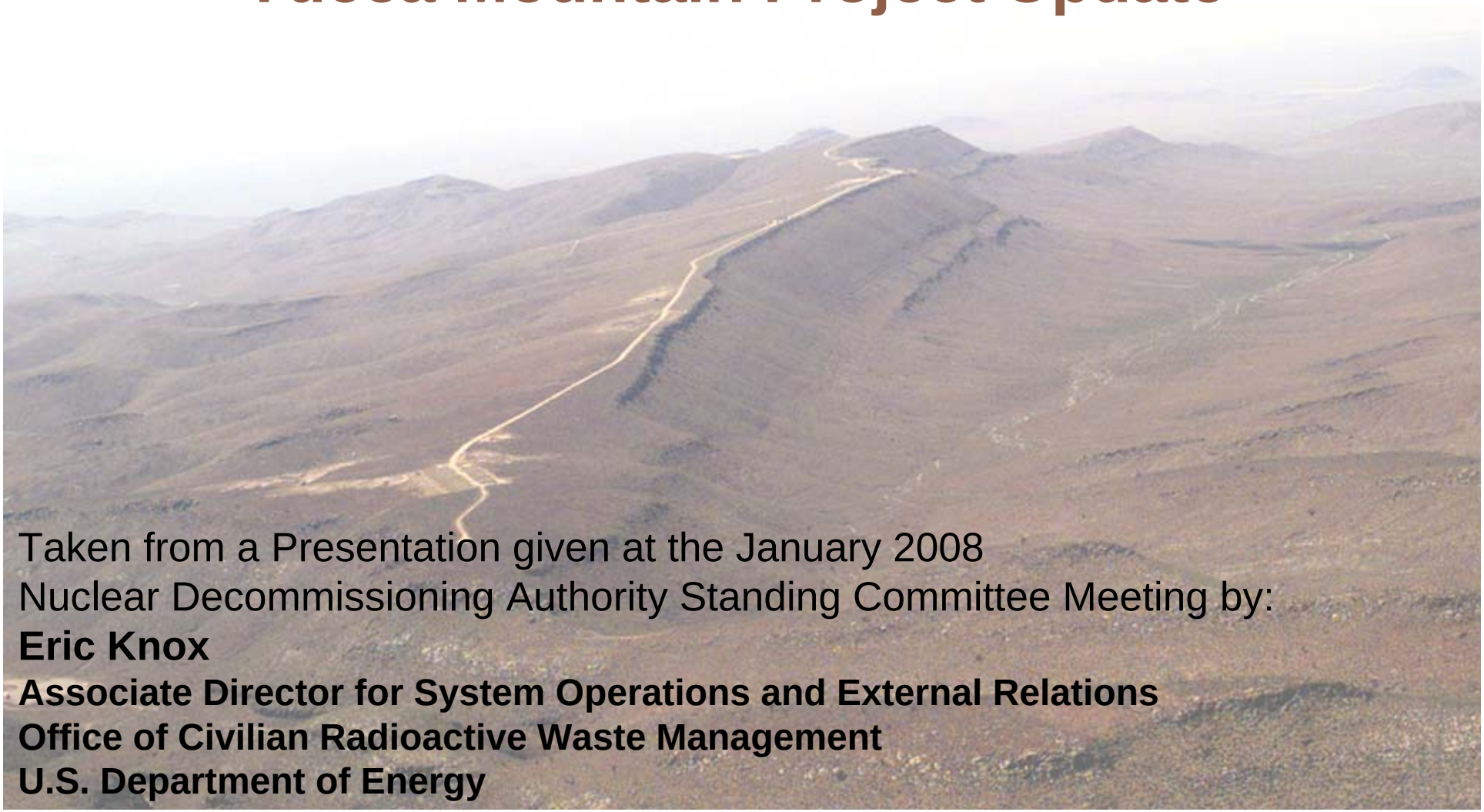
U.S. Department of Energy
Office of Civilian Radioactive Waste Management

CRWM Program

Yucca Mountain Project Update



Taken from a Presentation given at the January 2008
Nuclear Decommissioning Authority Standing Committee Meeting by:

Eric Knox
Associate Director for System Operations and External Relations
Office of Civilian Radioactive Waste Management
U.S. Department of Energy

Program Key Milestones

- **Design for License Application Complete- Nov. 2007**
  - **Actual: Completed 12/1/07**
- **LSN Certification- December 2007**
  - **Actual: October 19, 2007**
- **Supplemental EIS- May 2008**
  - **Actual: Draft Issued October 2007/Hearings completed**
- **License Application Submittal- June 2008**
  - **On schedule as of January 1, 2008**
  - **Impact of $108M FY 08 appropriations reduction currently being evaluated**

Program Key Milestones (cont'd)

- **Start Nevada Rail Construction- October 2009**
  - **Delayed- Inadequate funding to proceed with design**
- **YM Construction Authorization- September 2011**
  - **Best achievable date**
- **Operating License Submittal- March 2013**
  - **Predicated on Funding and Construction Schedule**
- **Rail Line Operational- June 2014**
  - **2016 is achievable only if adequate funding is provided**
- **Begin Receipt- March 2017 (Best Achievable Date)**
  - **Currently under evaluation due to FY '07 and '08 actual funding shortfalls**
  - **Firm date cannot be set until funding issue resolved**

OCRWM Releases

- **Independent Assessments (on website)**
  - **QAMA**
  - **Quality Assurance Programs**
  - **Engineering Processes**
- **TSLCC**
  - **Being revised to include current and constant dollars**
- **Final SEIS'**
- **License Application**
- **Fee Adequacy Determination**
- **Second Repository Report**
- **Interim Storage Report**

Program Challenges

- **FY ’08 Appropriations**
- **Access to Nuclear Waste Fund**
- **Program Structure for Management and Funding Continuity**
- **Revision to EPA Standard 40CFR197**
- **Government Financial Liability**

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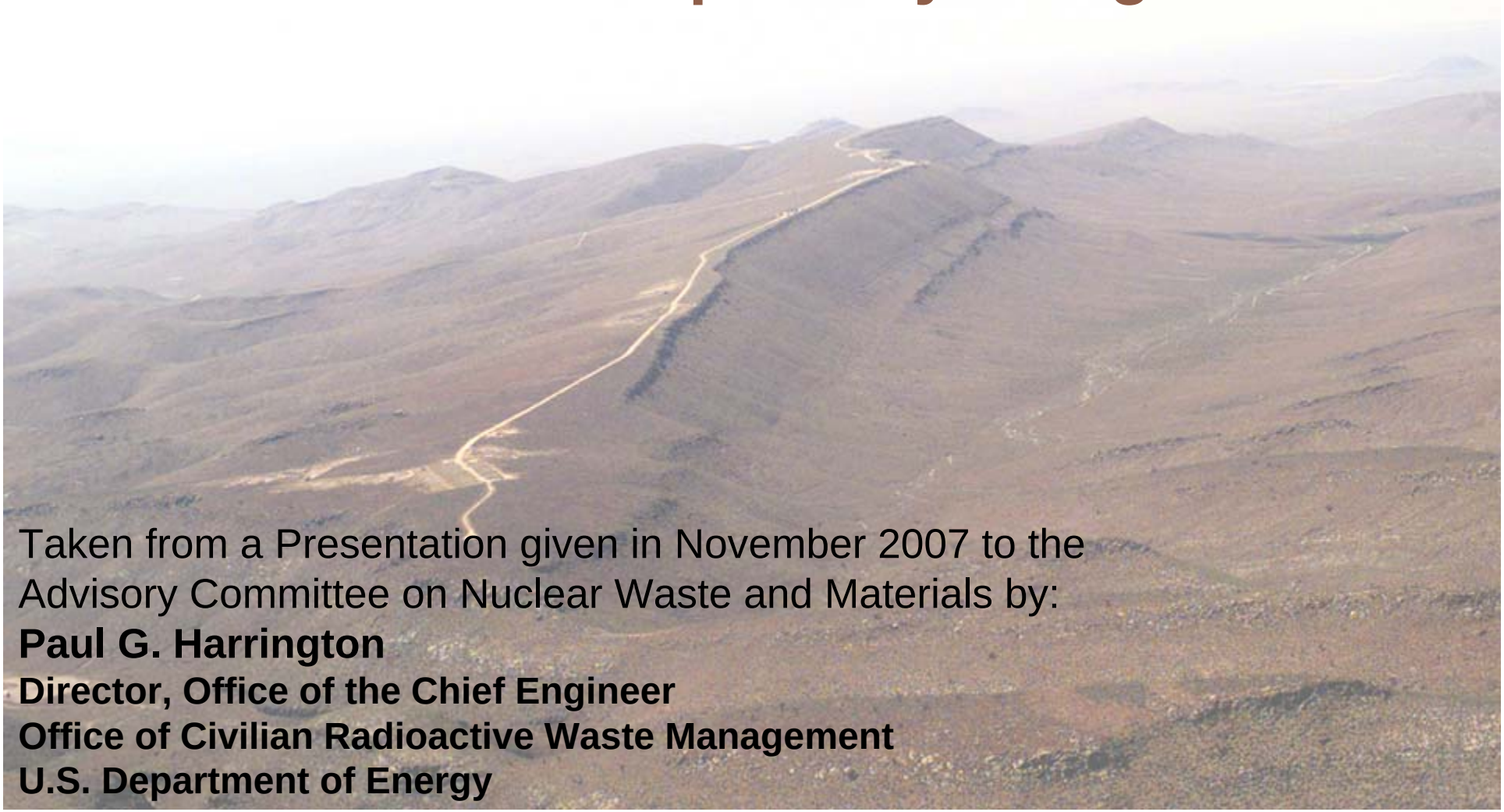
Yucca Mountain Repository Design Status

