

memorandum

DATE: October 21, 1997

REPLY TO
ATTN OF: Office of Field Support: R Barber: 301-903-3477

SUBJECT: RESPONSE SUPPORT FOR THE SECRETARY'S DIRECTIVE ON THE ACCIDENT AT HANFORD'S PLUTONIUM RECLAMATION FACILITY

TO: Bruce Twining, Manager, Albuquerque Operations Office
Cherri J. Langenfeld, Manager, Chicago Operations Office
John M. Wilczynski, Manager, Idaho Operations Office
Gerald Johnson, Manager, Nevada Operations Office
James C. Hall, Manager, Oak Ridge Operations Office
James M. Turner, Manager, Oakland Operations Office
John D. Wagoner, Manager, Richland Operations Office
Mario P. Fiori, Savannah River Operations Office
Frank M. Stewart, Golden Field Office
Bob Folker, Acting Manager, Ohio Field Office
Jessie M. Roberson, Rocky Flats Field Office

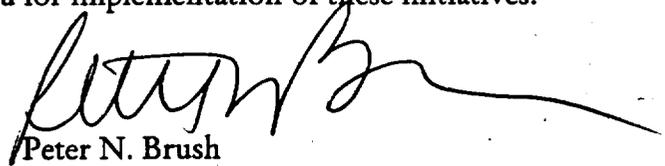
To facilitate the Department of Energy (DOE) responses to the Secretary's directive of August 4, 1997, on the accident at the Plutonium Reclamation Facility (PRF), Headquarters has established a group of representatives from each of the Program Offices, Environment, Safety and Health and Field Management to assist the field offices.

Questions about the interpretation of the August 4, 1997, letter or a request for assistance may be directed to the cognizant program representative on the group. The group will hold regular teleconferences, including your representatives, to ensure consistency in the interpretations and approaches to the action items. Answers to questions that arose over the last few weeks are attached for your information. The group of representatives are:

Lester Lee, Defense Programs, (301) 903-4006
Johnnie Newson, Environmental Management, (301) 903-4469
Ed Tourigny, Nuclear Energy, (301) 903-3679
Jay Larson, Energy Research, (301) 903-9869
Walt Sato, Field Management, (202) 586-2850
James Fairbent, Nonproliferation and National Security, (202) 586-8759
Craig Zamuda, Office of Fossil Energy, (202) 586-6367
Bob Barber, Environment, Safety, and Health, (301) 903-3477

The Secretary also issued two letters on August 27, 1997, regarding emergency response and notification based on the lessons learned from the PRF accident. The representative of the cognizant program office and the Office of Non-proliferation and National Security are available for a similar purpose for these actions items.

I hope that this is of some assistance to you for implementation of these initiatives.

A handwritten signature in black ink, appearing to read 'Peter N. Brush', with a long horizontal flourish extending to the right.

Peter N. Brush
Acting Assistant Secretary
Environment, Safety and Health

Questions and Answers¹
for the Secretary's August 4th Directive
DOE Response to the May 14, 1997
Explosion at Hanford's Plutonium Reclamation Facility

Q1. What is the scope of this directive?

A1. The directive is aimed primarily at DOE facilities² that halted or completed their production era mission, but are not fully deactivated, i.e. all radioactive and hazardous chemical inventory removed. However, it covers the use and storage of unneeded highly reactive or hazardous chemicals in any DOE facility.

Q2. Can you explain the technical competence related actions?

A2. This action is aimed at assuring the technical knowledge and competence of those controlling and supporting the facilities. This means management and staff in operations and technical support – process engineering and authorization basis support. At Hanford's PRF, neither line management nor cognizant process engineers or operators had sufficient knowledge to recognize that the chemicals involved could concentrate through evaporation and explode. Research chemists in the facility were aware of this mechanism, and Westinghouse Hanford Company had even run tests on it, but relevant information was never routed into the safety analyses for facilities. The facility Unreviewed Safety Question (USQ) process was used to discontinue the surveillance of the chemicals, but the reviewers were uninformed by the previous years of surveillance results. Apparently, the surveillance requirement was assumed to be solely administrative, derived from the Community Right to Know Act. The facility had an updated Safety Analysis Report (SAR), and the initially approved SAR did have a caution on high concentration nitric acid – hydroxylamine solutions, but it was not deemed relevant to storage, only mixing. Training programs should assure that 1) operations personnel and facility representatives have process knowledge about the historical facility missions and the associated hazards (chemical and nuclear), 2) multi disciplinary teams including engineers and operators that have process knowledge as well as analysts are used to prepare safety documentation and related controls, and 3) relevant information from management systems (e.g. corporate information letters, and occurrence reports) is used to inform management decisions.

