WIPP Remote-Handled TRU Waste Program Update

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ABSTRACT

There are two major regulatory approval milestones necessary in order to commence disposal operations for remote-handled transuranic (**RH TRU**) waste at the Waste Isolation Pilot Plant (**WIPP**)—the RH TRU hazardous waste permit modification request [1] and the radiological characterization plan [2]. One of those milestones has been achieved. The US Environmental Protection Agency (**EPA**) issued its final decision to approve the Department of Energy's (**DOE**) RH TRU radiological characterization plan along with the RH TRU Waste Characterization Program Implementation Plan [3], on March 26, 2004. The RH TRU hazardous waste permit modification request still awaits agency approval. In EPA's decision to approve the DOE's RH TRU radiological characterization plan, the EPA also set forth the process for approving site-specific RH TRU waste characterization programs.

Included in the March 29, 2005, RH TRU second Notice of Deficiency [4] (**NOD**) on the *Class 3 Permit Modification Request for RH TRU Waste*, the New Mexico Environment Department (**NMED**) requested that the Permittees combine their responses for the RH TRU Waste NOD with the Section 311 permit modification request NOD. The Combined Response Document was submitted April 28, 2005 [5]. Another NOD [6] was issued by the NMED on September 1, 2005, to clarify the Permittees' proposal and submit these clarifications to the administrative record. Combining both the §311 [7] and RH TRU waste permit modification requests allows for both the regulator and Permittees to expedite action on the modification requests. The Combined Response Document preserves human resources and costs by having only one administrative process for both modification requests.

Facility readiness requirements of the RH TRU waste final permit [8] must be implemented to declare that the WIPP is ready to receive RH TRU waste for storage and disposal. To demonstrate readiness, the WIPP is preparing for an Operational Readiness Review (**ORR**) of the RH TRU waste management equipment, system, and procedures. Required by DOE Order, the ORR demonstrates the capability of managing RH TRU waste. The Management and Operating Contractor (**MOC**) for the WIPP must first perform a Line Management Assessment. Upon successful completion of the Line Management Assessment, the MOC performs the Contractor ORR and presents the results to the local DOE office. At that time, the local DOE office performs its own ORR to declare readiness to DOE Headquarters.

INTRODUCTION

Two agency authorization documents required for the disposal of Remote Handled TRU (RH TRU) mixed waste are the WIPP's plan for the characterization of the radiological components of the waste and its plan for characterization of hazardous components of the waste. The

Department of Energy (DOE) has received approval from the Environmental Protection Agency (EPA) on March 26, 2004, for the radiological characterization plan. Included in the approval was the Waste Characterization Implementation Plan (WCPIP). The WCPIP serves as a guidance document to the generator/storage sites on implementing the requirements of the radiological characterization plan. Essentially a performance based approach, generator/storage sites are allowed to meet the characterization objectives as long as they justify the methods employed and the methods' associated tolerable decision errors used to provide the required radiological waste characterization information. The EPA granted the generator/storage sites this flexibility due to the variation in waste forms and characterization facilities across the DOE TRU waste complex. However, EPA mandated that the generator/storage sites' certification plans, characterization procedures, and characterization equipment must be pre-approved prior to beginning characterization activities. After the pre-approval, EPA will visit the sites to ensure proper implementation of the radiological characterization program before the waste can be shipped to WIPP for disposal.

The DOE and Washington TRU Solutions, LLC, collectively known as the Permittees, submitted the RH TRU Waste Permit Modification Request (**PMR**) on June 28, 2002. The RH TRU Waste PMR proposal establishes or contains:

- Acceptable Knowledge as the basis of the RH TRU Waste Analysis Plan
- Technical justifications for the elimination of headspace gas sampling in order to meet repository performance standards
- Technical justification for the elimination of solids sampling
- Technical justification for the estimation of material parameter weights
- Changes to the WIPP facility systems, equipment, and procedures necessary to safely manage, store, and dispose of RH TRU waste