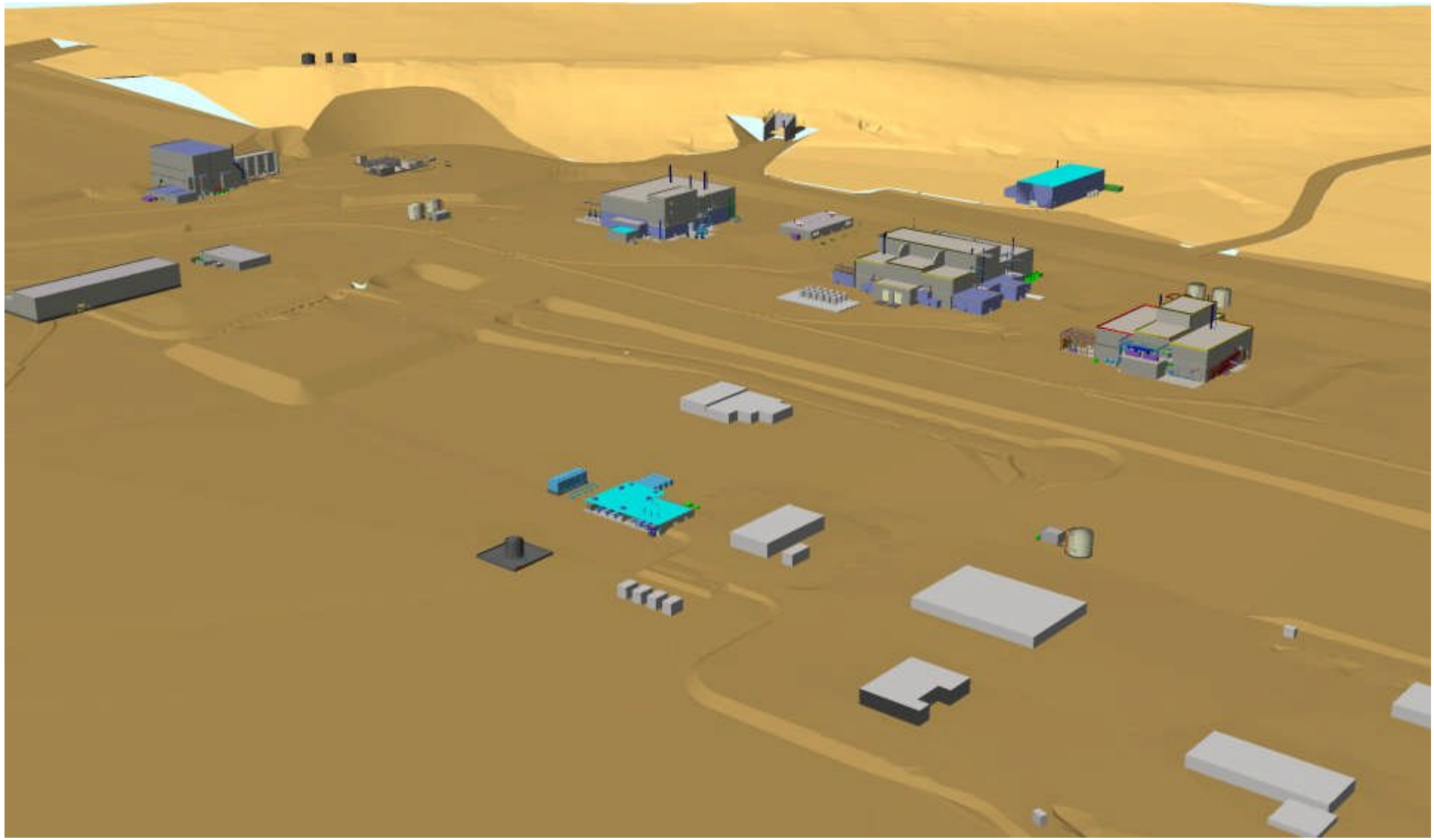


Taken from a Presentation given in November 2007 to the Advisory Committee on Nuclear Waste and Materials by:

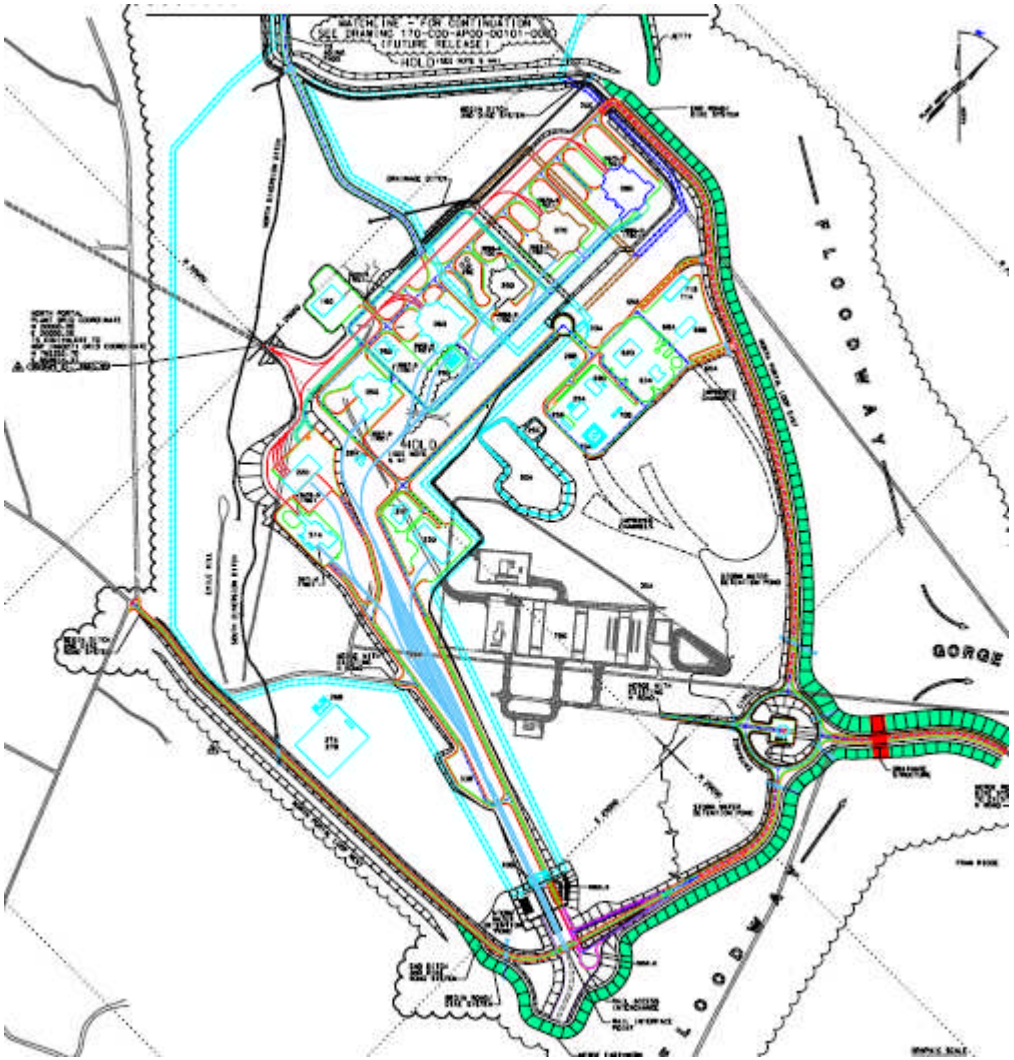
Paul G. Harrington
Director, Office of the Chief Engineer
Office of Civilian Radioactive Waste Management
U.S. Department of Energy

Site Overview

3D Repository Model Looking West



Site Overview



New Facilities

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

Previous Facilities

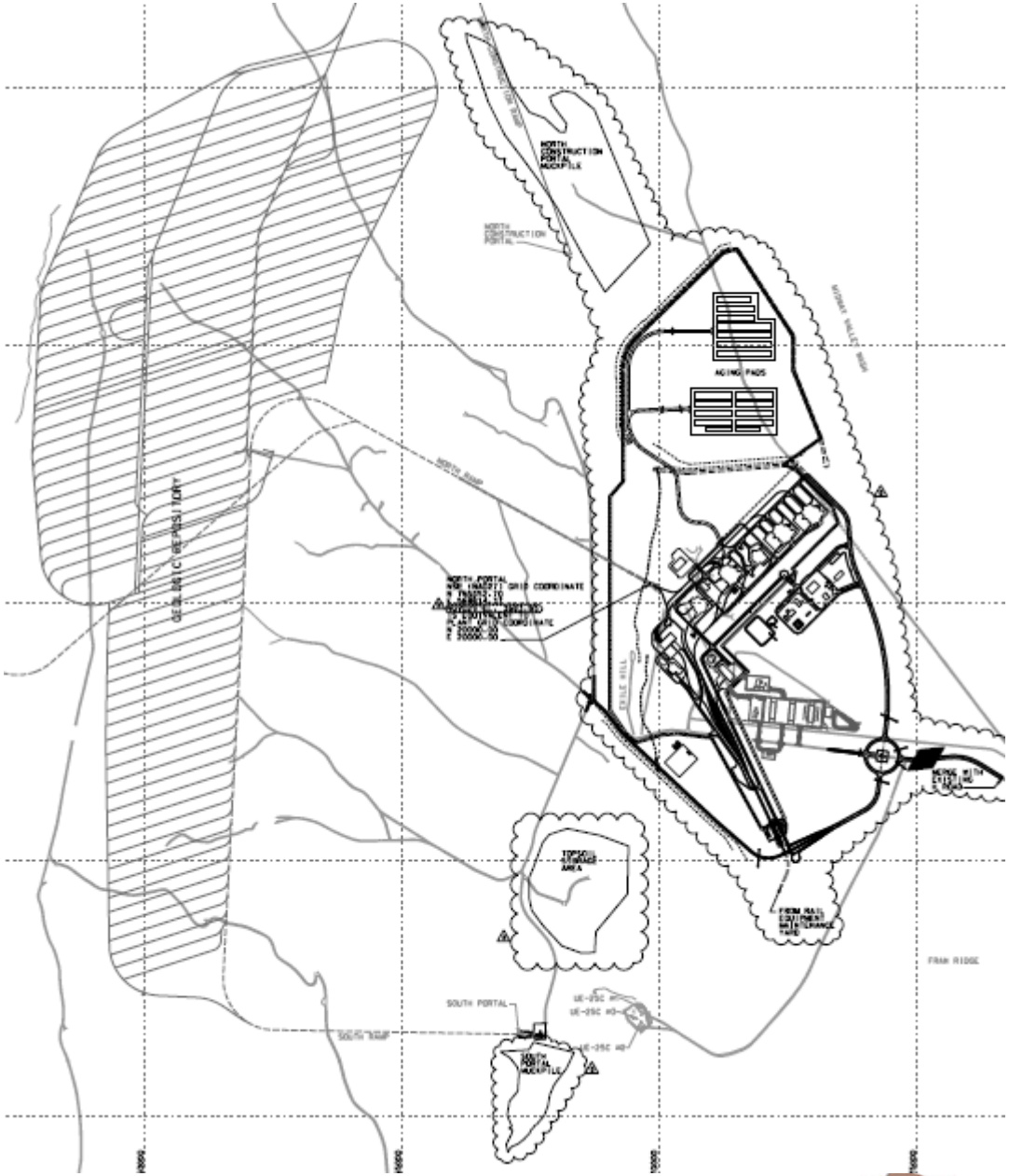
HEMF - Heavy Equipment Maintenance Facility

CCCF - Central Control Center Facility

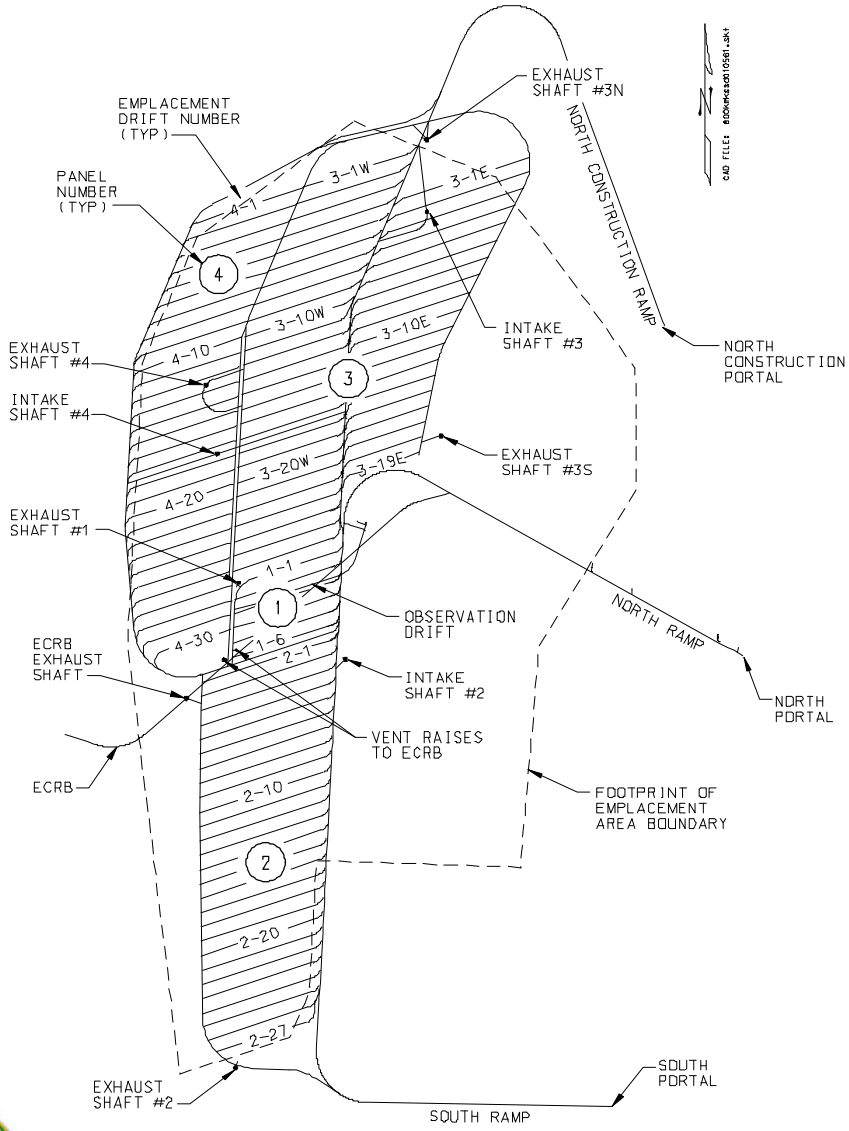
WNNRF - Warehouse and Non-Nuclear Receipt Facility