¹ These questions and answers are provided to explain the basis or intent of the Secretary's August 4th Memorandum. The answers are not intended to be additional "requirements" for implementation. They only provide supplemental information for line managers to enhance their understanding the action items.

² "Facilities" can be smaller units within an operating facility. The term "facilities" is not defined exclusively as an entire building or group of buildings. One building may contain several discrete facilities.

Q3. What assessments are needed, e.g. another ES&H vulnerability assessment?

A3. There are four assessments in this directive – 1) technical competence, 2) scrutinizing chemicals, 3) vulnerability status, and 4) lessons learned.

- (1) The technical competence assessment should focus on whether cognizant line managers and support personnel for a given facility are fully knowledgeable on facility specific hazards – radiological, chemical, or other physical mechanisms causing changes in materials, e.g. aging related phenomena, and appropriate safety envelopes or controls (see A2). The requisite knowledge should be benchmarked using DOE experts or consultants as needed. The assessment must be done in the DOE and contractor organizations. Remember that the knowledge being assessed begins with the hazardous material's properties, potential reactions, affects of aging, inadvertent mixing, concentration, or other process/operational influences.
- (2) The chemical assessment is aimed at evaluating chemicals or residuals in process (tanks, pipes, etc.), as well as those in storage (used, discarded, or new). It should validate the current characterization of the chemicals or characterize them. There are no specified threshold amounts for the assessment, and the chemicals in question are those that could cause any significant explosion, fire, or toxic release. The DOE Field Office must provide direction to the contractor to conduct the assessment and approve the retention of such chemicals or assure timely disposal in accordance with safety and environmental requirements. This item applies primarily to facilities in Q.1. above, but is applicable to all chemicals on the site that could cause a significant explosion, fire, or toxic release. Schedules may be graded according to the hazard.
- (3) The re-assessment of known vulnerabilities applies to vulnerabilities identified during the DOE-wide Vulnerability Assessments for spent nuclear fuel, plutonium, hazardous chemicals, and highly enriched uranium. PRF failed to implement a recommendation of their chemical vulnerability self-assessment to inspect and characterize the contents of their chemical mixing tanks. The assessment specified in the August 4th letter should review the status of the known vulnerabilities and formally track progress of resolution. In addition, the directive instructs contractor operators to identify new vulnerabilities as part of their normal functions as facilities or operations change. Effective management systems to formally track these new vulnerabilities, along with the previously identified vulnerabilities, should be established and maintained by the Contractor and validated by the Field Office. The term "vulnerability" is defined in the DOE-wide studies. Many vulnerabilities are bounded by current SAR analyses, but must still be eliminated on a risk-informed basis to assure safety. It should be noted that the SAR and USQ processes are not the sole source of vulnerabilities.

(4) The Lessons Learned assessment is discussed in Q&A # 5.

Q4. What DOE "approval process" is mandated?

A4. The approval process may be locally developed, but must be formal and assure accountability. The approval documentation should contain the actions that are approved for the chemicals in question. Approval may rely on facility representative approval, or higher supervisory approval, e.g. approval of the contracting officer (area or operations office manager). The approval documentation should be subjected to appropriate technical and administrative reviews.

The Office of Nuclear and Facility Safety is sponsoring a report on the properties and safety envelope for hydroxylamine nitrate solutions. That report will present review criteria that could be used by the field offices to review the controls imposed by their contractors for chemicals with similar hazardous properties.

Q5. What is the Lessons Learned assessment?

