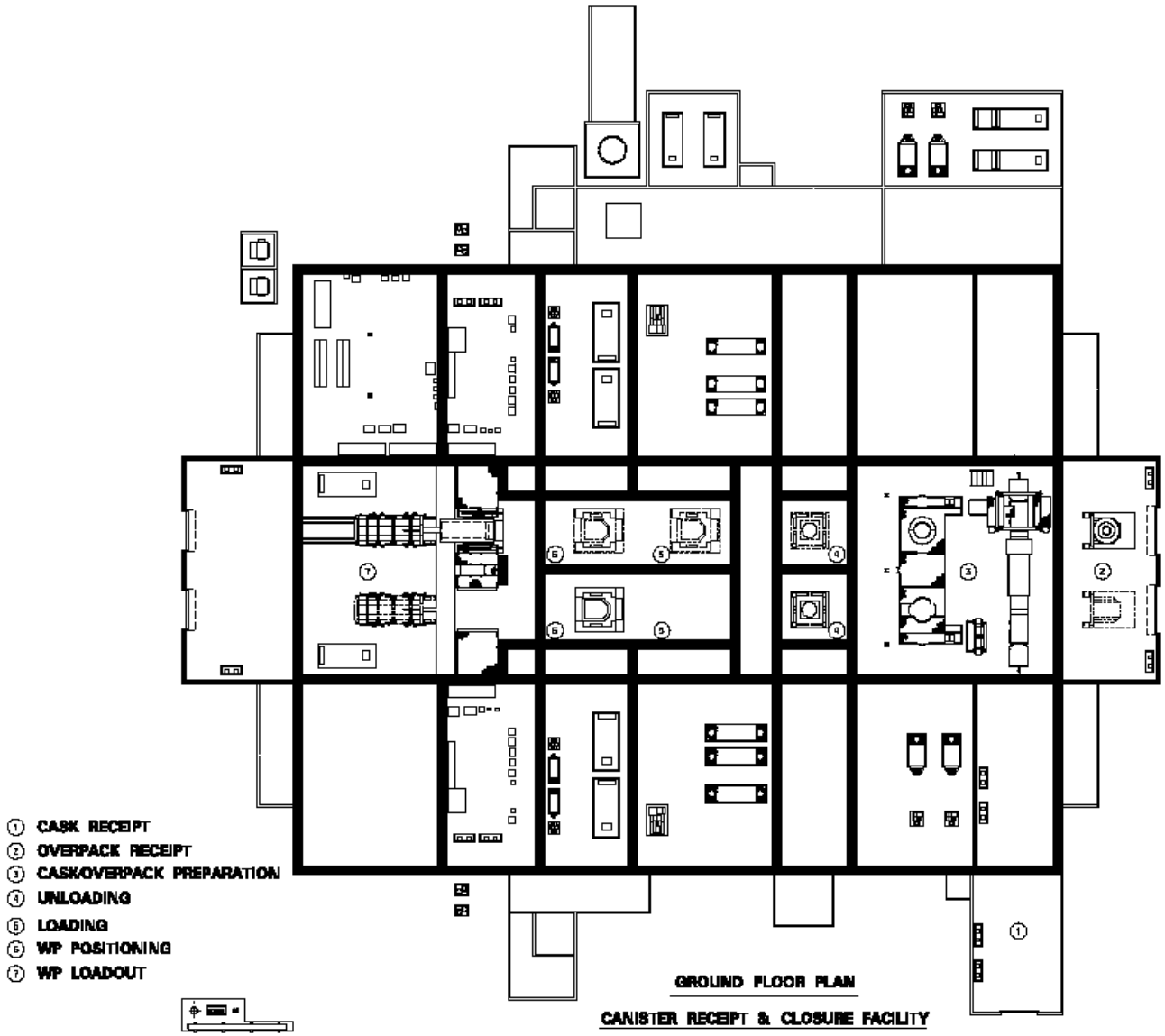
INITIAL HANDLING FACILITY SECTION



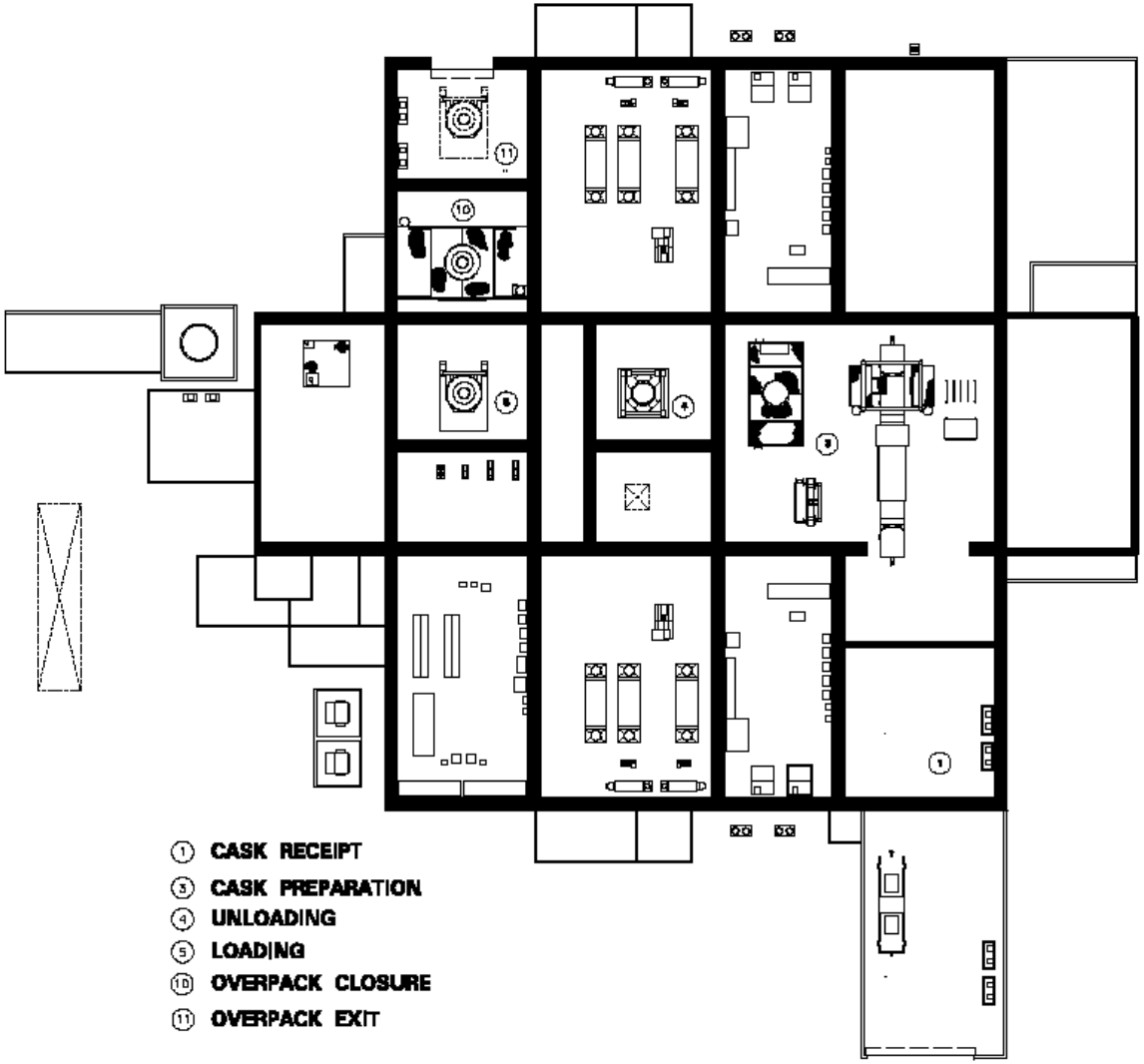
GROUND FLOOR PLAN

WET HANDLING FACILITY

WET HANDLING FACILITY POOL ROOM

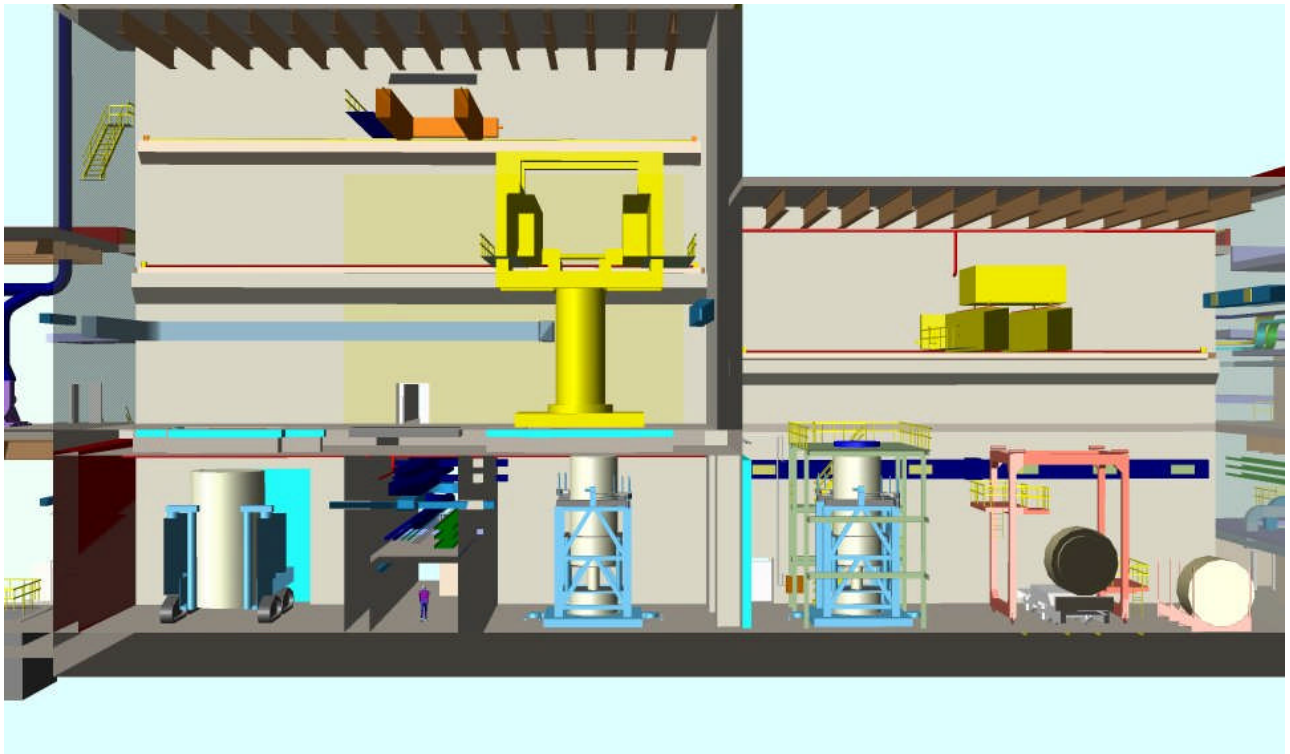

1 CASK RECEIPT
2 OVERPACK RECEIPT
3 CASKOVERPACK PREPARATION
4 UNLOADING
5 LOADING
6 WP POSITIONING
7 WP LOADOUT
GROUND FLOOR PLAN
CANISTER RECEIPT & CLOSURE FACILITY

