



U.S. Department of Energy
Office of Inspector General
Office of Inspections

Inspection Report

Inspection of Explosives Safety at
Selected Department of Energy Sites

DOE/IG-0578

December 2002



Department of Energy

Washington, DC 20585

December 19, 2002

MEMORANDUM FOR THE SECRETARY

FROM:


Gregory H. Friedman
Inspector General

SUBJECT:

INFORMATION: Report on "Inspection of Explosives Safety at Selected Department of Energy Sites"

BACKGROUND

The Office of Inspector General, U.S. Department of Energy (DOE), conducted an inspection at the Nevada Operations Office (NVO) and the Oak Ridge Operations Office (ORO) to determine if explosives were being stored in accordance with applicable DOE requirements.

RESULTS OF INSPECTION

We concluded improvements could be made in the areas of explosives safety, fire safety, and lightning safety. Specifically, we found that degradation review programs regarding explosives shelf-life were not fully implemented at NVO and ORO; DOE had not incorporated the "DOE Explosives Safety Manual" into all applicable contracts; combustible material was inappropriately stored near explosives at NVO; and tests of lightning protection on NVO explosive storage magazines were not completed consistently.

We recommended that the Manager, Nevada Operations Office:

- Ensure a robust degradation review program regarding explosives shelf-life;
- Apply the DOE Explosives Safety Manual to NVO contractors and other entities that handle and store explosives at DOE facilities;
- Ensure fire safety at explosive storage magazines at DOE facilities; and
- Determine whether NVO contractors and entities that store explosives at DOE facilities should implement a lightning protection testing program.



Further, we recommended that the Manager, Oak Ridge Operations Office:

- Ensure a robust degradation review program regarding explosives shelf-life; and
- Apply the DOE Explosives Safety Manual to ORO contractors and other entities that handle and store explosives at DOE facilities.

Since this report was first issued, in draft, the Department has undergone certain organizational changes which have affected the office designations identified in this report. For ease of use, we have not altered the designations used in this report.

MANAGEMENT REACTION

Management concurred with the recommendations and has initiated, or is in the process of initiating, appropriate corrective actions.

Attachment

cc: Deputy Secretary
Under Secretary for Energy, Science and Environment
Administrator, National Nuclear Security Administration
Assistant Secretary for Environment, Safety and Health
Director, Office of Science
Manager, Nevada Operations Office
Manager, Oak Ridge Operations Office
Director, Policy and Internal Controls Management, NA-66

INSPECTION OF EXPLOSIVES SAFETY AT SELECTED DEPARTMENT OF ENERGY SITES

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Overview

INTRODUCTION AND OBJECTIVE

The Office of Inspector General initiated an inspection to evaluate the implementation of explosive safety requirements at the Nevada Operations Office (NVO) and the Oak Ridge Operations Office (ORO). At NVO's Nevada Test Site, we inspected Department of Energy (DOE) explosive storage facilities operated by Wackenhut Services, Inc., Bechtel Nevada, the University of California, and the Defense Threat Reduction Agency (DTRA). Although DTRA is a Department of Defense component, it is using DOE's Nevada Test Site and storage facilities jointly with DOE contractors. At Oak Ridge, the explosive storage facilities were operated by Bechtel Jacobs Company and UT-Battelle.

NVO stores over 15,000 pounds of explosives and ORO approximately 90 pounds. Examples of explosives stored at NVO include C-4 plastic explosives, trinitrotoluene (TNT) and other military high-explosives. Explosives stored at ORO include demolition material called detasheet, blasting caps, and TNT.

The objective of this inspection was to determine if DOE facilities that store explosives were doing so in accordance with applicable DOE requirements regarding degradation review, fire safety and lightning safety. This inspection report complements our draft report on "Inspection of Explosives Security at Selected Department of Energy Sites."

OBSERVATIONS AND CONCLUSIONS

We concluded improvements can be made in the areas of explosives safety, fire safety, and lightning safety. Specifically, we found that:

- degradation review programs regarding explosives shelf-life have not been fully implemented at NVO and ORO;
- DOE had not incorporated the "DOE Explosives Safety Manual" into one of the contracts at NVO or both of the contracts at ORO;
- combustible material was inappropriately stored in explosive storage magazines at NVO; and
- lightning protection tests on explosive storage magazines at NVO were not being consistently completed by all contractors.

Details of Findings

Explosives Safety

The “DOE Explosives Safety Manual,” DOE M 440.1-1, states that each facility shall have a program to review explosive material because it is possible that explosives can degrade during prolonged storage, and that the hazards of handling and using degraded explosives may increase significantly. To facilitate this review, the manual recommends that a storage review date, based upon the explosives stability data or the manufacturer’s shelf-life, be assigned to every bulk explosive placed in storage. The importance of complying with this portion of the “DOE Explosives Safety Manual” increases when manufacturer’s shelf-life or other safety data is unknown.