A5. Before the PRF accident, two precursor events were reported to the Occurrence Reporting and Processing System (ORPS), which related to the causal mechanism. If their applicability had been recognized, the accident may have been prevented. In one case, the ORPS summary information was too vague to trigger any Hanford action; in the other, the event was not well characterized. This assessment by the field office should assure not only that potential precursor events are identified and thoroughly reported to the ORPS system, but also that there are systems in place to ensure that incoming precursors are identified and acted on. There should be an initial assessment and periodic follow-up assessments. This assessment must include some evaluation of technical qualification of those submitting and receiving the ORPS information. The response to the May 22, 1997 EH Safety Alert should also be evaluated. Although the details of the assessment systems may be determined by the field offices, some specific areas to assess are: 1) sources of information for reporting, such as shift logbooks, closed work packages, and audit reports, 2) evaluation of the threshold for reportable events to be consistent with ORPS guidance, 3) evaluation of the root cause and the clarity of the description of the event (and cause) to submit via the reporting system, 4) DOE review and reporting timeliness, 5) use of the reports (incoming from other sites and self generated) to implement remedial actions, 6) training for reporting coordinators, and 7) the self-assessment program for reporting. Recent assessments of the Lessons Learned Program at the site should be considered as part of the response. DOE-STD-7501, Development of Lessons Learned Programs, and DOE-HDBK-7502, Implementing US DOE Lessons Learned Programs, provide guidance on the program attributes. Information is also available on the Web at www.tis.ch.doe.gov/web/oeaf.

Q6. Who is going to pay for this?

A6. The provisions of this directive are essential to Integrated Safety Management. Before arriving at a conclusion that this directive will result in significant additional cost to DOE, field office personnel should examine each element with their contractors. Much of the work from this directive is to be done by the DOE field staff at the direction of their management. DOE personnel need to be cognizant of the controls associated with storage, handling, and disposal of the referenced chemicals. We envision field managers integrating these initiatives into their work as they would any new assignment from their management. Field managers may request additional support from headquarters or other sites if necessary. Limited technical assistance is available, from the Core Technical Group and from Environment, Safety and Health (EH-3 and EH-5).

Two items are the primary responsibility of the contractor: 1) scrutinizing (identifying and evaluating) and disposing of chemical inventories, and 2) assessment of staff technical competence.

- (1) The disposal of chemicals in accordance with safety and environmental requirements is part of normal operations. Additional cost could arise if the DOE field office imposes substantial new requirements on the contractor to support the field office approval function. Potential additional cost could be averted by formulating a process that relies on existing contractor activities and integrating new DOE approval functions for the process into routine activities of the federal staff.
- (2) Ongoing initiatives may already accommodate the cost for the contractor's evaluation of staff technical competence training initiatives. The implementation of this item may be approached through existing technical qualification programs, such as those associated with DNFSB Recommendation 93-3, DNFSB Recommendation 95-2 (enhancing the qualification and training of the workforce), or other contractor programs. The real thrust of this item is to thoroughly evaluate the various aspects of the hazards being managed and benchmark the level of knowledge needed to identify and control the hazards.

Q7. The letter directs a report to the Secretary by the end of the year, is this the fiscal year or calendar year?

A7. The calendar year – December 31, 1997.



Department of Energy

Washington, DC 20585

August 4, 1997

MEMORANDUM TO PROGRAM SECRETARIAL OFFICERS FIELD ELEMENT MANAGERS

FROM: FEDERICO PEÑA *Federico Peña*

SUBJECT: DOE RESPONSE TO THE MAY 14, 1997 EXPLOSION AT
HANFORD'S PLUTONIUM RECLAMATION FACILITY

I am in receipt of the Accident Investigation Board Report for the May 14th explosion in the Plutonium Reclamation Facility (PRF) at Hanford, and have determined that corrective action is warranted throughout the DOE complex. This explosion was a serious event and a warning of the potential for more serious accidents. If personnel were in the room when it occurred, there could have been fatalities. If the explosion had been more forceful, it could have released much more nuclear material. The fact that the event occurred in an inactive facility only further emphasizes that hazards still exist as we move from production to deactivation and decommissioning.

- The event underscores the hazards inherent in maintaining facilities in a shutdown or standby mode without full deactivation.
- It raises concerns about whether DOE and its contractors are maintaining the level of vigilance, knowledge and inquisitiveness needed to manage and oversee our operations.
- It calls into question the adequacy of facility and site safety management systems.
- It demonstrates that we still have serious unanalyzed hazards and have not followed up sufficiently on major hazard remediation initiatives, such as our own complex-wide vulnerability studies.
- It reinforces the need to make progress on the "Materials in Inventory Initiative" to dispose of materials for which there is no clear programmatic need.