In the Energy and Water Development Appropriations Act for Fiscal Year 2004, Section 311 of Public Law 108-137, [9] the U.S. Congress directed changes in the way waste analysis requirements of the Solid Waste Disposal Act (42 U.S.C. 6901 et seq.) are to be implemented for waste intended for disposal at WIPP. The Permittees must confirm that the waste contains no ignitable, corrosive, or reactive waste through visual examination or radiography of a statistically representative subpopulation of the waste. The Permittees must also review the Waste Stream Profile Form (**WSPF**) to ensure that no ignitable, corrosive, or reactive waste and that TRU mixed waste that is shipped to WIPP for disposal only contains approved hazardous waste numbers. Section 311 also directed that the monitoring of volatile organic compounds to comply with disposal room performance standards should occur exclusively in underground disposal rooms in which the waste has been emplaced until the underground panel is closed. Currently, the generator/storage sites must perform headspace gas sampling and analysis of nearly 100 percent of the containers bound for WIPP. As directed by Section 311, the Permittees submitted a modification to its hazardous waste facility permit (**HWFP**) to implement the new law. The Section 311 PMR was transmitted to the NMED on January 9, 2004.

A Notice of Deficiency is the regulator's vehicle to gather additional technical information. The NMED issued a NOD on the RH TRU Waste PMR on March 5, 2003; the Permittees responded to the regulators' concerns and questions 60-days later. A Section 311 NOD was issued by

NMED on December 30, 2004, allowing the Permittees 60-days to provide responses. The NMED granted a request for a 30-day extension until March 30, 2005, for the Permittees to provide their response.

However, a second NOD for the RH TRU Waste PMR was issued just one day before the deadline to respond to the Section 311 NOD. When the NMED issued the second NOD [**11**] on the RH TRU Waste PMR on March 29, 2005, they also directed the Permittees to develop a waste analysis plan that would address CH and RH TRU waste in a "unified manner" through a consolidated response to the NOD and provide a revised permit modification request. This tied the Section 311 and RH TRU Waste PMRs together. Combining both the Section 311 and the RH TRU Waste PMRs allows for both the regulator and the Permittees to expedite the action on the modification requests, preserve resources, and minimize costs by focusing on one PMR rather than two.

The NMED also understood that the Permittees wanted to include other proposed changes such as additional storage capacity and holding areas in the revised modification request. These additional storage and holding areas were necessary to facilitate the changes in confirmation the Permittees proposed. The Permittees previously had submitted a Class 3 Container Management Improvements (**CMI**) permit modification request [10] that included, among other proposals, additional storage areas in the Parking Area Unit and Waste Handling Building. Additional storage areas are necessary to provide the operational flexibility in the case of equipment down time, inclement weather, and increased shipping rates. This Class 3 permit modification request was withdrawn on July 19, 2005, as the Permittees included increased storage areas in the Revised Section 311/RH TRU Waste PMR and will address other container management improvements in subsequent permit modification requests.

The Revised Section 311/RH TRU Waste PMR

The Revised Section 311/RH TRU Waste PMR proposed:

- AK as the primary method for generator/storage sites to provide the necessary waste analysis information
- AK Sufficiency Determinations by the Permittees, subject to NMED approval
- If AK is not sufficient, perform solids sampling and analysis on 5 containers for homogeneous and soils/gravel waste streams
- If AK is not sufficient, perform headspace gas sampling and analysis on 10 containers for debris waste streams
- Estimation of material parameter weights
- Confirmation by the Permittees at either the generator/storage sites, off-site facility, or at WIPP
- Seven percent confirmation on every waste stream for every shipment
- Room-based VOC monitoring to demonstrate compliance with repository performance standards.

The heart of the Permittees' proposal is a waste analysis plan for both RH and CH TRU waste that is based upon the use of AK to provide the necessary waste characterization information.

Aside from the mandatory AK information for all waste streams, if a generator storage site believes there is sufficient AK information to characterize the waste, an AK Sufficiency Determination Request may be proposed to the Permittees. Subsequent to the Permittees' decision that the AK information is sufficient, the Permittees will forward the AK Sufficiency Determination to NMED for its review and a determination that the Permittees'approval is appropriate.

