ANDREWS, TEXAS

NRC Site Visit
February 2017

WCS Safety and Quality Focus

- WCS maintains a strong, overarching commitment to safety and quality.
- WCS promotes a safety culture consistent with the best nuclear utilities and DOE sites:
  - Trust-based organization
  - Open communication free from concerns over reprisal
  - All workers have right *and obligation to report safety and quality concerns*

Disposal and Service Capabilities

WCS provides the most comprehensive, full service, and complete Radioactive and Hazardous Waste Services in the Nation.

Commercial Waste

- In- and Out-of-Compact Class A, B, and C LLRW

Federal Waste

- Federal Class A, B, and C LLRW and MLLRW

Low Activity

- Accepts Exempt waste in RCRA/TSCA landfill

Transportation

- 3 state-of-the-art Type B Casks
- 2 Type A Casks

Processing

- Dewatering, Sorting, Stabilization, Repackaging, etc.

Storage

- GTCC, TRU, Sealed Sources, MLLRW
- WIPP Program

WCS Current Facilities

Texas is an Agreement State

- Texas is an Agreement State and has a bifurcated regulatory structure designating the Texas Commission on Environmental Quality to oversee the disposal of radioactive waste and the Department of State Health Services to oversee the generation of radiation and radioactive material.
- WCS enjoys a robust and open working relationship with TCEQ and encourages the 2 TCEQ Resident Inspectors to monitor and review any and all site activities, including processing and treatment.
- WCS supports a Compatibility C standard which would allow TCEQ to continue its current level of licensing and site scrutiny to ensure it is not just environmentally protective but also continues to share the confidence of the local community.

