OFFICE OF NUCLEAR AND FACILITY SAFETY

FY 1996 Activity Summary

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FY 1996 Activity Summary

U.S. Department of Energy Office of Environment, Safety and Health

MISSION

The Office of Nuclear and Facility Safety provides nuclear safety policy, independent technical evaluation and technical support in The Department of Energy through an integrated program of analysis of facility operations, assistance in implementing nuclear safety programs, and development of regulations, orders and standards. In FY 1996, the office also carried out the Department's responsibilities under the Price-Anderson Amendments Act of 1988 for setting nuclear safety requirements and investigating and enforcing instances of noncompliance.

Orin Pearson
Deputy Assistant Secretary

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INTRODUCTION

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The Office of Nuclear and Facility Safety (EH-3) is engaged with the Department's nuclear program offices to deal with the challenges of the post cold war weapons complex. These include:

- changing the mission of the former production facilities to storage and waste management;
- stabilizing nuclear materials not recycled due to production cessation or interruptions;
- reformulating the authorization basis for existing facilities to convert to a standards based approach for operations consistent with modern expectations; and
- implementing a modern regulatory framework for nuclear facilities.

One of the biggest challenges facing the DOE complex today is providing for the safe storage of spent nuclear fuel, plutonium, and highly enriched uranium. In the last few years EH-3 led comprehensive assessments of the environmental, safety, and health vulnerabilities associated with DOE's stockpile of these materials. We helped develop corrective action plans to resolve the deficiencies and helped develop a new storage standard for the safe storage of plutonium. EH-3 performed assessments in FY 1996 to support senior DOE management in decision-making regarding reprocessing facilities at Savannah River, restart of weapons disassembly operations at Oak Ridge, and safety issues related to transferring the uranium enrichment plants at Paducah and Portsmouth to Nuclear Regulatory Commission (NRC) regulation. We also provided technical support for two major assessments performed by the Office of Environmental Management.

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In addition, the office completed new initiatives to streamline DOE nuclear safety requirements. The utility of DOE Orders was significantly improved and a new process, the Work Smart Standards Closure Process, was formulated to establish the necessary and sufficient set of standards for performing work safely. EH-3 helped develop an entirely new regulatory approach for major nuclear facilities to process high level waste at Hanford. The office also completed a program to improve the reporting of events and incidents occurring at DOE facilities, and implemented a reengineered performance indicator program to monitor safety and operational performance.

As required by law, EH-3 developed and implemented the initial set of nuclear safety rules and established a process to enforce them. Civil penalties are assessed when warranted. The office published new enforcement procedures and conducted a complex-wide series of instructional seminars on the purpose and processes of the enforcement program. Upon its establishment and imposition of the first civil penalties, the enforcement program was elevated to report directly to the Assistant Secretary for Environment, Safety and Health.

*Corroded reactor target
slugs in stainless steel
storage basket.
Savannah River Site*

*Rupture of steel
container due to
expansion of oxidizing
plutonium metal. Los
Alamos, New Mexico*

*Operator filling
uranium hexafluoride
cylinder at the
Portsmouth, Ohio
Gaseous Diffusion
Plant.*

POLICY AND STANDARDS FOR SAFE OPERATIONS

The Office of Nuclear and Facility Safety (EH-3) is charged with creating and, when appropriate, revising policies and standards necessary to ensure safety, and protect health and the environment.

Rules, Orders & Standards

DOE is responsible for establishing the standards to which its contractors must adhere in performing nuclear related and non-nuclear operations. The Office of Nuclear and Facility Safety is charged with creating and, when appropriate, revising policies and standards necessary to ensure safety, and protect health and the environment. These standards are issued in the form of Rules, Orders, and various guidance documents including Technical Standards.

In FY 1996, EH-3 prepared and coordinated review efforts on seven nuclear safety rules in 10 CFR Part 830, Nuclear Safety Management. These performance-based rules revise and replace existing DOE Orders in the areas of Safety Analysis Reports, Technical Safety Requirements, Unreviewed Safety Questions, Conduct of

Operations, Maintenance Management, Training and Certification, and Occurrence Reporting and Processing of Operations Information. These rules complement the existing Quality Assurance Rule (10 CFR 830.120) and provide the nuclear safety infrastructure to support integrated safety management planning and the DOE nuclear safety compliance and enforcement program.

EH-3 also contributed to clarifying and simplifying numerous Departmental safety orders and related guidance documents. Fifty-one directives, policies, orders, and manuals were consolidated into eighteen orders and ten issued or pending rules. In FY 1996, EH-3 interfaced with the Defense Nuclear Facilities Safety Board (DNFSB), the NRC, and other governmental and industry groups on matters of nuclear safety and regulation.

Technical Standards Program

In 1996, the DOE Technical Standards Program (TSP) incorporated the provisions of a new public law, PL 104-113 (The National Technology Transfer Act) which requires DOE and other Federal agencies to adopt non-government standards when possible. In support of this law, the TSP provided identification and listing services for identifying voluntary consensus standards suitable for use by DOE organizations. In 1996, the TSP supported development of 18 DOE Technical Standards. A new voluntary conversion program supported the conversion of 5 DOE Technical Standards to voluntary consensus standards.

EH-3 led or contributed to the following in FY 1996:

- guidance defining the responsibilities and processes for granting exemptions from nuclear safety rules to facilitate and expedite decommissioning activities at nuclear facilities;
- a new Technical Standard for evaluating risks associated with aircraft crashes into hazardous facilities;
- guidance documents for the safe handling of tritium in order to achieve a significant reduction in worker exposure and the potential for inadvertent releases to the environment;
- 18 new or revised DOE Technical Standards;
- four new Technical Standards for HEPA filters at plutonium facilities, ensuring proper application of quality assurance and testing requirements;
- implementation of a new law requiring DOE to use voluntary consensus standards when appropriate;
- the Order requiring that a hazards analysis be performed and documented for all non-nuclear facilities to provide assurance that potential hazards are identified and controlled; and
- ES&H requirements and guidance for deactivation and decommissioning activities throughout the DOE complex.

