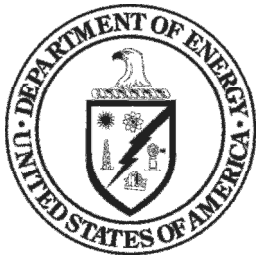

U.S. Department of Energy
Office of Inspector General
Office of Audit Services

Audit Report

Environment and Worker Safety Control Systems at the National Nuclear Security Administration's Kansas City Plant

DOE/IG-0839 September 2010

Department of Energy
Washington, DC 20585

September 20, 2010

MEMORANDUM FOR THE SECRETARY

FROM: Gregory H. Friedman
Inspector General

SUBJECT: INFORMATION: Audit Report on "Environment and Worker Safety Control Systems at the National Nuclear Security Administration's Kansas City Plant"

SUMMARY

The Department of Energy's National Nuclear Security Administration's Kansas City Plant is located within the Bannister Federal Complex in Kansas City, Missouri, which also houses the General Services Administration and other agencies. Current and former employees and families of former employees of the Bannister Complex have recently raised concerns about serious illnesses, in some cases leading to death, resulting from exposure to toxins at the Complex. Due to the seriousness of the health issues that were raised, the Office of Inspector General initiated an audit to determine whether the Kansas City Plant had controls in place to protect the environment, and, the health and safety of its employees.

In summary, we found that the Department, at the time of our review, had established and implemented controls designed to provide reasonable assurance that the environment and workers at the Kansas City Plant were adequately protected. Further, while we cannot provide absolute assurance, the results of our work indicated that the systems were working as intended.

BACKGROUND

The National Nuclear Security Administration's (NNSA) Kansas City Plant (Plant), a government-owned, contractor-operated facility, manufactures nonnuclear components for the nuclear weapons stockpile. The Plant was built in 1942 to manufacture airplane engines and began producing electrical and mechanical weapon components for the nuclear weapons stockpile in 1949.

The Bannister Federal Complex has experienced a number of environmental incidents resulting in soil and groundwater contamination, some of which continue to exist. From the 1940s to the 1960s, parts of the Complex were used as an industrial and sanitary dumping ground, actions that resulted in significant groundwater and soil contamination. Polychlorinated biphenyl compound (PCB) releases occurred on the site from the 1940s to the early 1970s.

In particular, the Plant had significant PCB spills in 1969 and 1971. Partial remediation of the spills was performed in 2000. The Plant also collected industrial wastewater in lagoons onsite from 1962 to 1988. Closure of the lagoons occurred in 1988 and final remediation activities, components of formal corrective action plans, were completed in 1996. The Department reported that it had removed accessible areas of PCB contaminated soils; however, the contamination under the building is inaccessible. We found that, to address this condition, the Department continues to monitor PCB levels.

As previously noted, given the nature and seriousness of the concerns that have been raised, we initiated an audit to determine whether the Plant had controls in place to protect the environment, and the health and safety of its employees. Toward this end, we:

- Interviewed senior NNSA and contractor managers at the Plant;

- Discussed the Plant's compliance with environmental regulations with State of Missouri officials;

- Reviewed environmental, and worker health and safety procedures at the Plant;

- Examined environmental and worker safety monitoring results for the years 2000, 2005, and 2009 to evaluate the consistency of results over a ten-year period; and,

- Coordinated the performance and results of our audit with the General Services Administration's (GSA) Office of Inspector General which has a separate ongoing review of that agency's health and safety conditions at the Complex.

The last of three attachments to this report includes a description of the scope and methodology of our audit in more detail.

OBSERVATIONS

We found that the Department had controls in place at the Plant to appropriately protect the environment, and health and safety of employees. Specifically, the Department had established:

- Environmental and monitoring controls to ensure compliance with operating permits granted by the State of Missouri and its environmental regulators; and,

- Worker safety, health and monitoring programs to protect workers from the potentially harmful effects of exposure to radiation, metals and chemicals.

The Plant operated under permits granted by the Missouri Department of Natural Resources (MDNR) which limit the amount of hazardous discharges into the environment. The permits also require the Plant to periodically provide monitoring reports to relevant regulatory agencies, including the MDNR and the U.S. Environmental Protection Agency (EPA). The Plant, among other things, used 215 groundwater wells, including 9 wells owned by the GSA, to monitor pollutants that are transferred by water to the environment. As the primary regulator, MDNR

informed us that the Plant is largely in compliance with its permit conditions. They told us, as well, that the Department had taken prompt action to address events that violated permit conditions.