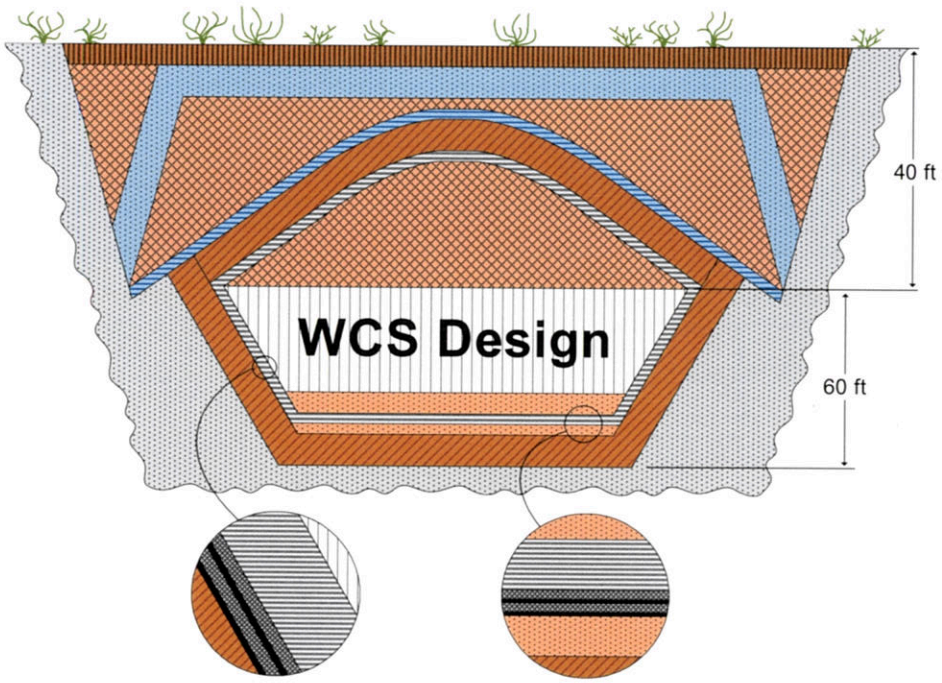

WCS
ANDREWS, TEXAS
Compact Waste Facility


WCS
ANDREWS, TEXAS
Federal Waste Facility

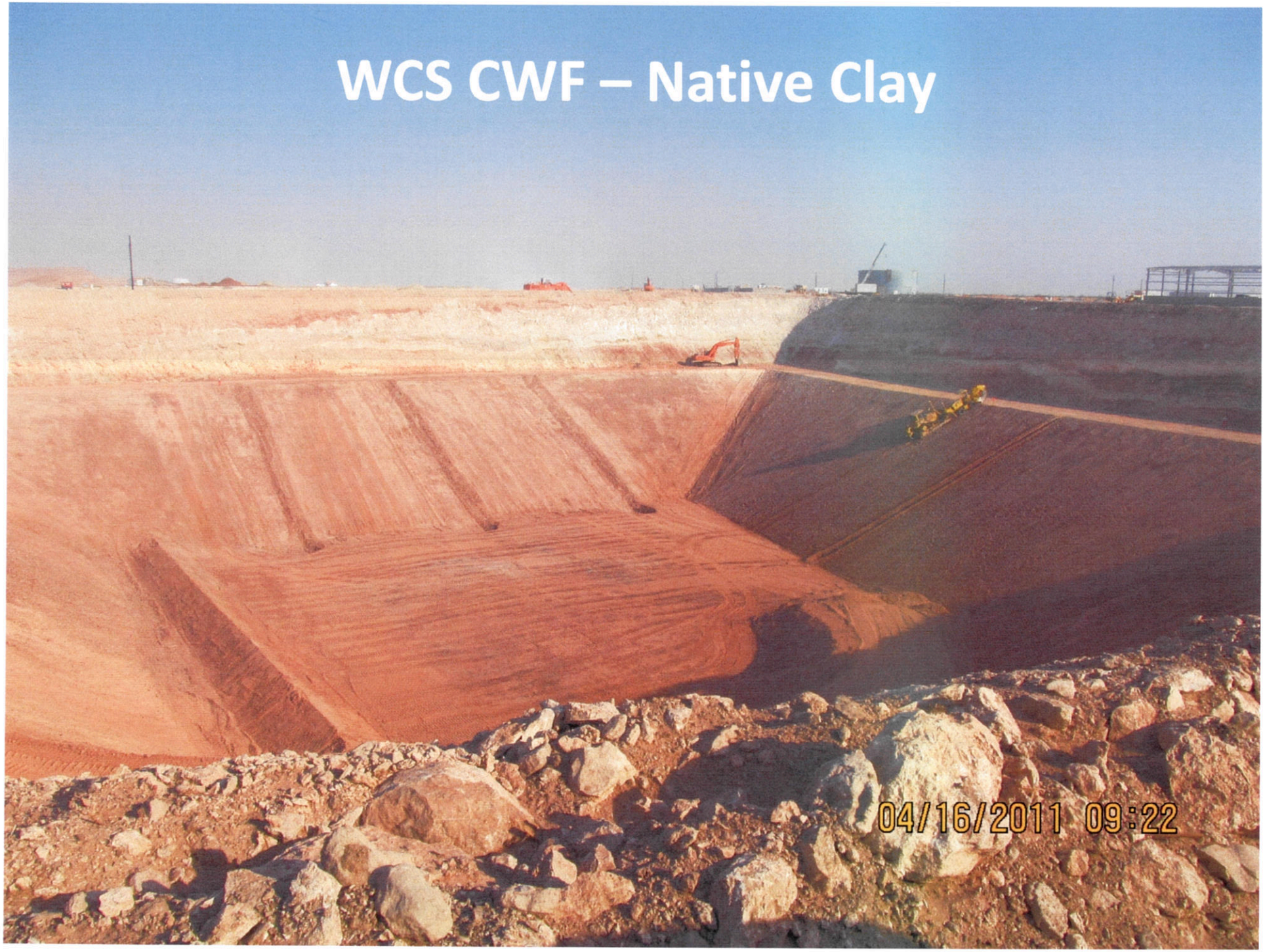
CWF and FWF Landfill Disposal Design

WCS CWF and FWF Landfill Design Andrews, TX

WCS Landfill Liner Design



- Multi-layered cover system up to 45 feet thick
- Depth to waste at least 25 feet below surface
- 7 ft. liner system on top of red bed clay which is less permeable to water than concrete and 600 feet thick
- Closest measurable water 225 feet