Utility, Security, and Administration Facilities

Site Overview



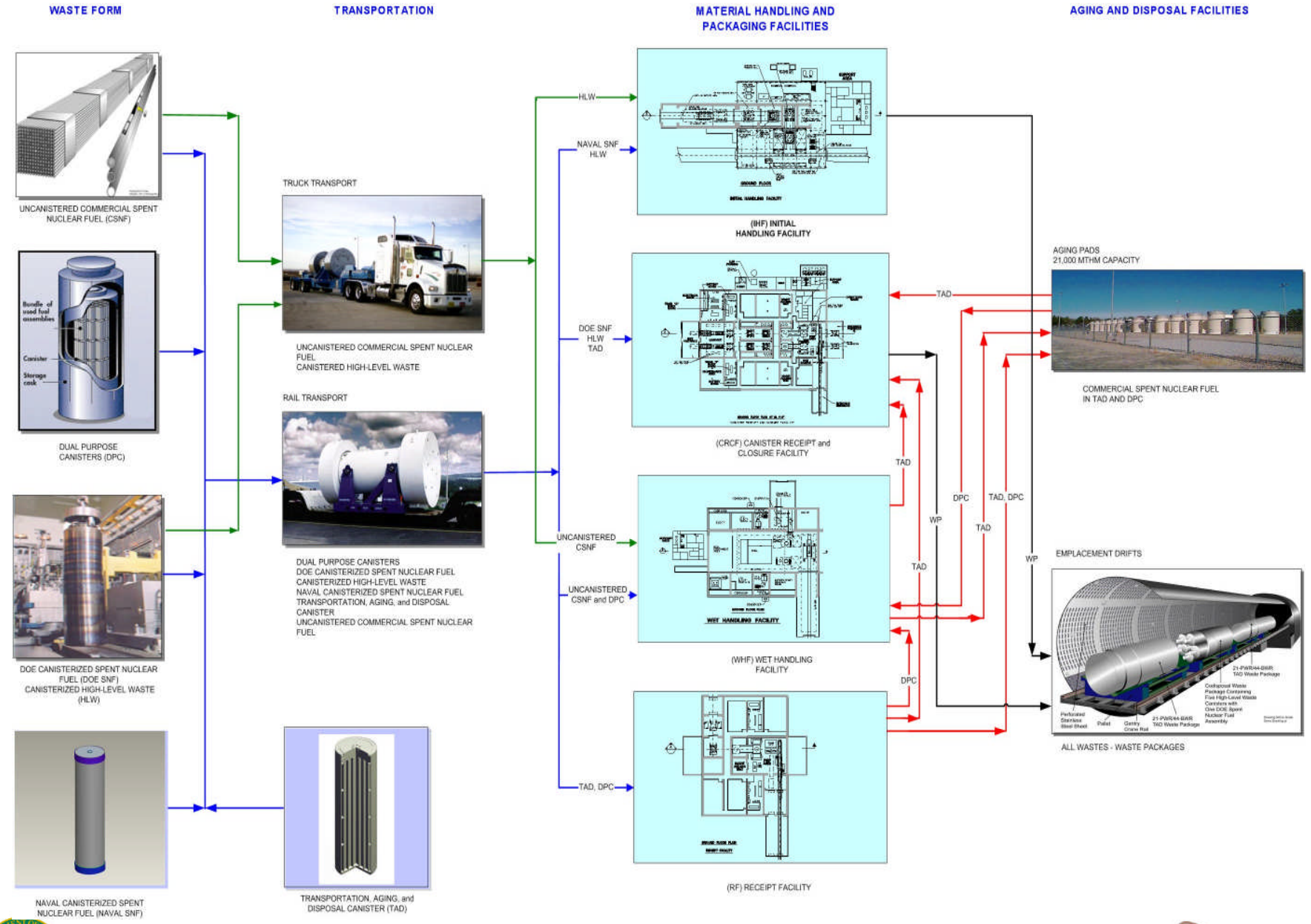
Subsurface Layout



- **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

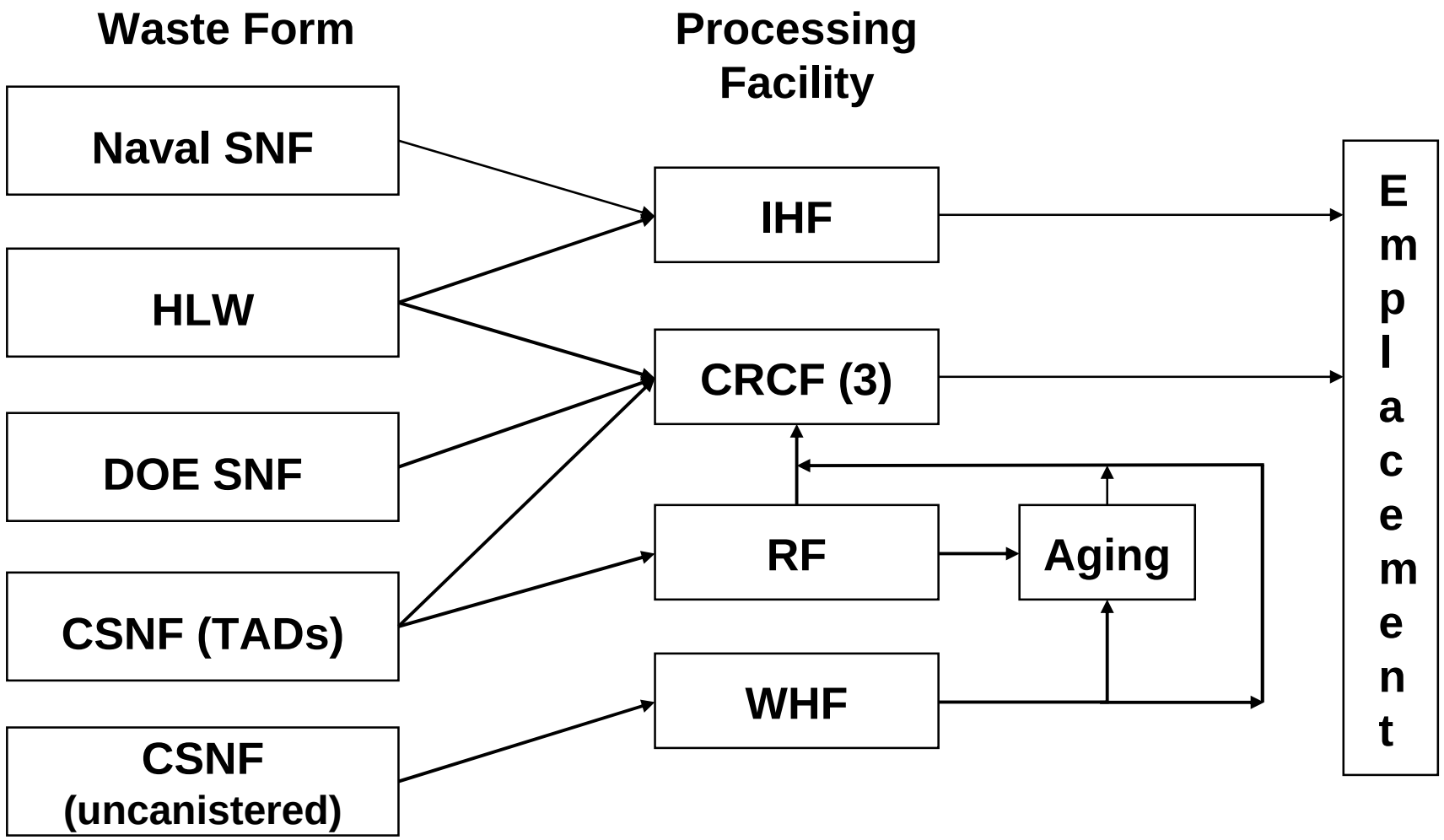


Functional Matrix

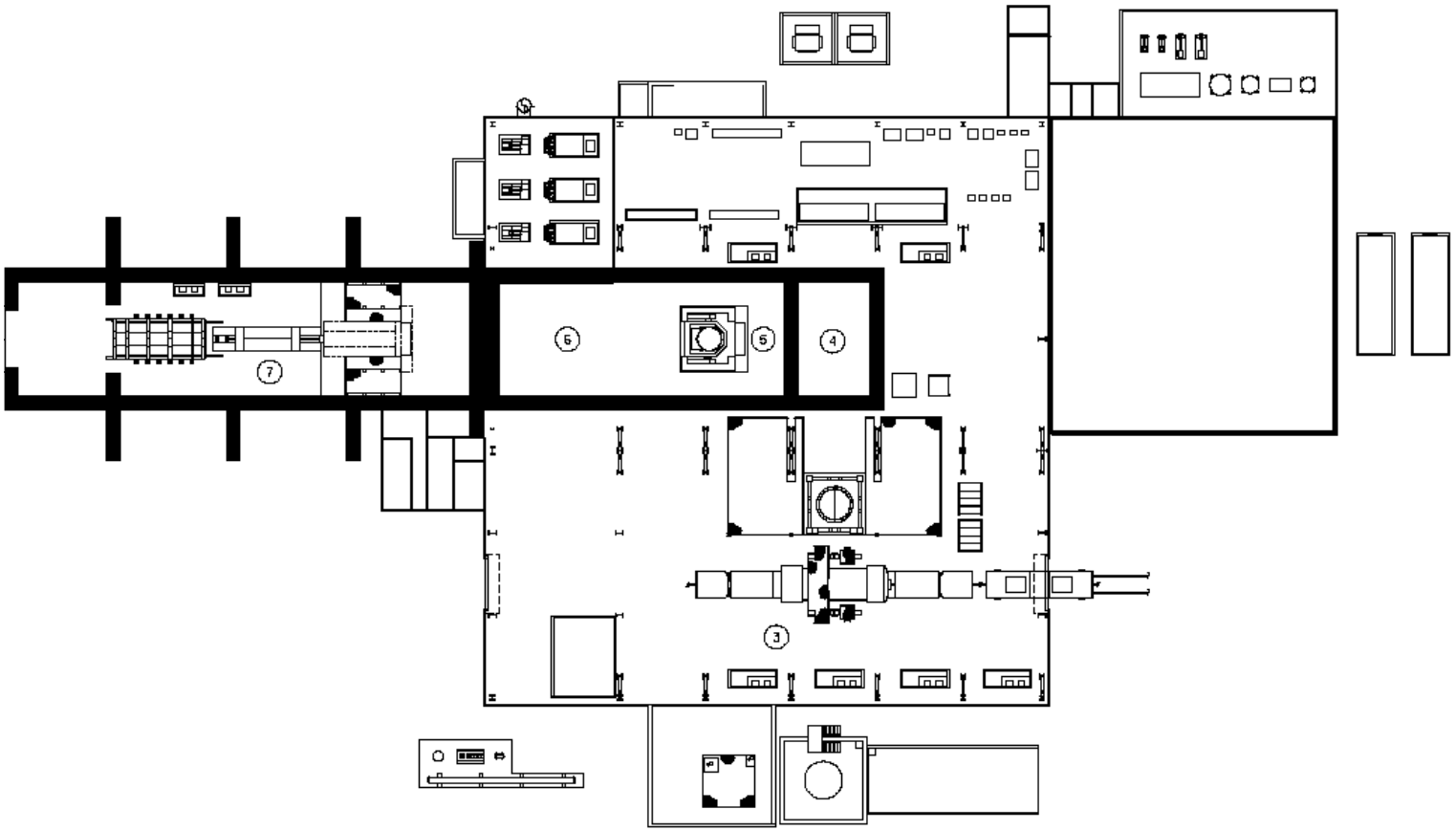
		Facilities			
		Initial Handling Facility (IHF)	Canister Receipt and Closure Facility (CRCF)	Wet Handling Facility (WHF)	Receipt Facility (RF)
Waste Forms					
HLW	Canister	X	X		
Naval SNF	Canister	X			
DOE SNF	Canister		X		
CSNF	Uncanisterd			X	
CSNF	TAD		X	X	X
Phase 1					
Phase 2					
Features					
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

