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Report to the Chairman, Environment, Energy, and Natural Resources Subcommittee, Committee on Government Operations, House of Representatives

April 1991

NUCLEAR HEALTH AND SAFETY

More Attention to Health and Safety Needed at Pantex

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GAO

United States
General Accounting Office
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Resources, Community, and
Economic Development Division

B-240635

April 15, 1991

The Honorable Mike Synar
Chairman, Environment, Energy, and
Natural Resources Subcommittee
Committee on Government Operations
House of Representatives

Dear Mr. Chairman:

Because of numerous environmental, safety, and health problems found at other Department of Energy (DOE) defense nuclear facilities, you requested that we review these conditions at DOE's contractor-operated Pantex Plant, where our nation's nuclear weapons are assembled. After subsequent discussions with your office, we agreed to focus the review on (1) examining key safety and health problems at Pantex and (2) determining the need for external safety oversight of the plant.

Results in Brief

Although past and present Secretaries of Energy have attempted, through various initiatives, to change DOE's management and operating philosophy from one that placed priority on production to one that also emphasized safety, safety and health problems continue to persist at Pantex. Pantex has completed fewer than half of the safety analysis reports (SAR) needed to help ensure plant safety, reports that should have been completed years ago.[1] Moreover, Pantex officials plan to complete SARs of less hazardous plant facilities before more hazardous ones. In addition, DOE recently identified deficiencies in Pantex's radiation protection program, such as inadequate staffing, training, and procedures designed to protect workers and the environment from radiation. The Occupational Safety and Health Administration (OSHA) also found 168 violations of worker protection standards at Pantex that had the potential to result in death or serious physical harm.

Because most of Pantex's SARs have not been completed, DOE cannot adequately ensure that the plant is operating safely. Pantex experienced radiation accidents in 1989 and 1990 resulting in workers being exposed to tritium and depleted uranium. Although DOE officials state that the levels of exposure were below DOE's allowable limit, circumstances surrounding the exposures raise questions about the adequacy of Pantex's

[1]For the purposes of this report, SARs include documents that assess the need for a detailed safety analysis.

attention to safety and health. Further, the plant has one of the highest injury/illness and lost workday rates in DOE's weapons complex.

The persistent safety and health problems at Pantex clearly support a need for external oversight of the plant's safety. Pantex has the same types of safety and health problems that we found at other DOE facilities throughout the 1980s. These types of problems had prompted us to recommend since 1981 independent, external oversight of the safety of DOE defense nuclear operations. When the Defense Nuclear Facilities Safety Board was established in 1988 to meet that need, Pantex was excluded from the Board's oversight. Although the establishing legislation and legislative history do not state any reasons for its exclusion, congressional staff told us that Pantex was considered a relatively safe operation when the legislation was drafted and that there was concern that allowing outside review of a plant that assembled nuclear weapons would result in security risks. However, these circumstances have changed since 1988 because safety and health problems have surfaced at Pantex and outside agencies, such as the Environmental Protection Agency (EPA), OSHA, and the state of Texas, have conducted inspections at Pantex.

Background

Located near Amarillo, Texas, Pantex is managed and operated by Mason & Hanger - Silas Mason Company, Inc. Pantex's mission includes the assembly, stockpile testing, maintenance, modification, and retirement of nuclear weapons. Pantex also develops and tests high explosives used to detonate nuclear weapons. Pantex does not produce or process nuclear materials like plutonium, tritium, and uranium; however, it receives and handles them. These materials are enclosed in metal assemblies that other DOE facilities provide to Pantex as finished components.