The TSP has reduced program costs by approximately 50% in two years by providing electronic on-line access to program services and all DOE technical standards via the internet on the TSP Home Page. The TSP successfully conducted a DOE-wide workshop on technical standards, and provided tutorials for newcomers to the program; conducted three interactive meetings with DOE Technical Standards Managers; established direct program contacts with standards development organizations; and supported the activities of the Department Standards Committee. DOE-wide topical committees were established to deal with such standards' issues as metrology, quality assurance programs, and laboratory accreditation. The TSP published monthly listings of technical standards activities of interest through the TSP "Standards Actions" publication and provided quarterly updates on key technical standards issues through the "Standards Forum."

Work Smart Standards

In FY 1996, The Department Standards Committee won the Hammer Award for the development and successful demonstration of the Work Smart Standards Closure Process. EH-3 provided the principle technical and liaison support for this Committee initiative. The Work Smart Standards Closure Process involves teams of DOE and contractor personnel working together to identify those federal, state, and local laws and regulations; and DOE Orders that are necessary and sufficient to provide adequate protection to workers, the public, and the environment. By focusing on the work to be performed, these teams build a "bottoms up" set of Work Smart Standards tailored to the work and the "as-is" condition of the facility or area in which the work will be performed.

The application of the Work Smart Standards Closure Process for Necessary and Sufficient Sets of Standards is to identify a set of standards that provides adequate protection for workers, the public, and the environment against the hazards associated with a defined body of work.

LEARNING FROM OPERATIONAL EXPERIENCE

The similarity of many activities at the various DOE sites presents opportunities to enhance safety performance, and reduce cost through the identification, dissemination, and application of lessons learned from operating experience.

EH-3 publishes the Operating Experience Weekly Summary. A recent survey indicated that this and the Safety Notices published by EH-3 reach several thousand readers, and 89% of the respondents reported that these publications contributed to improved safety at their facilities.

Operating Experience Weekly Summary

Nuclear operating experience has shown that a primary way to avoid accidents and improve safety performance is to learn from the experience of others. The similarity of many activities at the various DOE sites presents opportunities to enhance performance, meet environmental, safety, and health objectives, and reduce cost through the application of lessons learned by others. The Office of Nuclear and Facility Safety publishes the Operating Experience Weekly Summary. This document presents analyses of accidents or unusual events and disseminates the lessons learned to DOE and commercial facilities. Fifty-two issues were published in FY 1996 summarizing lessons learned from over 400 events. When warranted, EH-3 also publishes Safety Notices which provide more in-depth information on generic or recurring significant safety problems.

Performance Indicators

Performance measurement is an essential tool for management systems designed to preserve safety. It also helps improve communication with stakeholders, motivate employees and contractors, and improve decision making. The DOE Performance Indicator Report, published quarterly by EH-3, provides senior DOE management with a concise picture of Departmental performance in relation to several dozen ES&H performance indicators. These indicators not only call attention to events which have directly affected workers and the environment, they also focus management attention on precursors to events and provide a means of measuring the progress of risk reduction activities.

FY 1996 marked the release of the first reengineered Performance Indicator Report to better focus on those aspects of DOE operations determined to be most safety significant to senior DOE management.

Occurrence Reporting

The Department's ability to understand events occurring at its facilities and learn from them to improve safety and environmental protection is dependent upon the complex-wide Occurrence Reporting and Processing System (ORPS) managed by EH-3. In FY 1996, EH-3 improved ORPS by revising the threshold reporting requirements and eliminating reports that experience has shown to be not important to safety. This process improvement included major customer interaction and resulted in an estimated annual savings of over \$6M. It was awarded the Secretary's Honor Roll Award for quality engineering. EH-3 also integrated additional analytical functions into the system to improve the quality and efficacy of the reports.

Lessons Learned List Server

Recognizing the importance of local site involvement in analyzing events and publishing lessons learned to improve safety, EH-3 co-lead a lessons learned process improvement team in FY 1996. The team designed and implemented a network of personnel at each site screening events for lessons learned. Summaries of the lessons are then uploaded to an e-mail list server and automatically distributed to subscribers around the complex. The team also won a Secretary's Honor Roll Award for quality engineering for their teaming, contribution to safety, and innovative approach.

Specialized Training

An EH-3 expert who had participated in the recovery effort for a major plutonium fire at Rocky Flats conducted a series of seminars addressing the hazards of plutonium fires. DOE field personnel, contractors, and public fire department personnel learned about the events that led to the fires, their results, and the lessons learned about preventing and controlling plutonium fires.

EH-3 manages the Nuclear Facility Personnel Qualifications Policy and Standards Program. This program provides a corporate approach to the

development of nuclear facility personnel qualification programs so that they are comparable to commercial nuclear industry standards and helps assure that DOE's nuclear facilities are operated and maintained safely. Program objectives are achieved by providing a systematic approach to training development, sharing information across the complex, developing common training materials, and conducting seminars and workshops. This core technical support has helped refocus numerous contractor personnel qualification programs to ensure that the right people are trained on the right operation and maintenance activities. Department-wide savings attributed to this corporate training and assistance program were estimated at several million dollars.

Plutonium Metal Button
below:
Ignited Plutonium Button

ENGINEERING SOLUTIONS IN THE FIELD

EH-3 serves as a corporate resource for nuclear and facility safety, providing specialized expertise in several technical disciplines including nuclear criticality safety, operational readiness, radiological control, seismic evaluations, and regulatory compliance.