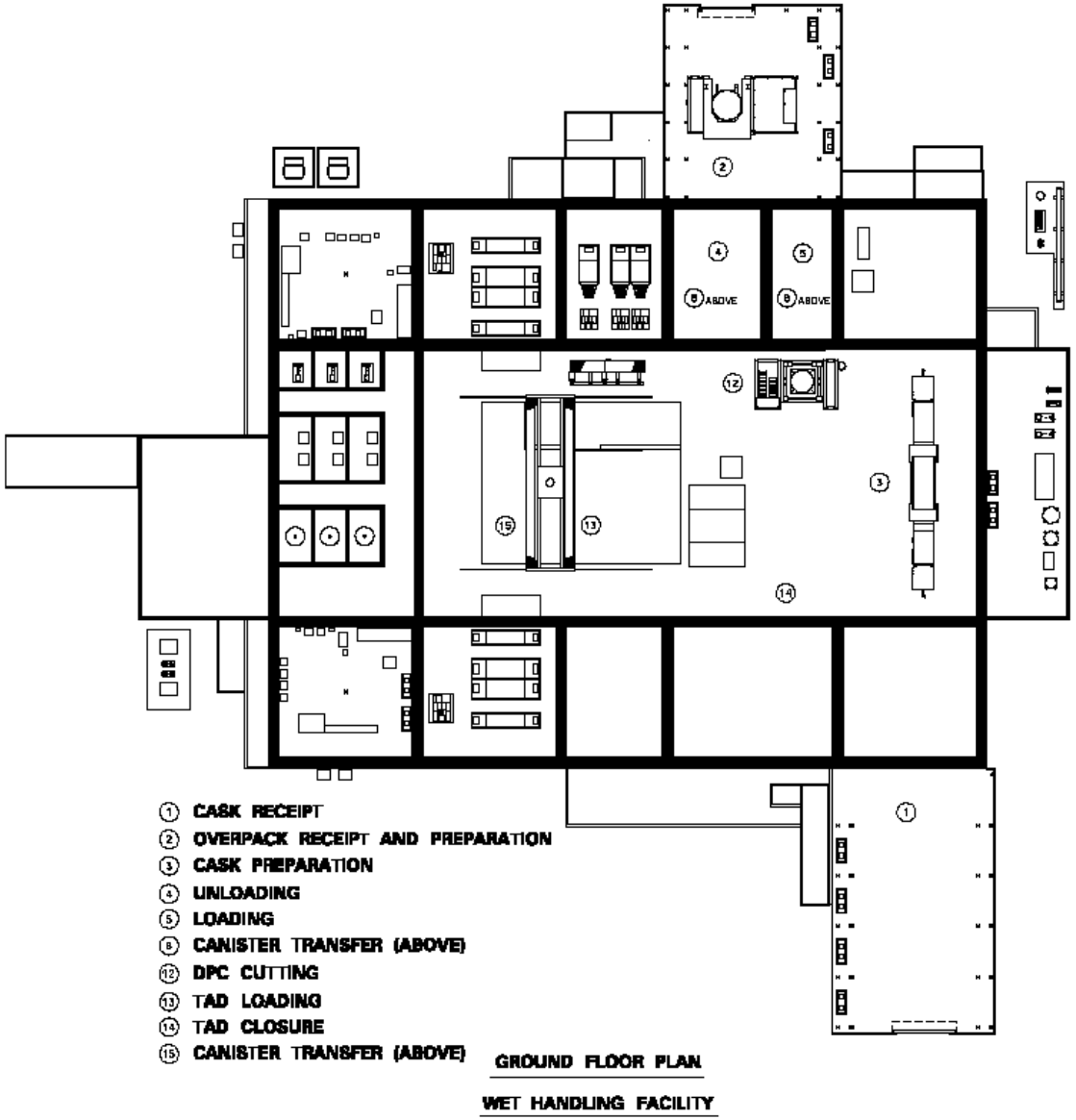


③ CASK PREPARATION
④ UNLOADING
⑤ LOADING
⑥ WP POSITIONING
⑦ WP LOADOUT

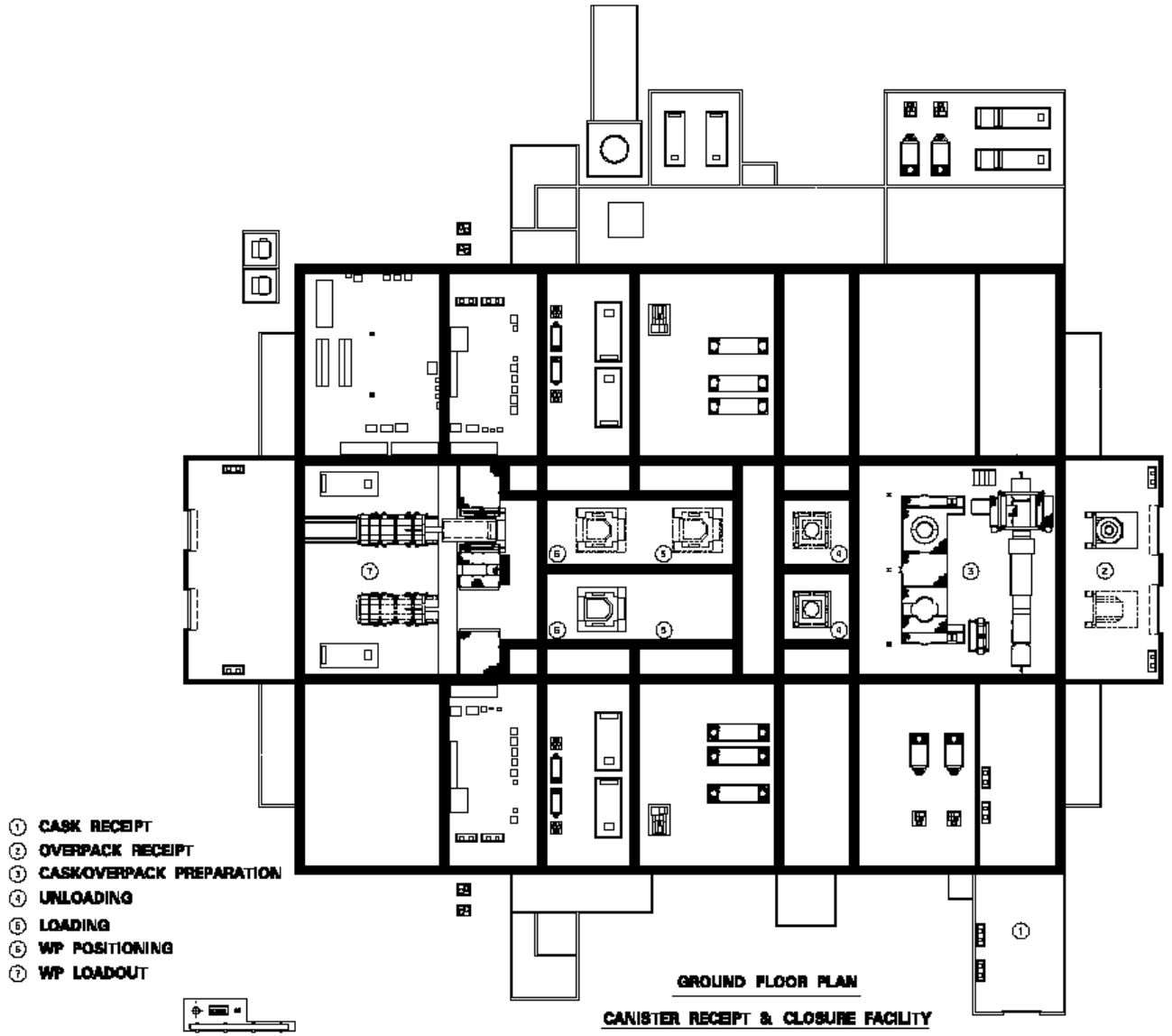
GROUND FLOOR PLAN

INITIAL HANDLING FACILITY

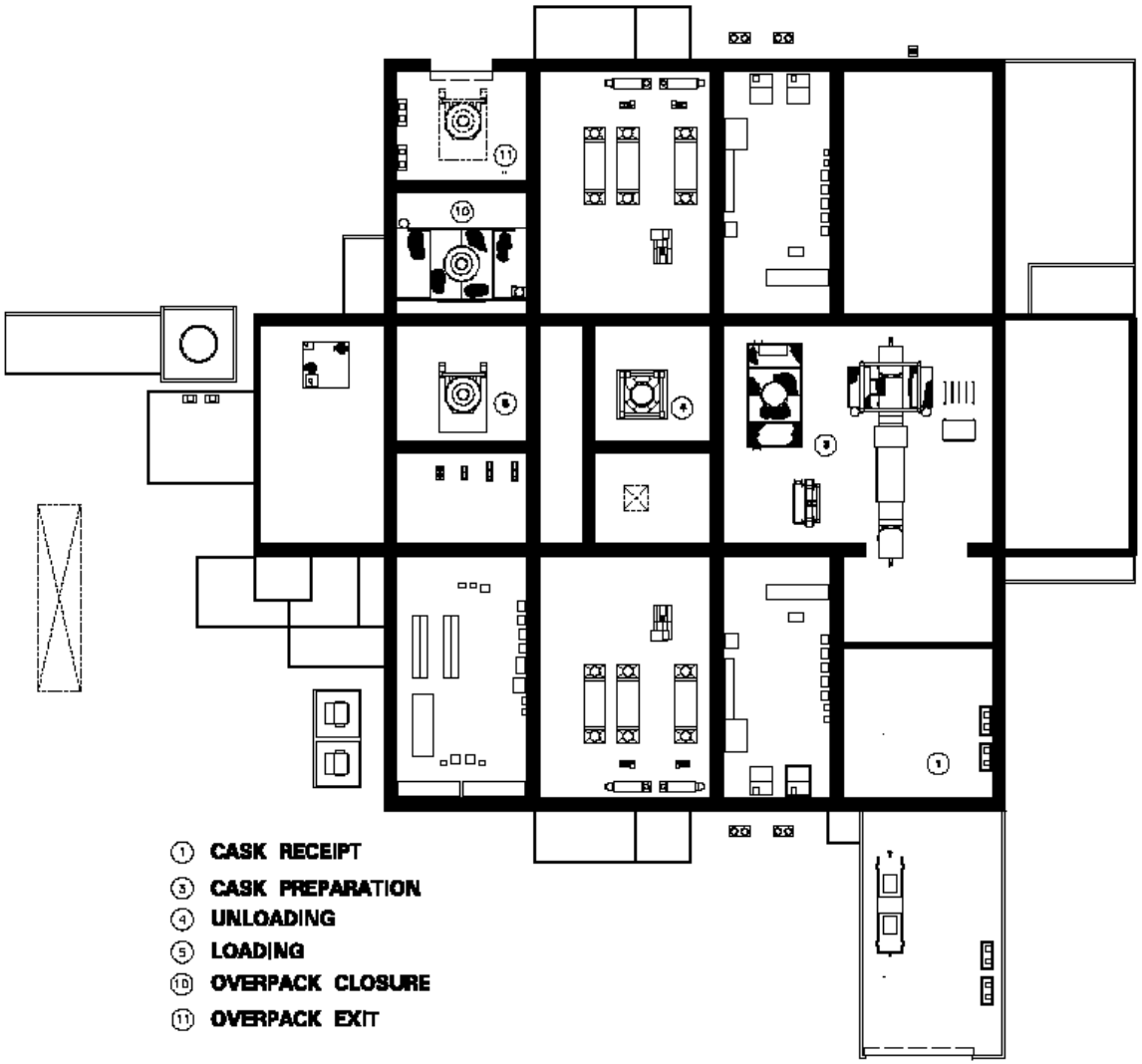
INITIAL HANDLING FACILITY SECTION


① CASK RECEIPT
② OVERPACK RECEIPT AND PREPARATION
③ CASK PREPARATION
④ UNLOADING
⑤ LOADING
⑧ CANISTER TRANSFER (ABOVE)
⑫ DPC CUTTING
⑬ TAD LOADING
⑭ TAD CLOSURE
⑮ CANISTER TRANSFER (ABOVE)
GROUND FLOOR PLAN
WET HANDLING FACILITY

WET HANDLING FACILITY POOL ROOM

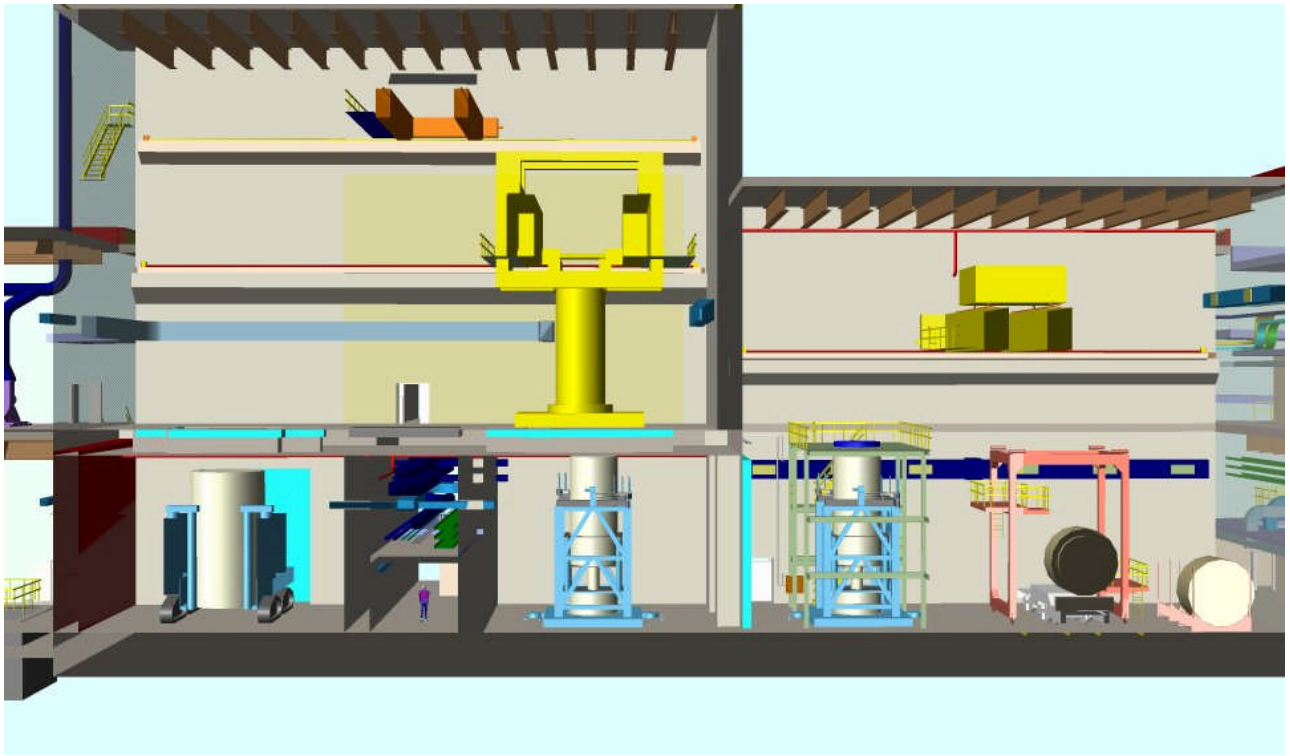

① CASK RECEIPT
② OVERPACK RECEIPT
③ CASK/OVERPACK PREPARATION
④ UNLOADING
⑤ LOADING
⑥ WP POSITIONING
⑦ WP LOADOUT
GROUND FLOOR PLAN
CANISTER RECEIPT & CLOSURE FACILITY

