Geologic Stability and Hydrologic Isolation at the WCS Site, Andrews County, TX

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The WCS site is One of the Most Characterized Sites in the U.S.

- 20,000 pages in reports to TCEQ related to the geologic and hydrologic conditions at the site
- These studies show that
  - The site has been and will continue to be geologically stable
  - Radioactive and hazardous wastes will be hydrologically isolated from usable water resources
- The following summarizes some important conclusions of these studies
Subsurface Characterization Activities at WCS Have Been Extensive

Approximately, 596 wells/soil borings, including:
- 448 monitoring wells
- Over 130 uncased soil borings
- 18 instrumented boreholes

Numerous geologic/hydrologic investigations, including:
- 15 major geologic studies
- 18 major hydrogeologic studies
- Nine geophysical investigations
The WCS site is Geologically Stable
The WCS site is Unaffected by Salt Dissolution

Rustler and Salado Formation Salt Beds Show Regional Continuity and No Changes Indicating Dissolution
The WCS site is Unaffected by Salt Dissolution

CP-975 Core Slabs Show No Brecciation Above Salt or Mudstones Equivalent to Salt-bearing Beds
The WCS site is Unaffected by Salt Dissolution

Trench Study of Caliche - “V-shaped” Fractures Claimed As Evidence of Dissolution

No “V-shaped” fractures found
Two Hydrologic Units are Important to the WCS Site – *The Dockum Group*

- **Mudstones/Claystones** – Ancient soils containing swelling clays
- **Siltstones/Sandstones** – Discontinuous stream deposits
Two Hydrologic Units are Important to the WCS Site – *The OAG*

Thin veneer of silts, sands, and gravels - *Occupies erosional depressions on the Dockum Group*
The Dockum is a Low Permeability Medium

- 168 measurements of Dockum hydraulic conductivity (core and well tests) show:
  - Vertical effective hydraulic conductivity of \(1.2 \times 10^{-9}\) cm/s (two orders of magnitude lower than required for a clay liner)
Dockum Red Beds are Unsaturated

- 1,303 measurements of *in situ* water potential on core samples from 12 boreholes indicate unsaturated conditions
- No vertical flow from the surface to depth
Water Flow in the Dockum is Slow

*Playa Observations* -

- Water table conditions existed in the OAG under the playa for at least 18,000 years
- Currently ~ 7 feet of water in the OAG at the playa
- Borehole B-133 was drilled into the playa and sampled
- Water has only moved between 23 and 29 feet into the Red Beds in 18,000 years
- Water is very slow moving
The OAG has Been Extensively Characterized

- 259 wells
- 157 dry wells
- OAG is only a few feet thick in near the WCS facilities and thickens to the north and south
- The average OAG thickness is 13.5 feet
- The average saturated thickness in the northern part of the facility is 2.7 feet
The Base of the OAG is the Dockum

Top of Dockum is an ancient land surface that predates the OAG
OAG water is Discontinuous and Controlled by Dockum Topography

These puddles accumulate, then dry out
Summary

- The site is geologically stable
- The site is hydrologically isolated
- The site is ideal for disposal of hazardous, byproduct and low-level radioactive waste