We determined that degradation review programs regarding shelf-life have not been fully implemented at NVO and ORO. NVO has issued a Standard Operating Procedure, “Chapter 5412 Explosives Safety,” requiring that shelf-lives of explosives be recorded on inventories. However, during the inspection we identified explosives inventories that did not include shelf-life information or posted shelf-life information as “unknown.” We found that Wackenhut Services, Inc., included shelf-life information with their inventories; Bechtel Nevada inventories contained shelf-life information but listed it as “unknown;” and, the University of California and DTRA did not include shelf-life information with inventories. Although DTRA is a Department of Defense component, it is using DOE’s Nevada Test Site and facilities jointly with DOE contractors. We also determined that the University of California and Wackenhut Services, Inc., had in place written procedures regarding the review of explosives degradation, but that the other two contractors did not. Finally, we found that NVO did not incorporate the “DOE Explosives Safety Manual” into its contract with Wackenhut Services, Inc., although it had incorporated it into the other contracts at the Nevada Test Site.

Unlike NVO, ORO procedures do not specify that shelf-life information be reviewed upon receipt of explosives, but it was being reviewed at the time of receipt. Further, we determined that the requirements of the “DOE Explosives Safety Manual” were not included in the UT-Battelle contract and the Bechtel Jacobs Company contracts at ORO.

Fire Safety

We found problems with the storage of combustible material in explosive storage magazines at the Nevada Test Site. An explosive storage magazine is defined as a structure designed or specifically designated for the long-term storage of explosives or ammunition. The “DOE Explosives Safety Manual” states that combustible materials such as excess pallets, packing material, and unused boxes shall not be stored in magazines containing explosives. However, our review disclosed that combustible material was located in the DOE-owned magazine operated by DTRA, including empty packing material, wooden pallets and containers. Explosives stored in this magazine included C-4 plastic explosives, several 2,000 pound bombs and detonation cord. In addition, a magazine operated by Wackenhut Services, Inc., contained approximately 150 pieces of wood to be used to stack incoming explosives. This magazine held military type high explosives. An NVO official informed us that the lumber was stored inside of the magazine because harsh environmental conditions would cause undue deterioration. We are concerned that these materials provide additional combustion sources that create an additional and easily preventable hazard. We did not find a fire safety concern at Oak Ridge.

Lightning Safety

We also examined explosive facilities equipped with lightning protection that were used by four contractors who maintained explosives at the Nevada Test Site. A standard industry practice for facilities with these types of lightning protection features is to conduct periodic testing. Although not a contract requirement, we found that the University of California and DTRA were conducting periodic tests. In contrast, Bechtel Nevada and Wackenhut Services, Inc. were not. At Oak Ridge, we observed no lightning protection issues.

RECOMMENDATIONS

We recommend that the Manager, Nevada Operations Office:

1. Ensure that a robust degradation review program regarding explosives shelf-life is implemented by all entities using NVO facilities.
2. Ensure that the DOE Explosives Safety Manual is incorporated as applicable with NVO contractors and other entities that handle and store explosives at DOE facilities.
3. Ensure that explosive storage magazines at DOE facilities are maintained in accordance with the fire safety requirements of the DOE Explosives Safety Manual.
4. Determine whether contractors and entities at NVO that store explosives at DOE facilities should implement a lightning protection testing program.

We recommend that the Acting Manager, Oak Ridge Operations Office:

5. Ensure that a robust degradation review program regarding explosives shelf-life is implemented by all ORO entities using DOE facilities.
6. Ensure that the DOE Explosives Safety Manual is incorporated as applicable with ORO contractors and other entities that handle and store explosives at DOE facilities.

**MANAGEMENT AND
INSPECTOR
COMMENTS**

Management provided comments indicating that they are taking action to strengthen explosive safety at NVO and ORO in response to our concerns. We agree that these actions are responsive to our recommendations. The Department's verbatim comments are included as Appendix A.



Department of Energy
National Nuclear Security Administration
Nevada Operations Office
P.O. Box 98518
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OCT. 23 2002

Christopher R. Sharpley, Acting Assistant Inspector General for Inspections, DOE/HQ
(IG-40) FORS

**COMMENTS ON DRAFT REPORT "INSPECTION OF EXPLOSIVES SAFETY AT
SELECTED DOE SITES"**

We have reviewed the draft report and offer general comments to the report, proposed corrective actions, and target dates for completion on the reports recommendations.

Response to Recommendations

1. Ensure that a robust degradation review program regarding explosives shelf-life is implemented by all entities using National Nuclear Security Administration Nevada Operations Office (NNSA/NV) facilities.