Our review of environmental monitoring reports provided by the Department to the regulators confirmed that essentially all significant issues had been addressed by the Department. Between 2000 and 2007, the Department reported 42 events of stormwater runoff into a stream leading offsite that exceeded permit discharge limits for PCBs. MDNR issued four Notices of Violations to the Plant related to these events. Available documentation disclosed that the Department had taken immediate action on each occasion to mitigate future discharging to the stream.

In addition to addressing environmental concerns, the Department had established a worker safety and health program to reduce or prevent occupational injuries, illnesses and accidental losses. The program incorporated the Department's Worker Safety and Health Program requirements. The Plant had 14 operating activities involving beryllium, which is a hazardous material. Accordingly, the Plant had implemented a Chronic Beryllium Disease Prevention Program to reduce the number of workers exposed to beryllium in the course of their work, and to minimize the levels of and potential for exposure to beryllium. The Plant's program included routine surface and air sampling in beryllium processing areas; work authorization permits that establish specific controls for beryllium processing for a specified timeframe; beryllium characterization and cleanup; and, medical surveillance to ensure early detection of a precursor condition, beryllium sensitization.

As part of the worker safety and health program, we found that the Department assessed worker exposure to hazards by performing monitoring tests of its employees. We reviewed the results of over 500 worker monitoring tests performed for exposure to radiation that were conducted in 2000, 2005, and 2009. Nothing came to our attention to indicate that any of the test results exceeded Departmental standards. We did identify one test result that exceeded Plant radiation standards. Interestingly, we found that the Plant’s standards were actually more stringent than Department requirements. In this case, the levels of radiation measured by dosimeter were five times the Plant standards, but only one-tenth of the Departmental standard. The Plant verified the functionality of the dosimeter as well as the radiation emitter and determined that the equipment was working properly. According to a Plant official, this isolated incident was considered an unexplained anomaly.

In addition, we noted that the Plant monitored and tested employees for chemical exposures, such as arsenic and hexavalent chromium. A Plant official told us that during 2000, 2005, and 2009, 8 of the 1,087 tests performed for chemical and beryllium exposures exceeded Department standards. According to Plant officials, all test results were addressed by exposure assessments to determine the source of the exposure, and that as a consequence, supplemental controls were established over the source of exposure and that these circumstances were fully reported to the Department.

As noted, the Department shares the Bannister Complex with the GSA. According to Plant officials, there are no hazards within the Plant that can be transferred to the GSA portion of the Complex. Plant officials also told us, and we confirmed, that the Department and GSA areas of

the Complex are separated by a wall. Further, we were told that the two areas do not share any air handling units. Plant officials also pointed out that there are only 11 systems for support functions such as chilled water and natural gas that are shared by the 2 areas. Eight of these systems, including the chilled water and natural gas systems, are closed loop or enclosed piping systems that are designed to prevent any cross contamination. The three systems that are not closed loop, the emergency notification, electrical conduit, and fire alarm systems are not pathways for cross-contamination, according to Plant officials. Attachments 1 and 2 describe the Plant's environmental and worker safety controls. This information, gathered during the audit, was highly relevant to the purpose of our review and was an important consideration in the conclusions we reached.

CONCLUSION

We found that the Kansas City Plant had what appeared to be appropriate environmental and worker health and safety systems in place at the given points in time covered by our review, reflecting nearly a decade of operations. The evidence developed during our review, while not providing absolute assurance, indicated that the systems were working as intended.

Exposure to hazardous materials is a serious issue with potentially devastating health effects. Throughout our review we were sensitive to these matters. Nonetheless, our review was not and should not be viewed as an epidemiological study of the health consequences or long-term effects of exposure to contaminants at the Plant.

Since we are not making any recommendations, a formal response is not required. We appreciate the cooperation of the Department and contractor officials who provided information and assistance.

cc: Deputy Secretary
Administrator, National Nuclear Security Administration
Chief of Staff

Attachments

ENVIRONMENTAL CONTROLS & MONITORING

The National Nuclear Security Administration's (NNSA) Kansas City Plant (Plant), established an Environmental Management System (EMS) designed to ensure compliance with operating permits that limit hazardous discharges into the environment. These permits cover air emissions and industrial wastewater discharges issued under delegated authority by the U.S. Environmental Protection Agency (EPA) to the city of Kansas City, Missouri. Also, stormwater discharges are regulated by a permit issued by the Missouri Department of Natural Resources (MDNR) under its delegated authority from the U.S. EPA.

