
Inspection of
Emergency Management
at the

Portsmouth Gaseous Diffusion Plant

November 2006



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Abbreviations Used in This Report

ALOHA	Areal Location of Hazardous Atmospheres
CM	Crisis Manager
DOE	U.S. Department of Energy
EAL	Emergency Action Level
EM	Office of Environmental Management
EOC	Emergency Operations Center
EPHA	Emergency Planning Hazards Assessment
EPIC	Emergency Plan Implementing Procedure
EPZ	Emergency Planning Zone
ERAP	Emergency Readiness Assurance Plan
ERO	Emergency Response Organization
FEP	Facility Emergency Packet
FERO	Field Emergency Response Organization
FY	Fiscal Year
IC	Incident Commander
ICP	Incident Command Post
LPP	LATA-Parallax Portsmouth, LLC
LSPT	Limited Scope Performance Test
NARAC	National Atmospheric Release Advisory Center
NRC	Nuclear Regulatory Commission
ORO	Oak Ridge Operations
PAR	Protective Action Recommendation
PORTS	Portsmouth Gaseous Diffusion Plant
PPPO	Portsmouth/Paducah Project Office
PSS	Plant Shift Superintendent
SAE	Site Area Emergency
TPMC	Theta Pro2Serve Management Company, LLC
UDS	Uranium Disposition Services, LLC
USEC	United States Enrichment Corporation

OVERSIGHT

1.0 Introduction

The Secretary of Energy's Office of Independent Oversight, within the Office of Security and Safety Performance Assurance, conducted an inspection of the emergency management program at the Portsmouth Gaseous Diffusion Plant (PORTS) in August and September 2006. Since the time of the inspection, the Office of Security and Safety Performance Assurance and the Office of Environment, Safety and Health were disestablished upon the creation of the new Office of Health, Safety and Security. The inspection was performed by the Office of Emergency Management Oversight.

Oversight of PORTS is shared between the Nuclear Regulatory Commission (NRC) and the Department of Energy (DOE). The United States Enrichment Corporation (USEC) leases uranium enrichment facilities from DOE at PORTS. In accordance with a memorandum of understanding between DOE and NRC, the NRC has responsibilities for all regulatory oversight of enrichment facilities, including emergency management, nuclear safety, safeguards, and security. Oversight of the remaining non-leased portion of the site is the responsibility of DOE. The NRC is the initial lead Federal agency in an emergency at the Portsmouth Site, but if the emergency is initiated within the DOE portion of the plant, then the lead Federal agency role would be transferred to DOE.

The DOE Office of Environmental Management (EM) has line management responsibility for PORTS and thus has overall Headquarters responsibility for programmatic direction, policy guidance, management overview, performance accountability, and funding of landlord activities and infrastructure operations, including emergency management. The Portsmouth/Paducah Project Office (PPPO) oversees cleanup activities at DOE's gaseous diffusion plant sites and is also responsible for the Congressionally mandated decommissioning of depleted uranium tails, involving the conversion of over 700,000 metric tons of depleted uranium to stable form. PPPO reports directly to the Assistant Secretary for Environmental Management.

PPPO manages three contractors for operations and activities at non-leased DOE facilities at PORTS under the environmental management cleanup mission. LATA-Parallax Portsmouth, LLC (LPP) performs environmental remediation and waste management activities. Uranium Disposition Services, LLC (UDS) is responsible for the depleted uranium hexafluoride conversion project. Theta Pro2Serve Management Company, LLC (TPMC) manages site infrastructure and maintenance activities at PORTS. Each of these contractors has facility-specific emergency management responsibilities. TPMC also coordinates emergency management program elements between these contractors and USEC. Under contract to DOE, USEC implements the sitewide emergency management program, including the emergency response organization (ERO), fire and medical response, and plant shift superintendents, who also serve as incident commanders (ICs). USEC personnel respond to fire and medical emergencies at all PORTS facilities regardless of operating contractor. The operating contractors are responsible for the emergency program within their respective facilities, including the development of emergency planning hazards surveys and assessments and facility-specific emergency preparedness procedures. The facilities' emergency programs are integrated with the USEC emergency management program, as are the protective services and related security functions.

