



**OFFICE OF INSPECTOR GENERAL**

U.S. Department of Energy

# AUDIT REPORT

DOE-OIG-17-07

September 2017

**QUALITY ASSURANCE MANAGEMENT  
AT THE WASTE ISOLATION PILOT  
PLANT**



**Department of Energy**  
Washington, DC 20585

September 14, 2017

MEMORANDUM FOR THE SECRETARY

*April Stephenson*

FROM: April Stephenson  
Acting Inspector General

SUBJECT: INFORMATION: Audit Report on “Quality Assurance Management at the Waste Isolation Pilot Plant”

BACKGROUND

The Department’s Waste Isolation Pilot Plant (WIPP) in southeastern New Mexico is the nation’s only geologic repository for the disposal of radioactive waste materials generated by atomic energy defense activities. WIPP is managed and operated by Nuclear Waste Partnership, LLC with oversight by the Department’s Carlsbad Field Office. Its mission is to protect human health and the environment through safe management and disposal of certain transuranic wastes. WIPP is categorized as a Hazard Category 2 Nonreactor Nuclear Facility because it has the potential for significant radiological consequences. To provide protection against such consequences, WIPP utilizes Safety Class/Safety Significant systems and components in its infrastructure and equipment. These items are designed to provide protection against radioactive exposure to the public and safety to the worker.

WIPP’s management and operating contract requires compliance with the Department Order 414.1D *Quality Assurance*, and that WIPP develop and conduct work in accordance with a Department approved quality assurance plan. In addition, WIPP’s contract requires the implementation and maintenance of a quality assurance program in accordance with the provisions of 40 Code of Federal Regulations Part 194. These regulations require WIPP’s quality assurance plan to comply with the American Society of Mechanical Engineers Quality Assurance Program Requirements for Nuclear Facilities, 1989 edition. At WIPP, these requirements, based on a graded approach, apply to all Safety Class/Safety Significant items. The Carlsbad Field Office provides oversight to ensure proper implementation of quality assurance at WIPP. Due to the importance of protecting the public, workers, and environment, we initiated this audit to determine whether WIPP effectively managed quality assurance requirements.

RESULTS OF AUDIT

Our review found that WIPP had not always effectively managed quality assurance requirements. Specifically, we found that WIPP did not always effectively:

- Perform commercial grade dedications<sup>1</sup> of items relied on for safety. We found instances where WIPP did not effectively perform technical evaluations and/or the acceptance process, which are both key parts of an effective commercial grade dedication. Subsequent to our identification of these issues, the Carlsbad Field Office conducted a surveillance of a select number of additional WIPP commercial grade dedications and found issues similar to those we identified.
- Evaluate suppliers' abilities to meet quality assurance requirements prior to and after contract award. One of WIPP's methods for evaluating suppliers prior to contract award did not effectively evaluate a supplier's ability to meet quality assurance requirements. Also, WIPP did not always continue to adequately evaluate a supplier's ability to meet quality assurance requirements after contract award.
- Identify the appropriate quality assurance requirements in contract documents. We found instances where WIPP did not specifically state in procurement documents the quality assurance program or standard that the supplier should adhere to.
- Maintain adequate document control of quality assurance documents. We found instances where WIPP did not include document revision numbers, dates, and titles in its procurement documents to ensure the appropriate documents were utilized.

We concluded that these weaknesses were attributable to limited oversight by the Carlsbad Field Office. In particular, although the Carlsbad Field Office provided oversight of quality assurance activities through audits and surveillances, we determined that, since May 2013, its oversight was limited and did not identify these weaknesses until after we brought the issues to the attention of the Carlsbad Field Office. According to the Carlsbad Field Office, its assessments of WIPP's quality assurance activities over the past few years were limited to allow WIPP to incorporate major programmatic changes following two events in February 2014 that temporarily closed the repository. However, we noted that limited oversight began approximately 9 months prior to the repository temporarily closing. We noted, however, the Carlsbad Field Office has subsequently conducted additional oversight to ensure future compliance with quality assurance requirements and has identified additional deficiencies with respect to training and familiarization with procedures. As a result of our review and recent oversight activities conducted by the Carlsbad Field Office, WIPP has already taken actions to improve its commercial grade dedication and supplier evaluation processes.

Ineffective implementation of quality assurance requirements limits WIPP's ability to provide reasonable assurance of safe future operations. Furthermore, problems associated with poor quality assurance can result in increased costs and future operational delays. Given WIPP's integral role in the Department's cleanup mission, it is imperative that quality assurance requirements are met in order to help eliminate future delays and additional costs to taxpayers.

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<sup>1</sup> Commercial grade dedication is the process of providing reasonable assurance that an item or service that was not manufactured or performed in accordance with American Society of Mechanical Engineers Quality Assurance Program Requirements for Nuclear Facilities requirements can successfully perform its nuclear safety function.

## MANAGEMENT RESPONSE

Management concurred with our recommendations and has initiated corrective actions. Management's comments and our responses are summarized in the body of the report. Management's formal comments are included in Appendix 3.