Before 1989 DOE and others considered Pantex to be a relatively clean and safe facility. Since 1989, however, Pantex has been criticized for its safety and health problems by a DOE Tiger Team, a group of specialists that assessed environmental, safety, and health conditions at the plant, and by OSHA, which DOE had invited to assist in the Tiger Team assessment. Earlier that year the Secretary of Energy established Tiger Teams and other initiatives to, among other things, instill in DOE management and contractors the need to pay increased attention to safety and health. The 1989 initiatives followed several other initiatives that the previous Secretary of Energy had implemented in 1985 to address safety and health problems at DOE's defense nuclear facilities. Those initiatives

included reorganizing safety and health activities at DOE headquarters, revising reporting and tracking systems for such activities, and carrying out technical safety appraisals of conditions at DOE nuclear facilities. Technical safety appraisals are conducted by a team of specialists to identify safety and health problems at DOE facilities. Contractors are expected to act on and correct these problems.

Summary of Key Safety and Health Problems

Pantex has not completed its SARs, which are important for ensuring plant safety. We are also concerned about the manner in which the SARs will be completed. In addition, the Tiger Team and DOE's Albuquerque Operations Office found inadequacies in the plant's radiation protection program, and OSHA found numerous violations with general worker safety standards.

Incomplete Safety Analysis Reports

Safety analysis reports are needed to help ensure that a nuclear facility is safely designed, constructed, and operated. DOE has required SARs for all of its defense nuclear facilities since late 1976. Prepared by the operating contractor, a SAR illustrates how a facility's systems, components, and structures meet established design criteria. It also analyzes potential accidents that could release radioactive materials. The comparisons with design criteria and accident analysis are both used to identify problem areas (e.g., accidents with high probability and severe consequences) so that corrective actions can be taken.

Since 1976, when DOE required SARs for all of its nuclear facilities, Pantex has been required to complete 66 of them. However, Pantex has completed only 32 SARs, or fewer than 50 percent. According to a DOE official who reviews SARs, almost all of the SARs were for facilities that existed before 1976 and should have been completed shortly after the 1976 requirement. Contractor officials told us that a lack of personnel has prevented completion of the SARs.

In addition to completing the remaining 34 SARs, Pantex plans to update the reports already completed. However, it does not plan to complete its SARs according to their hazard ranking. DOE has ranked its defense nuclear facilities according to their potential hazards under three major categories: high, moderate, and low. While none of Pantex's facilities has been rated as "high hazard," its facilities are still dangerous because they handle highly explosive materials as well as radioactive plutonium,

uranium, and tritium. (See app. I for the definitions of the three categories, DOE's hazard ranking of Pantex's facilities, and DOE's time frames for completing or updating the SARs.)

As appendix I illustrates, in many cases SARs for facilities ranked as moderately hazardous will not be completed until years after those that have been ranked as low. For example, some SARs for low-ranked radiography facilities are scheduled to be completed in 1991 while those for higher ranked facilities handling highly explosive materials are not to be completed until 1992 and 1993.

Pantex and DOE officials could not document or clearly identify the criteria they used to determine the order for completing the SARs for new and existing facilities. Further, in discussions we had with the officials, it was not clear what consideration, if any, they gave to the facilities' hazard ranking in determining the priority for completing the SARs. The officials stated that "new facilities are given priority because they cannot be started in operation without a SAR" and that "new facilities are often built to replace existing facilities, and from a safety perspective merit a higher priority." (Pantex has seven new facilities for which SARs are planned to be completed in 1991 and 1992; only the 66 SARs for existing facilities are listed in app. I.)

Regarding existing facilities, contractor and DOE officials said that some reports for less hazardous facilities will be completed before more hazardous ones because different subcontractors are assigned to prepare them and some reports are less complex and therefore require less time to prepare. However, in some cases, the scheduled completion dates are years apart while, according to contractor officials, SARs can be completed within 3 to 6 months.

SARs provide the basis for demonstrating that potential hazards and accident consequences have been analyzed and for determining reasonable measures that should be taken to eliminate and/or mitigate the hazards. Because most of Pantex's SARs have not been completed or need to be updated, DOE cannot adequately ensure that the plant is operating safely.