This evaluation examined the status of selected elements of the emergency management program at PORTS and included reviews of hazards survey and assessment documents, emergency plans, and associated sitewide and facility-specific implementing procedures. In evaluating the area of emergency response, the inspection team conducted limited-scope performance tests (LSPTs) with a sample of the site's key emergency response decision-makers to determine their ability to employ the available procedures, data sets, equipment, and skills when responding to postulated emergency conditions.

Finally, the team evaluated line management's ability to implement readiness assurance activities.

In evaluating emergency management programs, Independent Oversight has placed increasing emphasis on DOE line management oversight in ensuring effective emergency management programs, and has been reviewing the role of DOE organizations in providing direction to contractors and conducting line management oversight of the contractor's activities. In reviewing DOE line management oversight at PORTS, Independent Oversight concentrated on the effectiveness of PPPO in managing the various contractors, including such management functions as setting expectations, providing implementation guidance, monitoring and assessing contractor performance, and monitoring and evaluating self-assessments.

Section 2 of this report provides an overall discussion of the results of the PPPO and PORTS emergency management program elements that were evaluated. Section 3 provides Independent Oversight's conclusions regarding the overall effectiveness of PPPO and PORTS management of the emergency management program. Section 4 presents the ratings assigned as a result of this review. Appendix A provides supplemental information, including team composition. Appendix B identifies in summary fashion the findings that require corrective action and follow-up. Appendices C, D, and E detail the results of the reviews of individual emergency management program elements.

2.0 Results

2.1 Positive Program Attributes

USEC, as the lead contractor for emergency response at PORTS, has established a fundamentally strong emergency management program. Additionally, response protocols are well coordinated between USEC, TPMC, LPP, and UDS. The consistency in format and content of the emergency plans and procedures helps to ensure that roles and responsibilities are clearly defined and understood. Positive attributes of the emergency management program are discussed below.

Hazards surveys, material screening processes, and emergency planning hazards assessments (EPHAs) ensure that all materials that could produce classifiable emergencies are appropriately evaluated for non-leased facilities. The hazards surveys and EPHAs generally incorporate the provisions of DOE Order 151.1B and the *Emergency Management Guide*. The documents are well organized and consistently formatted, and facility management is involved in developing, reviewing, and approving them for their respective facilities. Source term quantity and form, assumptions used for analysis, and analysis results are well documented. Analyses also include an appropriate spectrum of events and consequences, including the toxicological effects of depleted uranium. Thus, the PORTS hazards survey and EPHA processes provide for a technically based emergency management program.

A hierarchy of documents establishes roles and responsibilities for managing and implementing the emergency management program at PORTS. Roles and responsibilities for program administration and response actions are clearly and consistently defined. The USEC emergency plan for PORTS, supported by a joint TPMC and LPP emergency plan and a UDS emergency plan, clearly delineates the chain of command in the event of an emergency. Emergency plan implementing procedures are established for sitewide emergency response functions and facility

worker responses to general events. Facility-level planning and response activities are well documented in facility emergency packets and emergency action plans that are useful to facility management and response personnel and reflect the sitewide requirements. Although emergency plans and procedures are generally comprehensive and well coordinated, two key areas – emergency action levels (EALs) and consequence assessment – are not adequately addressed, as discussed in Section 2.2 below.

ICs and crisis managers (CMs) effectively demonstrated their capability to activate and lead response organizations. ICs and CMs were knowledgeable of their assigned roles and responsibilities and were familiar with the incident command structure and emergency operations center (EOC) operations, respectively. They initiated timely actions for the protection of site workers and the public, such as evacuating or sheltering personnel in isolation zones, as appropriate; activating the public warning sirens; providing emergency alert system messages for public use; and recommending instructions to workers over the site's public address system. Except in extended downwind areas, the incident command teams applied safe approaches in their strategies and tactics during the performance of their duties, where response tools existed.

Since its standup in January 2004, PPPO has established and made notable progress in implementing plans and procedures that govern the roles, responsibilities, and processes of the emergency management oversight program at PORTS. The PPPO Management Plan establishes clear, unambiguous lines of authority and responsibility for oversight and assessments. With assistance from a DOE/EM Consolidated Business Center subject matter expert, PPPO recently completed a self-assessment of the PPPO emergency management program. The self-assessment identified programmatic weaknesses related to EALs, radiological consequence assessment, and DOE notifications consistent with those identified in this Independent Oversight report. However, due to the recency of the

self-assessment, corrective actions have not been developed. In addition to activities to formally define and implement their oversight responsibilities, PPPO has been proactive in resolving issues related to emergency management. Some PPPO programmatic responsibilities are not yet fully implemented, but the ongoing status of implementation does not significantly diminish the overall effectiveness of PPPO line management oversight.