Response: An NNSA/NV Nevada Test Site Explosives Safety Advisory Committee will be chartered to look at explosives safety and uses of explosives. The committee will consist of explosive personnel from NNSA/NV and its contractors, laboratories, and other NNSA/NV customers. The committee charter will be developed in concert with the requirements in NTS-SOP 5412, Explosives Safety, and other applicable procedures, orders, guides, or manuals. Expected completion is the second quarter CY 2003.

2. Ensure that the DOE Explosives Safety Manual is incorporated as a DOE requirement with NNSA/NV contractors and other entities that handle and store explosives at DOE facilities.

Response: NNSA/NV has chartered a Standards Identification Team (SIT) to identify the most appropriate standards for explosives, handling, storage, and use at the NTS. The SIT Chairman has indicated that the DOE Explosives Safety Manual will continue to be a prime requirement for explosives activities at the NTS. The SIT anticipates that their task will be completed by the end of the second quarter of FY 2003.

Appendix A (continued)

Christopher R. Sharpley

-2-

OCT 23 2002

3. Ensure that explosive storage magazines at DOE facilities are maintained in accordance with the fire safety requirements of the DOE Explosives Safety Manual.

Response: NNSA/NV's Environment, Safety, and Health Division Explosives Safety Functional Manager, in concert with the NNSA/NV Explosives Safety Advisory Committee, will conduct an initial assessment verifying that explosives magazines are properly maintained. This assessment is expected to be initiated prior to the end of the second quarter of FY 2003. Contractors, laboratories, and other explosives users will report on an annual basis the status of explosives storage magazine maintenance.

4. Determine whether contractors and entities at NNSA/NV that store explosives at DOE facilities should implement a lightning protection testing program.

Response: The NNSA/NV Explosives Safety Advisory Committee will conduct an evaluation of all explosives storage facilities for compliance with the DOE Explosives Safety Manual, Chapter 10, Lightning Protection, requirements and determine the appropriate course of action to take with respect to either attaining or maintaining compliance with the applicable requirements. This will be accomplished by the end of the first quarter of FY 2003.

NNSA/NV will enter the corrective actions and scheduled completion dates in our formal corrective action tracking systems, track them to closure, and notify your office when the actions are completed.

If you have any questions, please contact Charles E. White at (702) 295-7492 or John K. Robson at (702) 295-5002.


Kathleen A. Carlson
Manager

ESHG:JKR-3004
SHM 07-01

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Appendix A (continued)

DOE F 1325.8
(3/02)

United States Government

Department of Energy

Oak Ridge Operations Office

memorandum

DATE: November 1, 2002

REPLY TO:
ATTN OF: FM-733:Miller

SUBJECT: **RESPONSE TO DRAFT REPORT "INSPECTION OF EXPLOSIVES SAFETY AT
SELECTED DOE SITES"**

TO: Christopher R. Sharpley, Acting Inspector General for Inspections, IG-40/FORS

This is in response to your August 21, 2002, memorandum, with attached draft report, as revised on October 28, 2002.

Oak Ridge Operations Office concurs in the report Recommendations 5 and 6, and the details on planned actions are attached.


Judith M. Penry
Chief Financial Officer

Attachment

cc:
S. G. Hiser, AD-421
J. O. Moore, LM-11
D. H. Sumner, IG-43

Attachment

**OAK RIDGE OPERATIONS OFFICE
COMMENTS ON IG DRAFT REPORT**

"Inspection of Explosives Safety at Selected DOE Sites"

The following is the Oak Ridge Operations Office (ORO) position on the audit report recommendations applicable to this office:

We recommend that the ORO Acting Manager:

5. Ensure that a robust degradation review program regarding explosives shelf life is implemented by all ORO entities using DOE facilities.

Management Response. Concur. The Standards-Based Management System subject area "Explosives" will be revised to include the requirement for an annual degradation review of all explosives. Also, the hazardous material information system will be enhanced to provide automatic e-mail notifications to explosives custodians for the annual reviews related to stability and shelf-life issues. These actions are targeted to be completed by November 30, 2002.

6. Ensure that the DOE Explosives Safety Manual is incorporated as applicable to ORO contractors and other entities that handle and store explosives at DOE facilities.

Management Response. Concur. ORO will use the Work Smart Standards process to include only appropriate sections of the Manual in the contract.

Appendix B

SCOPE AND METHODOLOGY

This inspection was conducted in accordance with the Quality Standards for Inspections issued by the President's Council on Integrity and Efficiency. The fieldwork portion of this inspection was completed in early 2002 and involved facilities under the cognizance of ORO and NVO.

We interviewed officials at ORO, NVO, and their contractors. We reviewed pertinent records and documents pertaining to the Department's explosives storage and handling procedures.

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4. What additional actions could the Office of Inspector General have taken on the issues discussed in this report which would have been helpful?
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