EH-3 serves as a corporate resource for nuclear facility safety by providing policy, analysis, and nuclear safety engineering support to the Department's program, field, and Secretarial offices. Technical support is provided in all areas of nuclear safety including criticality safety, nuclear materials technology, operational readiness, radiological protection, facility seismic evaluation, and overall safety assessment. In FY 1996, an increased need for nuclear safety technical support was driven by:

- an increase in the number of programmatic decisions being made to manage the cold war legacy materials;
- the need to revise the authorization basis for nuclear facilities in light of mission changes;
- the advent of external regulation and the need for regulatory expertise for safety documentation work;
- the implementation of the first three nuclear safety rules under the Price Anderson Amendments Act;
- less stability than in the past in management and operating contracts and increased reliance on the federal staff to manage safe operations; and
- the downsizing of headquarters elements with the attendant delegation of safety responsibilities to field elements in accordance with strategic alignment initiatives.

These drivers caused EH-3 to improve its technical capability and increase the level of technical support provided to meet the Department's mission objectives. This section discusses our FY 1996 work.

Assessing Safety Vulnerabilities of Plutonium, Highly-Enriched Uranium & Spent Nuclear Fuel

Large quantities of plutonium, highly-enriched uranium and spent nuclear fuel are stored in numerous facilities across the DOE complex. This material is in a wide variety of forms, both liquid and solid, and much of it is in a degraded condition. The Office of Nuclear and Facility Safety led three Department-wide assessments to identify and characterize actual and potential safety problems associated with these materials so that needed corrective actions could be implemented. The plutonium study required 80,000 person-hours to assess 167 plutonium facilities at 13 DOE sites. The study's findings were published in a 28-volume report. The uranium study, conducted in FY 1996, required over 60,000 person-hours to assess 175 facilities at 22 sites and resulted in a 7,000-page, 14-volume report. Corrective action plans are being implemented across DOE to eliminate the vulnerabilities identified in both the spent nuclear fuel and plutonium vulnerability studies. EH-3 helps ensure that the corrective action programs developed in response to these studies will be effective in resolving the safety problems identified. EH-3 initiated a review of these corrective actions in FY 1996.

Contributing to Facility Safety

Savannah River

DOE is using Savannah River's F-Canyon to process unstable plutonium solutions and irradiated targets into forms suitable for extended storage.

(continued on page 8)

Environmental, Safety and Health Vulnerability Studies

Corroding spent fuel elements from the Hanford N-Reactor are stored in an unlined concrete pool in the 105 K-East area. A dry storage facility is under construction to safely store the fuel. Hanford Site, Washington

SPENT FUEL WORKING GROUP REPORT

AN
INVENTORY AND STORAGE
OF THE DEPARTMENT'S SPENT NUCLEAR FUEL
AND
REACTOR IRRADIATED NUCLEAR MATERIALS
AND THEIR ENVIRONMENTAL,
SAFETY AND HEALTH VULNERABILITIES

VOLUME I: NOVEMBER 1993
U.S. DEPARTMENT OF ENERGY

A worker at Rocky Flats carries out brushing on a plutonium button. The unstable plutonium oxide powder that was brushed off has been heated to convert it to a stable form thus eliminating a vulnerability. Rocky Flats, Colorado

DOE/EH-0415

PLUTONIUM WORKING GROUP REPORT

ON
ENVIRONMENTAL, SAFETY AND HEALTH
VULNERABILITIES ASSOCIATED WITH THE
DEPARTMENT'S PLUTONIUM STORAGE

VOLUME I: SUMMARY
U.S. DEPARTMENT OF ENERGY
NOVEMBER 1994

Highly-enriched uranium storage tank in H-Ar-1a of the Savannah River Site. The contents were found to be susceptible to freezing during extended cold weather and power loss creating a nuclear criticality vulnerability. A new administrative control was immediately put in place.

HIGHLY ENRICHED URANIUM WORKING GROUP REPORT

ON
ENVIRONMENTAL, SAFETY AND HEALTH
VULNERABILITIES ASSOCIATED WITH THE DEPARTMENT'S
HIGHLY ENRICHED URANIUM STORAGE

VOLUME I: SUMMARY
U.S. DEPARTMENT OF ENERGY
SEPTEMBER 1994

ENGINEERING SOLUTIONS IN THE FIELD

Savannah River (continued from page 6)

EH-3 has performed several special studies and assessments of the Savannah River F- and H-Canyons to support Departmental decisions regarding their use in waste management activities. EH-3 has also worked on the Defense Waste Processing Facility and In-tank Precipitation facility, Receiving Basin for Offsite Fuels (RBOF), and tritium facilities at Savannah River.

In FY 1996, two major studies were performed regarding the seismic capability of the canyons to withstand an earthquake. Early in the year, the operating contractor identified differences between the design features assumed in the current seismic analysis and those of the as-built structures. Questions immediately arose as to whether the damage state of the canyons, after an earthquake, was consistent with that estimated in the Environmental Impact Statement for the facilities. The engineering analysis needed to answer these questions was very sophisticated and relied heavily on expert judgement. The Under Secretary requested EH-3

to conduct an independent evaluation of the operating contractor's new analysis of the structures to determine whether it was thorough and accurate. The efficacy of the analysis had the potential to impact future canyon operations and was also the subject of inquiries by local and national environmental groups. EH-3 led a group of nationally recognized experts in the evaluation, and produced two reports that aided in resolution of the controversy. The results were also provided to the DNFSB.

During FY 1996, EH-3 also worked with SR on DNSFB Recommendation 96-1 regarding benzene generation in the In-tank Precipitation facility and consulted on matters about tritium processing.

Hanford

EH-3 is involved in a number of major nuclear initiatives at Hanford. DOE plans to design and construct a dry storage facility to stabilize and store degraded spent fuel assemblies now stored in Hanford's K-Basins near the Columbia River. EH-3 helped establish and is a member of a Regulatory Requirements Team and supported an Independent Senior Review Group on regulatory requirements for this project. EH-3 participated in these reviews in FY 1996. EH-3 staff are also conducting structural engineering and seismic reviews to support the Richland Operations Office's safety analysis activities for the project.

