



December 23, 2014

VIA EMAIL and FEDERAL EXPRESS

Mr. Charles Maguire, Director
Radioactive Materials Division
Texas Commission on Environmental Quality
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- Reference:
- (1) Letter from Rod Baltzer (WCS) to Richard Hyde (TCEQ), Petition for Rulemaking; 30 TAC 336; Radioactive Substance Rules, dated July 21, 2014
 - (2) Letter from Bridget C. Bohar (TCEQ) to Rod Baltzer (WCS), Consideration of a Petition for Rulemaking, dated September 19, 2014
 - (3) Radioactive Material License No. R04100, Amendment No. 26, CN600616890, RN101702439

Subject: Technical Basis Supporting Disposal of GTCC and GTCC-like LLW in the Federal Waste Disposal Facility

Dear Mr. Maguire:

Waste Control Specialists LLC (WCS) hereby submits technical information that may be useful to the Texas Commission on Environmental Quality (TCEQ) in consideration of proceeding with a proposed rulemaking that would authorize the disposal of commercial and federally owned or generated Greater-Than-Class C Low-Level Radioactive Waste (GTCC LLW) limited to the Federal Waste Disposal Facility (FWF).

As discussed in the Petition for Rulemaking that was unanimously approved by the TCEQ Commissioners (References 1 and 2), the U.S. Congress assigned the responsibility of disposing commercial GTCC and GTCC-like LLW to the federal government as stipulated in Section 3(b) of the Low-Level Radioactive Waste Policy Act Amendment of 1985 (LLWPAA). The U.S. Nuclear Regulatory Commission (NRC) was charged with licensing a facility authorized to dispose of commercially-generated GTCC LLW in a manner that is adequate to protect public health and safety

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in the LLWPAA. However, Congress did not assign such responsibilities to the NRC for GTCC-like LLW that was owned or generated by the federal government.

Pursuant to the Chapter 401 of the Texas Health and Safety Code (referred to as the Texas Radiation Control Act) “Federal Facility Waste” is waste that is the responsibility of the federal government as defined in the LLWPAA. Such waste must be disposed of in the Federal Waste Disposal Facility (FWF) located in Andrews County, Texas. Both commercially-generated GTCC and GTCC-like LLW that is owned or generated by the federal government is “Federal Facility Waste” that must be disposed of in the FWF.

As part of the Major Amendment to Radioactive Material License No. R04100 (Reference 3), WCS was authorized to expand the FWF to dispose of waste at a depth of approximately 120 feet (40 meters) below grade. The FWF is a state-of-the art disposal facility and the first new facility licensed and operating over the past 40 years. The waste disposal practices that have improved over the past 40 years include waste form improvements, better quality assurance, use of reinforced concrete barriers, deeper depths of disposal and more robust packaging, resulting in a greater degree of containment. Conceptually, the FWF disposal facility is a modified version of “assured isolation”, where the waste would be placed in retrievable, steel-reinforced concrete canisters. The FWF qualifies as greater confinement, intermediate depth facility, as envisioned by the NRC as they were contemplating disposal of GTCC in 1989. When compared to any existing radioactive waste disposal facility in the country, the design and robustness of the FWF is incomparable (Figures 1 and 2).

Figure 1, WCS Federal Waste Disposal Facility.



Figure 2, Disposal Facility in Barnwell, South Carolina.



The TCEQ' environmental protection regulations specified in Title 30 of the Texas Administrative Code (TAC), Chapter 336 are the most stringent in the country and ideal for protecting public health and the environment for disposal of GTCC and GTCC-like LLW. The regulatory requirement mandated by TCEQ ensures the protection of public health and the environment with a Period of Performance of 1,000 years or "peak dose", whichever is longer. This requirement ensures that radioactive waste is effectively removed from the biosphere for at least one-thousand years and more likely hundreds-of-thousands of years into the future. This requirement measures the long-term environmental performance of the site, as well as ensures that radiation doses to current and future members of the public will be much less than 25 millirem/year and 500 millirem/year for an inadvertent intruder.