According to the Plant's policies and procedures, the Plant maintains its EMS in accordance with the International Organization for Standardization (ISO) 14001-2004, Environmental Management System Standard. The ISO standards establish core elements for managing processes and activities to identify and control environmental effects. The EMS ensures ongoing compliance with applicable environmental regulations and requires the implementation of environmental improvement initiatives such as pollution prevention efforts.

As part of the EMS, the Plant has:

- Established an environmental oversight organization;
- Performed risk and performance assessments;
- Constructed and operated groundwater and industrial waste water treatment facilities;
- Maintained and operated groundwater monitoring and pumping wells;
- Established a data quality assurance program;
- Used a system of physical controls such as air handlers, filters and barriers to prevent the release of contaminants to the environment; and,
- Arranged for periodic external audits and reviews.

A management official told us that, to monitor most of the pollutants that are transferred by water, the Plant uses 215 groundwater wells, including nine wells owned by the General Services Administration (GSA). The Plant submits a semi-annual groundwater report to MDNR, which includes a comprehensive evaluation of the facility-wide groundwater monitoring program that (a) discusses any groundwater protection standards that are exceeded and applicable limits in the permit, (b) provides a description of the facility-wide groundwater monitoring program, and (c) includes conclusions concerning the overall adequacy and effectiveness of the program.

Additionally, as a result of its groundwater and stormwater monitoring, the Department of Energy (Department) reported 42 events, between 2000 and 2007, of stormwater runoff into a stream leading off-site that exceeded permit discharge limits for polychlorinated biphenyl compounds (PCBs). MDNR issued four Notices of Violations to the Plant related to these

events. Available documentation disclosed that the Department had taken immediate action on each occasion to mitigate future discharges to the stream.

A MDNR official stated that the Plant is largely in compliance with its permit conditions. Except for the previously noted discharges of stormwater runoff, our review of the Plant's semi-annual groundwater and air emissions reports submitted to MDNR during 2000, 2005, and 2009 did not disclose any instances where operating permit limits were exceeded.

Controls over Legacy Contaminants

According to Plant documents, there have been several notable environmental contamination incidents at the Bannister Federal Complex (Complex) since the main building was constructed in 1942. Our review of Plant documents revealed that, while actions have been taken to remediate legacy contaminants to the extent practical, the Plant continues to monitor the environment to detect and prevent the migration of these contaminants off-site, in accordance with operating permits.

Areas within the Complex were used as industrial and sanitary dumping grounds during the 1940s through 1960s, a practice that resulted in contaminated groundwater and soil. In the 1980s, the Plant installed groundwater monitoring and pumping wells and a treatment system to prevent the off-site migration of the groundwater because of residual contamination problems. Management officials stated that corrective action was completed in 2006, and the Plant continues to monitor the groundwater wells for potential contaminant releases.

According to the Plant's Annual Site Environmental Summary, PCB releases occurred from the 1940s to the early 1970s. PCBs were used at the Plant as a heat transfer fluid in plastic injection molding operations. Notable spills from this fluid occurred in 1969 and 1971. The spills were cleaned up according to industry practice at the time of release; however, the soils beneath the main building were contaminated. As a result, PCB contaminated soils remain beneath the main manufacturing building. Plant documents reported that PCBs are no longer used at the Plant; however, a storm sewer runs through or very near the area of the contaminated soils. According to Plant documents, the Plant has removed accessible areas of PCB contaminated soils as required under the applicable regulatory permits that address legacy releases, but the contamination under the building is inaccessible. In addition, the Plant continues to perform PCB sampling on a weekly basis as required by the operating permit.

Management officials told us that the Plant also collected industrial wastewater in lagoons onsite from 1962 to 1988. The lagoons were closed in 1988 and 40,000 tons of contaminated soil was removed. A pretreatment facility was constructed to collect and treat industrial wastewater. Closure of the lagoons occurred in 1988 and final remediation activities, components of formal corrective action plans, were completed in 1996. Since 1988, the Plant has monitored the release of treated industrial wastewater to prevent environmental discharges that exceed permit limits. According to a Plant document, the Plant performs approximately 70 industrial wastewater samples a year. The same Plant document records that there has only been one instance since 1988 in which the permit limits were exceeded.

WORKER SAFETY AND MONITORING

The Kansas City Plant (Plant) is required by Federal regulations to protect its workers from numerous hazards inherent in its manufacture of nonnuclear weapons components. The Plant has a worker safety and health program that is designed to reduce or prevent occupational injuries, illnesses and accidental losses. The program is based on the Department of Energy's (Department) Worker Safety and Health Program requirements.

