



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

October 27, 2016

Charles Maguire, Division Director  
Radioactive Materials Division  
Texas Commission on Environmental Quality  
P.O. Box 13087, MC-233  
Austin, TX 78711-3087

Dear Mr. Maguire:

On September 6, 2016, a Management Review Board (MRB), which consisted of U.S. Nuclear Regulatory Commission (NRC) senior managers and an Organization of Agreement States liaison to the MRB, met to consider the results of a special review of the Texas Commission on Environmental Quality (TCEQ) Agreement State Program. The review was conducted under the Integrated Materials Performance Evaluation Program (IMPEP) Low-Level Radioactive Waste non-common performance indicator, Technical Quality of Licensing Actions sub-element.

The special review focused on TCEQ's licensing process for reviewing depleted uranium disposal including the basis for granting a license amendment to dispose of depleted uranium, the associated performance assessment model for such disposal, and procedures and guidance related to the use of the performance assessment model. The enclosed final report contains a summary and recommendations for TCEQ's consideration with respect to improvements in documentation, including its communications with the licensee, process related to resolution of placeholder inputs in the performance assessment models, and process to track and identify technical analyses.

Section 3.0, page 5 of the enclosed final report contains a summary of the review team's findings and recommendations. The review team concluded that the site characteristics provide adequate margin to protect public health and safety, and the MRB agreed with the team's conclusion. The review team provided some recommendations for improvement with regard to TCEQ's documentation of this complex licensing action and corresponding decision making process, and the MRB agreed with those recommendations for improvement. The review team recommended, and the MRB agreed, that NRC staff follow up with TCEQ on the documentation improvements at the next IMPEP review of the Texas Agreement State Program in 2018.

C. Maguire

2

I appreciate the courtesy and cooperation extended to the NRC review team. I also wish to acknowledge the continued support of the Agreement State program by you and your staff. If you have any questions regarding the enclosed report, please contact Paul Michalak at (301) 415-5804 or via e-mail at [Paul.Michalak@nrc.gov](mailto:Paul.Michalak@nrc.gov).

Sincerely,

*/RA/*

Marc L. Dapas, Director  
Office of Nuclear Material Safety  
and Safeguards

Enclosure:  
Special Review Report



*SPECIAL REVIEW OF THE  
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY  
LOW LEVEL RADIOACTIVE WASTE DISPOSAL PROGRAM*

*APRIL 4–5, 2016*

*REPORT*

Enclosure

## **EXECUTIVE SUMMARY**

This report presents the results of the special review conducted with the Texas Commission on Environmental Quality (TCEQ) related to performance assessment modeling and a license amendment associated with the disposal of depleted uranium under TCEQ's Low-Level Radioactive Waste (LLRW) Disposal Program. The special review, conducted at the invitation of TCEQ, focused on TCEQ's licensing process for reviewing depleted uranium disposal, including the basis for granting a license amendment to dispose of depleted uranium, the associated performance assessment model for such disposal, and procedures and guidance related to the use of the performance assessment model. The review team concluded that the site characteristics provide adequate margin to protect public health and safety. However, the review team identified some items of concern that involved the lack of documentation needed to support this complex licensing decision. The review team recommended for TCEQ's consideration, and the Management Review Board (MRB) agreed with, documentation-related items for improvement (Section 2). The Nuclear Regulatory Commission (NRC) staff will follow up on these recommended items for improvement during the next Integrated Materials Performance Evaluation Program review of the Texas Agreement State Program in 2018.

## 1.0 INTRODUCTION

This report presents the results of a special review of the Texas Agreement State Program. The review was conducted April 4–5, 2016, by a team of technical staff members (review team) from the Nuclear Regulatory Commission (NRC). The review team visited the Office of Waste in the Texas Commission on Environmental Quality (TCEQ) in Austin, Texas, to review performance assessment modeling and related TCEQ licensing documentation associated with the disposal of depleted uranium. The review was conducted in accordance with the “Implementation of the Integrated Materials Performance Evaluation Program and Rescission of Final General Statement of Policy,” published in the *Federal Register* on October 16, 1997, and the NRC Management Directive 5.6, “Integrated Materials Performance Evaluation Program (IMPEP),” dated February 26, 2004. Specifically, the special review focused on the Technical Quality of Licensing Actions sub-element under the Low-Level Radioactive Waste (LLRW) Disposal Program non-common performance indicator.