WCS CWF – Native Clay
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CWF During Construction


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WCS Compact Facility
(New Industry Standard)

WCS License Status and Current Operations

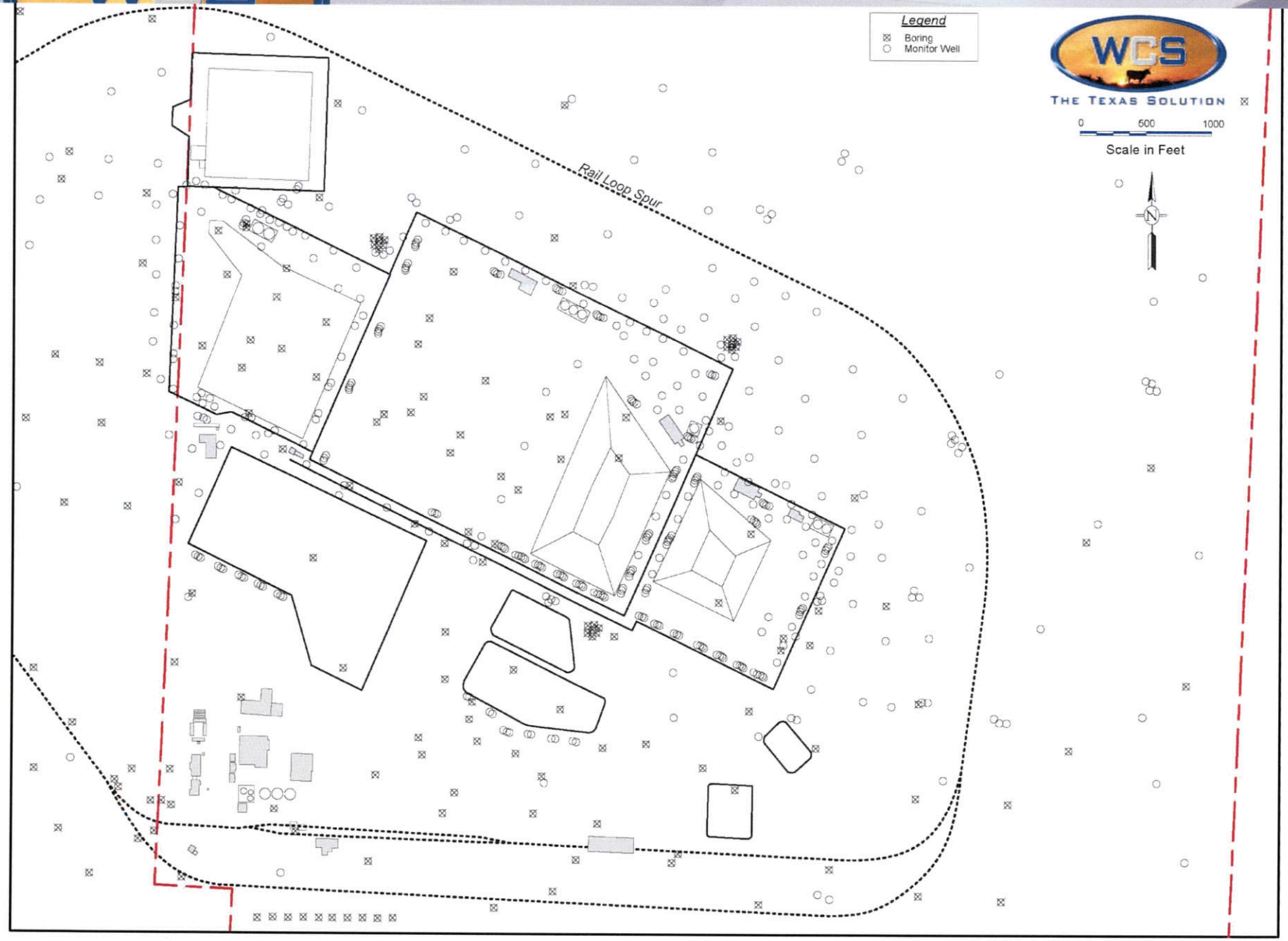
Licensed LLW Disposal Capacity

- **TX Compact Waste Disposal Facility:**
  - 9,000,000 cubic feet and 3,890,000 curies
  - TCEQ has taken ownership of Texas Compact Landfill and WCS leases it back for operations
- **Federal Waste Disposal Facility:**
  - 26,000,000 cubic feet and 5,600,000 curies total
  - DOE signed Agreement to take ownership of the Federal Landfill after post-closure
- **License Term –** through September 2024 with provision for 10-year renewals thereafter