CANISTER RECEIPT AND CLOSURE FACILITY SECTION



GROUND FLOOR PLAN

RECEIPT FACILITY

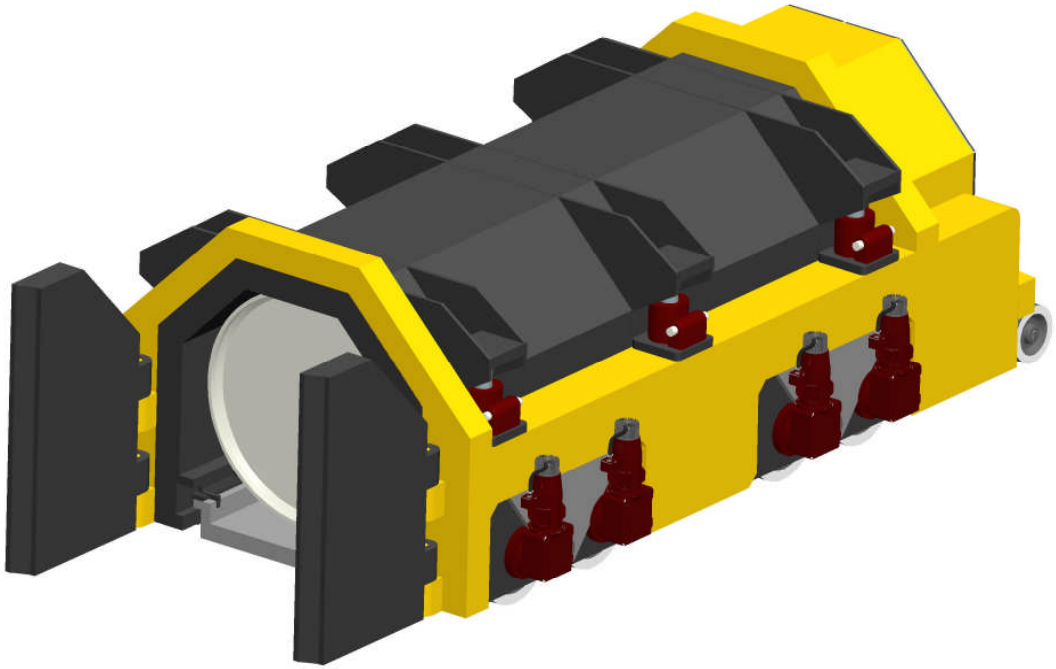


RECEIPT FACILITY SECTION

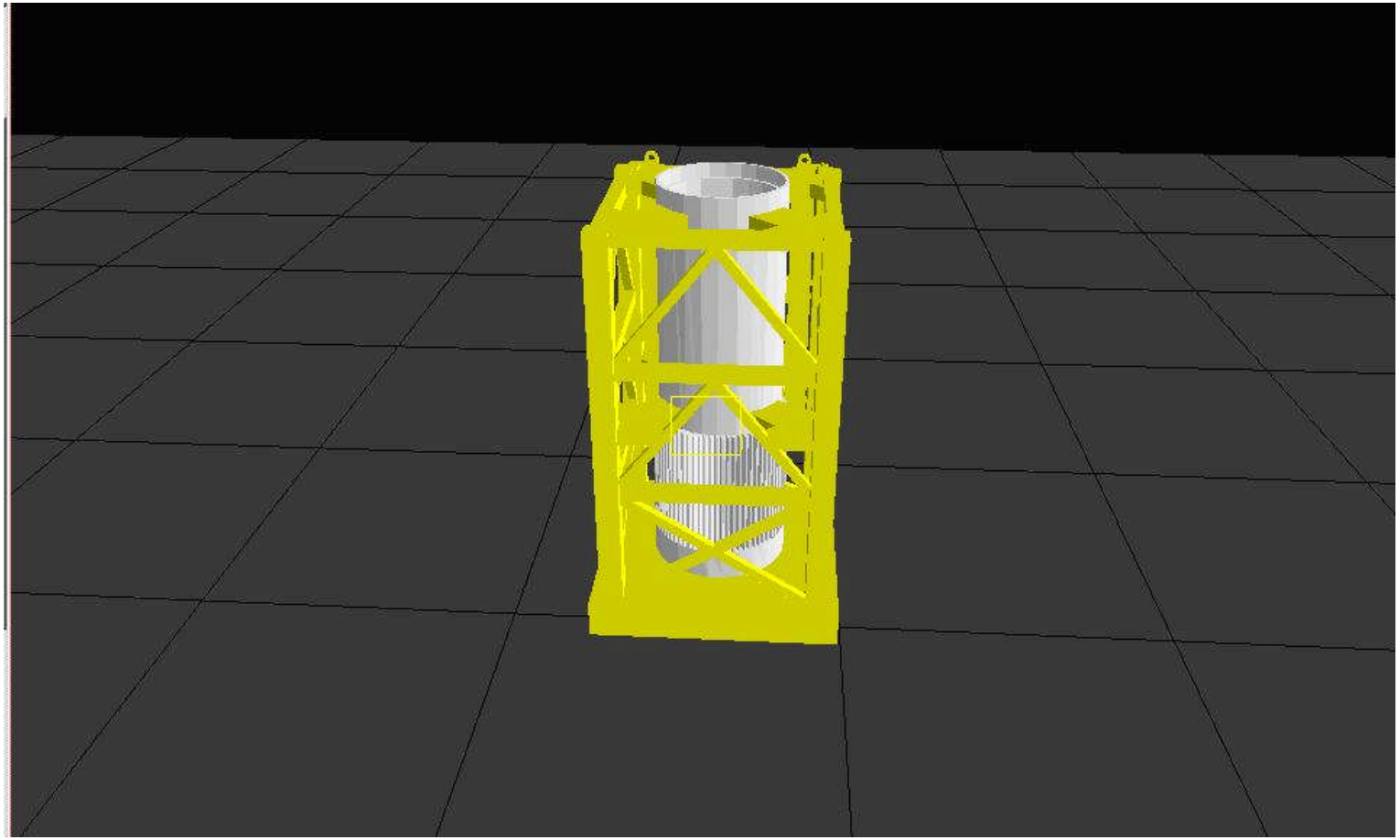
Commonality of Waste Handling Equipment

	Facilities			
	Initial Handling Facility (IHF)	Canister Receipt and Closure Facility (CRCF)	Wet Handling Facility (WHF)	Receipt Facility (RF)
Mechanical Handling Equipment				
Cask Handling Crane	X	X	X	X
Cask Transfer Trolley	X	X	X	X
Canister Transfer Machine	X	X	X	X
Waste PackageTransfer Trolley	X	X		
Transport and Emplacement Vehicle	X	X		
Site Transporter		X	X	X
Spent Fuel Transfer Machine			X	
TAD Closure			X	
DPC Cutting			X	