### a. Basis for the Special Review

In March 2015, TCEQ invited the NRC to perform a review of a performance assessment model developed by Waste Control Specialists (WCS) for the evaluation of LLRW disposal. In the resulting “peer review,” which was performed in June 2015, the NRC evaluated the performance assessment model in order to provide technical and regulatory guidance to TCEQ with respect to its licensing process. TCEQ acknowledged the experience of NRC staff and was interested in NRC staff insights relative to TCEQ’s licensing process. From the peer review, the team identified concerns with the model and its use in an August 2014 licensing action for the disposal of depleted uranium. In coordination with TCEQ, the review team planned to evaluate the depleted uranium disposal licensing action as a “special review” during the IMPEP periodic meeting with Texas (TCEQ and Department of State Health Services) planned for February 2016. In December 2015, the TCEQ staff requested a delay in the special review due to a competing priority. As a result, the special review was performed in April 2016.

### b. Purpose of the Review

To evaluate TCEQ’s licensing process for reviewing depleted uranium disposal including the basis for granting a license amendment to dispose of depleted uranium, the associated performance assessment model for such disposal, procedures and guidance related to the use of the performance assessment model, and resolution of comments from the June 2015 peer review.

## 2.0 LLRW DISPOSAL PROGRAM: TECHNICAL QUALITY OF LICENSING ACTIONS

The objective of this special review was to evaluate TCEQ’s licensing process related to the August 2014 WCS license amendment to dispose of depleted uranium. The review team, in coordination with TCEQ management, determined that the TCEQ’s licensing process for the disposal of depleted uranium, including the performance assessment model for depleted uranium disposal, would be evaluated in a special review in accordance with Section V.A.4. of the Office of Nuclear Material Safety Safeguards Procedure SA-100 “Implementation of the Integrated Materials Performance Evaluation Program (IMPEP).” The review was conducted under the IMPEP LLRW Disposal

Program non-common indicator, Technical Quality of Licensing Actions sub-element, to determine if TCEQ's licensing process with respect to depleted uranium disposal is adequate to protect public health and safety.

a. Scope

The review team used the guidance in State Agreements procedure SA-109, "Reviewing the Non-Common Performance Indicator: Low Level Radioactive Waste Disposal Program," and evaluated the TCEQ's performance with respect to the following performance indicator objectives in the context of the licensing process for depleted uranium disposal:

- Licensing action reviews are thorough, complete, consistent, and of acceptable technical quality with health, safety, and security issues properly addressed.
- Applicable LLRW guidance documents are available to reviewers and are followed (e.g., pre-licensing guidance, regulatory guides, etc.).
- Essential elements of license applications have been submitted and these elements meet current NRC or Agreement State regulatory guidance for describing the isotopes and quantities used, qualifications of authorized users, facilities, equipment, locations of use, operating and emergency procedures, and any other requirements necessary to ensure an adequate basis for the licensing action (e.g., financial assurance, increased controls/Part 37).
- The basis for major licensing decisions should be fully documented in a safety evaluation report. Evaluation of the technical quality of licensing actions should include a review of the safety evaluation reports pertaining to these actions. Evaluation of the quality of licensing actions should also include an assessment of ongoing requests and supporting documents for amendment, modifications, and/or renewal of the LLRW license.
- Deficiency letters clearly state regulatory positions and are used at the proper time.

b. Discussion

The special review focused on TCEQ's basis for the decision to amend the WCS license for the disposal of depleted uranium, the associated performance assessment model for such disposal, including the input parameters used in the performance assessment, and procedures and guidance related to the performance assessment model.