If the generator/storage sites do not feel that there is sufficient AK information to resolve the assignment of hazardous waste numbers to the waste, they may perform headspace gas sampling and analysis on 10 containers of a debris waste stream, or perform solids sampling and analysis on five containers for homogeneous or soils/gravel waste streams to resolve hazardous waste numbers. From these analytical results, the generators will assign or supplement the assignment of hazardous waste numbers.

Radiography and Visual Examination (**VE**) of the waste may be performed on the waste streams if the generator/storage sites feel it is necessary to segregate waste streams or to ensure the waste stream contains no prohibited items. The Permittees proposed that the procedures for these methods be reviewed by the Permittees either during the Permittees' audits or when a WSPF is reviewed and approved by the Permittees.

From data obtained from over 6 years of operating experience, the Permittees proposed that Material Parameter Weights (MPW) be provided by estimation from the AK information. Material Parameter Weights consist in part of cellulose, plastic, rubber, ferrous metals, non-ferrous metals, and other inorganic materials. The data from MPW estimations from AK compared to actual values reported in the WIPP Waste Information System from current confirmation activities show that estimating the MPW through the use of AK information is an appropriate means of reporting MPW.

The Permittees also proposed that confirmation activities be performed by the Permittees at either the generator/storage site or at the WIPP site. Whether confirmation is performed at WIPP of at the generator/storage sites, confirmation will be performed under the direct supervision of the Permittees, under the Permittees' programs and procedures. Confirmation will consist either of VE, examination of the VE record or Radiography. The Permittees will perform confirmation on seven percent of every waste stream of every shipment. For CH TRU waste, this amounts to at least one container per TRUPACT-II. Confirmation for some container configurations will occur at the generator site.

From inventory information previously collected through planning databases and interviews with the generator/storage sites, we know that approximately 95 percent of RH TRU waste has either not been packaged or will require repackaging to meet WIPP Waste Acceptance Criteria as depicted in Fig. 1, *Estimated Distribution of RH TRU Waste Inventory*. The inventory estimates of RH TRU waste that will require packaging or re-packaging can be segregated into four categories:

- Packaged - Waste is packaged in a final form suitable for transport to and disposal at the WIPP (i.e., the waste is either already in canisters [LANL] or in a package that may be transported to another facility and placed in a canister without repackaging).

- To Be Generated - Waste that the DOE anticipates generating, including projected generation by new activities and environmental restoration activities (i.e., retrieval from burial grounds).

- To Be Repackaged - Waste is currently packaged in some form, but is not suitable for transport and/or disposal as packaged (e.g., possibly due to package size, condition, or contents). The waste will be repackaged into containers suitable for transport to and disposal at the WIPP.

- To Be Packaged - Waste is either not yet packaged (i.e., tank sludges) or the decision has been made to package the current form differently (i.e., debris waste at Oak Ridge National Laboratory).