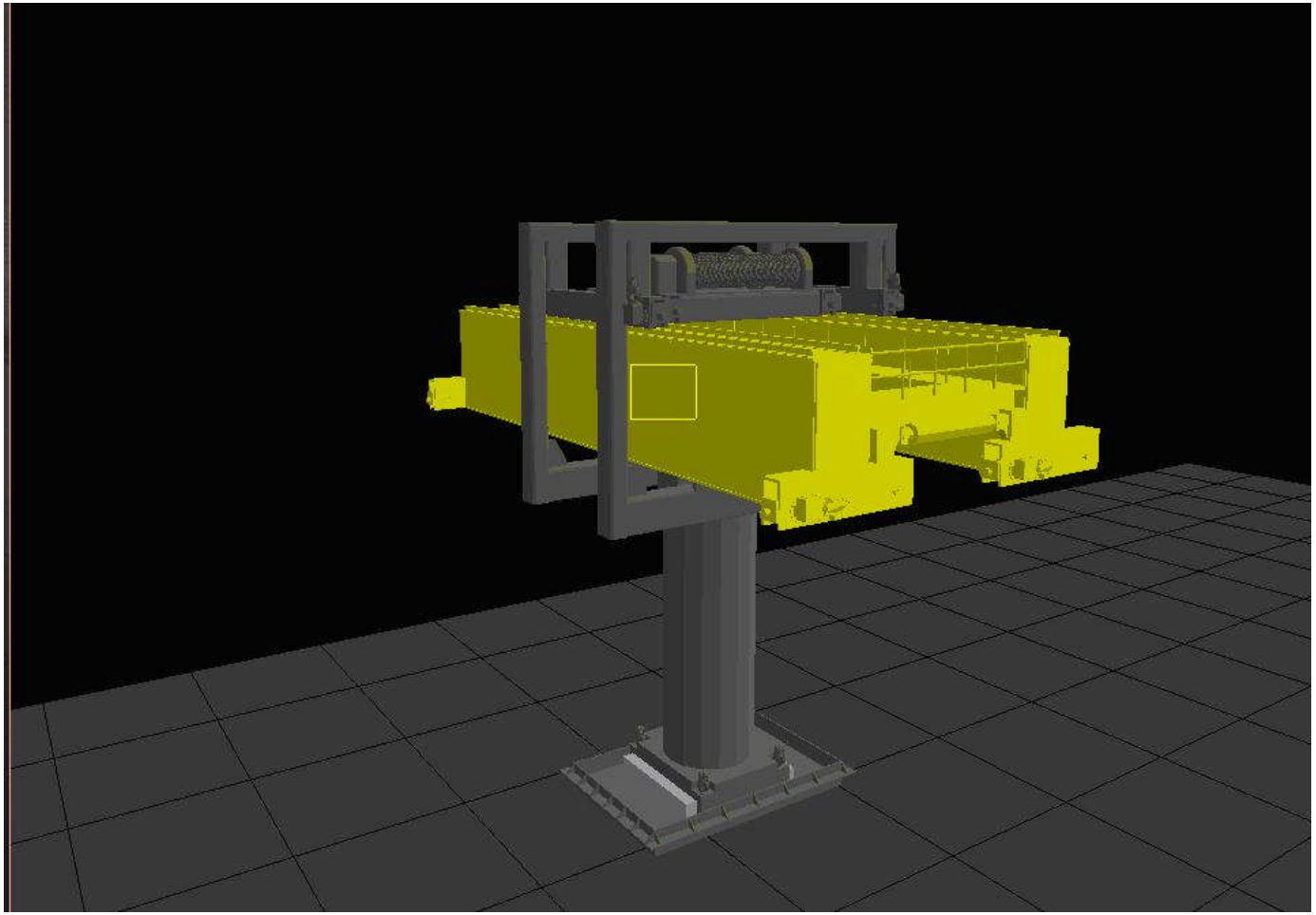
Transport and Emplacement Vehicle



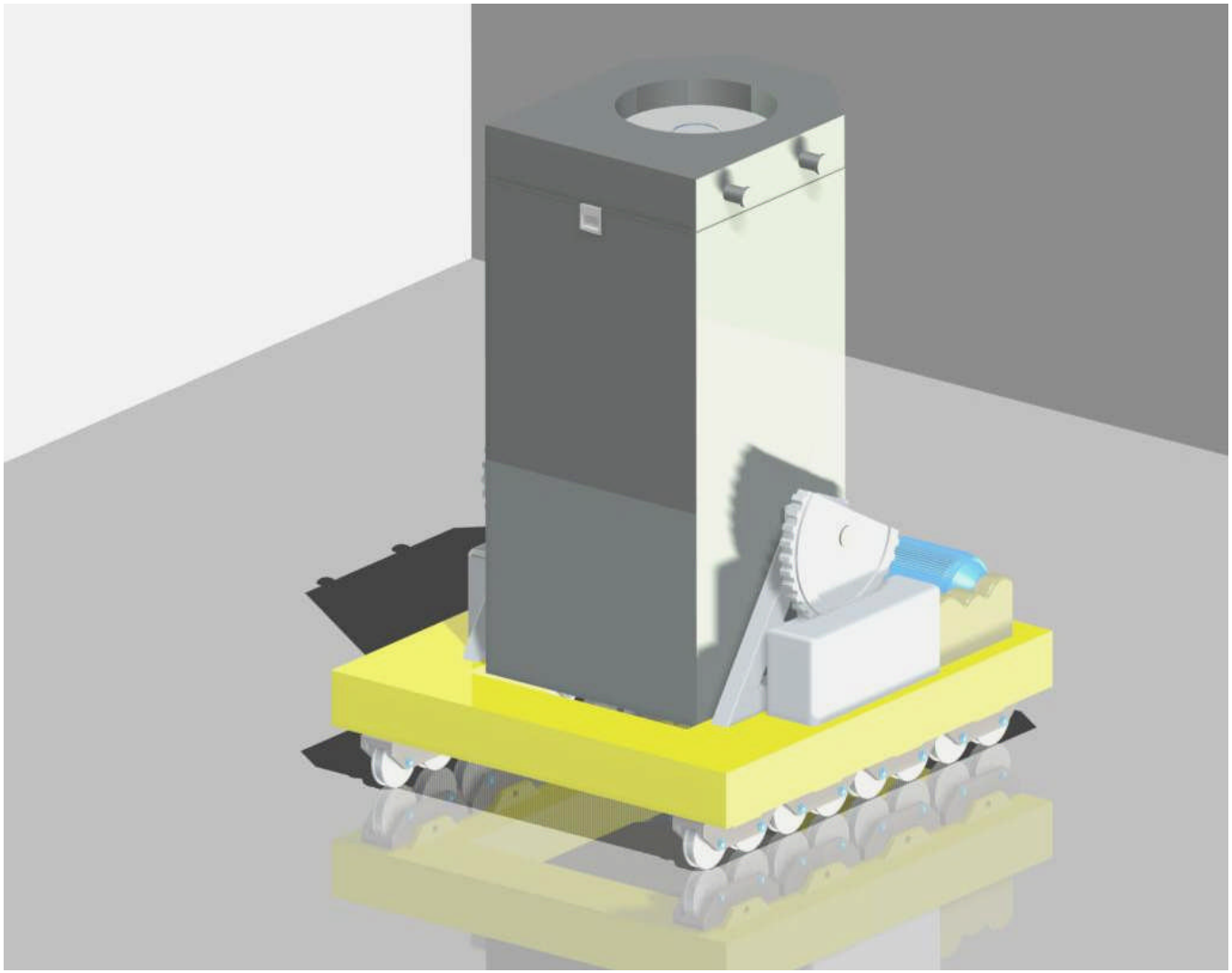
Cask Transfer Trolley



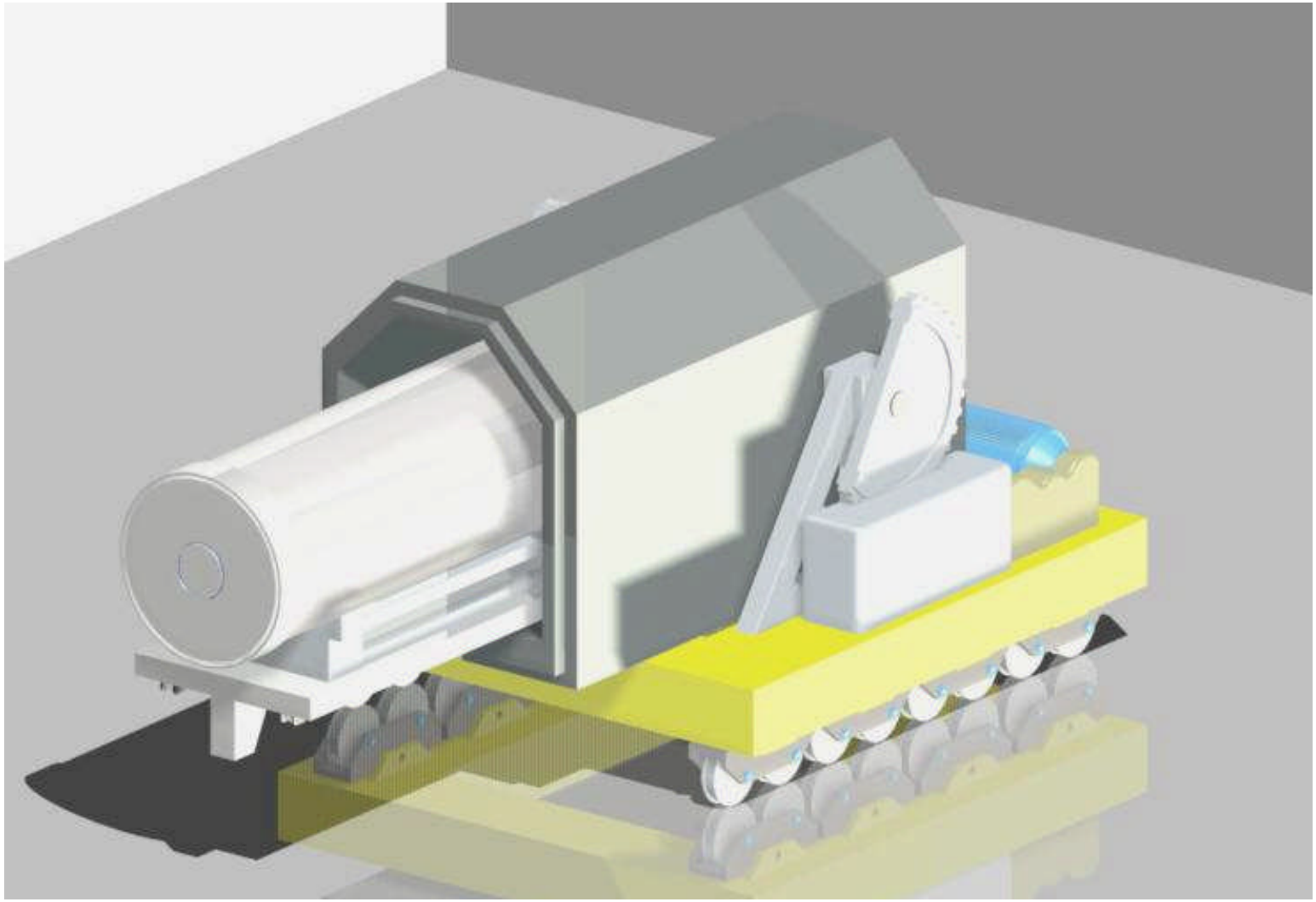
Canister Transfer Machine

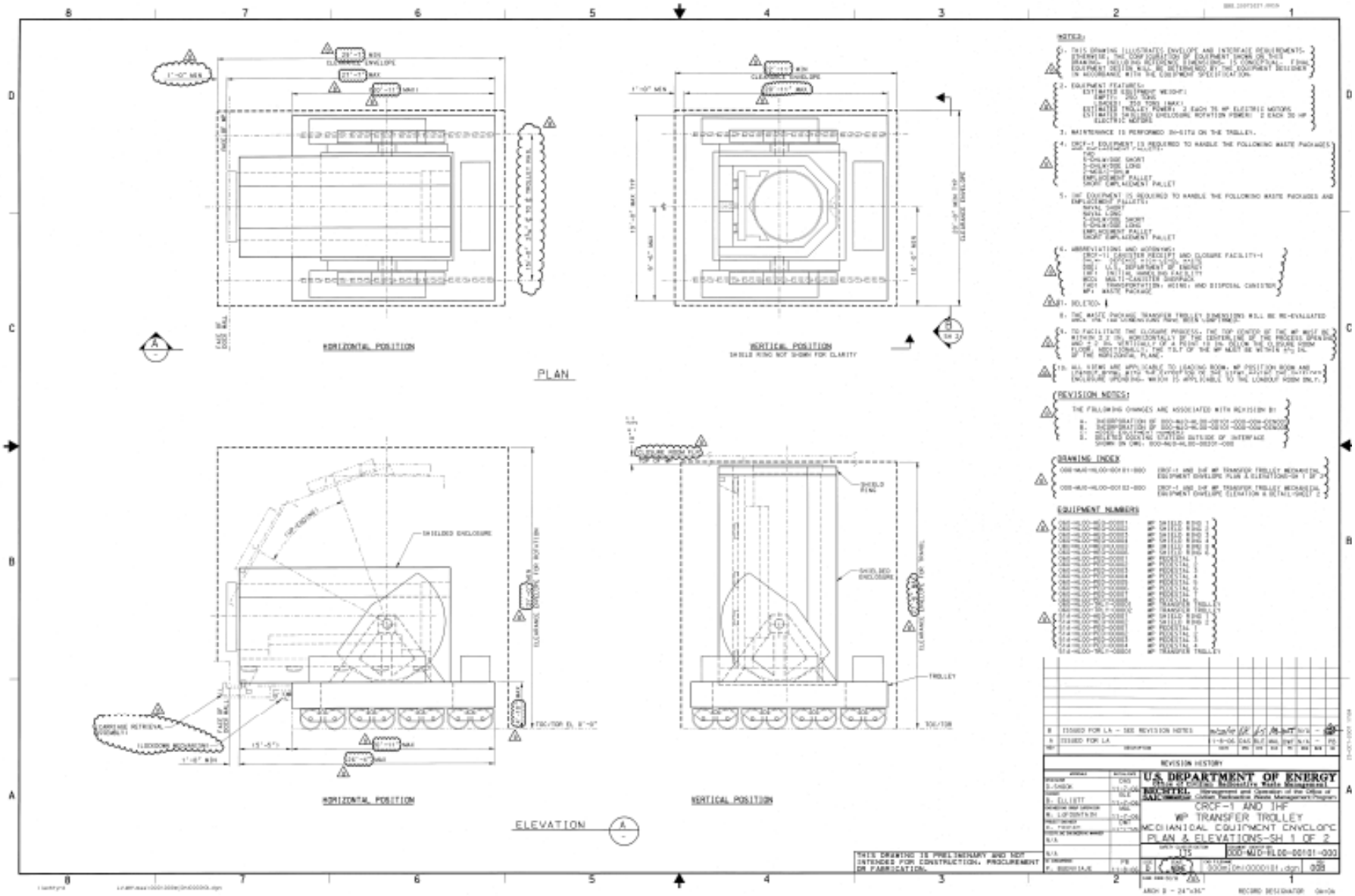


Waste Package Transfer Trolley



Waste Package Transfer Trolley




HORIZONTAL POSITION
VERTICAL POSITION
PLAN
ELEVATION
U.S. DEPARTMENT OF ENERGY
CRCF-1 AND IHF
WP TRANSFER TROLLEY
MECHANICAL EQUIPMENT ENVELOPE
PLAN & ELEVATIONS-SH 1 OF 2

Mechanical Handling Equipment Principal Design Codes

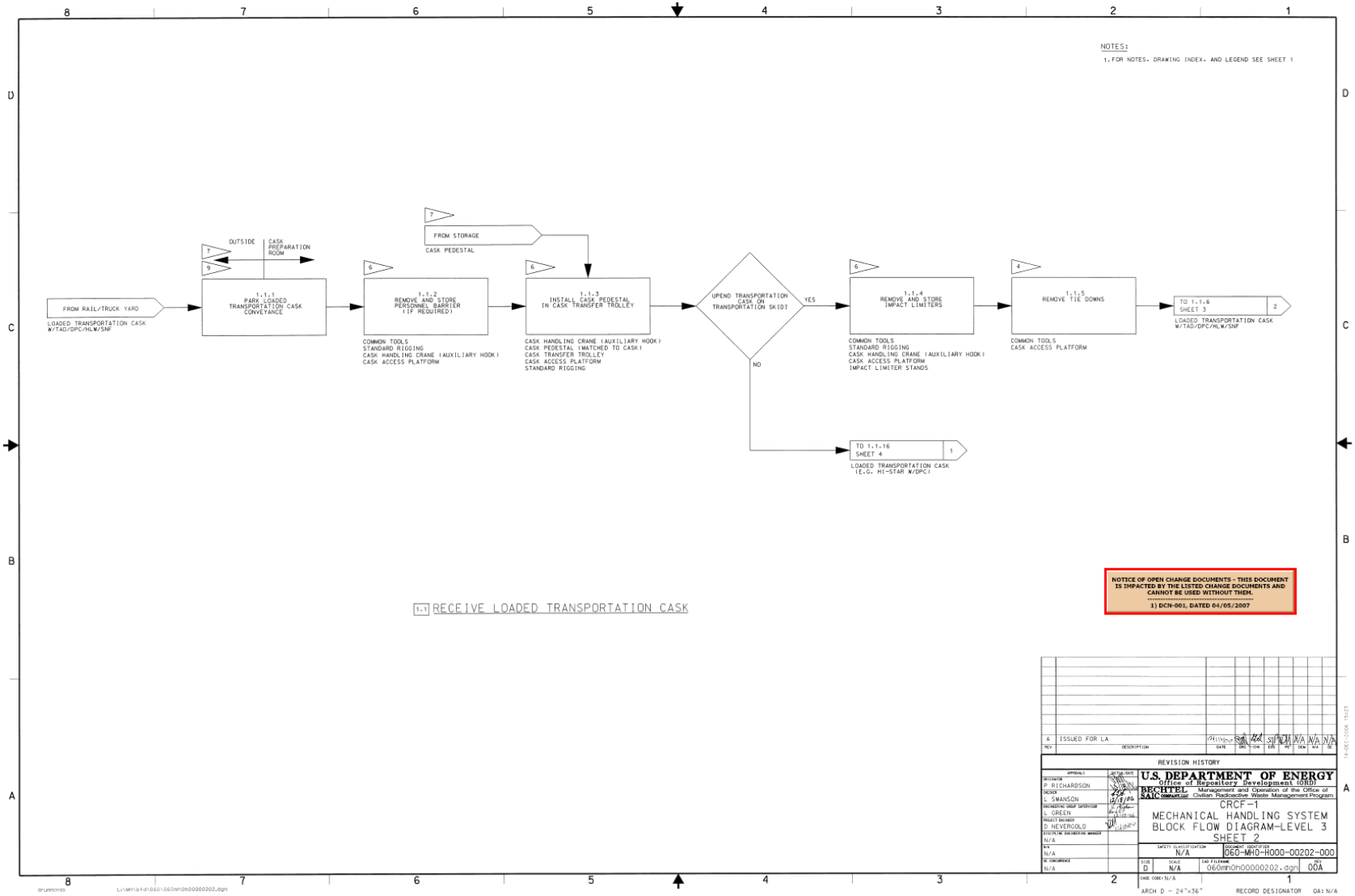
- **Cask handling cranes, site transporters, the spent fuel transfer machine, TAD closure equipment and DPC cutting equipment are currently in use at commercial nuclear plants and will be designed to the consensus codes and standards for the type of equipment. For example, the cask handling cranes and spent fuel transfer machine will be designed to ASME NOG-1**

Mechanical Handling Equipment Principal Design Codes

- **The cask transfer trolley and the waste package transfer trolley do not have a consensus design code and therefore will be designed to the applicable portions of ASME NOG-1 and AISC *Manual of Steel Construction***
- **The canister transfer machine is essentially a crane and will be designed to ASME NOG-1**
- **The transport and emplacement vehicle does not have a consensus design code and therefore will be designed to the applicable portions of ASME NOG-1, and AISC *Manual of Steel Construction***

Design Process for ITS Mechanical Handling Equipment

- The Conceptual Design Report (part of the CD-1 package) identified the basic handling concept and arrangement of the nuclear facilities
- The Preliminary Hazards Analysis (also part of the CD-1 package) identified functions of structures, systems and components that will be relied upon to prevent or mitigate event sequences