### Attachment

cc: Deputy Secretary  
Chief of Staff  
Acting Assistant Secretary, Office of Environmental Management

# QUALITY ASSURANCE MANAGEMENT AT THE WASTE ISOLATION PILOT PLANT

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# QUALITY ASSURANCE MANAGEMENT AT THE WASTE ISOLATION PILOT PLANT

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## BACKGROUND

The Waste Isolation Pilot Plant (WIPP), to meet its mission, procures items and services that must meet quality assurance standards. According to Federal regulations, WIPP adheres to the American Society of Mechanical Engineers (ASME) Quality Assurance Program Requirements for Nuclear Facilities (NQA-1), 1989 edition as its standard. NQA-1's 1989 edition requires WIPP to evaluate suppliers both before and after awards. Prior to contract award, an evaluation of suppliers' capabilities is required to ensure acceptable delivery of items or services. Three acceptable methods allowed by NQA-1 include: (1) an evaluation of the supplier's history of providing identical or similar items that perform satisfactorily in use; (2) an evaluation of the supplier's current quality records supported by documented qualitative and quantitative information; and (3) an on-site evaluation of the supplier's quality assurance capability based on an evaluation of their facilities, personnel, and quality assurance program implementation. NQA-1 requires periodic supplier audits scheduled at a frequency commensurate with the status and importance of the activity to ensure the supplier is performing in accordance with its quality assurance program. In addition, the Department's Guide 414.1-2B *Quality Assurance Program Guide* is more specific, stating that qualified suppliers' performance should be reviewed annually and audited every third year unless events warrant more frequent assessment.

NQA-1 includes additional requirements for documentation. In particular, procurement documents must require suppliers to have a documented quality assurance program that implements the applicable requirements of NQA-1. In addition, it requires that the preparation, issue, and change of documents that specify quality requirements or activities affecting quality shall be controlled to assure that correct documents are utilized. These documents must also be reviewed and approved by authorized personnel of the entity issuing the procurement.

Commercial grade dedication is the process of providing reasonable assurance that an item or service that was not manufactured or performed in accordance with ASME NQA-1 requirements can successfully perform its nuclear safety function. In particular, when an item or service that will operate in a nuclear environment is not designed, manufactured, or provided in accordance with ASME NQA-1 requirements, it must undergo a commercial grade dedication. The Department's Office of Environmental Management (Environmental Management) Guidance for Commercial Grade Dedication; September 2011 provides commercial grade dedication as an acceptable process for Environmental Management facilities. The Guidance for Commercial Grade Dedication; September 2011 states that, prior to acquisition or performance, a dedication plan must be developed by the entity procuring the item or service that identifies the critical characteristics for acceptance and dedication methods, including acceptance criteria. The dedication plan should be developed by engineering staff with input from quality assurance staff regarding how selected critical characteristics should be verified. Before the item or service can be used, the Guidance for Commercial Grade Dedication; September 2011 requires that the technical evaluation be performed by engineering staff. Dedication requirements must be included in applicable procurement and technical documents as necessary to support the dedication.

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## Quality Assurance Management

Our review identified weaknesses in WIPP's management of quality assurance requirements. In particular, we noted weaknesses in the following areas:

- Execution of commercial grade dedications;
- Evaluation of suppliers' capability to meet quality assurance requirements;
- Identification of quality assurance requirements in procurement documents; and
- Maintenance of adequate document control.

### Commercial Grade Dedication

WIPP did not always execute commercial grade dedications in accordance with quality assurance standards. Specifically, we identified instances where WIPP did not properly perform technical evaluations and/or the acceptance process in its commercial grade dedications of equipment that will be used at WIPP. According to Environmental Management's Guidance for Commercial Grade Dedication; September 2011, successful commercial grade dedications consist of two key elements: First, a technical evaluation, and second, an acceptance process.

In one example, WIPP did not adequately perform a technical evaluation prior to the acquisition of Safety Significant mechanical gauges used to provide differential pressure readings at various locations throughout WIPP. Specifically, WIPP's technical evaluation for these gauges was performed after their procurement and receipt. WIPP's commercial grade dedication procedure states that the technical evaluation should be performed prior to procurement to identify, among other things, the item's critical design/safety function, critical characteristics<sup>2</sup> to be verified, and acceptance criteria. Furthermore, Environmental Management's Guidance for Commercial Grade Dedication; September 2011 states that suitability of the item must be established prior to the technical evaluation and implementation of the commercial grade dedication process. However, we determined that WIPP did not perform its technical evaluation for the gauges until after the items were procured and received. In fact, the design document with the technical specifications for the gauges was not completed until after the procurement of the gauges was made. By not performing the technical evaluation until after the procurement of the gauges, it increases the risk that the items procured will not perform as desired.

We also determined that WIPP did not properly identify the gauges' critical design/safety function and associated critical characteristics to be verified in its technical evaluation of the gauges. A reason for procuring and installing the gauges was to provide redundant devices and reliable readings to mitigate a vulnerability that existed in transmitters that were not safety-certified. However, WIPP's technical evaluation and resulting critical characteristics did not address the reliability of the gauges. Reliability addresses built-in capabilities that typically

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<sup>2</sup> Critical characteristics are important design, material, and performance characteristics that, once verified, will provide reasonable assurance that the item or service will perform its intended safety function.