Inadequate Radiation Protection Program

In its October 1989 assessment of environmental, safety, and health conditions at Pantex, DOE's Tiger Team identified deficiencies in the plant's radiation protection program. Among other things, the Tiger Team found the following:

- Pantex had insufficient radiation protection staff to (1) provide emergency response in case of on-site radiation contamination accidents and (2) monitor routine plant operations for radioactive releases, through such means as air samples and swipes.[2] According to the Tiger Team report, DOE's manuals of good practices for plutonium and uranium facilities recommend one radiation specialist for every 20 radiation workers. Pantex had only four radiation protection specialists to monitor the activities of more than 400 radiation workers, or only one-fifth of the number called for in DOE's manuals.
- Pantex had weaknesses in training, such as (1) a lack of specific training on the characteristics and biological effects of tritium and practices necessary to effectively respond to and control tritium contamination and (2) a lack of a formal training and retraining program for its radiation protection staff.

Shortly after the Tiger Team review, DOE's Albuquerque Operations Office found other deficiencies. They included the lack of clear and specific radiation safety procedures and guidelines for the radiation protection technicians in performing their radiation protection duties, such as the types, frequency, and locations of swipes.

Since the Tiger Team review, DOE and the contractor have taken actions that include (1) increasing contractor and DOE safety staff at Pantex to implement and monitor safety and health activities; (2) providing Pantex's radiation protection specialists and workers with formal radiation protection training, including training on the characteristics and effects of tritium; and (3) reviewing and revising safety guidance and procedures to include specific types, frequency, and locations of swipes.

Violations in General Worker Safety Program

As part of the 1989 Tiger Team assessment, DOE invited OSHA to evaluate DOE's compliance with OSHA's worker protection standards at Pantex. By law, OSHA has inspection and enforcement authority throughout business and industry to ensure compliance with occupational safety and health standards. Although DOE defense facilities are exempt from OSHA requirements, DOE requires that the facilities comply with all standards comparable to, or more stringent than, OSHA regulations.

[2]Swipes, also known as wipes, is a technique whereby soft, absorbent paper is used to wipe a surface (work table, floor, wall, etc.) to determine the presence and amount of radioactive contamination.

OSHA found 168 violations at Pantex, all but one of which it categorized as serious.[3] Below are the typical and most frequently found infractions:

- improper storage of incompatible toxic and hazardous chemicals which, when mixed, can result in the formation of toxic gases;
- missing machine guards designed to protect employees from machines with rotators, agitators, spinning drums, and other moving parts;
- improper electrical safety installations and other electrical hazards, including unguarded live electrical parts, improper use of flexible cords and cables, and improper wiring resulting in reverse electrical polarity; and
- deficient protective equipment for personnel, such as improperly cleaned and stored respirators, and a lack of adequate eye protection.

According to OSHA officials, Pantex was unaware of what needed to be done to comply with OSHA standards. Pantex's lack of awareness was apparent, for example, when OSHA inspectors easily identified hazards (i.e., inadequate machine guarding) in areas that a Pantex Safety Engineer had inspected just before OSHA's visit but had not identified as safety hazards.

The contractor's own assessment of these violations indicated Pantex's lack of attention to OSHA requirements. The contractor stated that the three primary causes for the violations were (1) lack of familiarity with OSHA standards, (2) inadequate enforcement of OSHA regulations, and (3) insufficient emphasis on training on OSHA regulations.

Since OSHA's inspection, DOE and the contractor have taken actions that include training workers on OSHA standards and increasing inspections to ensure compliance with them. Also, DOE reported that Pantex has corrected almost all of the violations cited, most of which were corrected as they were identified.

Consequences of Poor Attention to Safety and Health

Despite the fact that Pantex does not directly handle plutonium, uranium, and tritium, radiation accidents have occurred at the plant. In one case, workers were exposed to radioactive hazards over a period of years but were not aware of it. In addition to the radiation accidents, Pantex has high rates of injury/illness and lost workdays.