- A conceptual design for the equipment was developed concurrent with ongoing PCSA assessment of the evolving design
- Block flow diagrams were developed to depict the handling process


NOTES:
1. FOR NOTES, DRAWING INDEX, AND LEGEND SEE SHEET 1
FROM RAIL/TRUCK YARD
LOADED TRANSPORTATION CASK W/TAD/DPC/HLW/SNF
OUTSIDE
CASK PREPARATION ROOM
1.1.1 PARK LOADED TRANSPORTATION CASK CONVEYANCE
1.1.2 REMOVE AND STORE PERSONNEL BARRIER (IF REQUIRED)
COMMON TOOLS
STANDARD RIGGING
CASK HANDLING CRANE (AUXILIARY HOOK)
CASK ACCESS PLATFORM
FROM STORAGE
CASK PEDESTAL
1.1.3 INSTALL CASK PEDESTAL IN CASK TRANSFER TROLLEY
CASK HANDLING CRANE (AUXILIARY HOOK)
CASK PEDESTAL (MATCHED TO CASK)
CASK TRANSFER TROLLEY
CASK ACCESS PLATFORM
STANDARD RIGGING
UPEND TRANSPORTATION CASK ON TRANSPORTATION SKID?
YES
NO
1.1.4 REMOVE AND STORE IMPACT LIMITERS
COMMON TOOLS
STANDARD RIGGING
CASK HANDLING CRANE (AUXILIARY HOOK)
CASK ACCESS PLATFORM
IMPACT LIMITER STANDS
1.1.5 REMOVE TIE DOWNS
COMMON TOOLS
CASK ACCESS PLATFORM
TO 1.1.6 SHEET 3
LOADED TRANSPORTATION CASK W/TAD/DPC/HLW/SNF
TO 1.1.16 SHEET 4
LOADED TRANSPORTATION CASK (E.G. HI-STAR W/DPC)
1.1 RECEIVE LOADED TRANSPORTATION CASK
NOTICE OF OPEN CHANGE DOCUMENTS - THIS DOCUMENT IS IMPACTED BY THE LISTED CHANGE DOCUMENTS AND CANNOT BE USED WITHOUT THEM.
1) DCN-001, DATED 04/05/2007
A ISSUED FOR LA
REVISION HISTORY
U.S. DEPARTMENT OF ENERGY
Office of Repository Development (ORD)
BECHTEL SAIC
Management and Operation of the Office of Civilian Radioactive Waste Management Program
CRCF-1
MECHANICAL HANDLING SYSTEM
BLOCK FLOW DIAGRAM-LEVEL 3
SHEET 2
060-MH0-H000-00202-000
00A
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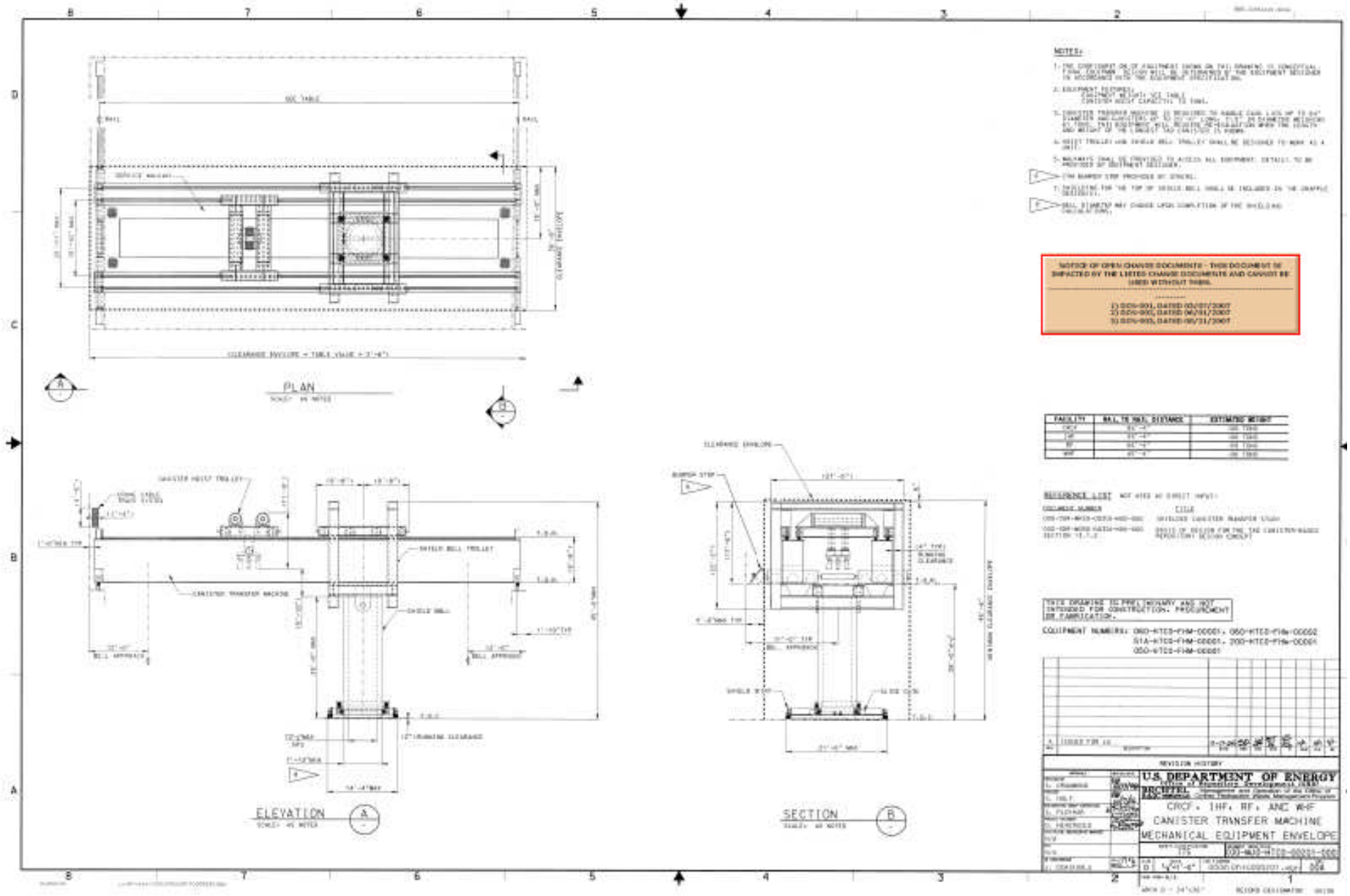
N/A
060mh0h00000202.dgn
ARCH D - 24"x36"
RECORD DESIGNATOR