The fundamental issue raised in the Hanford PRF report is how we manage safety. For our federal and contractor managers to manage safety, they must understand and control the hazards we face across DOE. The lessons of this accident must be addressed in a lasting way. Even with our best efforts, major vulnerabilities will exist at DOE sites for many years. These sites must be appropriately managed while the vulnerabilities are being eliminated.

Therefore, I am charging you to implement the following broad initiatives, and to report to me on your progress at the end of the year. Program Secretarial Officers should work with Operations and Field Office Managers to develop the report for each site to be submitted by the Operations or Field Office Manager.

- DOE site contractors must scrutinize their use or storage of any chemicals that have the potential for explosion, fire, or significant toxic release, and must promptly dispose of



unnneeded chemicals in accordance with safety requirements and environmental regulations. DOE field offices should develop an approval process to assure the disposal or safe and environmentally compliant storage and handling of such chemicals that are retained.

- DOE field offices must reassess known vulnerabilities (chemical and radiological) at facilities that have been shutdown, are in standby, are being deactivated, or have otherwise changed their conventional mode of operation in the last several years, and report status to their Program Secretarial Officers and the Assistant Secretary for Environment, Safety and Health within 120 days. Facility operators must evaluate their facilities and operations for new vulnerabilities on a continuing basis.
- DOE and contractor field organizations with operational responsibilities must assess the technical competence of their staffs to recognize the full range of hazards presented by the materials in their facilities, act on results, and implement training programs where needed.
- DOE field offices must assess their site Lessons Learned and Occurrence Reporting programs to assure that 1) outgoing information is well characterized and properly summarized, and 2) incoming information is thoroughly evaluated, properly disseminated, appropriately implemented, and tracked through formal management systems.

The emergency management of the PRF accident is the subject of a separate assessment by the Richland Operations Office. Results to date reveal deficiencies and lessons that may be applicable at other sites. I have asked the Offices of Nuclear Nonproliferation and National Security, and Environment, Safety and Health (EH) to evaluate those lessons and propose appropriate actions. This matter may be the subject of separate correspondence.

In closing, I want to reemphasize the importance of the EH Safety Alert issued on May 22nd. The Alert and other Lessons Learned notifications issued pursuant to this explosion advised facility managers and Operations and Field Office Managers to review their vulnerability assessment corrective action plans, the issues in the Alert, and surveillance data to ensure that they have a good understanding of the hazards associated with their chemical inventories and are responding appropriately. You should already have these activities underway. Our response to this event must be aggressive and reflect our commitment and responsibility to protect the safety of the workers and the public near our sites.



Department of Energy
Washington, DC 20585

JUL 31 1997

MEMORANDUM FOR THE SECRETARY

THROUGH: Elizabeth Moler
Deputy Secretary

FROM: Tara O'Toole, M.D., M.P.H.
Assistant Secretary for Environment, Safety and Health

SUBJECT: ACTION: Direct DOE-wide Actions Resulting from the May 14, 1997
Explosion at the Hanford Plutonium Reclamation Facility
(PRF)

ISSUE: DOE must implement lessons learned from the PRF accident in an effort to preclude similar accidents elsewhere in the DOE complex. The Accident Investigation Report is being issued today.

DISCUSSION: The Program Secretarial Officers and Field Managers need to re-emphasize to their staffs and their contractors the importance of maintaining an awareness of the hazards in their facilities. Your memorandum requires action to:

- Assure that known safety vulnerabilities receive adequate attention from the DOE field offices.
- Dispose of or implement controls for the types of chemicals that exploded in PRF.
- Evaluate DOE's technical competence to identify hazards and implement needed corrective training.
- Improve DOE's Lessons Learned Programs to ensure that operating experience is used to improve safety. This accident was preceded by two precursor events which, if acted upon, could have prevented it.