The site is the most extensively characterized low-level radioactive waste facilities in the U.S. These facilities were constructed entirely within approximately 600 feet of high impermeable clays (Dockum Formation) with a hydraulic conductivity of 1×10^{-9} centimeters/second. Rainfall measures on average less than 16 inches per year. The highly engineered cover system is approximately 30 feet (10 meters) thick that is not mounded at the surface. Additionally, a three foot (1 meter) reinforced concrete barrier is constructed around the entire disposal unit.

Disposal of GTCC and GTLL-like LLW would involve placement and grouting the waste inside of a Modular Concrete Canister (MCC), similar to current practices in place for Class B and C LLW. WCS has acquired experience in handling and disposing of irradiated hardware with dose-rates near 20,000 rem/hour that would be similar to certain types of GTCC and GTCC-like LLW. For irradiated hardware, the waste is placed using a transfer bell and mobile gantry crane into a specially fabricated MCC constructed of high-density grout and metal insert constructed of steel (Figure 3). The MCC are approximately ten feet in height and seven feet in diameter and weigh approximately

100,000 pounds when grouted. These engineering practices were established to reduce the dose-rates to less than 150 millirem/hour at a distance of 30 centimeters from the surface of the MCC.

Figure 3, Modular Concrete Canister Used for Disposal of Irradiated Hardware.



WCS has completed a preliminary performance assessment of the radiological impacts pertaining to the disposal of GTCC and GTCC-like LLW in the FWF consistent with the exposure scenarios and guidance provided in the NUREG-/CR-4370, *Update of Part 61 Impacts Analysis*, published in January 1986. WCS used the entire GTCC inventory source term provided in the U.S. Department of Energy's, Environmental Impact Statement (EIS) for GTCC EIS Volume 2, Table B-4 and B-7. This source term includes irradiated metals, sealed sources and other waste as discussed in the EIS.

WCS used the same probabilistic/conceptual model, parameters and radiological exposure scenarios that were used to support the major amendment to RML R04100 that was approved by the TCEQ authorizing disposal of large quantities of Depleted Uranium and removing the disposal limits for ^{99}Tc , ^{14}C and ^{129}I (Reference 3).

The peak dose for most receptors is dominated by upward diffusion of ^{99}Tc . The model assumes that the source inventory is equally spread over the entire inventory. If the GTCC is placed at the bottom of the cell, this upward diffusion would be greatly reduced. It's important to note that the bottom canister layer of the FWF is greater than 30 meters below the surface. With the recently approved expansion, the bottom two layers will be greater than 30 meters. This upward diffusion is believed to be a very conservative estimate due to the fact that the upper layers are very porous and dry, which may create a barrier to further upward diffusion through this upper layer where the uptake is assumed.

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The increased peak dose to nearest permanent resident is dominated by the increased amount of ^{129}I in the GTTC waste. The increased dose to the oilfield worker is dominated by ^{238}U . The increased peak dose to the adjacent resident is due to ^{129}I . The results of the preliminary assessment are presented in Table 1.

Table 1, Effective Dose (mrem/year) for Certain Radiological Exposure Scenarios

	Nearest Permanent Resident	Ranch Worker	Oil Field Worker	Recreational Hunter	Dry Land Farmer	On-site Resident
Base-case expected inventory in FWF	8.7e-9 @ 1000 y	0.00023 @ 100,000 y	0.014 @ 600 y	6.6e-5 @ 100,000 y	0.0028 @ 100,000 y	0.16 @ 100,000 y
All Group 1 and 2 GTTC + Base Inventory	6.8e-7 @1000 y	0.043 @ 100,000 y	0.1 @ 600 y	0.012 @ 100,000 y	0.52 @ 100,000 y	26 @ 100,000 y

The results of the performance assessment for the WCS FWF for disposal of all reported GTTC easily meets the performance objectives in 30 TAC 336. All GTTC can be safely disposed in the WCS FWF disposal facility.

WCS requests that a copy of all correspondence regarding this matter be directly emailed to my attention (skirk@valhi.net) as soon as possible after issuance. If you have any questions or need additional information, please call me at 972-450-4284.

Sincerely,



J. Scott Kirk, CHP
Vice President of Licensing and Regulatory Affairs, CRSO
Enclosure

cc: Bobby Janecka, TCEQ
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