Based on information from TCEQ management and staff, the decision to grant the license amendment for the disposal of depleted uranium was informed by a number of factors, including the performance assessment model developed by WCS in support of the license amendment. However, during the June 2015 peer review, the NRC staff did not find sufficient documentation of TCEQ's decision making process with respect to the license amendment. During the April 2016 office visit, the review team determined that two factors influenced TCEQ's licensing decision. First, the WCS disposal site appears to have significant disposal margin, which is related to the quantities of depleted uranium that are expected to be disposed of at the site, the sites physical features that are conducive to such disposal volumes, and disposal site performance is projected to meet regulatory objectives. Second, the performance assessment model for the disposal site is expected to be revised before significant quantities of depleted uranium will be disposed. While the review team did not identify any health and safety concerns with the

proposed depleted uranium disposal given the site's disposal margin, the team noted that these two factors should have been explicitly documented in TCEQ's licensing records and appropriate license conditions generated.

With respect to the performance assessment model, in response to review team inquiries during the review, TCEQ staff indicated that TCEQ did not develop any guidance for the review of performance assessments and associated documentation; however, TCEQ staff stated that they use NRC guidance (e.g., NUREG-1573, "A Performance Assessment Methodology for Low-Level Radioactive Waste Disposal Facilities: Recommendations of NRC's Performance Assessment Working Group", NUREG/CR-5542, "Models for Estimation of Service Life of Concrete Barriers in Low-Level Radioactive Waste Disposal", and NUREG/CR-6070, "Modeling Approaches for Concrete Barriers Used in Low-Level Radioactive Waste Disposal") as well as other external guidance. The review team did determine, through available documentation of some interactions between the TCEQ and the licensee, that an adequate review of the performance assessment for the disposal of depleted uranium was conducted. TCEQ staff indicated that questions concerning the WCS performance assessment model were being resolved primarily through e-mail exchanges and meetings. The review team observed that the volume of documentation regarding review activities was considerably less than would typically be expected for review of a complex performance assessment (e.g., performance assessment conducted for reviews of waste incidental to reprocessing under NUREG-1854, "NRC Staff Guidance for Activities Related to U.S. Department of Energy Waste Determinations"). In addition, TCEQ staff indicated that WCS did not provide an adequate response to all of TCEQ's comments. In their discussions with the review team, TCEQ staff commented that their analysis indicated that the unresolved comments were not significant enough to result in a public health and safety concern. However, the lack of records indicating a resolution for some of TCEQ's comments is a documentation weakness in TCEQ's regulatory process. TCEQ acknowledged this weakness and indicated that the performance assessment model would be updated as additional data and information becomes available (i.e., is provided or collected from the licensee).

During the April 2016 review, the team asked TCEQ staff if individual staff members have the ability to exercise the performance assessment model and conduct studies to assess model sensitivities to input parameters. TCEQ management indicated that their staff has the ability to study the sensitivity of the performance assessment model. In addition, when a model file is received from WCS, it is distributed to the relevant technical staff for review and analysis. As part of TCEQ's evaluation, staff will run the performance assessment model to verify the licensee's results and may perform additional calculations to verify the ranges of parameters. TCEQ also indicated that the results from these independent evaluations of the performance assessment model are the technical basis for questions and issues that are provided to WCS for resolution. However, based on the review, the team determined that these independent evaluations of the performance assessment model and associated results do not appear to be documented by TCEQ.