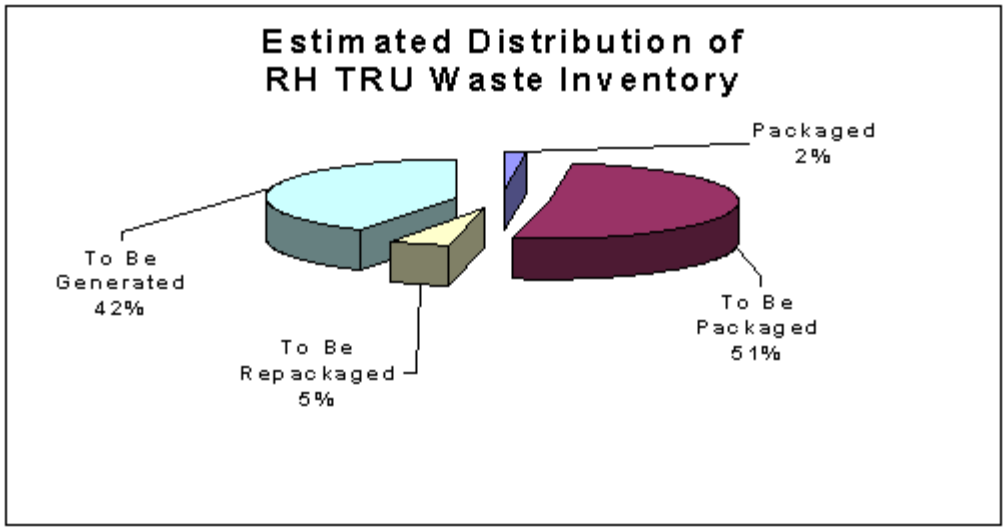

Fig. 1. Estimated distribution of RH TRU waste inventory

Acceptable Knowledge will be primarily used to characterize RH TRU waste. During packaging or re-packaging, additional characterization information may be collected by two trained operators (or by a trained operator and recorded on unalterable media). Packaging records will be used to perform the confirmation of seven percent of the RH TRU waste in each waste stream in each waste shipment.

Most hazardous waste disposal facilities depend upon technology to provide standards for protection of human health and the environment. The writers of the Resource Conservation and Recovery Act (RCRA) or "the hazardous waste regulations" understood that they could not foresee every imaginable type of facility to be proposed for disposal of hazardous waste. Therefore, the regulations have allowed for what are known as "miscellaneous units." The regulations governing miscellaneous units set forth environmental performance standards rather than technology based standards which have been established by the regulations for units such as

landfills, tanks, waste piles, and others. The exact nature of the environmental performance standards for a Miscellaneous Unit must be negotiated by the regulator and regulated entity. However, the environmental performance standards must ensure that the hazardous waste will not contaminate water, land, or air. As a deep geologic repository (not identified by the RCRA regulations) WIPP is a Miscellaneous Unit.

The only means by which hazardous waste can reach the accessible environment from the WIPP hazardous waste disposal units is by the emission of volatile organic compounds (**VOCs**) into the air, and only through the operational phase of the repository. When the WIPP repository is full, hazardous waste disposal units will be closed and the repository will be sealed. To protect the workers, the WIPP Hazardous Waste Facility Permit contains a permit condition that calls for headspace gas sampling and analysis of VOCs in nearly 100 percent of the containers destined to the WIPP for storage and disposal. These values are compiled to demonstrate that underground room-based VOC limits are not exceeded.

Section 311 directed the Permittees to demonstrate compliance with the environmental performance standards (also called disposal room performance standards) exclusively by monitoring the VOCs in every room where waste is disposed until the panel is closed. A Panel consists of seven rooms. After the last container of waste is placed in the last disposal room of the panel, the panel is closed and VOC monitoring in the rooms in the panel would no longer be required.

The Draft Section 311/RH TRU Waste Permit

The Permittees' Combined Response Document, containing responses to the NMED questions and concerns regarding both the Section 311 PMR and the RH TRU Waste PMR, was transmitted on April 29, 2005. Additional comments were provided to NMED on June 10, 2005, providing minor editorial corrections and clarifications. On November 23, 2005, the NMED issued:

- The Section 311/RH TRU Waste Draft Permit
- Fact Sheet
- Public Notice

The Fact Sheet discussed the background, administrative history, permit modification request summary, proposed actions in draft Permit, availability of additional information, public comment and request for hearing, and final decision. The Public Notice discussed background and administrative history, public review of the draft Permit, public hearing, public comment, procedure of issuance of final permit decision, arrangements for persons with disabilities, as well as additional information. The NMED allowed for a 60-day public comment period, ending January 23, 2006 (although the comment period will remain open until the end of any public hearing). A public hearing, if requested, was tentatively set for March 8, 2006.

In the Fact Sheet, the NMED stated that it believes that the proposed AK Sufficiency Determination process provides a "technically sound" approach for characterizing RH TRU

waste, as 95 percent of the RH TRU waste inventory packaging or re-packaging activities will be carried out under a stringent quality assurance program. The regulators also stated that the majority of modifications proposed for the waste analysis plan were technically defensible. These modifications include the AK sufficiency pathway, reduced sampling and analysis requirements, and (for the purposes of characterization) the elimination of radiography and VE of 100 percent of the containers to ensure that there are no prohibited items. New Mexico also agreed with estimating of MPWs through AK estimations and room-based monitoring of VOCs to demonstrate compliance with environmental performance standards.