Design Process for ITS Mechanical Handling Equipment

- **Mechanical equipment envelope drawings were developed to bound the expected size of the equipment for utilization in the 3-D model development and to identify interface requirements**
- **Process and instrumentation diagrams were developed to identify the controls, instrumentation and interlocks for the equipment**
- **Logic diagrams were developed to identify how the controls and interlocks interact**


PLAN
ELEVATION
SECTION
NOTES:
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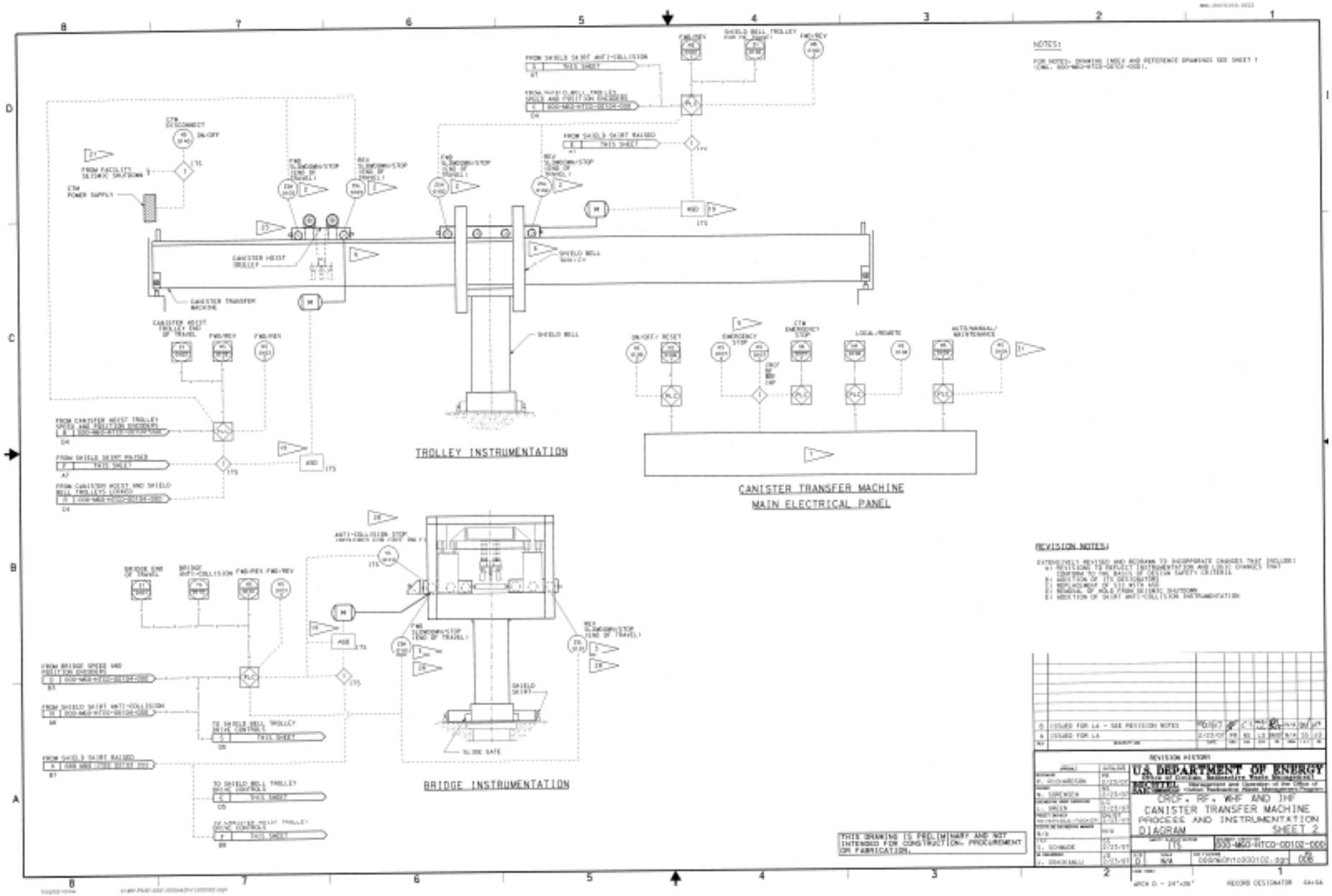
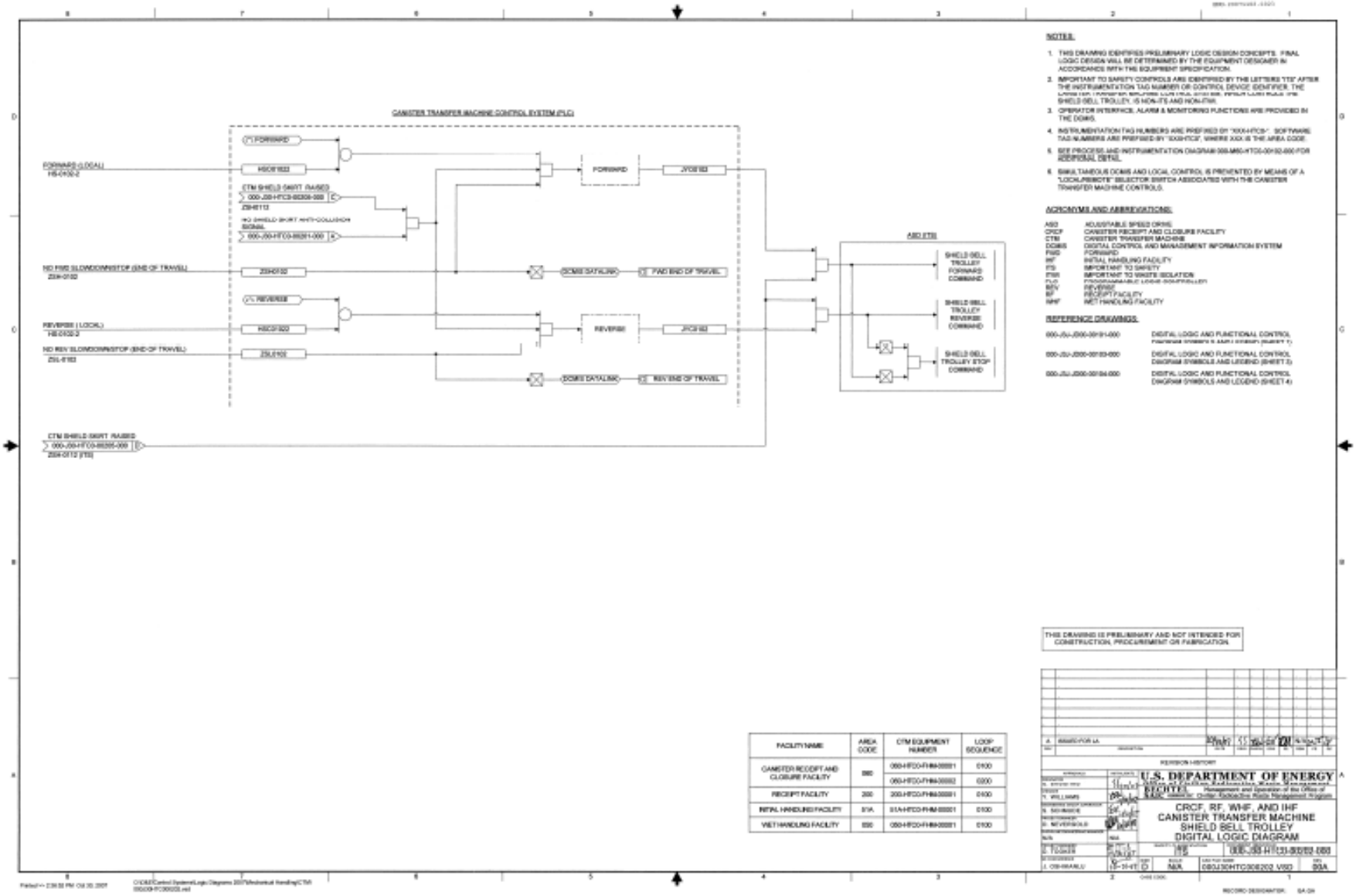
REFERENCE LIST
THIS DRAWING IS PRELIMINARY AND NOT INTENDED FOR CONSTRUCTION, PROCUREMENT OR FABRICATION.
REVISION HISTORY
U.S. DEPARTMENT OF ENERGY
BECHTEL
CRCF, IHF, RF, ANC WHF
CANISTER TRANSFER MACHINE
MECHANICAL EQUIPMENT ENVELOPE


TROLLEY INSTRUMENTATION
CANISTER TRANSFER MACHINE
MAIN ELECTRICAL PANEL
BRIDGE INSTRUMENTATION
NOTES:
REVISION NOTES:
REVISION HISTORY
U.S. DEPARTMENT OF ENERGY
CRCF, RF, VHF AND IHF
CANISTER TRANSFER MACHINE
PROCESS AND INSTRUMENTATION
DIAGRAM
SHEET 2
THIS DRAWING IS PRELIMINARY AND NOT INTENDED FOR CONSTRUCTION, PROCUREMENT OR FABRICATION.