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cannot be verified through inspection and testing alone and are generally affected by the process to produce the item. WIPP identified “item identification” and “functionality of local indication” as critical characteristics, which were later verified by ensuring the correct model number, gauge span, and that the gauges, after calibration, read within their normal span. In our estimation, however, these critical characteristics do not address the reliability of the gauges; such as whether the gauges will not stick and/or give a false reading. While the Carlsbad Field Office asserted that reliability of the gauges was addressed prior to turnover to operations and reliance on the items to fulfill their safety function, we found limited evidence that reliability was assessed prior to procurement from the manufacturer as required. The Carlsbad Field Office did, however, acknowledge that implementation of a sound commercial grade dedication program is important and that improvements are being implemented. In addition, during the Carlsbad Field Office’s August 2016 surveillance of commercial grade dedications, it identified other instances where WIPP did not properly identify the appropriate safety functions which resulted in inappropriately selected critical characteristics.

In another example, WIPP did not select the appropriate acceptance method or conduct an adequate technical evaluation for six spare steel ropes for the mine hoist used to lower radioactive waste into the underground. According to Environmental Management guidance, conducting tests is an appropriate acceptance method to ensure items will perform their safety function; and reliance on test results performed by suppliers may be used if sufficient confidence in the supplier’s ability to perform the test is established. However, we found that while WIPP relied on the non-NQA-1 supplier’s test results indicating the actual breaking point of the steel ropes, it did so without properly evaluating the supplier’s ability to perform and provide reliable test results. In particular, WIPP’s quality record package for the steel ropes did not contain evidence of its evaluation of the supplier’s internal controls in order to rely on its test results. Also, WIPP’s technical evaluation of the steel ropes did not address its corrosive environment. Specifically, the technical specification developed for the original steel ropes required internal lubrication and an external coating to mitigate the corrosive nature of the salt in WIPP. Nevertheless, the technical evaluation did not address the internal lubrication and external coating. In addition, the receipt inspection and acceptance did not test the internal lubrication and external coating because the steel ropes came packaged for long-term storage and were not to be opened for inspection.

The Carlsbad Field Office asserted that the steel ropes were inspected to provide the necessary assurance that the ropes will perform their intended function with no failures. Also, the Carlsbad Field Office asserted that WIPP has, for approximately 30 years, obtained the steel ropes from the original manufacturer in Europe. The Carlsbad Field Office further asserted that the steel ropes are a proprietary design from this manufacturer and the manufacturer has a quality assurance program that complies with the International Organization for Standardization’s requirements for a quality management system. However, the Carlsbad Field Office could not provide evidence that the steel ropes were inspected for quality by WIPP. Additionally, the fact remains that the commercial grade dedication process for the procurement of the steel ropes was not properly executed. Although the Carlsbad Field Office asserted that the quality of the steel ropes is not in question, without properly performing the commercial grade dedication process there is limited documentation to provide assurance that the steel ropes are identical to those obtained in the past and will meet WIPP’s rigorous quality requirements.



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The Carlsbad Field Office reviewed the issues we identified and found similar issues in other commercial grade dedications. In particular, in July 2016, we provided a list of our concerns with certain WIPP commercial grade dedication packages to the Carlsbad Field Office for its review and consideration. Subsequently, in August 2016, the Carlsbad Field Office conducted a surveillance to evaluate the adequacy, implementation, and effectiveness of WIPP's commercial grade dedication program. In its surveillance, the Carlsbad Field Office reviewed 12 commercial grade dedications generated in 2016, as well as those we identified as problematic during our audit. The Carlsbad Field Office's review also identified a lack of consistency in the description for the applicable design/safety functions, failure modes, and selected critical characteristics for verification. These three items are all part of the technical evaluation.

## **Supplier Evaluations**

WIPP did not always perform effective supplier evaluations. Specifically, WIPP did not always sufficiently evaluate suppliers before awarding the suppliers work. In addition, WIPP did not always ensure that its suppliers maintained and implemented effective quality assurance programs after contract award.

### **Evaluations Before Award**

WIPP did not always ensure that its suppliers were capable of meeting quality assurance requirements identified in procurement documents. WIPP utilized either desktop evaluations or audits to evaluate suppliers' capabilities. Its desktop evaluations were intended to meet one of NQA-1's supplier evaluation methods, which required an evaluation of the supplier's current quality records supported by documented qualitative and quantitative information. Under this method, WIPP assigned points for attributes such as whether a supplier had national certifications, favorable results of internal audits, and provided similar items/services at other Department facilities. A score of 70 points or higher negated the need to perform a supplier audit. In contrast, audits were detailed, objective, on-site assessments of the supplier's quality assurance program and how effectively the supplier implemented its program. Audits included personnel interviews, and reviews of policies, procedures, and current quality assurance records. Audits verified conformance to requirements set forth in contractual agreements, procedures, and/or standards.