Groundwater Monitoring

- Over 640 borings determined geologic characteristics and confirmed WCS is not over an aquifer
- Over 400 monitoring wells that are measured quarterly, many of which are dry
- Approximately 150 monitoring wells are laboratory sampled semi-annually, if there is enough water

Map of Borings/Wells



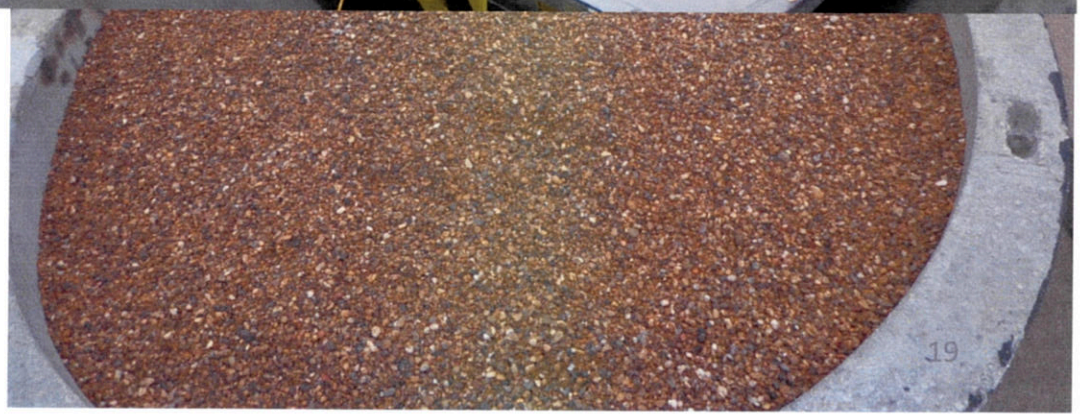
Groundwater Characteristics

- WCS is not above or adjacent to any underground drinking water supply
- Texas Water Development Board map confirms site characteristics
- Hydraulic conductivity of clay is $1x10^{-9}$ cm/sec and the 225-foot zone is $1x10^{-8}$ cm/sec
- Horizontal groundwater travel is 4 feet (1.3 meters) per 1,000 years
- Groundwater is ~16,000 years old