[3]A serious violation is defined by OSHA as one in which there is substantial probability that death or serious physical harm could result and one whose hazard the employer knew or could have known.

Radiation Accidents

In February 1989 a radiation specialist found a worker contaminated with depleted uranium. The worker, who was disassembling a particular weapon, came in contact with black dust that consisted of depleted uranium. According to DOE, the worker was not exposed beyond DOE's allowable limit.[4] However, DOE later discovered that, although workers occasionally had observed the black dust during disassemblies of the weapon since 1984, nothing had been done about it. Consequently, workers were exposed to the black dust for years without being aware of its radioactive hazard.

In May 1989 a tritium accident occurred during a normal weapon disassembly and retirement operation: a device designed to contain tritium gas had failed, exposing workers to the gas. In addition, the disassembly facility was contaminated, and about $2 million to $3 million will be needed to decontaminate it.

According to the Chairman of DOE's Advisory Committee on Nuclear Facility Safety, who reviewed the events of the accident, the accident should have been anticipated. In his December 1989 report to the Secretary of Energy, the Chairman stated, "There appeared to be no plan to handle what must surely be an anticipated accident. It is still unclear that effective control of the situation by an adequately prepared response team ever took place."

DOE Savannah River officials who assisted Pantex during and following the tritium accident told us that the radiation protection staff at Pantex was ill prepared to handle the release of a radioactive gas like tritium. They said that because the staff had little or no knowledge of the general characteristics of tritium and the biological hazards that such a release posed, they took few to no precautionary measures to protect workers from being exposed to the gas.

Although, according to DOE, none of the five workers in the disassembly facility received an exposure beyond DOE's allowable limit, their exposures could have been prevented had proper equipment and procedures been implemented. For example, since the tritium accident, DOE has taken steps to prevent production workers from being needlessly exposed to tritium, should such an accident occur again. New procedures call for only two workers to perform the tritium-related disassembly operation. They are required to wear self-contained breathing

[4]DOE's annual limit of exposure for an individual radiation worker is 5 rem (a rem is the basic unit of measurement of radiation received).

apparatus during the operation. Specific precautionary steps have been added in the disassembly process to ensure that, if a leak of tritium occurs, it will be identified and contained with minor release of the radioactive gas.

In October 1990 seven radiation technicians were contaminated with uranium oxide when they entered a disassembly facility. Failing to wear protective clothing, they received contamination to their hands, shoes, and coveralls. According to DOE, no one received an exposure beyond DOE's allowable limit. DOE and contractor officials attributed this radiation exposure to inadequate instructions about protective clothing.

High Rates of Injury/ Illness and Lost Workdays

Although the size of Pantex's work force is average compared with those of other DOE nuclear facilities, it ranked first in the number of lost workdays among 14 DOE nuclear facilities in calendar years 1988 and 1989 and third through the first 9 months of 1990. Pantex ranked third in the number of injuries and illnesses in 1989 and fourth through the first 9 months of 1990.

Contractor officials could not explain why Pantex had high rates of injury/illness and lost workdays. They said that they did not manage this problem as well as they could have. The officials are currently analyzing injury/illness trends to determine why Pantex has such high rates. They expect to complete the analysis in mid-1991. In addition, they have established a committee to review lost workday cases to determine if workers can perform restricted or part-time duty during recovery from an injury or illness.

Pantex Not Subject to Independent External Oversight

Over the past 10 years, we have identified numerous important safety and health problems at DOE's defense nuclear facilities similar to those found at Pantex. For example, in 1981 and 1986 we criticized DOE for not having completed, approved, or updated SARs.[5] In 1988 we summarized major safety and health problems at DOE's Rocky Flats Plant. The problems included inadequate management attention to the plant's

[5]Better Oversight Needed for Safety and Health Activities at DOE's Nuclear Facilities, GAO (EMD-81-108, Aug. 4, 1981) and Safety Analysis Reviews for DOE's Defense Facilities Can Be Improved (GAO/RCED-86-175, June 16, 1986).

safety and health programs and deficiencies in the plant's radiation protection program.[6] Further, in numerous testimonies we pointed out that inadequate oversight was one underlying cause of DOE's safety and health shortcomings and that independent oversight of DOE's operations was needed.[7] We also stated that such oversight would provide increased public assurance that DOE facilities can be safely operated.