According to the Plant's policies and procedures, as part of the worker safety and health program, the Plant has processes and controls to identify and evaluate health, safety, and environmental hazards, risks and impacts. These processes and programs include:

- Health, safety and environmental annual risk assessments to identify its higher risk activities;
- Preliminary hazard analysis (PHA) programs which analyze hazards and develop controls to mitigate those hazards;
- Trend analyses of safety and health performance data to identify statistically significant changes in performance measures;
- Safety and health focus areas which target issues identified based on the trend analyses in determining specific plans and actions to minimize and/or eliminate hazards;
- An employee concerns program enabling employees to raise concerns or ask questions regarding health, safety, and environmental issues;
- Exposure assessments which define the risk levels, and develop and implement industrial hygiene controls based on potential occupational exposures; and,
- A Chronic Beryllium Disease Prevention Program that includes air and surface sampling of the facility and equipment and medical surveillance of employees.

Our review of a National Nuclear Security Administration Site Office document showed that, as part of its efforts to implement these controls, the Plant performed a risk ranking of all major environment, safety, and health functional areas using Fiscal Year (FY) 2006 as a baseline for creating a three-year schedule for monitoring its employees for FY 2008 through FY 2010. According to management officials and/or Plant documents, as part of its worker safety and health program, the Plant assesses employee exposure to hazards by using dosimeters to monitor exposure to radiation, and air and surface sampling, as well as, biological monitoring for chemical exposures. The Plant provides employees with monitoring results on a regular basis, including yearly reports on radiation exposures.

Plant work instructions require the performance of exposure assessments to evaluate occupational health hazards. The Plant uses the results of the assessments to establish controls, such as the use of protective clothing and specific training for handling certain hazardous

materials, to ensure employees performing work remain protected from unnecessary risks. According to available documents, the Plant has a qualification training program to document qualification training needs, the records of training taken, assessment of individual qualifications for specific job functions, and documentation of training for personnel.

Regarding the employee concerns program, our review disclosed that employees reported numerous concerns about various health, safety, and environmental issues, including beryllium, asbestos and other chemical exposures. Specifically, we identified 53 concerns related to beryllium, asbestos, and other chemical exposures in 2000, 16 in 2005 and 29 in 2009. According to Plant officials and our review of documentation, employee concerns were addressed by the operating contractor. We found that the Plant responded to concerns about potential employee exposures to beryllium and chemicals by performing additional surveillance tests and by providing additional information to employees about potential exposures.

The Plant's policies and procedures require a records management process to meet regulatory, legal and employee health needs that was certified by independent third parties. The records associated with health, safety and environment programs include monitoring data; compliance inspection and self-assessment results; internal/external complaints; hazards, risk and impacts; legal and other requirements such as regulations and permits; incident analyses; and, employee medical data.

Finally, we noted that the Plant has received the Department's Voluntary Protection Program (VPP) STAR designation from the Office of Health, Safety, and Security. This program requires annual self-assessments and triennial Departmental re-certification assessments to ensure that performance and program requirements are sustained. According to the Department, contractors who meet the requirements for outstanding safety and health programs receive STAR recognition, the highest achievement level. The Plant received its initial VPP STAR designation in 1996 and has been recertified triennially, including 2008.

SCOPE AND METHODOLOGY

This review was performed between March 2010 and September 2010, at the Department of Energy's (Department), National Nuclear Security Administration's (NNSA) Kansas City Plant (Plant), located in Kansas City, Missouri. The scope of our audit included a review of the Plant's environmental control systems as well as its worker safety program. We did not review individual health claims associated with the Plant. To accomplish the objective of this audit, we:

- Reviewed Department directives and guidance concerning environmental and worker safety control systems;

- Reviewed Kansas City Plant Annual Site Environmental Summaries;

- Reviewed the Plant's Health, Safety and Environment Management System Description and Worker Safety & Health Program documents;

Held discussions with Department, NNSA, Plant, Missouri Department of Natural Resources, and U.S. General Services Administration's Office of Inspector General officials; and,

- Reviewed environmental and worker safety monitoring reports for 2000, 2005, and 2009.

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 objectives. We believe that the evidence obtained provides a reasonable basis for our conclusions based on our audit objective. 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. We also assessed performance measures in accordance with the Government Performance and Results Act of 1993. We found that the Department had established a performance measure for the Plant to manage its environmental programs as well as its worker safety program. We did not assess the reliability of computer-processed data, since we did not rely on it to accomplish our audit objective.

Management waived an exit conference.

IG Report No. DOE/IG-0839

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