Receipt of TRU

- Receipt by WCS of TRU for temporary storage

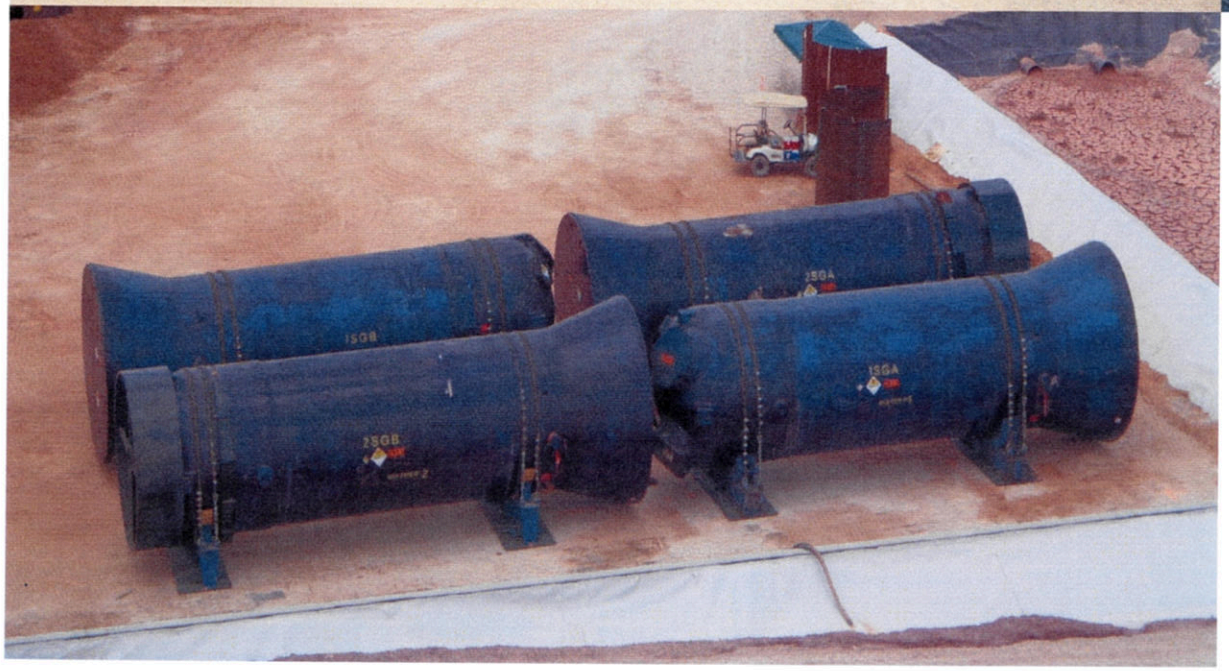
TRU Storage in MCC



WCS RT-100 Type B Cask

- **3 RT-100 Type B casks commissioned in 2014**
- **RT-100 is 76,500 lbs; made of stainless steel with lead shielding and can transport containers up to 160 cubic feet with dose rates to 500R/hr.**
- **Hauled by team drivers on a specially designed trailer using EPA certified zero emissions tractors**

Large Component Disposal



Large Component Disposal:

- Steam Generators
  - 1st shipment 7/14
- Reactor Heads,
- Reactor Vessels,
- Condensers,
- Feed-water Heaters

Rail or Truck Delivery

Class A, B, or C or Exempt

The WCS Difference

Class A, B & C and Exempt Waste Disposal

- One stop shop for Class A, B and C waste, low-activity (exempt) waste, irradiated hardware and sealed sources.
- Transportation solutions with WCS –dedicated Type A and B casks.

Safe and Secure

- The WCS LLW disposal facilities are the most robust disposal facilities ever built
- 100 foot cell depth with multi-layered cell design
- Cell final cover is 25-45 feet thick with multi-layered design to grade
- MCC placement allows for waste retrievability via GPS technology

Real Transfer of Ownership

- Upon receipt, Compact LLW waste ownership is transferred to the State of Texas and Federal LLW is transferred to the US DOE after post-closure of the FWF
- Waste becomes Texas "compact" waste when importation is approved and compliant waste is received

Future Planned WCS Operations

GTCC Disposal

- Waste that was not generally suitable for near surface disposal in the 1980s can be demonstrated suitable in 2016 at WCS.