In September 1988 the Congress passed the National Defense Authorization Act for Fiscal Year 1989, which established the Defense Nuclear Facilities Safety Board. The purpose of the Safety Board is to provide independent external oversight of safety matters at DOE's defense nuclear facilities. Pantex, however, was excluded from the Safety Board's purview. While nothing in the legislation or its history indicates why Pantex was excluded, congressional staff involved in drafting the legislation told us that there were two primary reasons. First, at the time the legislation was passed, safety and health problems had not surfaced at Pantex. Second, because Pantex assembles the nation's nuclear weapons, there was concern that allowing outside review raised security risks.

Since 1988 circumstances have changed. The Tiger Team and OSHA have found safety and health problems at Pantex. We have found problems with Pantex not completing SARs and the manner in which they will be completed. In addition, properly cleared agencies, such as EPA and OSHA, and the State of Texas have been invited to inspect environmental, safety, and health conditions at Pantex.

In its February 1991 annual report to the Congress, the Defense Nuclear Facilities Safety Board discussed the need for independent external oversight of additional DOE facilities, including those currently excluded from the Board's jurisdiction. The Board concluded that such oversight by an appropriately qualified group would be beneficial and should result in health and safety improvements.

[6]Nuclear Health and Safety: Summary of Major Problems at DOE's Rocky Flats Plant (GAO/RCED-89-53BR, Oct. 27, 1988).

[7]Environmental, Safety, and Health Aspects of the Department of Energy's Nuclear Defense Complex (GAO/T-RCED-87-4, Mar. 12, 1987); Key Elements of Effective Independent Oversight of DOE's Nuclear Facilities (GAO/T-RCED-87-32, June 16, 1987); and Modernizing and Cleaning Up DOE's Nuclear Weapons Complex (GAO/T-RCED-89-10, Feb. 22, 1989).

Conclusions

Even after the implementation of initiatives by the present and former Secretaries to strengthen DOE's safety and health activities, Pantex continued to have problems in completing safety analysis reports, implementing an adequate radiation protection program, and complying with OSHA standards. Although DOE has taken steps to rectify these problems, Pantex still needs to complete more than half of its SARs. It also plans to complete SARs without clear criteria that take into consideration the facilities' hazard ranking.

By not completing its SARs as soon as possible, Pantex is not emphasizing actions to help ensure that it is operating safely. SARs become especially important in light of the radiation accidents that have occurred in the past 2 years. We also believe that the persistent safety and health problems at Pantex, which are similar to problems we found at other DOE facilities, clearly support a need for independent, external safety oversight. Although Pantex was excluded from the Defense Nuclear Facilities Safety Board's oversight, circumstances have changed that may warrant a renewed examination of the appropriateness of including Pantex under the jurisdiction of the Safety Board.

Recommendation to the Secretary of Energy

We recommend that the Secretary of Energy direct Pantex to expedite completion of its safety analysis reports, taking into consideration their hazard ranking.

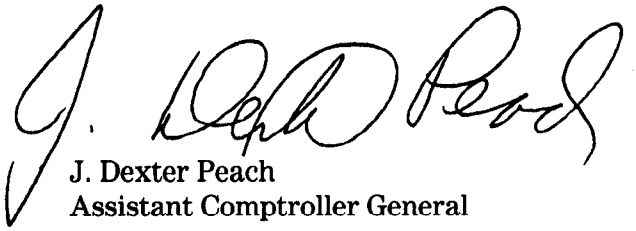
Matter for Consideration by the Congress

Given the circumstances that now surround Pantex, the Congress may wish to reconsider including Pantex among DOE's other defense nuclear facilities that are subject to independent, external safety oversight by the Defense Nuclear Facilities Safety Board.