CANISTER RECEIPT AND CLOSURE FACILITY SECTION



GROUND FLOOR PLAN

RECEIPT FACILITY

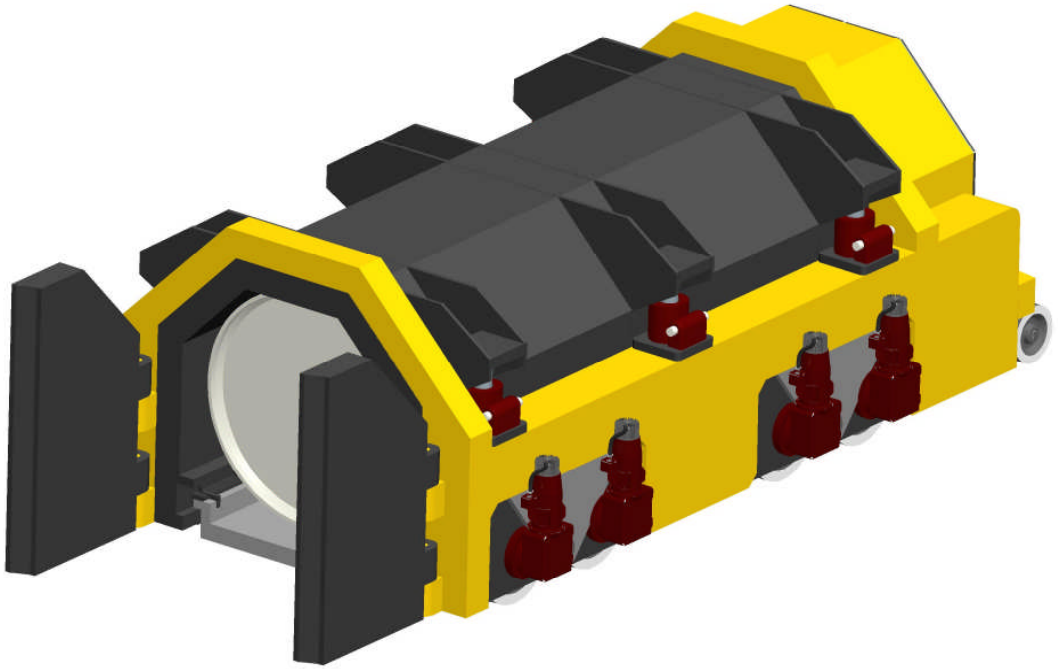


RECEIPT FACILITY SECTION

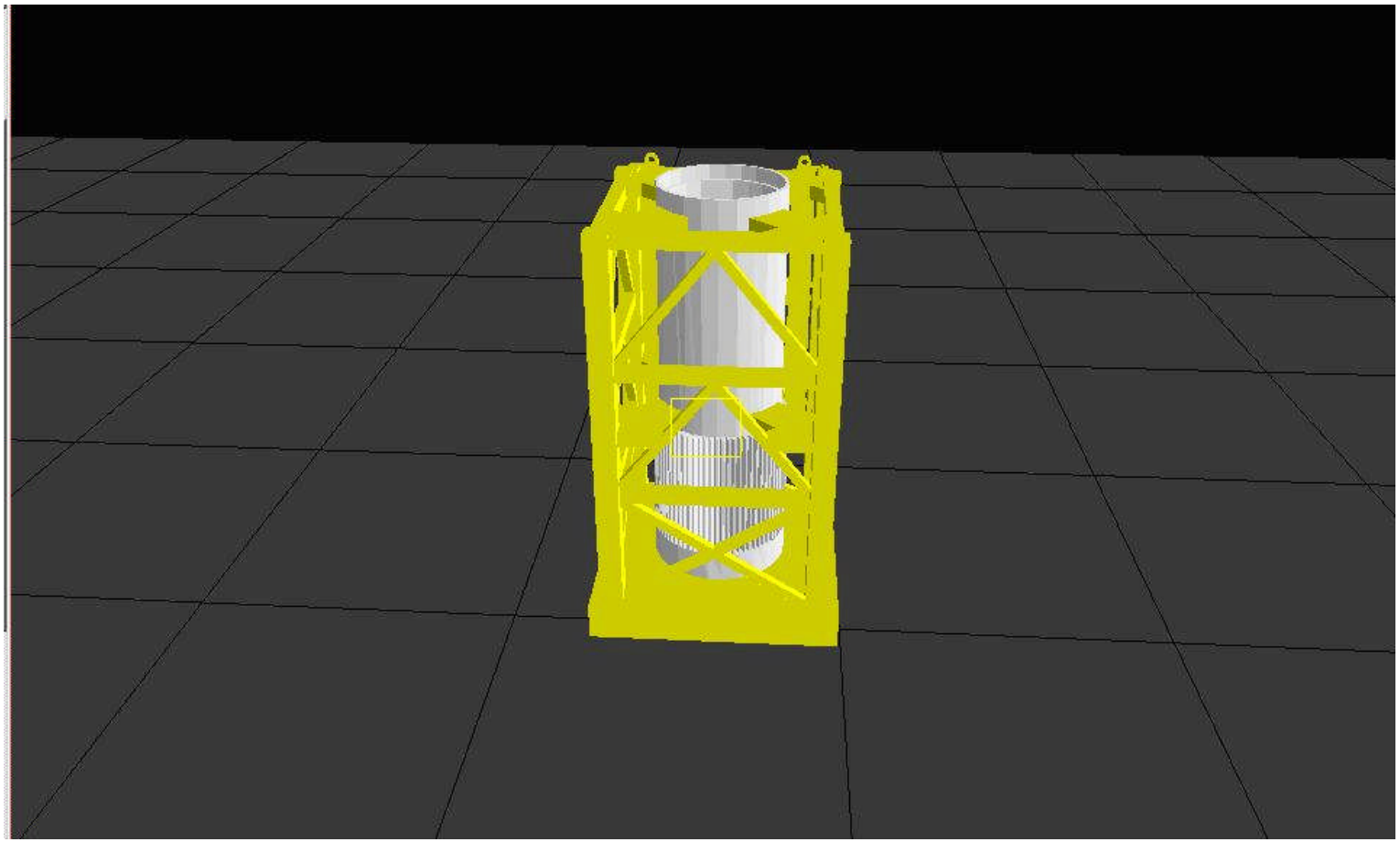
Commonality of Waste Handling Equipment

	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	

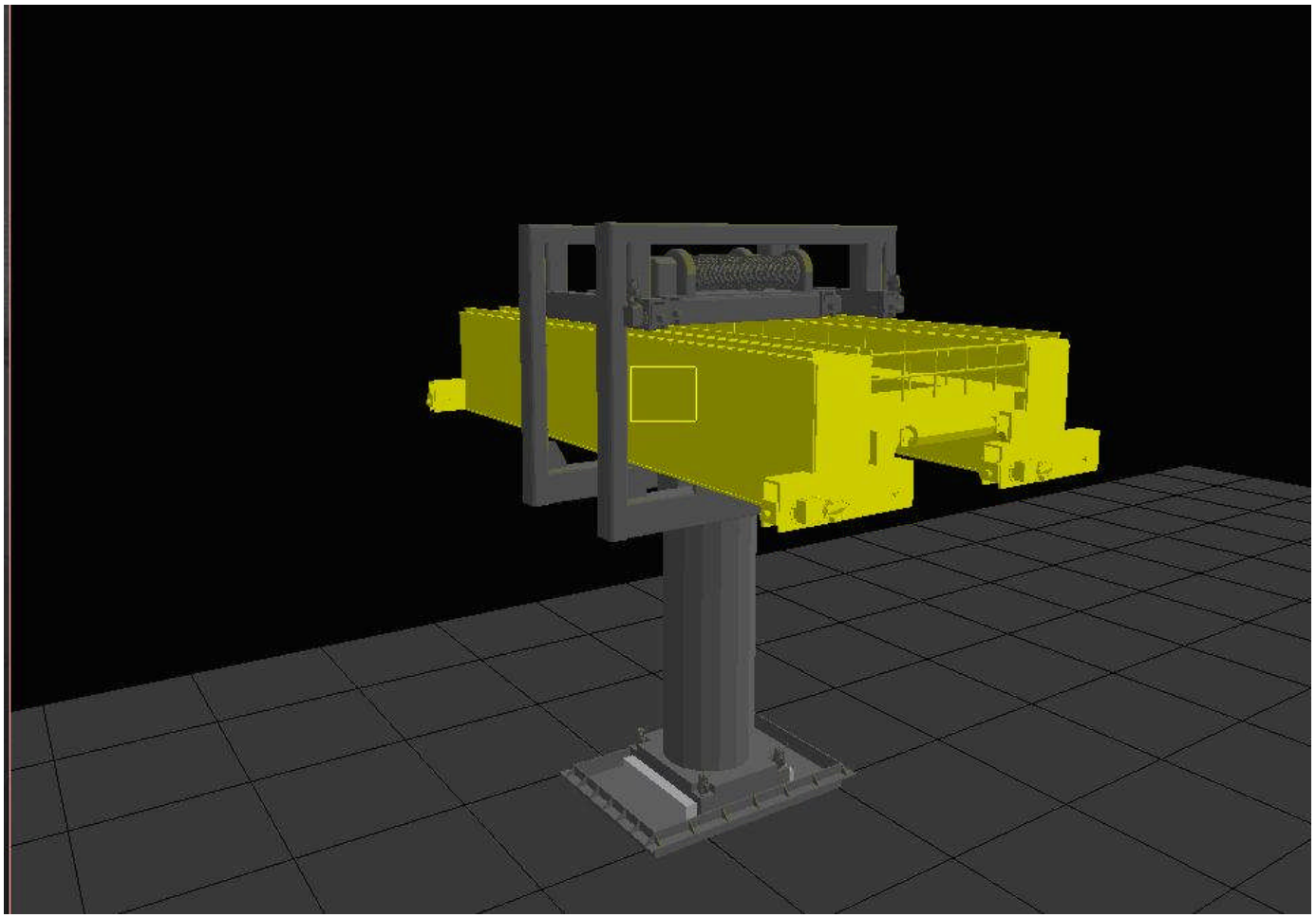
Transport and Emplacement Vehicle