We found that WIPP's desktop evaluations process did not always provide sufficient objective evidence to ensure suppliers could meet quality assurance standards for nuclear safety work. In our limited review, we identified one instance where WIPP's desktop evaluation process awarded a Safety Significant contract for the procurement, design, installation, and maintenance of automatic fire suppression systems on liquid fueled equipment to an unqualified supplier. WIPP's desktop evaluation of the supplier resulted in a score of 75, which, according to WIPP policy, negated the need to perform a supplier audit. However, the evaluation score of 75 used to justify the selection of the supplier included points for items that were not nuclear safety related. Specifically, WIPP awarded points for national certifications related to non-nuclear fire protection and for an internal audit that addressed non-nuclear safety issues. Furthermore, the desktop evaluation was for a different scope of work that was less than Safety Significant; and

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therefore, awarded points for the scope of work not being Safety Significant even though it was. Had WIPP's desktop evaluation process not awarded points in these areas, the resulting score likely would have fallen below 70, thus requiring a supplier audit.

When we expressed our concerns to the Carlsbad Field Office, an official acknowledged that it appeared WIPP did not follow its processes by awarding Safety Significant work to a supplier that was not qualified to perform such work. Nevertheless, the Carlsbad Field Office stated that it believed the supplier was qualified based on its ability to perform fire protection work in general. WIPP engineers also imposed additional requirements such as inspections and hold points to ensure that the procured services met nuclear quality assurance requirements. In addition, the fire suppression systems were procured from a supplier on WIPP's qualified supplier list and the supplier for the installation was to perform work on site under WIPP's approved quality assurance program. Although the Carlsbad Field Office believes the desktop evaluation process was acceptable, it plans to review WIPP's qualified supplier list process and implementation beginning in April 2017 and will address any issues it identifies once the review is completed.

### **Evaluations After Award**

In addition, WIPP did not always ensure that suppliers continued to implement their quality assurance programs after the award. NQA-1 requires periodic audits to ensure that suppliers are performing in accordance with established quality assurance programs and the Department's Guide 414.1-2B *Quality Assurance Program Guide* states that suppliers should be reviewed annually and audited every third year at a minimum. We found, however, that WIPP did not always periodically audit its suppliers to verify their continued capability to implement their quality assurance programs and meet quality requirements. For example, we identified the following:

- A supplier of testing services for Safety Class/Safety Significant High Efficiency Particulate Air filters that was audited in 1997 and again in 2000, but had not been audited by WIPP since at least 2010.
- A supplier of drum filter vents had not been audited by WIPP since at least 2010.

In these examples, the suppliers were initially qualified through a supplier audit, but subsequently, WIPP utilized its annual evaluation process to evaluate each supplier's continued performance and compliance with the quality assurance standard. However, we concluded that these annual evaluations were not detailed, on-site assessments and, accordingly, did not provide sufficient assurance that the suppliers continued to implement their quality assurance program and comply with the quality assurance standard. When we expressed our concerns to WIPP, it maintained that NQA-1's 1989 edition makes provisions for supplier qualification other than on-site visits, but that it was determined that it would be prudent to perform on-site audits of suppliers of safety related items/services that had not been visited for some time, using a phased approach. Since that determination, WIPP performed on-site audits on a number of suppliers and scheduled future on-site audits for other suppliers.

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## Identification of Quality Assurance Requirements

We identified weaknesses in WIPP's identification of quality assurance requirements in procurements of items and services relied on for safety. Specifically, WIPP did not consistently identify in procurement documents the requisite quality assurance program or standard, such as NQA-1. Both NQA-1 and WIPP's quality assurance program state that procurement documents must require suppliers to have a documented quality assurance program that implements the applicable requirements of NQA-1.

We identified a subcontract for technical services to support WIPP in the inspection, test, and maintenance of fire suppression systems on Safety Class/Safety Significant waste handling equipment that did not specify any quality assurance program or standard. Instead, WIPP included a section in the statement of work that identified certain requirements to be met, such as the need for instrumentation to be calibrated, chemical suppressant to have external labeling to identify its contents, and Material Safety Data Sheets for the dry chemical suppressant.

However, NQA-1's 1989 edition states that procurement documents shall require that the supplier have a documented quality assurance program that implements portions or all of NQA-1. Absent identification of specific NQA-1 standards, there is no guarantee that the subcontractor will implement the standards and satisfy the stringent requirements for nuclear facilities. For example, NQA-1 includes specific requirements to establish the quality of an item or service before it is accepted. A critical aspect of quality assurance is establishing, prior to acceptance, the subcontractor's ability to meet stringent nuclear safety and quality requirements to avoid unnecessary delays to correct deficiencies discovered after performance by the subcontractor. Therefore, we believe a more explicit identification of quality assurance requirements would have been prudent; such as clearly stating in procurement documents the requirement to adhere to NQA-1.

We presented our concerns to WIPP quality assurance personnel who stated that WIPP specified quality assurance requirements without specifically identifying a quality assurance standard, such as NQA-1. WIPP believes that requirements for the flow down of quality into subcontracts are met through special requirements, quality clauses, and required submittals included in the procurement documents. Despite these assertions, special requirements, technical specifications, etc. do not always provide the up-front assurance that the item or service can/will reliably perform its safety function. NQA-1 establishes the up-front controls necessary to ensure a quality product is received and requires, among other things, that quality assurance records are sufficient to demonstrate that work meets specifications. Without specifying NQA-1 in procurement documents, it may be difficult to ensure that the technical specifications or special requirements were met, especially for items that must adhere to precise manufacturing procedures or cannot be tested after receipt. Although receipt inspection and verification can, at times, identify nonconformances, when this occurs there are typically delays and increased costs associated with the re-work. Further, WIPP quality assurance personnel stated that because there are a limited number of NQA-1 suppliers, specifying NQA-1 would likely result in the supplier's refusal of the work. However, the commercial grade dedication process was established to ensure parts and services not provided under an NQA-1 program could be procured and still provide reasonable assurance of meeting the safety function.