At WCS:

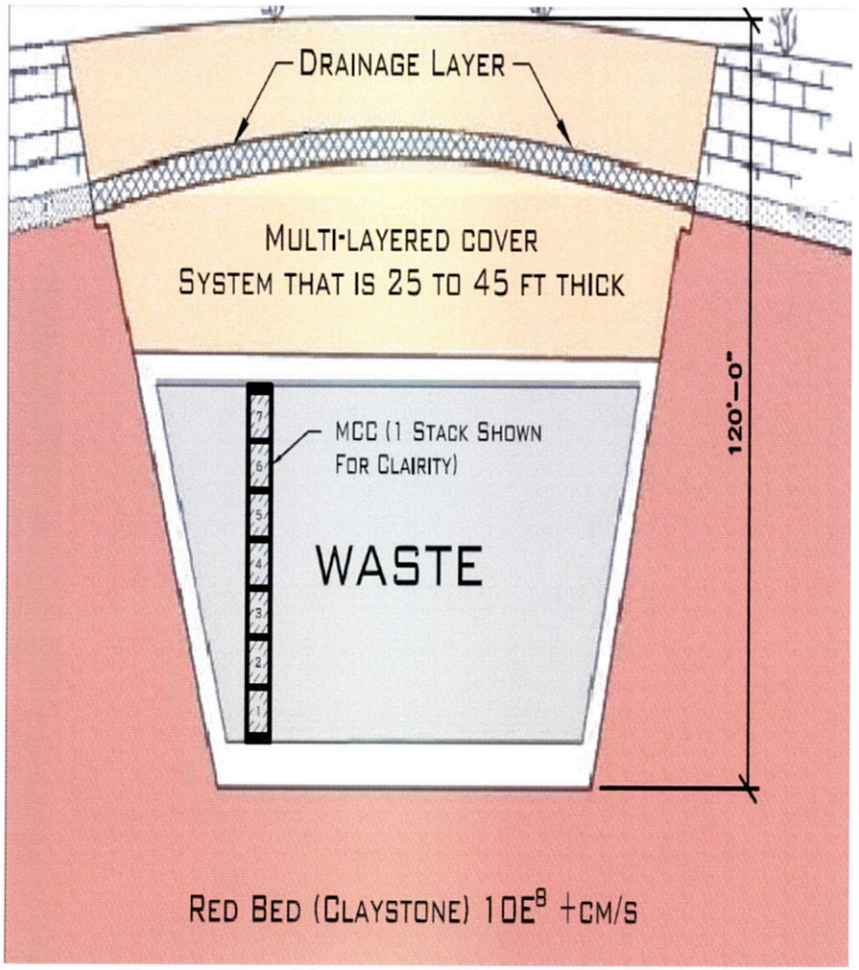
  - Deeper depth of disposal
  - Multiple intrusion barriers
  - Minimal rainfall
  - High rate of evapotranspiration
  - Lack of potable water, etc.
- Historical scenarios at other facilities do not reflect modern disposal practices, especially in an arid environment like at WCS.

Barnwell

WCS

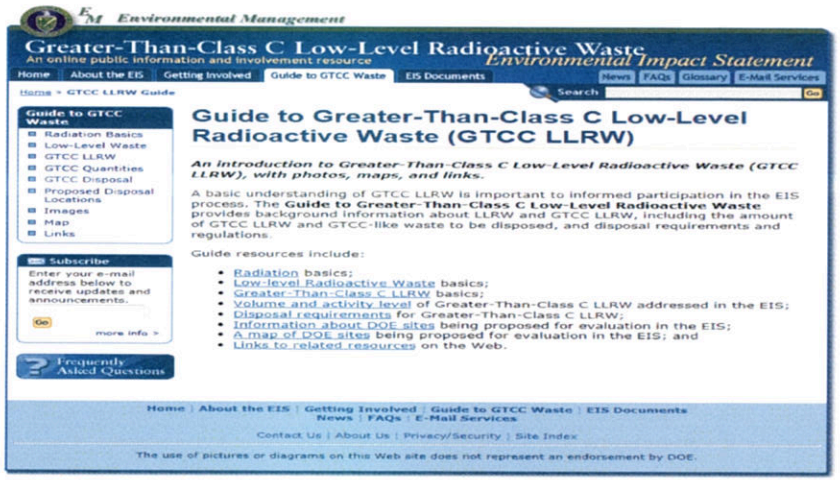
WCS Site Characteristics and Engineering Design