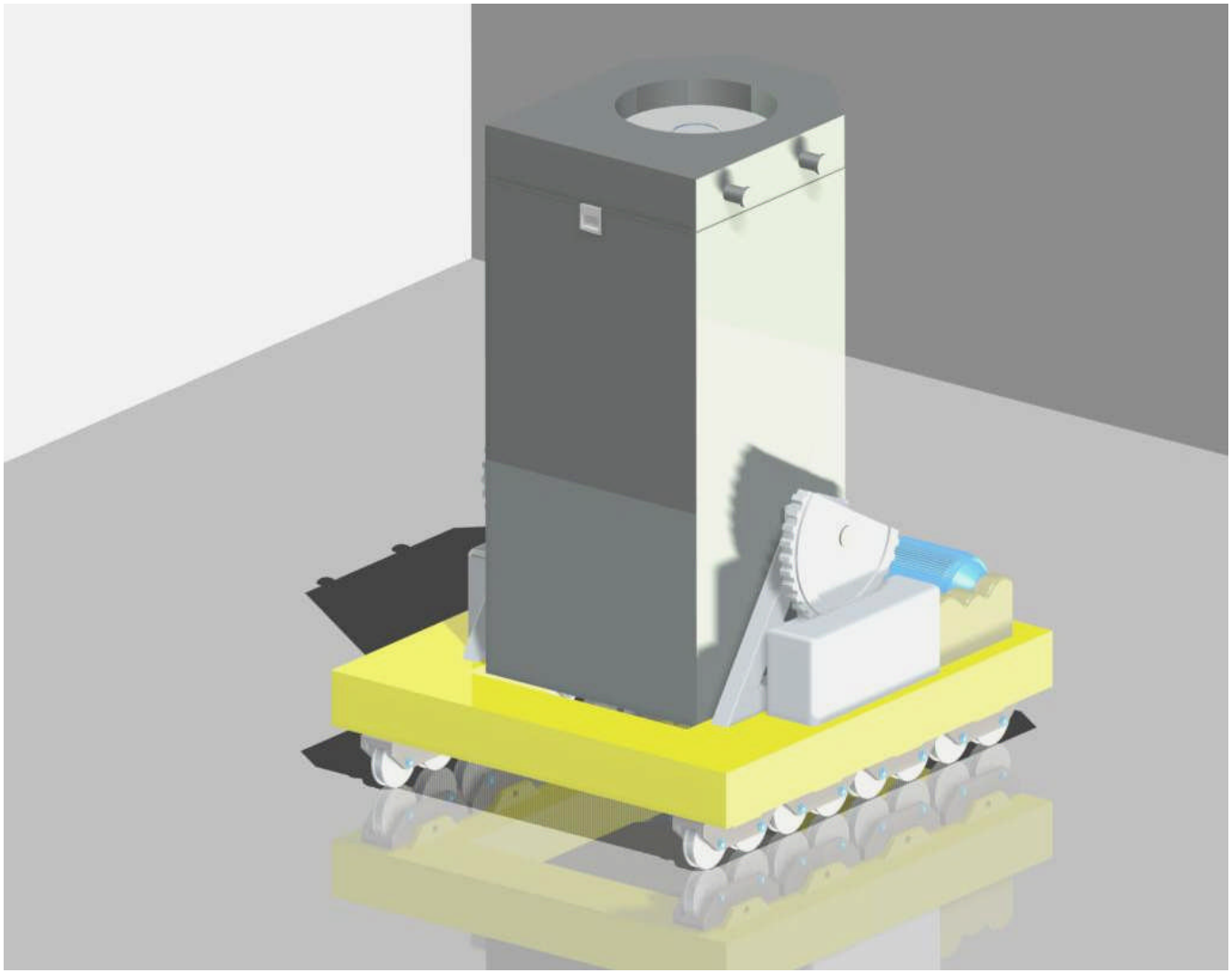
Cask Transfer Trolley



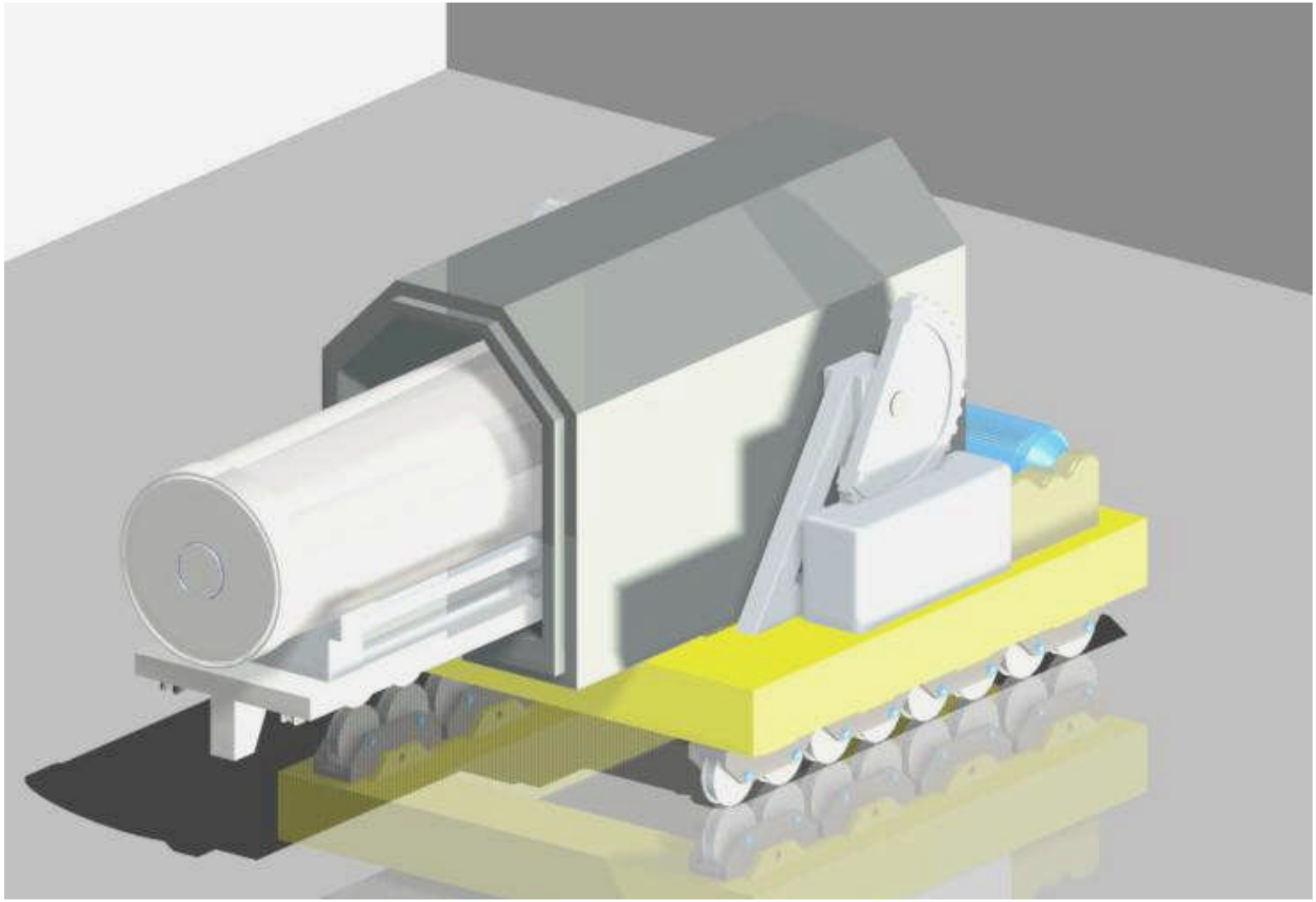
Canister Transfer Machine



Waste Package Transfer Trolley



Waste Package Transfer Trolley



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

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Transportation, Aging and Disposal (TAD) Canister System Status