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We discussed our concerns with Environmental Management officials who agreed with us that suppliers can only be held to what is included in their contracts. Therefore, without specifically identifying a quality assurance standard in procurement documents, as required by NQA-1 and WIPP's quality assurance program, it increases the risk that the supplier will not meet the quality assurance requirements of that standard.

## **Document Control**

WIPP's procurement packages did not always maintain adequate document control. WIPP's quality assurance program required controls for the preparation, issue, and change of procurement documents, including review and approval, to ensure that the correct documents were utilized. This includes controls to identify the current status/revision of controlled documents and forms. An effective document control system helps provide reasonable assurance that documents, to include procurement documents, that specify quality requirements or prescribe activities affecting quality are correct and up to date. Nevertheless, WIPP procurement documents did not always contain the appropriate identifiers, such as revision number, date, title, and approval. In one instance, we could not determine if the statement of work for a subcontract for inspecting, testing, and maintaining fire suppression systems on Safety Class/Safety Significant waste handling equipment was the correct version because it did not contain a revision number or date. Further, the statement of work did not contain evidence of review and approval on the actual, physical document. In another instance, the statement of work for testing of High Efficiency Particulate Air filters relied on for safety did not contain a title, date or revision number. The purchase order referred to the work to be performed by its description, but did not include any other identifiers to tie it back to the purchaser order, or contain any evidence of review and approval.

In January 2016, the Carlsbad Field Office identified a similar concern with document control in its review of the procurement for an underground fire suppression system. In particular, it identified two versions of a statement of work with the same revision number but different dates. Although these two versions of the statement of work were not used in the final solicitation, the Carlsbad Field Office recommended clearly stamping draft documents until approved. According to the Carlsbad Field Office, this is one of many corrective action reports written in the area of procurement since 2013. Further, during the Carlsbad Field Office's surveillance of WIPP's commercial grade dedication process in August 2016, it identified instances where changes were made to WIPP's commercial grade dedication form; however, the form did not contain an associated revision number change. The Carlsbad Field Office also found that WIPP's commercial grade dedication procedure did not include a process for revising documents.

## **Carlsbad Field Office Oversight**

We attributed the problems identified to weaknesses in the Carlsbad Field Office's oversight of WIPP's quality assurance program. In particular, the Carlsbad Field Office did not always provide adequate oversight to enable it to detect weaknesses in WIPP's execution of commercial grade dedications, supplier evaluations, identification of quality assurance requirements, and document control. According to the Carlsbad Field Office, it ensures the implementation and

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adequacy of WIPP's quality assurance program through audits and surveillances. Prior to May 2013, the Carlsbad Field Office conducted comprehensive quality assurance specific audits of all 18 NQA-1 requirements annually. These audits included evaluations of the adequacy, implementation, and effectiveness of quality assurance activities and verified implementation of procedures associated with WIPP's quality assurance program and NQA-1 requirements. In May 2013, instead of quality assurance specific audits, the Carlsbad Field Office began conducting "targeted assessments." According to the Carlsbad Field Office, "targeted assessments" look at specific program areas, such as procurement, and the implementation of the associated quality assurance elements for each. The Carlsbad Field Office explained that after two events in February 2014, WIPP ceased operations for an extended period of time to allow for investigations of the events. As a result, major programmatic changes were instituted to address the investigations' findings. The Carlsbad Field Office allowed WIPP time to incorporate these changes prior to evaluating effective implementation; therefore, limited assessments were performed during this time. However, we noted that the investigations' reports on the two events were issued between March 2014 and April 2015 while the limited oversight began in May 2013. Accordingly, due to the weaknesses identified despite the Carlsbad Field Office's efforts, we believe more thorough and/or restructured oversight by the Carlsbad Field Office may be necessary to ensure effective implementation of quality assurance requirements at WIPP.

### **Actions Taken**

In August 2016, after we notified the Carlsbad Field Office of our concerns; it conducted a surveillance of WIPP's commercial grade dedication program. According to the Carlsbad Field Office, this surveillance was originally planned for February 2016; however, due to circumstances, it was postponed until August 2016. During the surveillance, the Carlsbad Field Office identified deficiencies in WIPP's training and familiarization with procedures. Specifically, there was no record of formal training on WIPP's commercial grade dedication process since May 2009 and those completing the commercial grade dedication forms did not have the appropriate training. In addition, there was no documented required review of WIPP's commercial grade dedication procedure. Had WIPP ensured the appropriate training and required procedural reviews were performed, it is likely that it would have been able to more effectively implement its commercial grade dedications process. Although WIPP did not adequately implement its quality assurance program, the Carlsbad Field Office is ultimately responsible for the adequate and effective implementation of quality assurance requirements at WIPP.