The review team also evaluated TCEQ's practice with respect to input parameters for the performance assessment model. As indicated in the August 5, 2015, peer review letter (NRC Agencywide Documents Access and Management System Accession Number ML15209A311), the review team noted that an earlier version of the performance assessment model (v0.205) had a number of input parameters that were

clearly identified within the model input file as “placeholder” inputs. TCEQ staff indicated that the licensee provides annual updates to its performance assessment modeling, and that the licensee was working to resolve the placeholder inputs as the model was being revised. However, this version of the performance assessment model appeared to be the one used by TCEQ to inform its depleted uranium disposal licensing decision. At the April 2016 office visit, the review team observed that there were two performance assessment models with the v0.205 designation, one had the word “draft” in bold red text on the main menu as well as bold red text for the designating placeholders, while the other version did not have the red text, but still identified the model as preliminary and many of the inputs as placeholders. In addition, during the April 2016 office visit, TCEQ provided several newer versions of the performance assessment model (v0.3, v0.4, and v0.51) which contained some new input values, with none of the values designated as placeholders. Based on these observations, the review team concluded that the documentation related to the performance assessment model was inadequate (i.e., ambiguity in terms of the inputs designated as placeholders). TCEQ indicated that the issues surrounding the model inputs and their placeholder status were being resolved over time as additional information and documentation is included in the model by the licensee. Subsequent to the April 2016 review, TCEQ provided the review team with a “Timeline for WCS Performance Assessment Development Process” which documented the changes between versions v0.1 through v0.6 of the performance assessment model.

During the April 2016 review, TCEQ indicated that the WCS disposal license has a condition that requires the licensee to perform specific sensitivity analyses when requested by TCEQ. However, TCEQ staff do not appear to have a system or process in place to track the results of the sensitivity analyses, including assessing the impact of input parameter errors or changes to the model. For example, with respect to placeholder values, TCEQ does not have a system in place to verify the basis for the removal of placeholder designations on the performance assessment model inputs.

c. Evaluation

During its April 2016 visit to the TCEQ office, the review team did not identify any concerns that would question whether health and safety is protected. The review team identified weaknesses associated with TCEQ’s documentation for the license amendment associated with depleted uranium disposal. This included lack of documentation to support the basis for the licensing decision and the associated performance assessment model used to inform the decision. Therefore, the review team offered the following recommendations for TCEQ’s consideration.

1. TCEQ should improve the documentation of its communications with the licensee. Specifically,
  - a) Questions about a licensee’s submittal should be developed and provided to the licensee in a formal Request for Additional Information format. Upon resolution of the questions, the outcomes should be documented. During the evaluation process, issues raised by TCEQ, issues self-identified by WCS, and the resolution of these issues should be adequately documented.
  - b) TCEQ should improve the documentation of the assessment process when reviewing new versions of the performance assessment models that are provided annually by the licensee.



- c) TCEQ should improve the documentation of the safety technical bases for the disposition of a licensing action. This should be completed in a Safety Evaluation Report (SER) or similar document. The SER would allow TCEQ to document how the licensee is addressing compliance with regulatory requirements and why TCEQ has determined that the information provided by the licensee is acceptable. If the licensing action is subject to a hearing or an allegation, the associated regulatory process could be followed and supported by the contents of the SER.
2. TCEQ should improve the documentation of its process related to the resolution of placeholder inputs in the performance assessment models. TCEQ should document how placeholder inputs have been removed along with suitable justification.
3. TCEQ should have a documented process to track and identify both the technical analyses upon which a regulatory decision has been made and the significance of errors or changes that may be identified in the supporting performance assessment model. Resolution of significant errors or changes should be documented and in the case of errors, appropriate corrective actions taken.

### 3.0 SUMMARY

The review team conducted a special review of TCEQ's licensing process for reviewing depleted uranium disposal including the basis for granting a license amendment to dispose of depleted uranium, the associated performance assessment model for such disposal, and procedures and guidance related to the use of the performance assessment model. This review was conducted under IMPEP non-common performance indicator Low-Level Radioactive Waste Disposal Program, sub-element Technical Quality of Licensing Actions.

The review team concluded that the site characteristics provide adequate margin to protect public health and safety. The review team provided some recommendations for improvement with regard to TCEQ's documentation of this complex licensing action and corresponding decision making process. The review team recommended, and the MRB agreed, that the NRC staff will follow up with TCEQ on the improvements with documentation at the next IMPEP review of the Texas Agreement State Program in 2018.