However, NMED did not agree that the Permittees demonstrated that they could return prohibited items to the generator site should they be detected during confirmation activities performed at the WIPP facility. This is because some prohibited items in the WIPP HWFP are prohibited from transportation and the NMED had questions as to how such items could be returned to the generator sites. The NMED denied confirmation of waste at the WIPP unless the Permittees could demonstrate that containers with prohibited items could be returned to the generator/storage sites or another off-site facility.

The Permittees will submit their comments to the draft Permit no later than January 23, 2006. In their response the Permittees will provide additional information regarding the return of prohibited items. The Permittees' response identifies options using currently available shipping packages and describes shipping packages under development that will be certified to transport the prohibited items.

The formal public comment period ends January 23, 2006. Upon request, and indeed expected, the public hearing is scheduled to begin on March 8, 2006. Subsequent to the public hearing, the hearing officer will review the Findings of Fact and Conclusions of Law and submit recommendations to the Secretary of the New Mexico Environment Department. The Secretary is not bound by the hearing officer's recommendations, but the recommendations are an important part of his deliberations on the content of the final Section 311/RH TRU Waste Permit. The final Permit will become effective 30-days after the Secretary issues his decision. See Fig. 2, *Permit Process*.

Operational Readiness

The WIPP facility is preparing for the receipt of RH TRU waste by a systematic review of formal processes and procedures of the facility's capability to manage, store, and dispose of RH TRU waste. The Management and Operating Contractor (**MOC**) for the WIPP is Washington TRU Solutions, LLC. The MOC has embarked upon a Line Management Assessment (**LMA**) to verify that systems, equipment, and procedures are in place and that performance of the Contractor (MOC) Operational Readiness Review is justified. The readiness review process begins with an LMA. The LMA is schedule for completion in June 2006. Among other criteria being assessed are the anticipated permit conditions set forth by the anticipated final Section 311/RH Permit. A team of cognizant professionals, managers, and senior management have established prerequisites and criteria by which to assess WIPP facility readiness.

Regardless of where confirmation activities occur, the draft Permit received on November 23, 2005, provides the necessary information about WIPP facility requirements to allow the Permittees to assess readiness of the facility to receive RH TRU waste. Therefore, the MOC will proceed with the LMA based upon the draft Permit. Moreover, the LMA directs that upon receipt of the final Section 311/RH Permit, a controlled change tracking system will be employed to review any changes from the draft Permit to the final.

After successful completion of the LMA, the MOC will conduct the Contractor Operational Readiness Review in order to make a readiness declaration to the DOE. The DOE will then perform its own operational readiness review to verify that WIPP facility readiness has been achieved.

CONCLUSION

The Permittees have presented a regulatory and technically sound Revised PMR for Section 311/RH TRU Waste that is protective of human health and the environment. The objectives of the Permittees' proposal for RH TRU waste analysis have remained constant since its submittal in June 2002. A performance-driven approach is still the basis for safe and efficient waste analysis of RH TRU waste, thereby reducing the risk of exposure by reducing unnecessary sampling and analysis. The proposed confirmation activities will catch non-compliant waste before it is emplaced in the WIPP repository. Furthermore, the associated costs of performing the unnecessary sampling and analysis can be focused on clean-up of both CH and RH TRU waste throughout the DOE-complex.