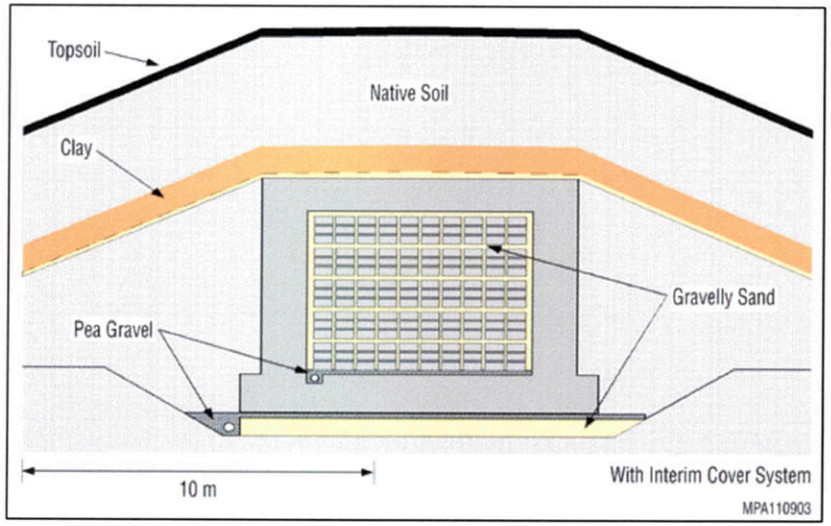
- All waste is disposed of in impermeable redbed clays (Dockum Formation) that are 600-800 thick.
- Non-potable water tables located 600 – 1000 feet below grade.
- Located in an arid climate with rainfall less than 16 inches per year
- Evapotranspiration potential over 60 inches of water per year.



Environmental Impact Statement on GTCC LLW

- The DOE issued its final EIS on GTCC and GTCC-like LLW in February 2016.
- A generic commercial entity is one of its Preferred Alternatives.
- WCS thinks an enhanced near surface disposal vault facility similar to the FWF would be suitable and appropriate for commercial and defense generated GTCC
- Characteristics include features such as barriers, deeper depth to disposal, and enhanced waste packaging.





Modular Concrete Canisters: Enhanced Waste Packages

- Modular Concrete Canisters (MCCs) serve as an enhanced disposal package.
- Intruder resistant, reduce radiation levels and impede mobility of radionuclides.
- Depth of disposal deeper than 30 meters possible.