FACILITY NAME	AREA CODE	CTM EQUIPMENT NUMBER	LOOP SEQUENCE
CANISTER RECEIPT AND CLOSURE FACILITY	000	000-HTCO-FHM-00001	0100
		000-HTCO-FHM-00002	0200
RECEIPT FACILITY	200	200-HTCO-FHM-00001	0100
INITIAL HANDLING FACILITY	01A	01A-HTCO-FHM-00001	0100
WET HANDLING FACILITY	050	050-HTCO-FHM-00001	0100

Design Process for ITS Mechanical Handling Equipment

- A mechanical handling design report was developed for the conceptual design to demonstrate that the equipment can be expected to perform the functions relied upon by the preclosure safety analysis
- Fragility analyses and fault trees are being developed for the conceptual design to demonstrate the expected reliability of the equipment meets the reliability used in the preclosure safety analysis
- A performance specification will be prepared to procure the equipment
- The selected vendor will prepare the detail design of the equipment including analyses to confirm the equipment is bounded by the parameters used in the preclosure safety analysis

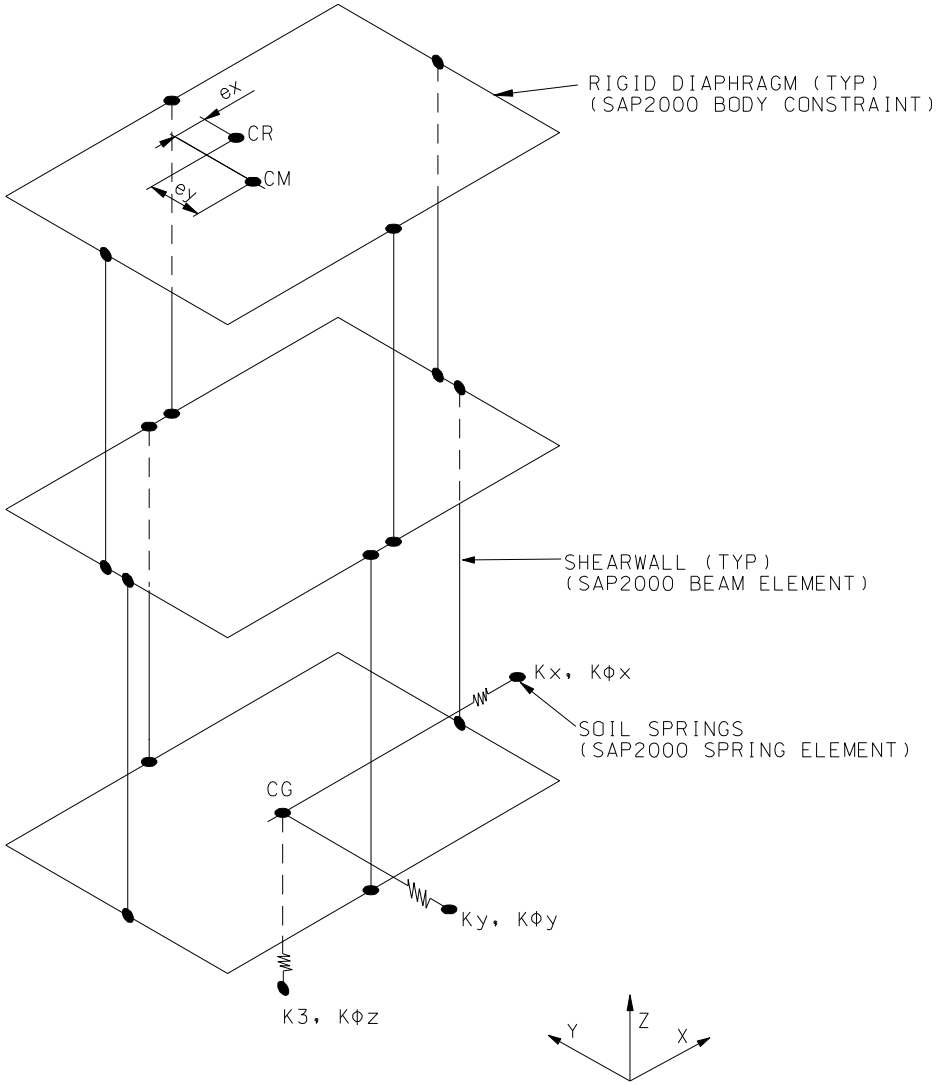
Structural Principal Design Codes

- **ASCE Standard 4-98: *Seismic Analysis of Nuclear Structures***
- **ACI-349-01: *Nuclear Safety Related Concrete Structures***
- **ANSI/AISC N-690-1994: *Steel Safety Related Structures for Nuclear Facilities***

Structural Design Process

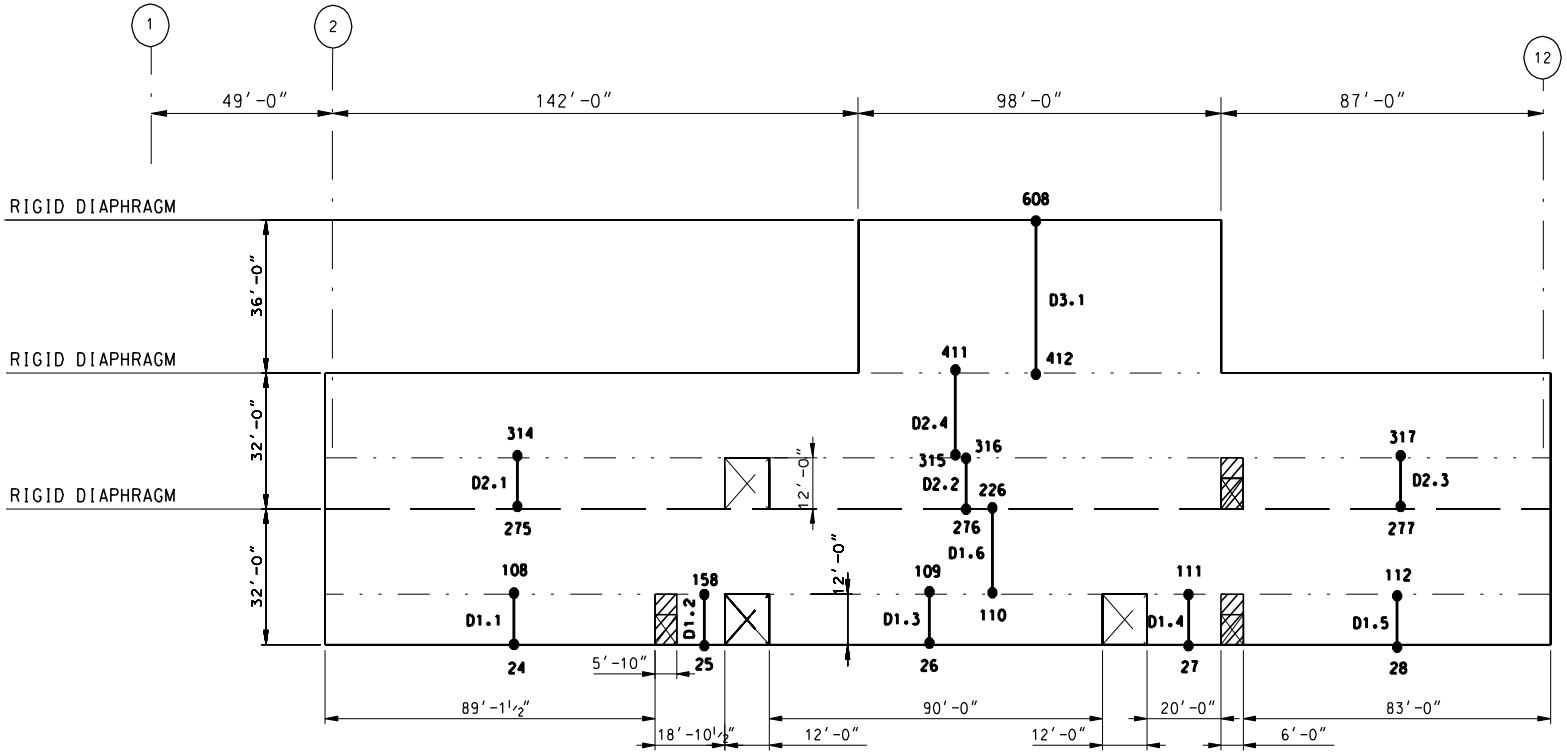
- The facility configuration is set, wall and slab thicknesses have been estimated, and major equipment loads have been identified
- A lumped mass multiple stick model with appropriate soil springs and damping values has been developed and analyzed with appropriate load cases
- The ITS surface structures, systems and components are designed for the 2,000 year return period earthquake (5x10-4 MAPE) with a horizontal PGA of 0.58g and vertical PGA of 0.52g
- Results of the lumped mass multiple stick model analysis confirm the concrete wall and slab thicknesses and determine the reinforcing steel requirements
- Additional analyses of the lumped mass multiple stick model are being performed to determine a fragility curve to demonstrate design margin to evaluate the facility against beyond design basis ground motion earthquakes
- A seismic hazards curve has been developed and is combined with the facility fragility curves to demonstrate the ITS structures can perform their ITS functions for all Category 1 and 2 event sequences