High-level nuclear waste is stored in 177 large underground storage tanks at Hanford. In FY 1996 EH-3 assisted site management in resolving criticality safety issues that affect several of these tanks. They included evaluating the chemical composition of the tanks' contents to identify potential accident scenarios that might result in criticality.

DOE has embarked upon an ambitious program to stabilize the liquid high level radioactive wastes through vitrification or other immobilization technologies. This program is to be operated by private contractors on a fixed price basis and is known as the Hanford Tank Waste Remediation System.

*Savannah River F-Area
separations and support facilities.*

This EH-3 review was a critical factor in resolving public and State concerns about the facility's capability to contain radioactive material in the event of an earthquake. The review also helped resolve DOE concerns about potential litigation under NEPA.

By selecting contractors to privately finance and operate facilities to vitrify the high-level nuclear waste, DOE hopes to make cost effective progress in resolving a major national safety risk. In FY 1996, EH-3 assisted this effort by helping define the regulatory approach and nuclear safety requirements for the program. EH-3 reviewed all of the pre-bid documents related to safety, provided input for contractor selection, and developed the schedules and skill requirements to support the establishment of a regulatory entity to oversee regulation of the program beginning in FY 1997. EH-3 also served on a team that developed and executed a Memorandum of Understanding with the NRC, paving the way for external regulation of these DOE nuclear facilities. In FY 1997, EH-3 is scheduled to provide a substantial portion of the technical support for the project through safety reviews and on site assistance.

DOE has embarked upon an ambitious program to stabilize the liquid high level radioactive wastes in 177 tanks through vitrification or other immobilization technologies. EH-3 assisted this effort by helping define the regulatory approach and nuclear safety requirements for the program.

Radiological experts from EH-3 also provided radiological engineering expertise to support remediation activities at N-Reactor, C-Reactor, REBOX Separation Canyon, and associated plutonium facilities at Hanford. EH-3 was asked by the Principle Deputy Assistant Secretary for Defense Programs to co-lead an independent review of Operational Safety Requirements and implementation of the critical-safety program at the Oak Ridge Y-12 Plant. The resumption of enriched uranium operations at

Oak Ridge

EH-3 provided technical support in statistical analysis and helped refine the approach used to remediate plutonium residues and materials at Los Alamos National Laboratory's plutonium facility, Building TA-55.

Los Alamos National Laboratory

Y-12 is one of the Department's highest priorities since it is needed for a very high-priority defense program. EH-3 formulated the detailed assessment plan, established the team, and co-lead two thorough assessments. The second assessment was completed in early FY 1997. The assessments helped DOE respond to DNFSB concerns (DNFSB Recommendation 94-4) about the restart of weapons disassembly operations at Y-12. They also provided the Oak Ridge Operations Office with valuable information to avoid serious safety problems in enriched uranium operations.

Above: Million gallon double-walled carbon-steel tanks designed to contain high-level radioactive waste are shown under construction at Hanford. Right: The face of Hanford's N-Reactor core.

ENGINEERING SOLUTIONS IN THE FIELD

Idaho National Engineering Laboratory

EH-3 began a program of technical support for the Idaho National Engineering Laboratory in FY 1996. The first task involved conducting specialized technical support to DOE-Idaho for a first time license application with the NRC for dry storage of the damaged nuclear fuel from the accident at Three Mile Island. This included several technical evaluations and meetings to finalize the safety analysis in the license application. EH-3 provided support in the areas of nuclear criticality safety, fire protection, and transportation. EH-3 also provided technical support to formulate the license application to NRC for DOE to assume responsibility for the Ft. St. Vrain independent fuel storage facility.

EH-3 also provided nuclear criticality safety advice for the Pit-9 Remediation Project. The project is to retrieve, characterize, and vitrify the transuranic waste from Rocky Flats. EH-3 staff helped to ensure nuclear criticality safety was properly addressed in the project.

Fernald and Mound

In FY 1996, the manager of DOE's Ohio Field Office asked EH-3 to evaluate the radiological control and nuclear criticality safety programs at Fernald. This was needed to respond to a series of local news media assertions of serious safety problems at the site. The EH-3 evaluation developed the facts to accurately characterize the situation at the site and respond to allegations in local newspaper articles.

The Fernald Site Office asked EH-3 to assist in a comprehensive review of skin and clothing contamination events. To help improve the cost-effectiveness of Fernald's radiological control program, EH-3 senior staff also participated in an analysis and benchmarking of contamination control, respiratory protection, and personal protective equipment usage at DOE sites and selected commercial nuclear power plants.

EH-3 assisted the DOE Ohio Field Office in establishing the format and content for safety documentation for Mound's facilities. This included the review of draft safety documentation for radioactive waste staging and disposal facilities.

Paducah and Portsmouth Gaseous Diffusion Plants

DOE's former uranium enrichment plants at Paducah and Portsmouth are now owned and operated by the United States Enrichment Corporation and are regulated by the NRC. DOE is responsible for assisting this transition from DOE ownership and regulation. EH-3 is assisting the Regulatory Office at Oak Ridge and the Office of Nuclear Energy at Headquarters as a reviewer and prime technical advisor for the Portsmouth and Paducah NRC Compliance Plan. The initial application to the NRC required the preparation of "compliance plans." These compliance plans specify where the facilities are not in compliance with 10 CFR 76 and DOE is responsible for the cost of bringing the plants into compliance with this regulation. The Regulatory Office estimates that well over \$100 million will be needed to bring the plants into compliance. EH-3 reviewed two revisions of the plan and conducted onsite evaluations of the facilities.