As a result of the surveillance, the Carlsbad Field Office and WIPP notified us that actions have been taken to address the issues identified with WIPP's commercial grade dedications. Specifically, WIPP established an independent management review of all commercial grade dedications going forward, cancelled some commercial grade dedications to prevent future reuse, and hired a new employee with commercial grade dedication expertise to review all commercial grade dedications and help with WIPP's revision of its commercial grade dedication procedure. WIPP submitted a formal Corrective Action Plan on October 13, 2016. This plan identified actions to be taken to prevent recurrence of the problems identified and was to be completed and

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closed out by April 2017. In addition, the Carlsbad Field Office stated that it sponsored formal commercial grade dedication training on October 14, 2016 for the Carlsbad Field Office and WIPP personnel.

Also, after we presented our concerns to the Carlsbad Field Office and WIPP regarding supplier evaluations, WIPP's quality assurance officials informed us that several program enhancements had been initiated. While WIPP maintained that NQA-1 makes provisions for supplier qualification other than on-site visits, WIPP determined that it would be prudent to perform on-site audits of suppliers of safety related items/services that had not been visited for some time using a phased approach. In particular, WIPP notified us that it had performed a few on-site audits of suppliers, and developed a schedule for on-site audits of suppliers through fiscal year 2017. Also, WIPP reinstated its membership with the Nuclear Industry Assessment Committee. The Nuclear Industry Assessment Committee is a U.S. Nuclear Regulatory Commission sanctioned organization of qualified entities that share auditing services to eliminate redundancy and costs associated with supplier audits. As an active member of the Nuclear Industry Assessment Committee, WIPP is allowed to utilize supplier audit reports from the Nuclear Industry Assessment Committee database when evaluating its suppliers. Although these actions are certainly constructive, we concluded that more should be done to ensure WIPP's evaluation process, including desktop evaluations, adequately evaluates suppliers prior to contract award.

### **Limited Assurance of Safe Operations**

The weaknesses identified in our report limit WIPP's ability to provide reasonable assurance that its items and services meet the requirements for its safe operation. Specifically, these weaknesses can result in the procurement of items or services that are not suitable for the nuclear environment. In addition, these weaknesses may result in increased costs and future operational delays. For example, it took more than a year to receive the six spare mine hoist steel ropes. If these steel ropes are found to be non-conforming during installation, WIPP operations could be delayed until new steel ropes can be obtained. Due to WIPP's critical role in the Department's successful cleanup of legacy waste, it is imperative that the Carlsbad Field Office ensures that WIPP meets all quality assurance requirements.

In February 2014, two incidents occurred at WIPP that put the public, workers, and the environment at risk. On February 5, 2014, a truck used to transport salt mined from WIPP caught fire in the underground. Nine days later, on February 14, 2014, there was an event in the underground repository that resulted in a radiological release into the environment. Following the first event, WIPP suspended operations as it implemented corrective actions and restructured its operations. In January 2017, limited waste emplacement operations resumed. While we did not identify a direct connection between the accidents and the weaknesses identified in our report, the delay to the Department's cleanup mission and increased financial burden to the taxpayer as a result of the accidents from February 2014 highlight the importance of minimizing the risk of future operational delays.

Further, in order to return to full disposal operations, subject to the completion of its National Environmental Policy Act process, WIPP is planning to construct a new Permanent Ventilation System. This system consists of a new safety significant confinement ventilation system and a new exhaust shaft. Until this project is complete, waste emplacement operations will be

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constrained by available airflow in the underground and simultaneous mine stability, mining, maintenance, and waste emplacement activities cannot be conducted. This system will require the dedication of commercial grade items; therefore, it is critical that WIPP demonstrate that it can adequately perform commercial grade dedications.

### **Other Matters**

WIPP adheres to an ASME NQA-1 edition that is roughly 20 years older than the edition currently utilized by Environmental Management. In 2012, Environmental Management, through its Corporate Quality Assurance Program, adopted NQA-1's 2008 edition and addenda through 2009. This edition applies to Field Offices and contractors as applicable to the work performed by each entity. However, 40 Code of Federal Regulation Part 194, established before WIPP began disposal operations, requires WIPP to adhere to a quality assurance program that implements the requirements of NQA-1's 1989 edition. As a result, in 2012, before the two events in 2014 that halted operations, the Carlsbad Field Office obtained an exemption from Environmental Management's Corporate Quality Assurance Program and continues to work to NQA-1's 1989 edition.

Although newer editions of NQA-1 exist, the Carlsbad Field Office asserted that the cost-benefit of migrating to a newer edition is negligible. Specifically, it asserted that NQA-1's 1989 edition is a strong standard and that problems typically occur during implementation and not due to the requirements or drivers. Therefore, an effectively implemented quality assurance program adhering to any of NQA-1's editions would result in essentially the same operations. More recent NQA-1 editions provide clarification, and at times, additional requirements; however, the Carlsbad Field Office maintains that it has refined its quality assurance program, which flows down to WIPP, to account for these changes. Furthermore, the Carlsbad Field Office stated that migrating to a newer edition of NQA-1 would first require a rulemaking by the Environmental Protection Agency. In addition, quality assurance program implementation includes document revision, training, subcontract revisions, audits and Environmental Protection Agency audits of all the characterization activities at all of the waste generator sites. The Carlsbad Field Office estimated the total cost to migrate to a newer edition at several million dollars. Furthermore, it asserted that the issues identified in our report would have occurred regardless of the NQA-1 edition followed.