There is a separate investigation by the Richland Operations Office (RL) of the emergency response and employee medical treatment aspects of the accident. A draft of that report was released by RL for review by state and local stakeholders before issuance in mid-August. EH and EM are evaluating the report for potential DOE-wide implications and actions.





Department of Energy

Washington, DC 20585

August 27, 1997

MEMORANDUM TO SECRETARIAL OFFICERS HEADS OF FIELD ELEMENTS

FROM: FEDERICO PEÑA *Federico Peña*

SUBJECT: LESSONS LEARNED FROM THE EMERGENCY
RESPONSE TO THE MAY 14, 1997 EXPLOSION AT
HANFORD'S PLUTONIUM RECLAMATION
FACILITY

This memorandum identifies actions to be taken at all DOE sites to implement lessons learned from the emergency response to the accident at the Plutonium Reclamation Facility on May 14, 1997¹. In my August 4, 1997 memorandum about this accident, I emphasized the safety-related lessons that must be implemented. Today I want to emphasize the emergency management lessons. The Richland Operations Office (RL) conducted the evaluation, and a summary is attached.

The Emergency Response report is intended to be a critique of the RL emergency response, and forms the basis for valuable lessons. I believe that these lessons can be applied throughout the Department to enhance our ability to respond to potential accidents, particularly in the areas of medical monitoring and treatment of personnel potentially affected by an accident involving hazardous material.

The lessons from the accident involve fundamental elements in our emergency management capabilities and competencies. We must :

- improve training for facility and site emergency management personnel
- assure that equipment and qualified personnel are ready for the wide variety of potential radiological and chemical hazards
- improve coordination with our local medical communities, and

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¹ Report on the Emergency Response to the Event of May 14, 1997, at the Plutonium Reclamation Facility, Hanford Site, Richland, Washington, DOE/RL-97-62.

- have in place comprehensive procedures to attend to personnel who are potentially affected by an accident.

GENERAL ACTIONS. In order to implement these lessons, each DOE field office will work with their site contractors, local medical facilities, and community emergency response organizations to thoroughly examine the specific, interrelated action items below, make improvements, and report on their completion as set forth below. Enhanced training, drills, or exercises should result from this examination. In some cases, the actions taken may involve the formulation of agreements with community resources.

The status of these action items should be included in the report requested in my August 4, 1997 memorandum. That report is due December 31, 1997.

The Office of Nonproliferation and National Security in conjunction with the applicable responsible Secretarial office will provide technical assistance and guidance in this effort. Overall emergency management program guidance is contained in DOE G 151.1-1, *Emergency Management Guide*.

SPECIFIC ACTIONS. DOE Field and Operations Office managers shall take appropriate steps to assure that the following action items are accomplished as soon as possible and no later than the deadlines specified below. In some cases, immediate actions are called for within times specified; in all other cases requiring longer term actions, the actions will be accomplished not later than March 31, 1998.

- **EMERGENCY MANAGEMENT DECISION MAKING.** Emergency management decisions should be consistent with a conservative assessment of the situation. Emergency management training should emphasize making conservative judgments about facility conditions and personnel exposure in the absence of confirmed data. Key emergency management personnel will be trained on this matter within 60 days and Field Office Managers shall confirm that this milestone has been achieved. Realistic exercises will be conducted and will include and confirm this decision making capability.

- **PROTECTIVE EQUIPMENT AND STAFFING.** Personal protective equipment, equipment for field monitoring of chemical hazards, and qualified staff (e.g. industrial hygienist) needed for post accident activities must be readily available. Availability and qualification of critical personal protective equipment will be confirmed within 45 days. Sufficient numbers of qualified personnel must be available at all times for response and post accident activities involving chemical or radiological hazards. Readiness should be periodically verified in accordance with established Departmental requirements.
- **PROTECTIVE TREATMENT OF PERSONNEL.** Emergency procedures must provide for timely medical attention to injured or potentially exposed personnel; and policy and procedures must exist for the care and continued monitoring of affected personnel for an appropriate period after accidents. Review of such policy and procedures, with participation by local medical authorities and workers, will begin immediately and be completed within 90 days. Realistic exercises will be conducted and will include and confirm that procedures are implemented for the notification and protection of workers in a variety of remote locations (indoors and outdoors) at event onset, and that methods are available to control their sheltering. Security, medical, and other emergency responders must be trained to recognize the health impacts of potential accidents, including the effects of exposures to chemicals and the potential for post-traumatic effects associated with accidents.
- **HAZARDS INFORMATION.** Procedures must be in place to provide local medical facilities with available information on chemical and radiological hazards, as well as timely qualitative and quantitative exposure information for individuals in the event of an accident. Review and development of these procedures, in coordination with local medical facilities, will begin immediately and will be completed within 90 days. Realistic exercises will be conducted and will include and confirm the ability of DOE contractors to provide local medical facilities with adequate information for a variety of potential accidents to effectively diagnose and treat injured, exposed, or potentially exposed workers.