West Valley

DOE will vitrify the high-level nuclear waste now stored in tanks at West Valley. EH-3 observed operational readiness activities involving radioactive material that confirmed several corrective actions prior to the start-up of the facility.

The melter for the facility experienced weld failures and an independent expert review team was formed to identify the causes and corrective actions to recover from the event in FY 1996. EH-3 participated in the review to assist the DOE program and field office in evaluating the results.

Other Generic Studies

EH-3 provided fire protection and design review technical support for two major studies led by the Office of Environmental Management (EM) for ventilation systems in plutonium facilities and high efficiency particulate filter test facilities. The ventilation system study was conducted in response to a letter from the Defense Nuclear Facilities Safety Board to analyze the design details in existing facilities. The second study was conducted to determine the cost-benefit aspects of the current filter test program that the Department uses to

assure the efficiency of filters prior to use in nuclear facilities. These studies provided recommendations to improve safety and reduce costs.

Improving Radiological Protection

EH-3 provides senior technical and managerial expertise to assist in improving the conduct of radiological work. Activities include advice on implementation of 10 CFR 835, development of radiological engineering capabilities, training of personnel, and integration of radiological control into planning, scheduling, and performance of radiological work. These are all aimed at better, more cost-effective mission accomplishment in the new regulatory environment. Experts who understand the DOE nuclear business and the attendant radiological risks provide assistance that complements DOE federal employees in delivering radiological safety services. Some experts are able to bring a wealth of knowledge from outside the DOE complex to help solve DOE's health and safety problems. Most of DOE's sites with nuclear facilities have received some EH support in this area and that assistance continued in FY 1996.

EH-3 also was instrumental in benchmarking a maintenance program and coordinating the Westinghouse DOE-GOCO contractors' preparation of a Radiological Engineering Manual.

Residual contamination of americium column explosion debris still requires personnel respiratory protection for room entry.

Improving Operational Safety of Soviet-Designed Reactors

EH-3 helps management conduct the training and simulator projects for the Office of Nuclear Energy's international safety program, which has established regional training centers at the Balakovo and Khmelnytsky nuclear power plants located in Russia and the Ukraine, respectively. Through this program, simulators are being built at four plant sites in Russia and five sites in the Ukraine. EH-3 has also helped initiate training assistance projects at the Chernobyl plant in the Ukraine and the Kozloduy plant in Bulgaria.

Soviet reactor turbine hall

ANALYZING SAFETY AND RISK

EH-3 assists line management in the preparation of safety authorization documents to ensure their conformance to modern safety standards.

Nuclear Safety Authorization

DOE policy is to authorize its contractors to conduct high hazard nuclear operations only after the hazards have been carefully analyzed. Controls are provided to prevent harm to the public, the workers, and the environment. The analysis of potential accidents, their consequences, and the controls to prevent or mitigate them are documented in Safety Analysis Reports and other documents. These documents collectively define the safety authorization of a DOE facility. The quality of these documents directly affects the safe operation of the facility through the implementation of the controls that they prescribe. EH-3 assists line management in the preparation of safety authorization documents to ensure their conformance to modern safety standards.

Barrels of transuranic waste awaiting removal.

In FY 1996, EH-3 participated in ensuring that adequate safety margins were provided in safety authorization documents for:

- removing the damaged Three Mile Island nuclear fuel from the TAN facility at INEL, and drying, repackaging, and storing it in a new facility at INEL to be licensed by the NRC;
- removing the degraded spent nuclear fuel and associated debris from the K-Basins at Hanford and treating, repackaging, and storing it in a new facility at Hanford;
- increasing the power level of the High Flux Beam Reactor at BNL;
- continued operation of nuclear weapons disassembly facilities at Pantex;
- decontamination and decommissioning the N-Reactor at Hanford;
- stabilizing, consolidating, packaging, and removing nuclear material from the T-Building and other facilities at Mound;
- storing hazardous, low-level radioactive, and transuranic waste in Building 440 at Rocky Flats;
- storing plutonium in Building 371 at Rocky Flats;
- onsite transportation at Pantex;
- reformulating the Authorization Basis for the Pantex Plant; and
- revising the Safety Analysis Report for the Advanced Test Reactor at INEL.

Environmental Impact Statements & Environmental Assessments

The National Environmental Policy Act (NEPA) requires that DOE determine and consider the potential effects of its actions on the environment. Identifying potential accident scenarios and analyzing their consequences to the environment are critical aspects of these evaluations. EH-3 reviews the Environmental Impact Statements (EISs) and Environmental Assessments (EAs) produced in accordance with NEPA and advises the appropriate Secretarial Officer before a Record of Decision is issued. In FY 1996 EH-3 reviewed 10 EISs and EAs. In one of these reviews EH-3 identified a previously unrecognized safety issue. This safety issue was resolved by physically modifying the facility in question so that the potential release of radiological material was reduced to a safe level.

Dam Safety

The DOE Complex has many dams and water impoundments, eight of which are classified as high or significant hazard dams by federal guidelines. EH sponsors the safety inspection of these dams by the Federal Energy Regulatory Commission and manages DOE's Dam Safety Program in accordance with the guidelines promulgated by the Federal Emergency Management Agency. It participates with other federal agencies in the Interagency Committee on Dam Safety which addresses technical issues such as seepage, piping, and seismic design.

Transportation of Nuclear Material

Potential accidents associated with transporting nuclear material across public roads must be analyzed to ensure that the design of the shipping packaging is adequate to protect the public and the environment. EH-3 was responsible for the Department's review of the safety documents for these shipping containers in accordance with the requirements of the NRC and Department of Transportation. In FY 1996, EH-3 assisted in the transition of this responsibility to EM.

INSRP Cassini support.