On the other hand, Environmental Management, while recognizing reasons for the Carlsbad Field Office continuing to comply with NQA-1's 1989 edition, stated that there is a benefit to adopting a more current edition of NQA-1, such as the 2008 or 2015 editions. Further, Environmental Management stated that it should not be a major effort to move to a newer edition while retaining existing quality assurance program commitments. In addition, during our review we noted that NQA-1's 2015 edition states that supplier audits should be performed on a triennial basis and supplemented by annual evaluations. In contrast, NQA-1's 1989 edition does not contain this specific language. This lack of specificity may have contributed to the weaknesses we identified. Given the changes to WIPP's operations over the years since the establishment of NQA-1's 1989 edition, the two incidents in 2014 that led to a restructuring of

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WIPP operations, statements from Environmental Management, and issues we identified regarding supplier evaluations, we believe that it may be prudent to fully consider the cost-benefit of migrating to a more current edition.



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## RECOMMENDATIONS

Although the Department and WIPP have taken positive steps to address some of the weaknesses identified, we believe that additional steps are needed to ensure that quality assurance requirements are met for all future operations at WIPP. Accordingly, we made recommendations to ensure effective quality assurance performance at WIPP. Specifically, we recommend that the Acting Assistant Secretary for Environmental Management:

1. Ensure that corrective actions developed by WIPP for commercial grade dedications and supplier evaluations are adequate and effectively implemented.
2. Enhance and/or restructure Department oversight to enable it to detect weaknesses in the implementation of WIPP's quality assurance procedures to include flow down of requirements and document control.
3. Consider, in consultation with the Carlsbad Field Office, the cost-benefit of migrating from NQA-1's 1989 edition to a more recent edition, such as the 2015 edition.

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## **MANAGEMENT RESPONSE**

Management concurred with our recommendations and stated that corrective actions have been initiated or are planned to address the issues identified in the report. In particular, management stated that changes have been made in the Carlsbad Field Office Quality Assurance organization and staffing that will improve oversight. In addition, management indicated that various process improvements have been established to further address weaknesses in oversight. Management also stated that it will evaluate the cost-benefit of migrating to a newer edition of NQA-1 and explore the option of utilizing later editions of NQA-1 to enhance its existing quality program.

## **AUDITOR COMMENTS**

Management's comments and planned corrective actions were responsive to our recommendations and included target dates for completion of its corrective actions. Management's comments are included in Appendix 3.

## **OBJECTIVE, SCOPE, AND METHODOLOGY**

### **Objective**

We conducted this audit to determine whether the Waste Isolation Pilot Plant (WIPP) effectively managed quality assurance requirements.

### **Scope**

The audit was performed from March 2016 through September 2017 at the Carlsbad Field Office and WIPP facility located near Carlsbad, New Mexico. The scope of the audit included procurements issued, modified, or closed by WIPP during fiscal year 2013 through March 2016. The audit was conducted under Office of Inspector General project number A16ID027.

### **Methodology**

To accomplish the audit objective, we:

- Reviewed applicable laws and regulations, Department of Energy policies, and industry standards related to nuclear safety management and quality assurance;
- Reviewed WIPP's Quality Assurance Program Description and associated implementing procedures;
- Interviewed key WIPP and Carlsbad Field Office personnel; and
- Reviewed a judgmental sample of 26 procurements to determine whether WIPP (1) flowed down quality assurance requirements; (2) adequately evaluated suppliers for the ability to provide the item or service; (3) included quality assurance requirements in staff augmentation contracts; and, (4) ensured design changes were adequately administered. Because selection was based on a judgmental sample, results of the sample cannot be projected to the universe of procurements.

We conducted this performance audit in accordance with generally accepted Government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objective. We believe the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective. The audit included tests of controls and compliance with laws and regulations to the extent necessary to satisfy the objective. We assessed the implementation of the *GPR Modernization Act of 2010* as necessary to accomplish the objective, and determined that WIPP did not have goals specific to quality assurance; however, quality assurance contributed to the goals established. Because our review was limited, it would not necessarily have disclosed all internal control deficiencies that may have existed at

the time of our audit. Finally, we did not rely on computer-processed data significant to our audit objective and therefore did not conduct a reliability assessment of computer-processed data.

We held an exit conference with management officials on September 6, 2017.