We discussed the information in this report with DOE officials and incorporated their comments where appropriate. However, as you requested, we did not obtain official agency comments on a draft of this report. Our work was performed between March and December 1990 in accordance with generally accepted government auditing standards. (App. II provides a more complete discussion of our objectives, scope, and methodology.)

Unless you publicly announce its contents earlier, we plan no further distribution of this report for 30 days from the date of this letter. At that time we will send copies to the appropriate congressional committees; the Secretary of Energy; and the Director, Office of Management and Budget. We will also make copies available to others upon request. This work was performed under the direction of Victor S. Rezendes, Director of Energy Issues, who can be reached at (202) 275-1441. Other major contributors to this report are listed in appendix III.

Sincerely yours,



J. Dexter Peach
Assistant Comptroller General

Contents

Abbreviations

AL	Albuquerque Operations Office
DOE	Department of Energy
EPA	Environmental Protection Agency
GAO	General Accounting Office
OSHA	Occupational Safety and Health Administration
SAR	safety analysis report

Status of Approved Safety Analysis Reports (SAR) and Proposed Schedule of Future SARs at Pantex

66 Facilities	Hazard category[a]	Approval dates for existing reports[b]	Scheduled update or completion dates for all reports
12-31 Subassembly	Low	•	09/90
12-32 Subassembly	Low	05/19/75	09/90
12-33 Subassembly	Low	•	09/90
12-24S Assembly Building	Low	•	09/90
Big Bore Rifle Range	Low	•	09/90
Pantex Live Fire Ranges	Low	•	10/90
12-17 High Explosives Pressing	Moderate	•	11/90
12-24N Machining	Moderate	•	12/90
12-26 Pit Vault	Moderate	12/19/80	01/91
12-21 Radiographic	Low	01/29/76	02/91
12-21A Weapons & Material Evaluation Laboratory	Low	07/05/74	02/91
12-64 Assembly Building	Moderate	•	02/91
12-42 S. Vault	Moderate	07/20/87	02/91
12-44 Assembly Cells & Cell 8 Supplement	Moderate	03/26/81 03/07/89	03/91
12-26 Assembly Building	Moderate	•	03/91
12-58 Weapons & Weapons Components Staging	Moderate	09/02/87	04/91
12-62 PETN Processing	Moderate	09/21/83	05/91
12-63 High Explosives Processing	Moderate	12/24/85	07/91
12-65 Service Magazines	Low	08/26/81	09/91
12-83 High Explosives Magazines	Low	10/07/83	09/91
12-43 High Explosives Waste Filter	Moderate	•	10/91
12-56 Radiography	Low	•	11/91
12-40 Radiography	Low	•	11/91
12-50 and 12-60 Test and Mass Properties	Low	•	12/91
12-55 Weapon Staging	Low	•	01/92
12-78 Remote Hole Drilling	Moderate	07/25/86	02/92
12-84 Seven Bays Plus Linac	Moderate	03/28/84	03/92
12-84 Assembly/ W80 Surge Complex (Add-on)	Moderate	03/26/86	03/92
12-99 Nuclear Weapons Stockpile Improvement	Moderate	02/26/88	04/92
12-104 High Explosives Subassembly	Moderate	01/31/89	04/92
12-85, 92, 96 Two Assembly Cells and Service Magazine	Moderate	03/28/84	05/92
12-98 Assembly Cell Complex	Moderate	09/22/87	05/92
12-86 Inert Assembly and Test	Low	08/10/88	06/92

(continued)