Lumped Mass Multiple Stick Model Schematic



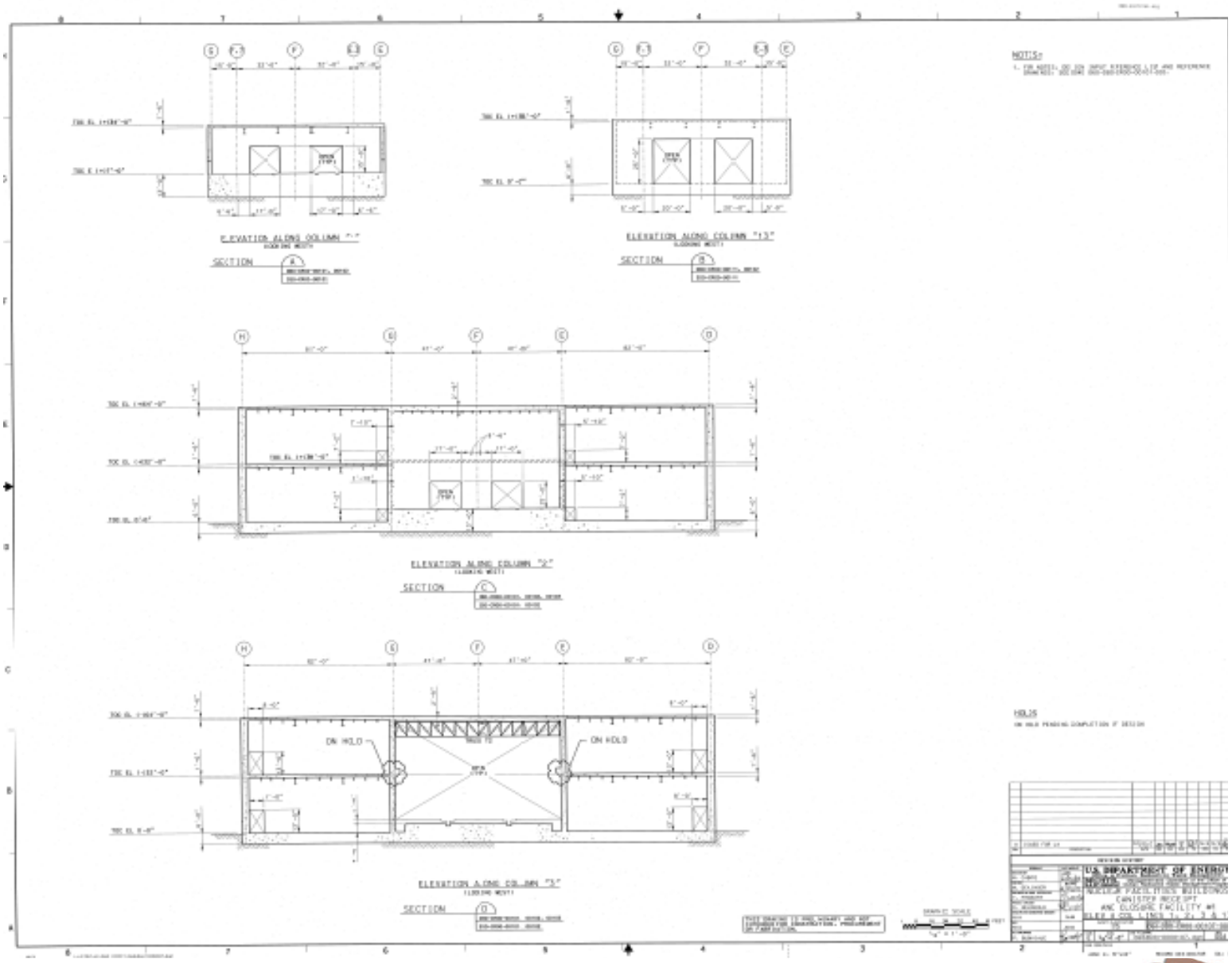
CR:Center of Rigidity
CM:Center of Mass
CG:Center of Gravity