Space Programs Involving Nuclear Material

NASA's Pathfinder mission to Mars and its planned Cassini mission to Saturn both carry plutonium 238 for use as power and heat sources. By serving as a safety analysis expert member on the Interagency Nuclear Safety Review Panel (INSRP), EH-3 discharges the Department's responsibility to ensure that the nuclear aspects of these missions are conducted within acceptable safety margins.

A worker decontaminates an empty cask for shipping spent fuel after its cargo of irradiated fuel has been deposited into the nearby spent fuel pool for storage. Building 666, Idaho National Engineering Laboratory.

IMPROVING TECHNICAL COMPETENCE

Providing specialized technical expertise to identify engineering, scientific, and regulatory solutions to complicated problems requires technically qualified people. EH-3 has a diversified workforce with strong technical capabilities.

Improving Technical Competence

In FY 1996, EH-3 improved its technical staff through the use of newly authorized *excepted service* hiring authority. A nationally recognized expert in plutonium technology joined the staff. In FY 1995, an experienced plutonium facility manager was brought on board, and additional experts in nuclear criticality engineering and fissile materials separations facility processing were hired in 1996.

EH-3 experts contribute to the start-up and safe operations of nuclear facilities throughout the country each year. EH-3 helps DOE optimize the use of its human resources by providing very specialized expertise, such as seismic and geotechnical engineering, plutonium chemistry, consequence analysis modeling, and other specialties to several offices rather than having a redundant, and possibly underutilized, expertise in each of its several Headquarters and field offices.

In FY 1996, EH-3 also began the implementation of the Defense Nuclear Facilities Safety Board's Technical Qualification Program for its personnel to certify their qualifications.

EH-3 staff are often on site in the facilities providing assistance to Program or Field Office elements. The backgrounds of many EH-3 staff include prior assignments with the DOE Program Offices, DOE site contractors, the Nuclear Regulatory Commission, commercial nuclear utilities, consulting firms, nuclear design vendors, architectural engineering firms, and other Federal agencies.

Examples of EH-3 Experience and Capabilities

- Plutonium Chemistry/Chemical Engineering
- Civil/Structural Engineering
- Conduct of Operations
- Nuclear Criticality Safety
- Decontamination/Decommissioning
- Dose Analysis and Radiation Protection
- Electrical Engineering
- Facilities Design and Management
- Fire Protection/Hazard Analysis
- Process and Handling of Tritium
- Facility Startup Testing, Operation, Maintenance, and Surveillance
- Safety and Risk Analysis
- Tritium Technology
- Seismic Analysis
- Spent Nuclear Fuel and Plutonium Storage and Disposal
- Systems Engineering
- TRU Waste/Mixed Waste/Waste Management
- Nuclear Engineering
- Instrumentation & Controls
- Process Safety Management
- Environmental Analysis
- Emergency Planning
- Separations Engineering Process Safety
- Plant Safety

ENFORCING NUCLEAR SAFETY STANDARDS

Establishing the Infrastructure for Enforcement

DOE's enforcement program has provided notable results in its first full year of operation, and will become an increasingly important tool for DOE management to effect continued improvement in the safety of its nuclear operations. The enforcement program underscores a fundamental element of DOE's safety management program — that DOE's contractors play a vital role in ensuring the safety of operations, and will be held accountable to high standards of safety.

In FY 1996, EH-3 completed the establishment of much of the infrastructure necessary to support the enforcement program. This included 1) assembling a Headquarters staff of technical, investigative, and legal professionals; 2) developing a network of enforcement coordinators in the Field and in Headquarters Program offices; 3) implementing a system for contractor self-reporting and tracking of potential violations; 4) issuing guidelines governing the investigation of potential

In FY 1996, EH-3 completed the establishment of the infrastructure necessary to support the enforcement of the Nuclear Safety Standards program.

noncompliances with safety standards and the issuance of a Notice of Violation or Civil Penalty; and 5) training DOE field and contractor personnel on the DOE enforcement policy and processes. With the issuance of DOE's first Notice of Violation and Civil Penalty, the enforcement program was transferred from EH-3 and now reports directly to the Assistant Secretary for Environment, Safety & Health.

