Department of Energy
Office of Legacy Management

MAY 2 0 2008

Mr. William von Till
U.S. Nuclear Regulatory Commission
Mail Stop T-8F42
Washington, DC 20555-0001

Dr. Gary Smith, PhD, Section Manager
Texas Commission on Environmental Quality
P.O. Box 13087, Mail Code 233
Austin, TX 78711-3087

Subject: Assessment of the Impact of the April 7, 2008, Seismic Event on the Stability of the Falls City, Texas, Disposal Cell

Dear Mr. Von Till and Dr. Smith:

The purpose of this letter is to document and inform your office of the additional steps taken to ensure the stability of the Falls City disposal cell after the April 7, 2008, earthquake with a magnitude 3.9 that occurred near the site. Following this seismic event, three actions were taken to evaluate if any impact occurred at the disposal cell. The first was a visual inspection of the disposal cell. No observations were discovered. Secondly, the sampling team scheduled to perform April sampling took a close look at the condition of the monitoring wells. The sampling crew reported that all of the monitoring wells sampled were in good condition, and there was no evidence of damage from the recent earthquake. Third, a technical evaluation was conducted based upon the seismic design parameters.

Enclosed is an engineering assessment prepared by Geo-Smith Engineering that concludes that given the distance between the Falls City disposal cell and the epicenter of the seismic event, the strength of the seismic event was not large enough to impact the stability of the Falls City disposal cell.

Seismic design parameters for the Falls City disposal cell (an earthquake magnitude of 6.1 and a maximum horizontal ground acceleration of 0.10g) are defined within the *Draft Remedial Action Plan* for the Falls City site. The enclosed engineering assessment concludes that the recent 3.9 magnitude seismic event resulted in a peak horizontal ground acceleration of only 0.003g, well below the design criterion of 0.10g.

In accordance with the Long-Term Surveillance Plan specification, if an earthquake were to occur, a seismic impact assessment for the Falls City site would be limited to:

- Any earthquake of magnitude 3.0 or greater, within 0.3 degree (about 20 mi [30 km] at N28.91 latitude and W98.13 longitude) of the site.

- Any earthquake of magnitude 5.0 or greater, within 1.0 degree (about 70 mi [110 km] at N28.91 latitude and W98.13 longitude) of the site.

Please contact me at (970) 248-6016 if you have any questions.

Sincerely,

Jalena Maestas
Site Manager

Enclosure

cc w/enclosure:
C. Carpenter, Stoller
M. Miller, Stoller
M. Widdop, Stoller
File FCT 535.10 (Roberts)

Geo • Smith
ENGINEERING, LLC

Geotechnical, Geohydrological and Geoecological Consulting Services

gsmith@geo-smith.com
(970) 256-7060
2591 B ¾ Rd.
Grand Junction, CO 81503

April 29, 2008

Ken Broberg
S.M. Stoller
Fernald Preserve

Dear Ken:

Per your request, I have reviewed the design stability and liquefaction analyses for the Falls City UMTRA site in light of the recent earthquake in southern Texas. Based on review of the USGS earthquake report of location and magnitude, and seismic design parameters used for the Falls City closure, occurrence the earthquake was well within design values and damage to the Falls City repositories is not expected.

Per Falls City (FCT) design calculations: [MKES calculation 20-438-05-02, Embankment Design Slope Stability Analysis and 20-438-04-03, Embankment Design Liquefaction Analysis], seismic design parameters used are:

Earthquake magnitude - 6.1,

Maximum horizontal acceleration - 0.10g.

A magnitude 3.9 earthquake occurred Monday April 7, 2008 at 4:51:13 AM Central Daylight Time approximately 65 kilometers NNW of Beeville, Texas (see attached USGS report). USGS reports the epicenter at a 5 kilometer depth, 28.93° N latitude, 98.02° W longitude.

The Falls City repository is at 29.81° N latitude, 98.13° W longitude, at a distance of 98.54 kilometers (see attached computation sheets). Using procedures outlined in the UMTRA Technical Approach Document, Revision II[1] for seismic design, the attenuation relationship of Campbell (1981)[2] shall be used to determine the on-site peak horizontal acceleration and compared with values use in long-term slope stability and liquefaction analyses.

Per Campbell [equation 3, pp. 2047], the peak horizontal ground acceleration (PGA) is represented by the functional relationship:

$$PGA = 0.0159\, e^{(0.868M)} [R + 0.0606\, e^{(0.700M)}]^{-1.09}$$

Where M is the earthquake magnitude and R is the distance to the fault (epicenter). Substituting earthquake magnitude and distance to the epicenter into this equation produces a PGA of 0.003g. Given the earthquake magnitude and computed maximum horizontal acceleration are considerably less than the design values, I do not have any embankment stability or liquefaction concerns.

---

[1] Department of Energy,1989. "Technical Approach Document, Revision II", UMTRA-DOE/AL 050425.0002, Uranium Mill Tailings Remedial Action Project, Albuquerque, New Mexico, December.

[2] Campbell, K.W., 1981. "Near-source attenuation of peak horizontal acceleration," *Bulletin of the Seismological Society of America*, 71 (6): 2039-2070.

It is worth mentioning that the relationship presented by Campbell is derived for earthquakes of magnitudes 5.0 to 7.7. As stated in his paper, "The study was restricted to the near source region of earthquakes of magnitude 5.0 or greater to eliminate the small accelerations generally considered to be of little importance in earthquake engineering." Therefore the computed value for the PGA is outside of values used to derive the equation, but nonetheless the horizontal acceleration felt at the site would have been well below design values.

Sincerely,

Gregory M. Smith, P.E.
Manager, Geo-Smith Engineering, LLC

Latitude/Longitude Distance Calculation

This query will determine the distance between two points on the earth given their latitudes and longitudes.

Valid input formats are at the bottom of this page.

Source
Latitude : 28.9300N Longitude: 98.0200W

Destination
Latitude : 29.8100N Longitude: 98.1300W

Units for results km Send Query Clear Query

Questions or comments should be directed to Chris.Michels@nau.edu. My home page is here.

I got the formula for this calculation from the math forum at Drexel University. If your are interested in the math behind this calculation then you can read their explanation here.

Here is a page showing the important sections of the code that performs this calculation.

If you are looking for a way to determine your latitude and longitude go to the find location page.

Valid formats for Latitudes and Longitudes are:

option 1: **dddmmssD** or **ddd mm'ss" D**

where ddd = 1-3 digits for degrees, mm = 2 digits for minutes, ss = 2 digits for seconds and D = N,S,E, or W. The seconds and special characters (spaces, apostrophes, quotes) are all optional in this format. This leads to quite a large number of possible valid formats.

option 2: **ddd.ffffD**

where ddd = 0-3 digits, ffff = 0-10 digits and D = N,S,E, or W. This format represents a decimal number of degrees. If the number of degrees is a whole number, the decimal point is optional.

option3: **ddd mm.ffff D**

where ddd = 0-3 digits for degrees, mm = 2 digits for minutes, ffff = 0-10 digits for decimal portion of minutes and D = N,S,E, or W. This format represents degrees and a decimal number of minutes.

Distance Calculation Results

Distance between 28.9300N 98.0200W and 29.8100N 98.1300W is 98.5385 km

This calculation assumes the earth is a perfect sphere with a radius of 6378.0 km

This is query number 1583022 since Jan 24, 1997.