Taken from a Presentation given at the January 2008 Institute of Nuclear Materials Management by:

Dave Zabransky
Office of Waste Management
Office of Civilian Radioactive Waste Management
U.S. Department of Energy

TAD Background

- DOE announced incorporation of a Transportation, Aging and Disposal (TAD) canister system approach in October, 2005
- TAD system benefits include:
  - Supporting the standardization of commercial spent nuclear fuel (CSNF) storage, transport, aging and disposal packaging, allowing integration of CSNF handling operations
  - Utilizing utility fuel handling experience in loading CSNF
  - Simplifying DOE operations and minimizing redundant handling of bare CSNF assemblies at the repository
  - Reducing low-level waste production and worker radiation exposure at DOE facilities
  - Reducing complexity and cost of DOE facilities

TAD Program Implementation

- DOE issued the preliminary TAD system performance specification on November 29, 2006 and initiated a proof-of-concept design phase
- Qualified vendors have completed TAD proof-of-concept designs:
  - Energy Solutions
  - Holtec International
  - NAC International
  - Transnuclear (TN)
- DOE review of the submitted TAD proof-of-concept designs was completed in March 2007

TAD Program Implementation

- With the proof-of-concept design phase completed, DOE initiated the procurement for the development of complete TAD system designs and safety analysis reports (SARs) for NRC certification under 10 CFR 71 and 10 CFR 72
- Solicitation was issued in July 2007
- Proposals to the solicitation were received in August 2007
- Evaluation of the proposals is currently underway

Final TAD Performance Specification

- **The final TAD specification, issued in June 2007, delineates the requirements that DOE will rely upon in the repository license application to demonstrate compliance of the TAD system with 10 CFR 63**
- **The specification includes other requirements that are expected to improve the efficiency of TAD system operations at the repository**
  - **Dimensional, weight, radiological and handling requirements**

Final TAD Performance Specification – Highlights

- Capacity – 21 PWR's or 44 BWR's
- Canister Length (including lifting feature) – no less than 186.0 and no greater than 212.0 inches
- Diameter – 66.5 inches
- Maximum Weight – 54.25 tons
- Maximum average dose rate from top – 800 mr/hr
- Borated Stainless Steel is the required neutron absorber for disposal
- TAD canisters to be seal welded
- TAD canisters, transportation overpack lid and aging overpack lid will have a common lifting fixture
- Handling and aging at repository in vertical orientation
- Organic, pyrophoric, and RCRA materials prohibited

TAD Summary

- **The finalized TAD Specification can be found on the OCRWM website:**

  http://www.ocrwm.doe.gov/receiving/wat.shtml

- **Procurement**
  - **Solicitation was issued and proposals were received**
  - **Proposals are currently being evaluated**

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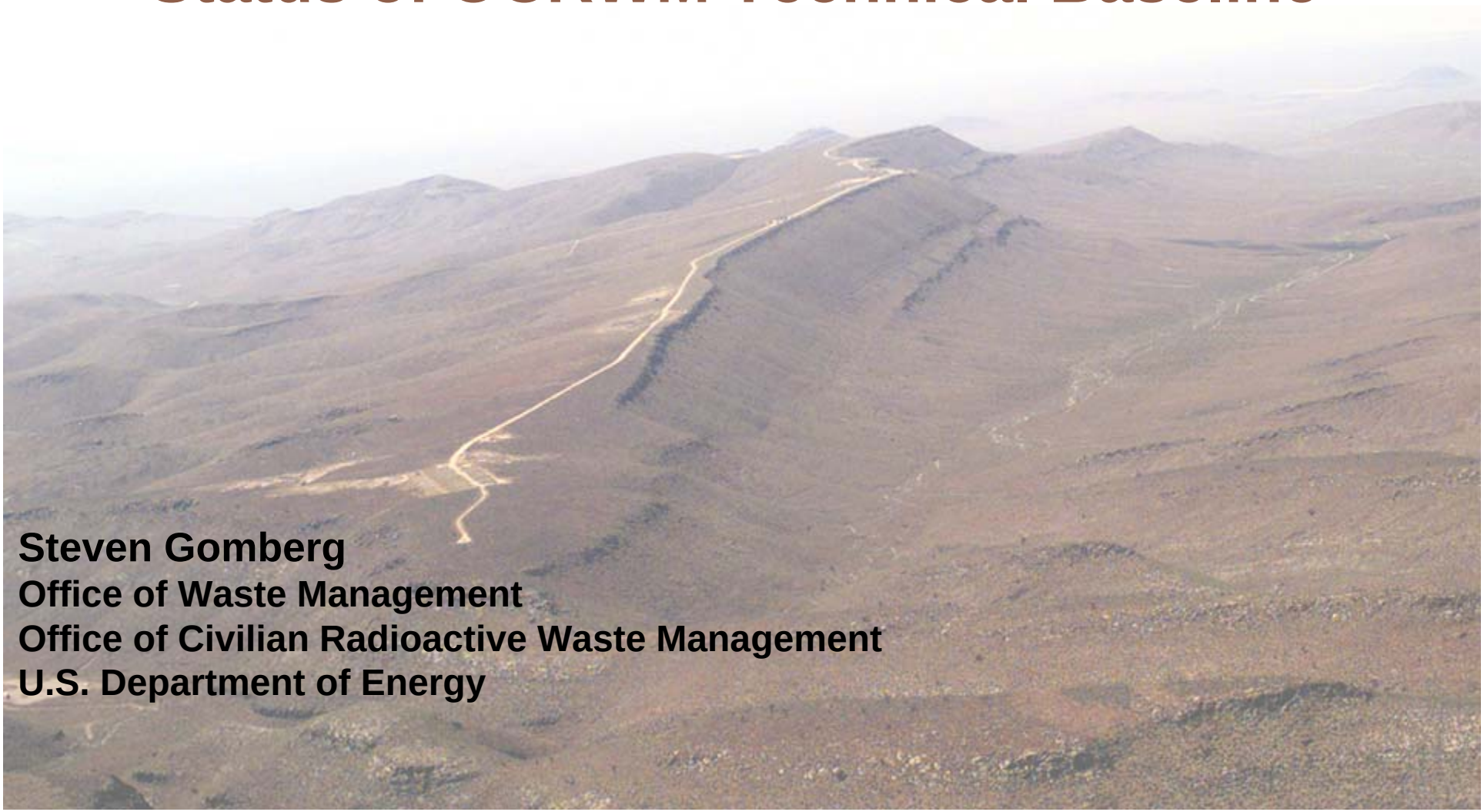
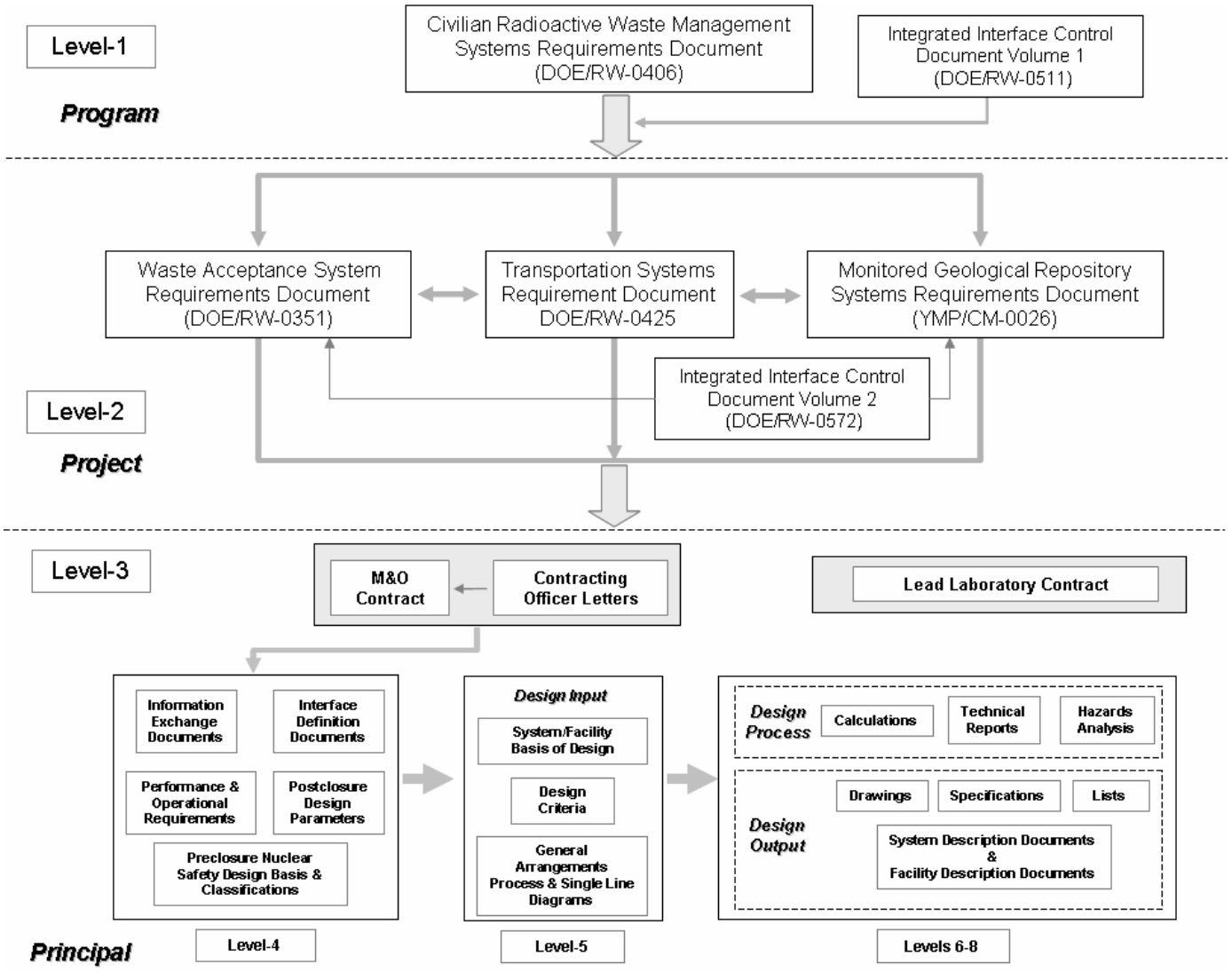
Status of OCRWM Technical Baseline



Steven Gomberg
Office of Waste Management
Office of Civilian Radioactive Waste Management
U.S. Department of Energy

OCRWM Technical Baseline



WASRD Status

- RW Change Control Board approved proposal to update the Waste Acceptance System Requirements Document
- Purpose is to clarify requirement to limit amount of free liquids in SNF casks and canisters
  - Driven by need to limit potential for internal corrosion or gas generation during after repository closure
  - Utilizes drying process specified in NUREG-1267 or similar, based on no more than 1 torr change after 30 minutes
- Applies to canistered commercial, naval, and DOE SNF
- Concurrence review on Revision 5 ICN 1 underway
- The WASRD is a references in the License Application

IICD Volume 1 Status

- **RW Change Control Board approved proposal to update the Integrated Interface Control Document Volume 1**
  - **Includes agreed to restrictions on MGR design involving NSFC handling and safety analyses**
  - **RW also chose to update its approach for control of physical interface characteristics documented in design drawings in IICD Appendices**
  - **Concurrence review on IICD-1 Revision 4 is underway**
- **The IICD is a references in the License Application**