66 Facilities	Hazard category[a]	Approval dates for existing reports[b]	Scheduled update or completion dates for all reports
12-94 Weapons Aging	Low	07/17/84	06/92
12-71 Class C Storage	Low	06/20/84	07/92
12-95 Small Explosives Components Staging	Low	01/06/84	07/92
11-14 Inert Machining	Moderate	•	08/92
11-15 High Explosives Processing	Moderate	•	09/92
11-20 Development Support	Moderate	09/14/77	09/92
11-36 High Explosives Synthesis	Moderate	02/12/76	10/92
11-5 Physical Testing	Moderate	•	11/92
11-16 Environmental Chamber	Low	•	12/92
11-17 Chemistry Laboratory	Low	•	01/93
11-18 Small Components	Low	•	01/93
11-28 Assembly & Inspection	Low	•	02/93
11-37 High Explosives Service Magazine	Low	•	03/93
11-44 High Explosives Filter Facility	Moderate	•	04/93
11-38 Project Impact System & Test Fire Chamber	Moderate	04/19/82 09/29/88	04/93
11-50 High Explosives Machining	Moderate	01/31/85	05/93
11-51 Weapons Analytical Laboratory	Low	03/01/82	06/93
Zone 4 SNM Staging Magazines	Moderate	11/17/86	07/93
11-23 High Explosives Service Magazine	Low	•	08/93
11-25 High Explosives Service Magazine	Low	•	08/93
11-42 High Explosives Service Magazine	Low	•	08/93
11-45 High Explosives Service Magazine	Low	•	08/93
11-46 High Explosives Service Magazine	Low	•	08/93
Firing Site 2	Moderate	•	09/93
Firing Site 4	Moderate	•	09/93
Firing Site 11	Moderate	03/20/78	09/93
Firing Site 21	Moderate	11/19/81	09/93
Firing Site 23	Moderate	10/23/83	10/93
Firing Site 24	Moderate	10/21/88	10/93
Firing Site 5	Moderate	•	11/93
Firing Site 10	Moderate	•	11/93
Firing Site 22	Moderate	•	11/93
High Explosives Burning Grounds	Moderate	•	12/93

Note: Based on DOE data provided in October 1990.

[a]Facilities ranked as "high" are those with the potential for on-site or off-site impacts on large numbers of people or for major impacts on the environment (DOE has not ranked any of Pantex's facilities as high hazard); facilities ranked as "moderate" are those that present considerable potential on-site impacts on people or the environment, but at most only minor off-site impacts; facilities ranked as "low" are those that present minor on-site and negligible off-site impacts on people or the environment.

[b]Date appears only for existing SARs.

Objectives, Scope, and Methodology

On the basis of a December 20, 1989, request from the Chairman, Environment, Energy, and Natural Resources Subcommittee, House Committee on Government Operations, and subsequent meetings with his office, we agreed to (1) examine key safety and health problems at the Department of Energy's (DOE) Pantex Plant and (2) determine the need for external safety oversight of the plant.

To implement our objectives, we obtained and reviewed relevant documents from the headquarters of DOE, its Albuquerque Operations Office (AL), its Amarillo Area Office, and Pantex's Management and Operating contractor (Mason & Hanger - Silas Mason Co., Inc.). These documents included DOE orders; the February 1990 DOE Tiger Team report on environment, safety, and health activities at Pantex, including the Occupational Safety and Health Administration's (OSHA) findings; AL's health physics reviews and other inspections of Pantex; and safety analysis reports (SAR) for Pantex Plant facilities. In addition, we reviewed reports on DOE's tritium accident in May 1989 and other unusual occurrences. We also reviewed pertinent legislation and its history relating to the establishment of the Defense Nuclear Facilities Safety Board and talked to representatives of the Board.

We interviewed DOE officials at headquarters, the Albuquerque Operations Office, Amarillo Area Office, and Savannah River Operations Office and OSHA officials and contractor officials at Pantex to discuss safety and health conditions at the plant. We also toured the major facilities at Pantex.

Our audit work was conducted between March and December 1990 in accordance with generally accepted government auditing standards.

Major Contributors to This Report

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