

**Texas Commission on Environmental Quality**

INTEROFFICE MEMORANDUM

**To:** Susan Jablonski, P.E. Director, Radioactive Materials Division

**Date:** August 14, 2007

**Through:** Devane Clarke, Manager, RML Team

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**Subject:** Groundwater intrusion into proposed LLRW facility

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Analysis of the data submitted by Waste Control Specialists LLC, in its license application for near-surface disposal of radioactive waste, has resulted in the following conclusions:

- Groundwater is likely to intrude into the proposed disposal units and contact the waste from either or both of two water tables near the proposed facility. The Applicant has failed to demonstrate compliance with 30 TAC §336.728(f) which states "The disposal site shall provide sufficient depth to the water table so that groundwater, perennial or otherwise, shall not intrude into the waste."
- The Applicant has failed to successfully use numerical modeling to predict the future location of one water table that is expected to intrude into radioactive waste. This constitutes a failure to characterize the proposed site as required by 30 TAC §336.728(a) which states the proposed disposal site "...be capable of being characterized, modeled, analyzed, and monitored." Moreover, the Applicant's failure to model the future location of the water table violates 30 TAC §336.709(1) which requires analysis of future site conditions.

Based on information provided, the Applicant has not demonstrated the site is suitable for nearsurface disposal of radioactive waste. Natural site conditions provide the essential assurance that a proposed facility will perform satisfactorily for the thousands of years required for radioactive waste to decay to safe levels. Natural site conditions cannot be improved through special license provisions. Therefore, technical staff recommends denial of license issuance. A brief discussion of the technical arguments supporting this recommendation is provided below.

**Current Location of Two Nearby Water Tables**

According to data submitted by the applicant, there appear to be two water tables. in the immediate vicinity of the proposed facility. The first is a water table present within the Ogallala, Antlers and Gatuna (GAG) materials which lie above the proposed FWF and CWF disposal units. While the data demonstrates that the GAG water table lies above the proposed facility, the precise lateral extent of the water table remains uncertain.

The second water table is in the Triassic redbed materials in which the proposed disposal units will be founded. The two proposed waste disposal units are to be constructed to depths of 120 feet and 85 feet within these redbed materials. In Revision 12a of the application, submitted on March 16, 2007, the Applicant states the second water table is no closer than 14 feet from the bottom of the proposed FWF disposal unit. However, staff analysis of the data shows that the water table may be closer than 14 feet. The current proximity of the second water table makes groundwater intrusion into the disposal units highly likely because of future annual rainfall increases and evapotranspiration decreases due to changing climatic conditions.

**Predicted Future Locations of Water Tables**

The applicant submitted two predictive numerical models of the future position of each of the two water tables. The GAG predictive model was successfully calibrated to approximate current OAG conditions. However, the calibrated GAG model predicts that groundwater will intrude into the proposed disposal facility within the period of analysis. Thus, the prohibition against groundwater intrusion provided in 30 TAC §336.728(f) is violated.

In an effort to avoid this outcome, the applicant also simulated the effects of "playa intervention" in which playas in the vicinity of the proposed units would be filled with excavated clay in an attempt to limit

recharge of the GAG water table. However, the Applicant has submitted no data to demonstrate that such modified playas would effectively prevent recharge over the long term, or that on-going active maintenance after site closure will not be necessary. 30 TAC §336.727 requires "the disposal facility shall be sited, designed, used, operated, and closed to achieve long-term stability of the disposal site and to eliminate to the extent practicable the need for ongoing active maintenance of the disposal site following closure so that only surveillance, monitoring, or minor custodial care are required."

### **Conclusion**

Analysis of available data shows that groundwater in the natural system already is unacceptably at or near the boundaries of the proposed disposal units. Predicted increases in rainfall are expected to drive the water tables into the proposed units. These conditions fail to meet the requirements of 30 TAC §336.728(f). In addition, the Applicant did not successfully calibrate the numerical model of the water table in the red beds. Consequently, simulation of the future location of that water table was not possible. This failure to characterize the proposed site constitutes a violation of 30 TAC §336.728(a) and 30 TAC §336.728. Natural site characteristics of proposed low-level waste disposal sites provide the key assurance that radionuclides will safely be isolated as they decay over intervals lasting thousands of years. The Nuclear Regulatory Commission states in 10 CFR §61.7(b)(2), "A cornerstone of the system is stability -- stability of the waste and the disposal site so that once emplaced and covered, the access of water to the waste can be minimized." Intrusion of groundwater into the proposed disposal units will increase the mobility of radionuclides and the likelihood of public exposure to radioactivity during the period of analysis. The likelihood of such an event causes technical staff to conclude that issuance of a license for the proposed facility cannot be recommended.