Proposed Interim Storage Project Scope

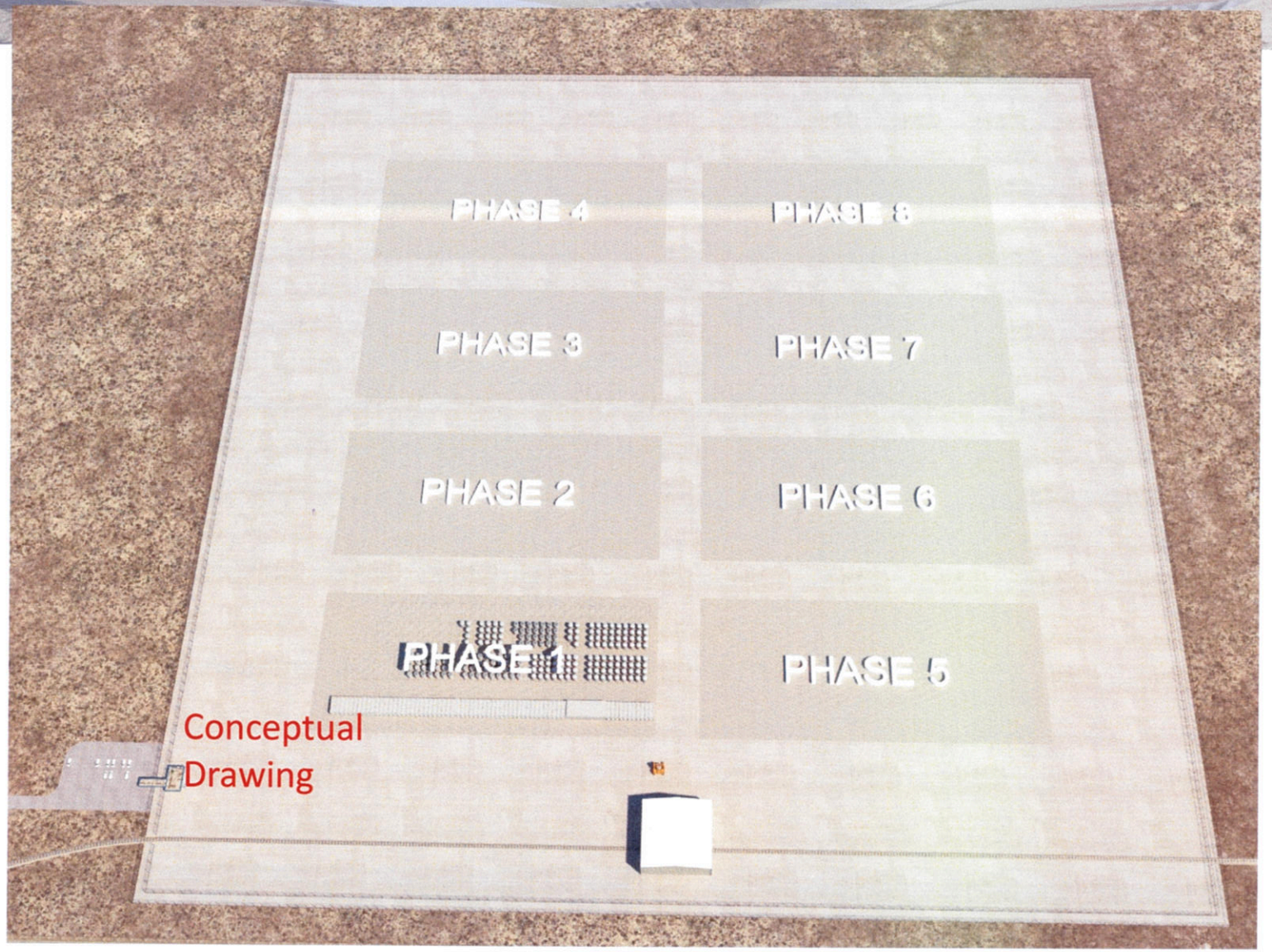
- Environmental impacts analyzed with storage of 40,000 MTHM.
- 8 separate phases; storage of up to 5,000 MTHM in each phase.
- License for 40 years with multiple renewals of up to 20 years each.
- Initial SAR includes selected AREVA NUHOMS® and NAC International storage systems which prioritize shutdown sites.
  - Additional systems and sites to be added in future License Amendments.
  - Storage of used fuel from over 12 shutdown/decommissioned nuclear power plants will fit in Phase 1.
- Allows flexibility to transition beyond storage of fuel from currently decommissioned reactors.
- Ongoing discussions with DOE and the U.S. Congress on how to integrate the availability of an interim storage facility into the national strategy for used nuclear fuel management.

Location of CISF

POTENTIAL SITE OF CONSOLIDATED INTERIM STORAGE FACILITY (CISF)

1. Treatment & Storage
2. Hazardous Waste Landfill
3. Byproduct Disposal Facility
4. Low Level Storage Pad
5. Federal Waste Facility
6. Compact Waste Facility

Proposed Pad Layout for CISF

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ANDREWS, TEXAS
View of Deployed Systems for Phase 1 Pad
Conceptual Drawing

Estimated Timeline

- **February 2015: filed the notice of intent**
- **April 2016: filed license application**
- **February 2017: license docketed**
- **Late 2019: NRC issues license application**
  - Assumes a three year review period
- **Late 2019: Construction begins**
- **January 2021: Operations begin**

Questions?