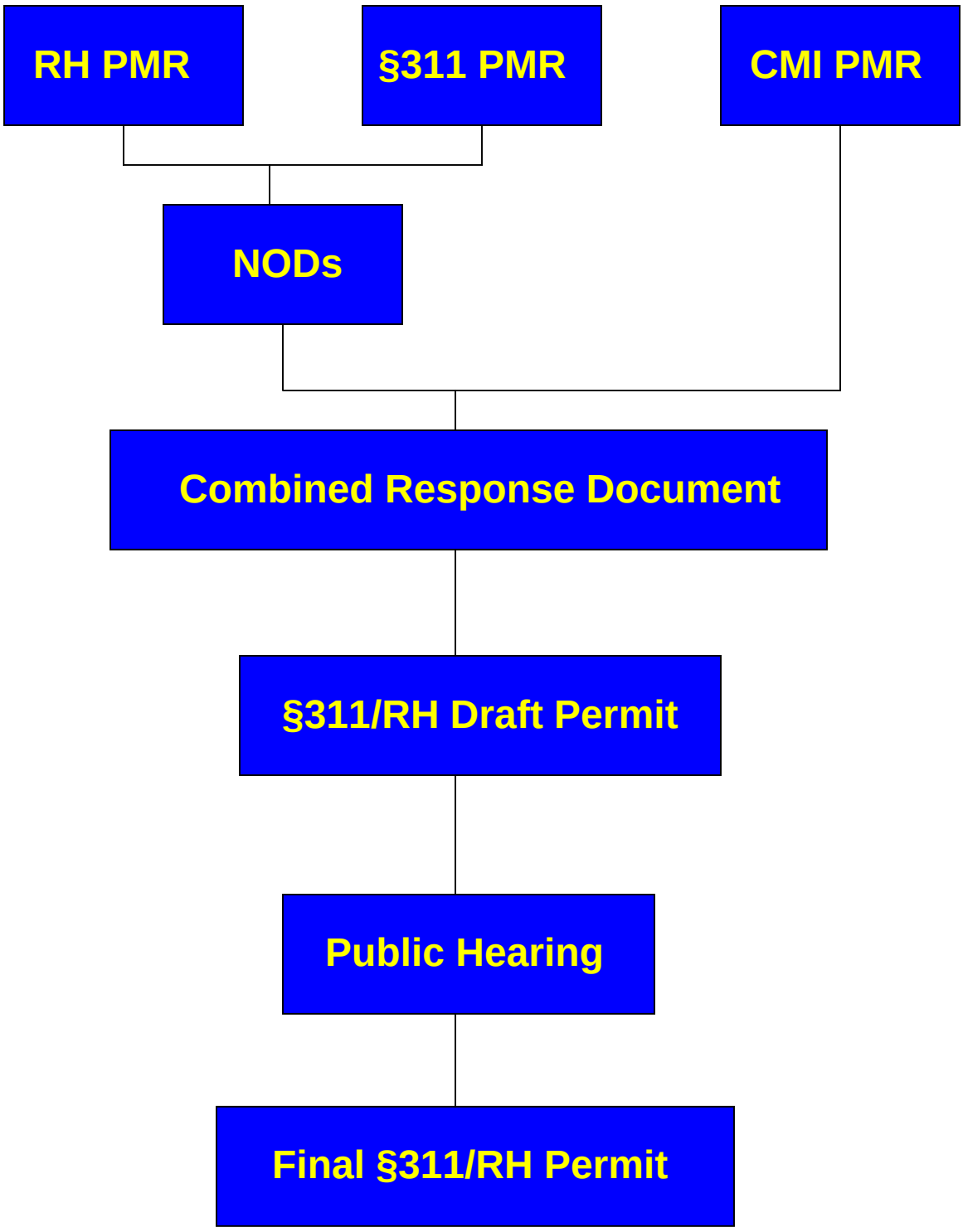

Fig. 2. Permit process

REFERENCES

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2. *Notification of Planned Change to the EPA 40 CFR 194 Certification of the Waste Isolation Pilot Plant, Remote-Handled Transuranic Waste Characterization Plan*; US Department of Energy; April 30, 2003
3. Remote-Handled TRU Waste Characterization Program Implementation Plan, Revision 0D; DOE/WIPP-02-3214; US Department of Energy; October 30, 2003
4. *Second Notice of Deficiency, Class 3 Permit Modification Request for Remote Handled Waste, WIPP Hazardous Waste Facility Permit, E.P.A. ID Number NM4890139088*; New Mexico Environment Department; March 29, 2005
5. Class 3 Section 311/RH TRU Waste Revised Permit Modification Request; US Department of Energy/Washington TRU Solutions; April 28, 2005
6. *Notice Of Deficiency (NOD), Consolidated Response To NOD Class 3 Permit Modification Request Submitted In Accordance With Pub. L. 108-137, Section 311 And Second NOD For RH TRU Waste WIPP Hazardous Waste Facility Permit EPA I.D. Number NM4890139088*; New Mexico Environment Department; September 1, 2005
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