- **INDEPENDENT OVERSIGHT.** Beginning immediately the Assistant Secretary for Environment, Safety and Health shall include a review of site emergency management and response systems as a part of each Safety Management Evaluation carried out by the Office of Oversight.

Completion of these actions will be reported to me through the Office of Nonproliferation and National Security in conjunction with the responsible Secretarial offices by April 1, 1998, and subsequently documented in the annual Emergency Readiness Assurance Plan by November 30, 1998, in accordance with DOE O 151.1, *Comprehensive Emergency Management System*.



Department of Energy
Washington, DC 20585

MEMORANDUM FOR THE SECRETARY

THROUGH

ELIZABETH MOLER
DEPUTY SECRETARY

FROM:

TARA O'TOOLE, M.D., M.P.H.
ASSISTANT SECRETARY FOR
ENVIRONMENT, SAFETY AND HEALTH

SUBJECT:

ACTION: Direct DOE-Wide Follow-On Emergency Management Actions Resulting from the May 14, 1997 Explosion at the Hanford Plutonium Reclamation Facility (PRF)

ISSUE:

DOE must implement follow-on corrective actions and lessons learned in emergency management to preclude the errors that were made in response to the PRF accident. The Report on the Emergency Response is being issued shortly.

DISCUSSION:

The Secretarial Officers and Heads of Field Elements need to reemphasize to their staffs and their contractors the importance of readiness and emergency response to accidents or incidents. Your memorandum requires immediate action on some of the following items, with all actions completed not later than March 31, 1998:

- Assure that emergency response actions are conservatively based even in the absence of data
- Assure personnel are properly equipped, trained and qualified in emergency response
- Evaluate and improve, as necessary, the medical response program for onsite response
- Evaluate and improve, as necessary, the capability to provide local facilities with available information on chemical and radiological hazards



-Ensure that review of site emergency management is included as part of each Safety Management Evaluation carried by the Environment, Safety and Health Office of Oversight.

This action memorandum is in response to the separate investigation conducted by the Richland Operations Office of the emergency response and employee medical treatment aspects of the PRF accident. Information on the status of these actions will be included in the end of calendar year report on safety related actions required by your August 4, 1997 memorandum. Completion of these actions will be reported to you through the Office of Nonproliferation and National Security in April 1998.

SENSITIVITIES: The PRF accident was a serious event for DOE even though there were no fatalities and no large radiological releases. The review of the emergency management response indicates that multiple programs and systems failed in the intervening hours following the accident. These either compounded or exacerbated efforts to take control and gain an understanding of the accident and the events that followed. Major programmatic failures occurred during the emergency response including:

- Failure to provide timely emergency classification and implement notifications to offsite agencies**
- Failure to implement emergency response activities consistent with the requirements for facility take-cover and lockdown conditions**
- Failure to initiate appropriate actions in response to personnel exposure to uncharacterized hazards**
- Failure to adequately prepare for emergency response to chemical hazards.**

The Department was criticized in the press for not being forthcoming with information about the accident. Drafts of the Emergency Response evaluation have already been reported in the press and highlight the above issues bringing further criticism regarding the Department's handling of the PRF accident.

POLICY IMPACT: We should articulate that protection of workers, the public, and the environment is our top priority in facilities that house nuclear, radiological or chemical hazards. Furthermore, we need to articulate the vital importance of emergency management preparations, readiness and response. DOE managers must ensure that this policy is implemented in budgets and actions.

RECOMMENDATION: Sign the attached memorandum to the Secretarial Officers and Heads of Field Elements.

Attachment