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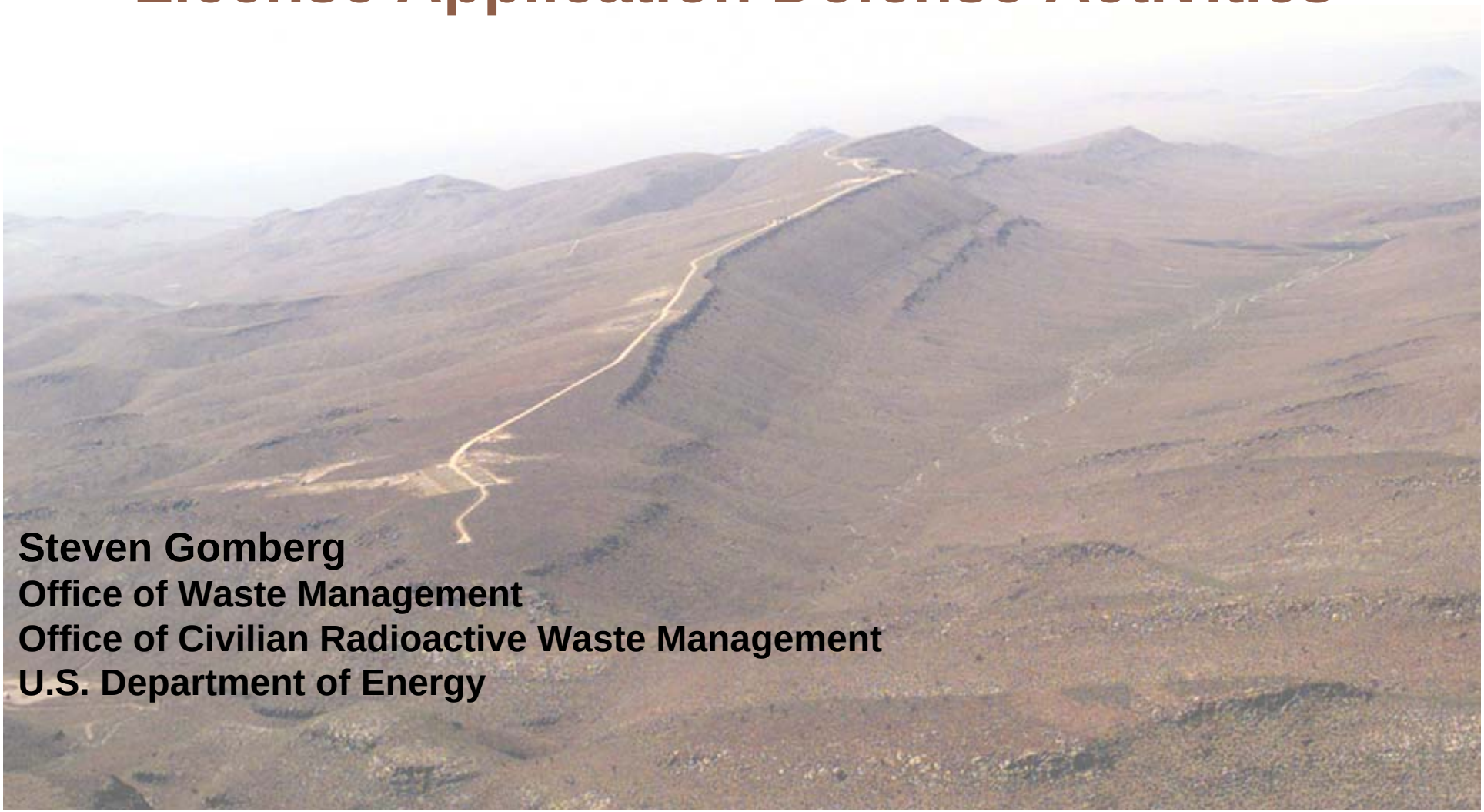
License Application Defense Activities



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Office of Waste Management
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License Application Status

- **OCRWM Plans to Submit the License Application to the NRC in Summer 2008**
  - **Complete License Application includes Safety Analysis Report and General Information sections**
  - **All DOE SNF and BSi HLW glass are identified in the LA**
    - **However, MCOs are not fully analyzed at this time**
- **OCRWM Will Submit the Final Supplemental Environmental Impact Statement with the LA**
- **Prior June 2008 submittal cannot be guaranteed**
  - **FY 2008 budget impacts of over $108 million**
  - **Major layoffs expected by end of FY 2008**
  - **Current rebaselining effort underway**

Post-LA Submittal Process

- **Process for LA review is set in NRC regulations**
  - **10 CFR Part 2, 10 CFR Part 63 consistent with NWPA**
- **Once DOE submits the LA and SEIS**
  - **NRC conducts its docketing review**
    - **NRC review would take 90 days**
    - **Review evaluates completeness of submittal against Yucca Mountain Review Plan**
    - **Review may generate docketing-relevant staff questions**
    - **No LA updates may be submitted during docketing**
  - **DOE hopes NRC will adopt the Yucca Mountain SEIS**

Post-Docketing Process

- Staff begins its technical review of the SAR
  - At least two formal rounds of Requests for Additional Information (RAIs) are expected
  - Staff review could take from 18-24 months
  - Staff issues its (draft) Safety Evaluation Report (548 days)
- Atomic Safety and Licensing Board Panel(s) are set [LA Update?]
  - ASLB issues FRN soliciting draft contentions from parties
  - Petitions for party status and to intervene with contentions (30 days)
  - First prehearing conference on parties and admitted contentions (100 days)
  - Second prehearing conference on issues for hearing and schedule (578 days)
  - Evidentiary hearing(s) begin (720 days)
  - ASLB issues its initial decision (955 days)
  - Construction Authorization issued (pending Commission decision)

LA Defense Roles

- **OCRWM plans to move to 2010 organization**
  - **Focus on LA defense and facility construction**
  - **LA Development and Defense Office will lead LA defense activities for DOE**
    - **Focus on licensing strategy development, RAI responses, and expert witness activities**
    - **Expert teams identified to support license application review and ASLB hearing process**
- **DOE EM and NNPP expected to participate in process due to their expertise with SNF and HLW**
  - **EM HQ, NSNFP, DOE sites, and Yucca Mountain liaison will be vital over this upcoming defense phase**

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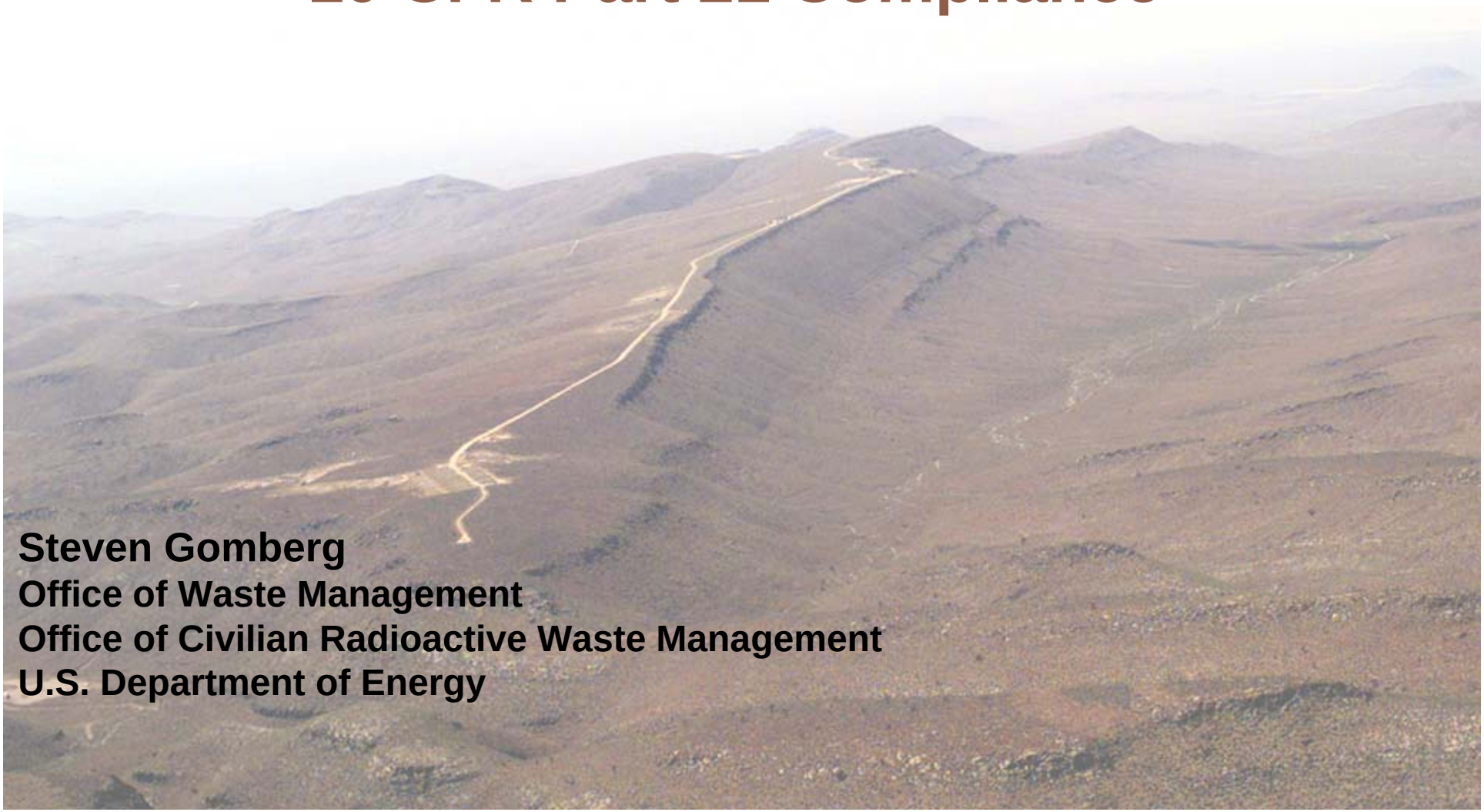
10 CFR Part 21 Compliance



Steven Gomberg
Office of Waste Management
Office of Civilian Radioactive Waste Management
U.S. Department of Energy

Reporting of Defects and Noncompliance

- **10 CFR Part 21 identifies requirements for**
  - **Licensees responsible for construction and operation of a repository**
  - **Entities who supply basic components for a repository**
- **Basic components is defined very broadly**
  - **Applies to any system, structure, or component, or part thereof, related to safety**
  - **Applies if a defect could create a substantial safety hazard**
- **RW would begin compliance with Part 21 at the time of construction authorization**

Applicability to EM

- **EM/RW Memorandum of Agreement identifies compliance with 10 CFR Part 21**
  - **Part 21 is passed down to DOE sites and contractors through QARD and WASRD**
- **Basic components could include any item "procured" for use in a repository**
  - **Any item which is important to safety or waste isolation**
- **Licensee is required to ensure the procurement document specify the applicability of Part 21**
  - **MOA is considered a form of procurement document and has been conservatively applied**

Process for Compliance

- **Two types of reporting possible**
  - **Acceptance process reporting (MOA/WASRD)**
    - **EM submits a non-conformance report for any item that does not meet waste acceptance baseline requirements**
    - **RW assesses impact of non-conformance**
    - **If necessary, an action plan to resolve issues is prepared and implemented**
  - **Basic component defect reporting (10 CFR 21)**
    - **Sets forth requirements for notification of defects (including timelines), maintenance and inspection of records, and imposition to procurement documents**
    - **Applies at time of dedication (after receipt for use as a basic component)**

For Further Consideration

- **RW would report, if necessary, any EM procurement item defects for use in or acceptance at the repository to NRC**
  - **AFTER an evaluation of the safety hazard is performed**
- **The acceptance processis consistent with the intent of Part 21 reporting**
  - **Reporting of non-conformances, evaluation against acceptance requirements, action plans**
- **EM HLW and SNF, and canisters and other components for receipt at the repository, are not the traditional types of basic components envisioned by Part 21**