Decontaminating a glove box

THE PEOPLE THAT MAKE IT HAPPEN

NAME	TITLE	PHONE	NAME	TITLE	PHONE
Acharya, Sarbeswar	Director, Office of Facility Safety Analysis	903-1341	Kapila, Vishwa	Safety Engineer	903-3639
Adamovitz, Susan	Health Physicist	903-0125	Keating, Judith	Program Support Specialist	586-7551
Arnold, Charles	General Engineer	903-5773	Khanna, Satish	Safety Engineer	903-4114
Betancourt, Mary	Secretary	903-7449	Lai, Calvin	Safety Engineer	903-6357
Bhatnagar, Shushil	Nuclear Engineer	903-6358	McKamy, Jerry	Nuc. Crit. Safety Specialist	903-1743
Black, Richard	Director, Office of Nuclear Safety Policy and Standards	903-3465	Marchese, Andy	Deputy Director	903-2712
Blackwood, Edward	Director, Office of Radiological Protection Staff	903-0120	McSpadden, Thomas	Safety Engineer	903-5656
Boyle, Jeannie	Computer Systems Analyst	903-3393	Niyogi, Pradyot	Safety Engineer	903-2421
Carnes, Earl	Physical Scientist	903-5255	Pearson, Orin	Deputy Assistant Secretary for Nuclear and Facility Safety	586-2407
Chandr, Harish	Civil Engineer	903-6681	Protopapas, Tako	Safety Engineer	903-5179
Chen, Frank	Nuclear Engineer	903-6369	Peterson, Sue	Program Support Specialist	903-0112
Chow, I-Ling	Operations Research Analyst	903-5984	Pyatt, David	Safety Engineer	903-5614
Christopher, Keith	Director, Office of Enforcement and Investigation Staff	903-0100	Ramsey, Charles	Fire Protection Specialist	903-5999
Danielson, Gustave	Safety Engineer	903-2954	Read, Jacques	Physical Scientist	903-2535
Day, Richard	General Engineer	903-8371	Riggs, Robert	Nuclear Engineer	903-6254
Derderian, Leo	Safety Engineer	903-4327	Rollow, Tom	Director, Office of Operating Experience Analysis and Feedback	586-7449
Englehart, Richard	Nuclear Engineer	903-3718	Rosenbloom, Samuel	Nuclear Engineer	903-5749
Feit, Jeffery	Safety Engineer	903-3927	Rothleder, Burton	Nuclear Engineer	903-3726
Feit, Natalie	Secretary (OA)	903-0120	Schwartz, M. Norman	Safety Engineer	903-2996
Felt, Rowland	Nuclear Heavy Metals Specialist	903-0444	Sen, Subir	Civil Engineer	903-6571
Goodman, Martin	Physical Scientist	903-4662	Serbu, Richard	Physical Scientist	903-2856
Griffith, Mary Grace	Secretary (OA)	903-3491	Singh, Braj	Nuclear Engineer	903-3037
Guha, Pranab	Safety Engineer	903-7089	Snell, James	Nuclear Engineer	903-4094
Guzy, Daniel	Safety Engineer	903-2428	Stark, Richard	Deputy Director	903-4407
Haas, Milton	Nuclear Materials and Facilities Specialist	903-0355	Stevens, Robert	Electrical Engineer	903-3518
Harlow, Donald	Sr. Chemical Process Safety Engineer	903-1743	Sturdivant, Maggie	Nuclear Standards and Procedures Systems Specialist	903-0078
Harper, Delphine	Secretary (Steno/OA)	586-2407	Trevillian, Dick	Nuclear Safety Assessment Specialist	903-3074
Haughey, Mary	General Engineer	903-2867	Weaver, William	Nuclear Facilities and Tritium Risk Specialist	903-7038
Huff, Darrell	Safety Engineer	903-2136	Wilchins, Howard	Sr. Litigation Attorney	903-0107
Hull, Thomas	Nuclear Engineer	903-5677	Williams, Mark	Associate DAS for Nuclear and Facility Safety	903-1743
Hughes, Earl	General Engineer	586-9065	Wininger, Judy	Secretary (Steno/OA)	903-8253
Hurley, Sharon	Criminal Investigator	903-0110	Yoder, John	Physical Scientist	903-5650
James, Debra	Program Analyst	903-3465			

PUBLICATIONS AND DOCUMENTS

DOE/EH Home Pages Related to EH-3 Activities

<http://www.explorer.doe.gov>

<http://apollo.osti.gov/html>

<http://www.dsc.doe.gov/>

<http://tis-nt.eh.doe.gov/dd>

- DOE Directives

- DOE Technical Standards

- DOE Standards Committee

- EH Deactivation and Decommissioning
Technical Assistance Project

<http://tis.eh.doe.gov/web/oeaf/> - Operating Experience Analysis and Feedback

<http://tis-nt.eh.doe.gov/enforce/> - DOE Enforcement and Investigation

<http://www.eh.doe.gov/pi> - DOE Performance Indicator Reports

http://www.tis.eh.doe.gov/web/oeaf/lessons_learned/lessons_learned.html
- DOE Operating Experience, Lessons Learned

Major Deliverables/Contributions

Task 2 Assessment of Oak Ridge Y-12 Facility resulting from DNFSB Recommendation 94-4, DOE-DP/EH-OR-01, November 29, 1995.

Memorandum from Jill E. Lytle, DAS for Nuclear Material and Facility Stabilization, Office of Environmental Management, to the Assistant Secretary for Environmental Management, transmitting the "Report on Quality Assurance Testing of High Efficiency Particulate Air (HEPA) Filters, September 23, 1996."

Independent Review of the Seismic Analyses for the F-Canyon at the Savannah River Site, DOE EH-0529, August 19, 1996.

Letter from Hazel R. O'Leary, Secretary of Energy, to the Honorable John T. Conway, Chairman, Defense Nuclear Facility Safety Board, transmitting the "Plutonium Ventilation Study Report," March 15, 1996.

Highly Enriched Uranium Environmental, Safety and Health Vulnerability Assessment Plan, March 29, 1996.

Letter from C. A. Hanson, Assistant Manager for Waste Management, Richland Operations Office, to Dr. A. L. Trego, President, Westinghouse Hanford Company, transmitting the "Safety Evaluation Report for Supporting Safety Documentation for Subsurface Construction of the Canister Storage Building," WHC-SD-SNF-RPT-004, Revision 1, April 3, 1996.

Memorandum of Agreement for the Execution of Radiological, Nuclear, and Process Safety Regulation of TWRS Privatization Contractors, DOE/RL-96-004, Revision 0, July 3, 1996.

Top-Level Radiological Nuclear and Process Safety Standards and Principles for TWRS Privatization Contractors, DOE/RL-96-0006, Revision 0, February 1996.

DOE Regulatory Process for Radiological, Nuclear, and Safety Standards and Principles for TWRS Privatization Contractors, DOE/RL-96-0003, Revision 0, February 1996.

Process for Establishing a Set of Radiological, Nuclear, and Process Safety Standards and Requirements for TWRS Privatization, DOE/RL-96-004, Revision 0, February 1996.

Safety Notices: 95-03, Lessons Learned Programs; 95-04, Post-Maintenance Test Programs; 95-05, Department of Transportation Non-Compliance by Vendor Shippers; 96-01, Chemical Spills During Loading; 96-02, Risk-based Analysis of Electrical Hazard; 96-03, Compressed Gas Cylinder Safety; 96-04, Lightning Safety,

Technical Bulletins: 96-01, Normalization of Data; 96-02, Barrier Analysis - A Tool for Safety Management; 96-03, Importance of DOE-Wide ES&H Data - Progress in Occurrence Reporting Quality, October 1995.