Typical Shear Wall
Stick Element Representation

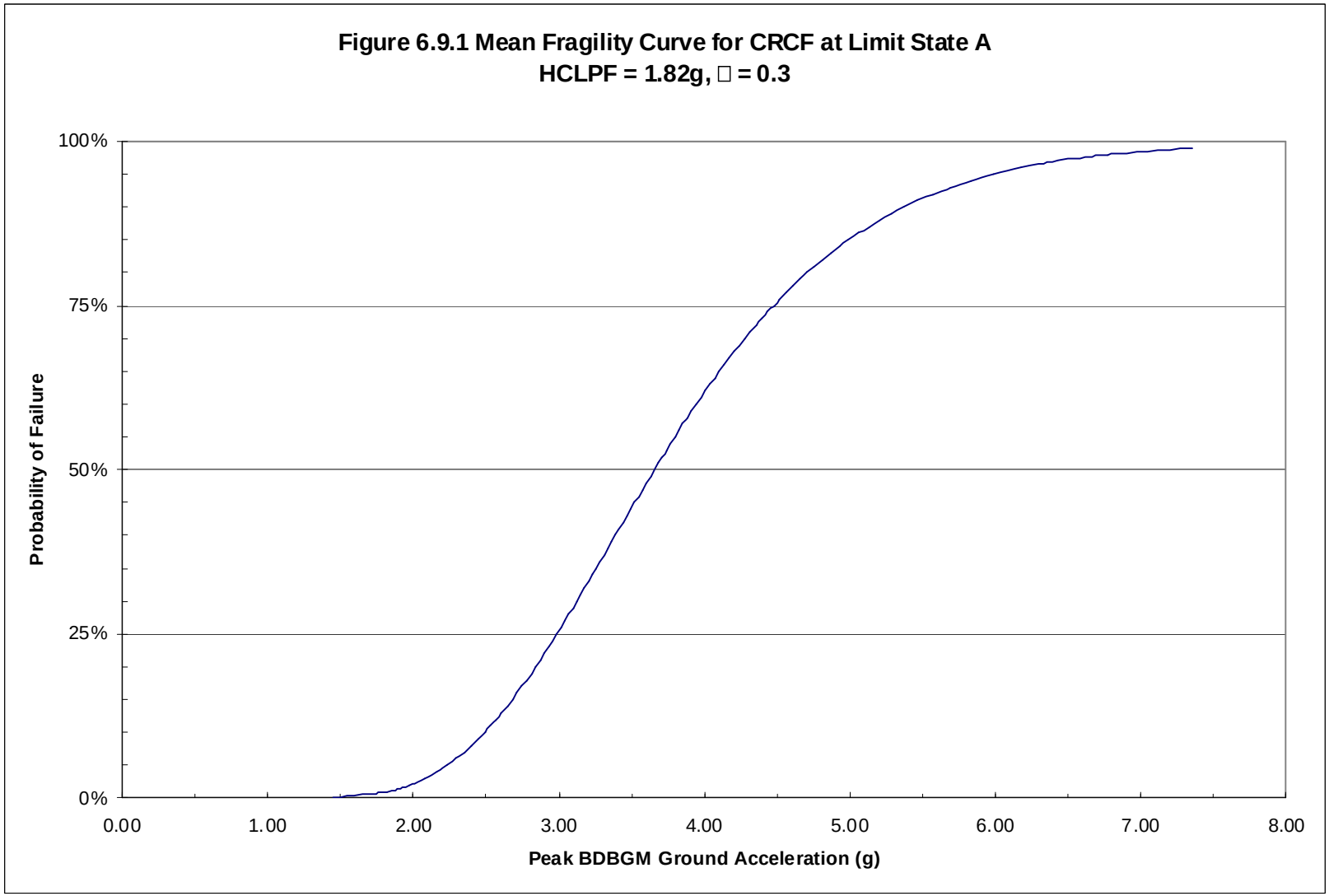


TYPICAL WALL ELEVATION

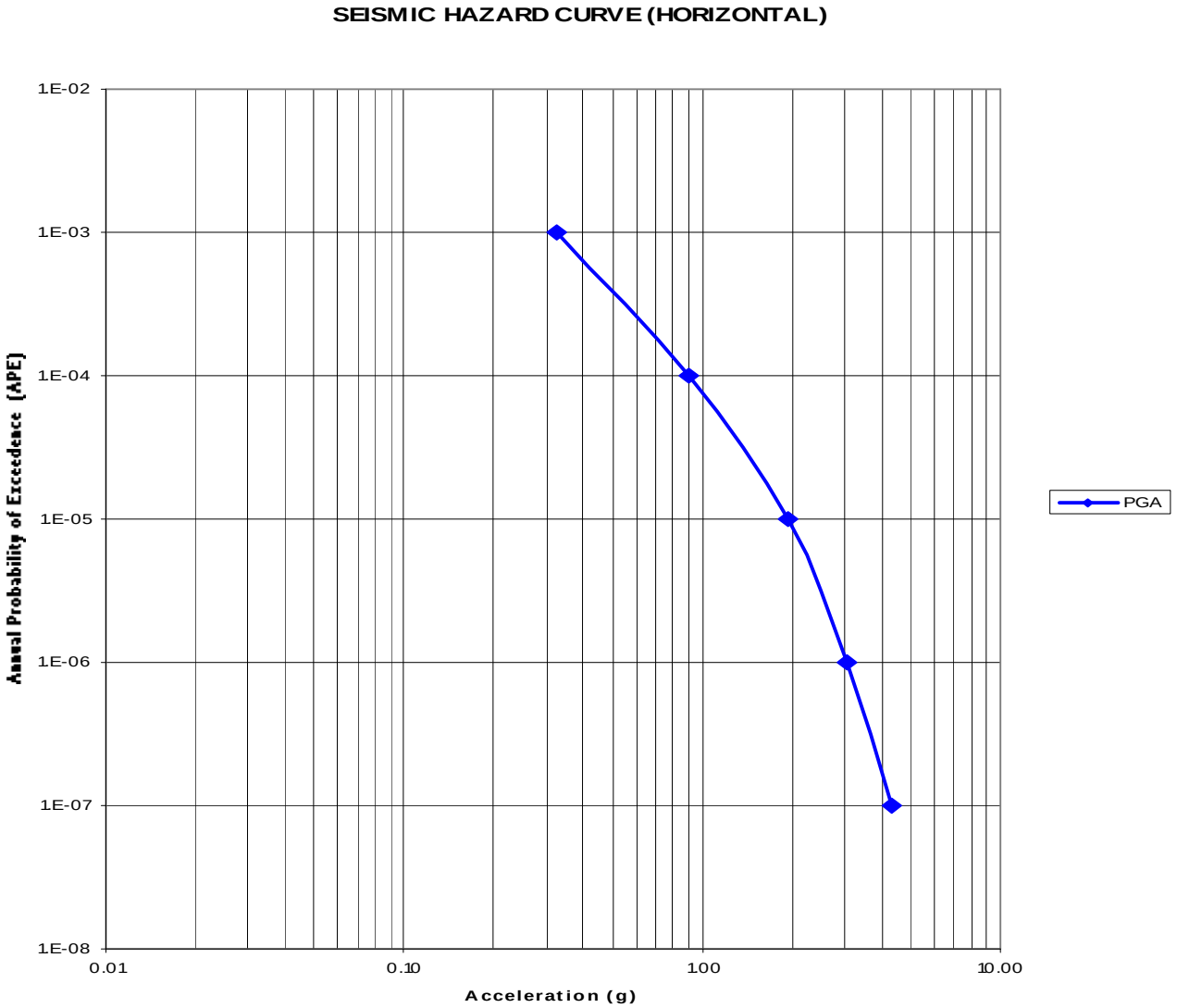
CRCF Concrete Forming Document



Typical Fragility Curve



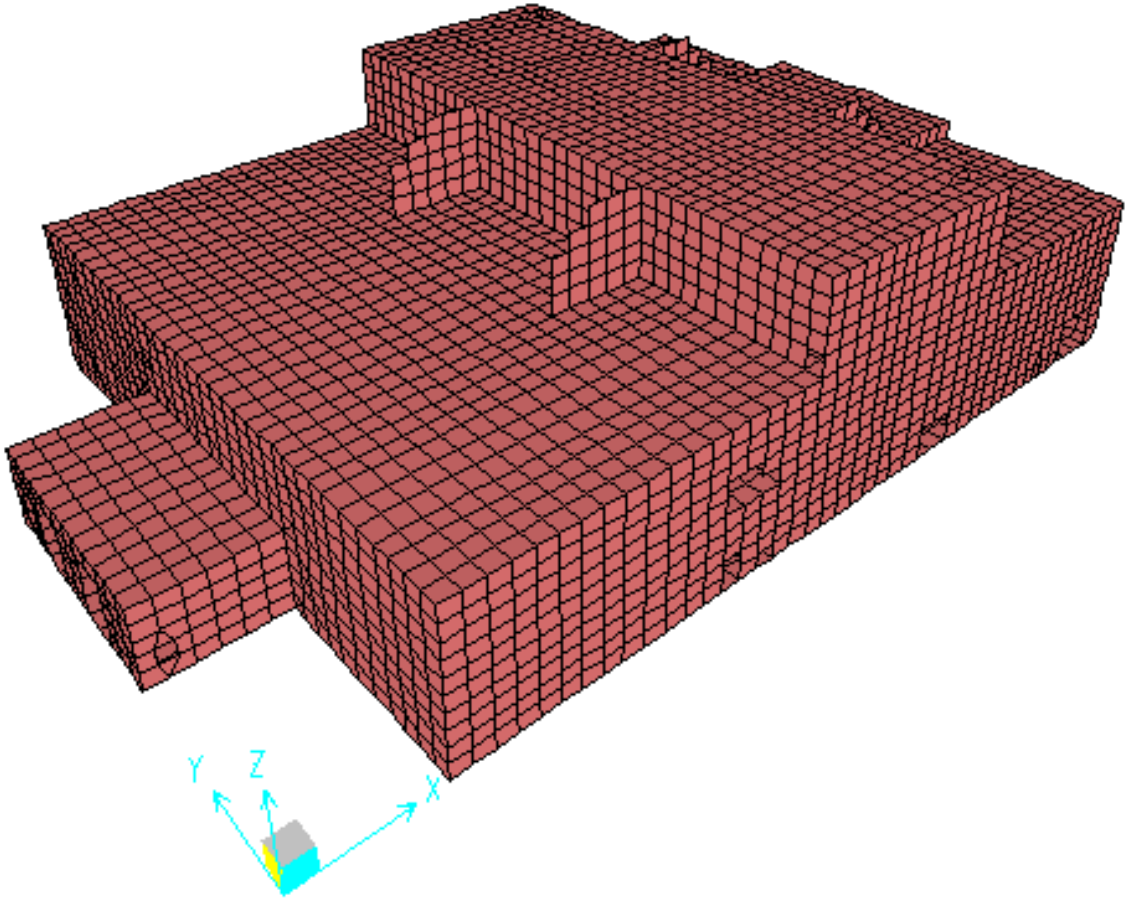
Preliminary Seismic Hazards Curve



Structural Design Process

- **Following the demonstration of the adequacy of the structural design, additional modeling of the ITS structures is performed**
- **A finite element model of each ITS facility is developed including soil-structure interaction generated using SASSI software**
- **The model will be used as a tool to complete the detailed design of the facilities**

CRCF Finite Element Model



Design and PCSA Status

- A total of 1,318 products (calculations, drawings, and reports) are being developed by design and PCSA to support the 71 sections of the License Application
- These products provide a level of detail that is sufficient to demonstrate the safety case for the repository and to allow the NRC to complete its safety evaluation for the repository
- More than 95 percent of the design and PCSA products have been completed to date
- Design products will be completed by December 2007
- PCSA products will be completed by February 2008

STATE-OF-THE-ART REACTOR CONSEQUENCE ANALYSES

Advisory Committee on Nuclear Waste and Materials Briefing
November 15, 2007

Agenda

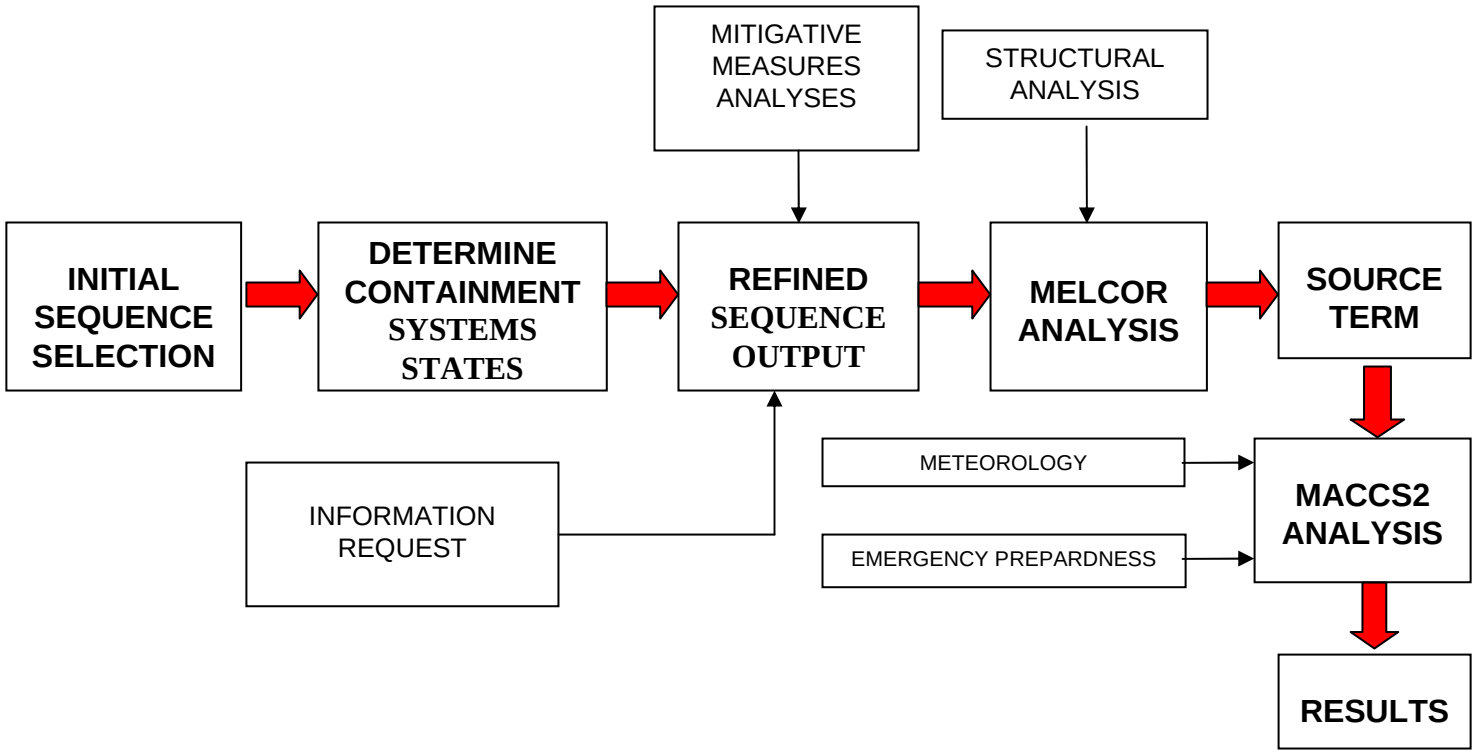
- Overview
- Reporting Latent Cancer Fatalities

SOARCA Goal

Develop a state-of-the-art, more realistic evaluation of severe accident progression, radiological releases and offsite consequences for dominant accident sequences and replace analyses such as NUREG/CR-2239, “Technical Guidance for Siting Criteria Development,” issued November 1982.

- SR-COMSECY-06-0064
- SR-SECY-05-0233

SOARCA PROCESS



Project Plan

- Initial scope, not more than eight plants that represent the different reactor and containment design combinations operating in the United States

- Initial scope with staff recommendations to the Commission, TBD

SOARCA Approach

- Full power operation
- Plant-specific sequences including external events (CDF $\geq 10^{-6}$, CDF $\geq 10^{-7}$ for bypass events)
- Plant improvements: design, operations, emergency response
- Sensitivity analyses to assess effectiveness of safety measures
- State-of-the-art accident progression modeling based on 25 years of research to provide a best-estimate for accident progression, containment performance, time of release, fission product behavior
- More realistic offsite dispersion modeling
- Site-specific evaluation of public evacuation based on updated site- specific Emergency Plans

Reporting Latent Cancer Fatalities Background

- Commission emphasized the use of Risk Communication
- Steering Committee directed the SOARCA team to assess options
- SOARCA team developed options

Reporting Latent Cancer Fatalities

- Commission Paper
- Options
  - Range of thresholds (0 – 5 rem)
  - Linear no threshold (LNT)
  - Estimate point value from Health Physics Society
    - 5 rem in one year, 10 rem in a life time
- Commission paper in staff review