**PRIOR REPORTS**

- Audit Report for [\*Department of Energy Quality Assurance: Design Control for the Waste Treatment and Immobilization Plant at the Hanford Site\*](#) (DOE/IG-0894, September 2013). The audit found significant shortcomings in the Department's process for managing the design and fabrication changes of waste processing equipment procured for the Waste Treatment and Immobilization Plant. The Department had not ensured that Bechtel National, Inc. subjected design changes requested by suppliers to the required review and approval by the organization responsible for nuclear safety. Also, the Department had not ensured that Bechtel properly verified that deviations from design requirements that could affect nuclear safety were implemented.
- Audit Report for [\*The Department of Energy's \\$12.2 Billion Waste Treatment and Immobilization Plant – Quality Assurance Issues – Black Cell Vessels\*](#) (DOE/IG-0863, April 2012). The audit found that the Department had procured and installed vessels in the Waste Treatment and Immobilization Plant that did not always meet quality assurance and/or contract requirements. The audit identified multiple instances where quality assurance records were either missing or were not traceable to the specific area or part of the vessel. In addition, it found that the Department paid the Waste Treatment and Immobilization Plant contractor a \$15 million incentive fee for production of a vessel that was later determined to be defective.
- Audit Report for [\*The Procurement of Safety Class/Safety-Significant Items at the Savannah River Site\*](#) (DOE/IG-0814, April 2009). The audit found that the Department had procured and installed safety class and safety-significant structures, systems, and components that did not meet Quality Assurance Program Requirements for Nuclear Facilities standards. For example, three structural components were procured and installed at the Mixed Oxide Fuel Fabrication Facility that did not meet technical specifications for items relied on for safety. Also, in six instances the items used in the construction of the National Nuclear Security Administration's Tritium Extraction Facility failed to satisfy quality standards. Finally, one component at the Interim Salt Processing project that did not meet quality standards was procured.

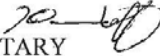
MANAGEMENT COMMENTS



Department of Energy  
Washington, DC 20585

AUG 28 2017

MEMORANDUM FOR APRIL STEPHENSON  
ACTING INSPECTOR GENERAL

FROM: JAMES M. OWENDOFF   
ACTING ASSISTANT SECRETARY  
FOR ENVIRONMENTAL MANAGEMENT

SUBJECT: Office of Environmental Management review of Office of  
Inspector General Draft Audit Report – Quality Assurance  
Management at the Waste Isolation Pilot Plant

The Office of Environmental Management (EM) appreciates the work performed by the Department of Energy’s (DOE) Office of the Inspector General (OIG) in conducting a review of quality assurance (QA) management at the Waste Isolation Pilot Plant (WIPP). EM concurs with the three recommendations to improve quality assurance at WIPP. EM is currently implementing changes that will address the first two recommendations and will evaluate the cost-benefit and explore an alternative option to address the third recommendation.

The corrective actions to address your recommendations are as follows:

Management Response to Draft Audit Report - Quality Assurance Management at the Waste Isolation Pilot Plant		
Recommendation	Response	Target Date for Completion
1. Ensure that corrective actions developed by WIPP for commercial grade dedications and supplier evaluations are adequate and effectively implemented	EM concurs with this recommendation. Compensatory measures are now in place. Changes have been made in the CBFO QA organization and staffing that will improve oversight. In addition, the Carlsbad Field Office (CBFO) QA organization has filled two vacancies.	March 2018
2. Enhance and/or restructure oversight to enable it to detect weaknesses in the implementation of WIPP’s quality assurance procedures	EM concurs with this recommendation. Process improvements established as a result of recent independent external	September 2018



<p>to include flow down of requirements and document control.</p>	<p>reviews and the corrective action plans developed under the accident investigation reports for the underground salt haul truck fire and the radiological release events of 2014 are now maturing to address documented weaknesses in oversight of WIPP.</p>	
<p>3. Consider, in consultation with the Carlsbad Field Office, the cost-benefit of migrating from NQA-1's 1989 edition to a more recent edition, such as the 2015 edition.</p>	<p>EM concurs with this recommendation. EM will first evaluate the cost benefits of implementing or migrating completely to a newer ASME NQA-1 standard. EM will then explore the option to use later editions of the ASME NQA-1 standard to enhance its existing ASME NQA-1 1989 quality program. As long as EM can demonstrate the base quality program within at WIPP continues to meet or exceed the requirements of ASME NQA-1 1989; the assumption is EM can continue to identify with the ASME NQA-1 1989 quality program for reporting purposes to the State of New Mexico and Environmental Protection Agency.</p>	<p>September 2018</p>

In order to fully address the IG's recommendations in the Draft Audit Report, EM requests clarification for the following: The discussion in "Identification of Quality Assurance Requirements" on page six indicates that the IG believes NQA-1 must be specifically identified in the contract. The Report then provides an example of where NQA-1 was not specifically included as a reference. It is not clear from this discussion which, if any, necessary requirements the IG believes were omitted from the contract. If necessary requirements were omitted from the contract, please identify those requirements. (There is a difference between not including the phrase "NQA-1" in the

contract but adequately addressing all applicable requirements from NQA-1 and missing or omitting requirements that should have been included.)

Additional comments provided by the Office of General Counsel are attached for your consideration.

If you have any questions regarding this response, please contact Mr. Mike Brown, Office of Quality Assurance, Carlsbad Field Office, at (575) 234-7476 or [mike.brown@cbfo.doe.gov](mailto:mike.brown@cbfo.doe.gov).

Attachment



## **FEEDBACK**

The Office of Inspector General has a continuing interest in improving the usefulness of its products. We aim to make our reports as responsive as possible and ask you to consider sharing your thoughts with us.

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Office of Inspector General (IG-12)  
Department of Energy  
Washington, DC 20585

If you want to discuss this report or your comments with a member of the Office of Inspector General staff, please contact our office at (202) 253-2162.