Fifty two editions of Operating Experience Weekly Summary No. 95-40 through 96-39.

Special Reports Involving the Analysis of Occurrence and Operating Event Information for DOE Sites.

White Papers on Normalization, Sampling the Occurrence Reporting and Processing System Database, and ORPS Analysis Methods.

Safety Evaluation Report for the National Aeronautics and Space Administration Mars Pathfinder Mission, June 1996.

An Overview of The Space Nuclear Risk Assessment and Review Process of the Interagency Nuclear Safety Review Panel, Paper Presented at the Probabilistic Safety Assessment and Management '96 Conference in Crete, Greece, June 24-28, 1996.

Memorandum from Sarbes Acharya, Director, Office of Facility Safety Analysis, to Orin Pearson, Deputy Assistant Secretary, Office of Nuclear and Facility Safety, transmitting the Office Technical Position on the Exclusion of Radioactive Material in DOT Type B Packages from Inventory Considerations for Facility Safety Analysis, January 24, 1996.

EH Technical Position on Bechtel Hanford, Inc. Applicability and Implementation of Facility and Worker Safety Requirements for Nuclear Operations, December 31, 1995.

Enforcement Action EA-96-01, Preliminary Notice of Violation for Battelle, Pacific Northwest Laboratory (NTS-RL-PNL-325-1995-0001), April 3, 1996.

Enforcement Action EA-96-02, Preliminary Notice of Violation and Proposed Imposition of Civil Penalty (\$37,500) for Westinghouse Hanford Company (NTS-RL-WHC-TANKFARM-1996-0002), July 16, 1996.

Enforcement Action EA-96-03, Preliminary Notice of Violation and Proposed Imposition of Civil Penalty (\$5,000) for Sandia Corporation (NTS-ALO-KO-SNL-9000-1996-0001), August 14, 1996.

Enforcement Action EA-96-04, Preliminary Notice of Violation and Proposed Imposition of Civil Penalty (\$37,500) for Kaiser-Hill Company, L.L.C., Rocky Flats Environmental Technology Site (NTS-RFO-KHLL-7710PS-1996-0001), October 7, 1996.

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Performance Indicators for Environment, Safety and Health, April-June 1995 and March 1996

Type A and B Accident Investigation Report Summaries (1986-1995), November 1995

Quality in Occurrence Reporting, November 1995

Quality in Occurrence Reporting, November 1996

Formal Publications

DOE-EM-STD-5505-96 Operations Assessments

DOE-HDBK-1001-96 Guide to Good Practices for Training and Qualification of Instructors

DOE-HDBK-1002-96 Guide to Good Practices for Training and Qualification of Chemical Operators

DOE-HDBK-1003-96 Guide to Good Practices for Training and Qualification of Maintenance Personnel

DOE-HDBK-1084-95 Primer on Lead-Acid Storage Batteries

DOE-HDBK-1089-95 Guidance for Identifying, Reporting and Tracking Nuclear Safety Noncompliances

DOE-HDBK-1099-96 Establishing Nuclear Facility Drill Programs

DOE-HDBK-1101-96 Process Safety Management for Highly Hazardous Chemicals

DOE-SPEC-3018-96 Flooded-Type Lead-Acid Storage Batteries

DOE-SPEC-3019-96 Valve-Regulated Type Lead-Acid Storage Batteries

DOE-STD-1020-94 CN 1 Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities

DOE-STD-1021-93 CN 1 Natural Phenomena Hazards Performance Categorization Guidelines for Structures, Systems, and Components

DOE-STD-1022-93 CN 1 Natural Phenomena Hazards Site Characterization Guidelines

DOE-STD-1023-95 CN 1 Natural Phenomena Hazards Assessment Criteria

DOE-STD-1024-92 CN 1 Guidelines for Use of Probabilistic Seismic Hazard Curves at Department of Energy Sites for Department of Energy Facilities

DOE-STD-1030-96 Guide to Good Practices for Lockouts and Tagouts

DOE-STD-1091-96 Firearms Safety

DOE-STD-1104-96 Review and Approval of Nonreactor Nuclear Facility Safety Analysis Reports

DOE-STD-3006-95 Planning and Conduct of Operational Readiness Reviews (ORR)

DOE-STD-6002-96 Safety of Magnetic Fusion Facilities: Requirements

DOE-STD-6003-96 Safety of Magnetic Fusion Facilities: Guidance

DOE-STD-7502-95 Implementing U.S. Department of Energy Lessons Programs, I&II

DOE-TSL-1-96 Department of Energy Standards Index

DOE-TSL-4-96 Directory of DOE and Contractor Personnel Involved in Non-Government Standards Activities

Department Standards Committee Documents

Policy DOE P 450.3

Notice DOE N 450.3

Manual DOE M 450.3-1

Pilot Reports for:

Fermi National Accelerator Laboratory; Los Alamos National Laboratory; Lawrence Livermore National Laboratory; Westinghouse Savannah River Company; Lawrence Berkeley Laboratory; Bechtel Hanford, Inc.; Argonne National Laboratory, and Rocky Flats

Technical Papers:

Building a Marketplace for Cross-Departmental Change; Building Usable Change Documentation; Providing Support that Helps Change Endure; Building on Small Scale Pilots: Field Testing the Necessary and Sufficient Closure Process; The National Training Program Efforts for Work Smart Standards

Necessary and Sufficient Training Manual

DOE Orders: O 210.1, Performance Indicators Program; O 231.1, Environment, Safety and Health Reporting; M 231.1-1, Environment, Safety and Health Reporting; O 232.1, Occurrence Reporting and Processing of Operations Information; M 232.1-1, Occurrence Reporting and Processing of Operations Information