2.2 Program Weaknesses and Items Requiring Attention

The PORTS site has in place a mature emergency management program for NRC-regulated activities; however, additional work remains to address DOE requirements, particularly in the areas of EALs, radiological consequence assessment, protective actions, notifications, and contractor feedback and improvement. Specific weaknesses are discussed below.

EALs have not been developed for non-leased DOE facilities to provide a technically accurate and adequate basis that facilitates timely, consistent, safe, and accurate decision-making. EALs have been developed for hazardous materials under the control of USEC-leased facilities; however, they do not, in all cases, encompass the full range of emergency events that could occur at non-leased DOE facilities. Correspondingly, predetermined protective actions and protective action recommendations (PARs) for events at non-leased facilities have not been established. The absence of an EAL for a non-leased facility resulted in some of the performance problems that were observed during the LSPTs conducted as part of this evaluation.

Emergency plans and procedures do not address consequence assessment for radiological releases. There is no procedure or capability, such as HotSpot or National Atmospheric Release Advisory Center (NARAC), for dispersion modeling of radioactive releases in the EOC. As a result, no predictive dispersion modeling capabilities exist for

radiological releases to aid in timely initial protective action decision-making, and consequence assessment must wait for the deployment of field monitoring teams and subsequent sampling results. Additionally, the dispersion modeling procedures and software used for modeling chemical releases do not address the toxicological effects of uranium.

During LSPTs, protective actions and PARs were not conservative for extended areas downwind (outside of the isolation zone), and DOE notifications were not always timely and accurate. ICs and CMs were effective in keeping personnel safe in areas close to the event scene; however, they did not adequately evaluate the safety of responders and the public positioned downwind and outside of the isolation zones. The absence of facility-specific EALs made it difficult to identify the material at risk and determine the distances at which protective action criteria could be exceeded. Additionally, in some instances, such appropriate response tools as a USEC EAL for chlorine releases and the emergency response guidebook were available but were not followed in formulating protective actions. Finally, the notification process is cumbersome, and the EROs were not diligent in assuring that notified authorities received accurate and consistent information related to the postulated emergencies.

Contractor self-assessments and issues management are not adequately coordinated to ensure that all elements of the emergency management program receive an annual assessment and that corrective actions are appropriately assigned and completed. Although numerous assessments are conducted, there is no integrated schedule to ensure that all appropriate elements are assessed for each contractor. Weaknesses in coordinating issue resolution between PORTS contractors has resulted in gaps where the responsible PORTS contractor did not correct issues discovered during an assessment conducted by another PORTS contractor, such as issues involving EALs and habitability of emergency facilities.

Planning and implementation of the PORTS emergency management program provide some unique challenges to PPPO and site contractors. The activities at leased facilities are regulated by the NRC. USEC, as the lead organization responsible for managing the overall direction and control of emergency responses at PORTS, is an NRC licensee. DOE contractors who are contractually required to meet DOE requirements operate the non-leased facilities. The coordination of emergency plans and procedures among USEC and DOE contractor organizations has successfully integrated the emergency management programs into a single cohesive program for the PORTS site.

Other strengths include accurate hazards surveys that identify applicable emergency conditions and appropriately screen hazardous materials. Clearly-documented EPHAs present the consequence analyses and results in a well-organized and consistent format that facilitates their review and update. Activation of field and EOC response organizations during LSPTs was timely and effective, and responders demonstrated their familiarity with emergency operations and their assigned responsibilities. Also, ICs were effective in keeping personnel safe in areas close to the event when appropriate response tools were available. Additionally, PPPO has made notable progress in developing and implementing oversight plans and implementing procedures. The services of an emergency management subject matter expert have been obtained from the EM Consolidated Business Center, significantly strengthening oversight and assessment capabilities, although some oversight responsibilities have not been fully implemented. PORTS contractors have conducted numerous self-assessments and implemented comprehensive assessment and issue management processes that are effective for identifying and correcting issues within their own organizations. However, the resolution of contractor-identified issues is not always adequately coordinated between contractor organizations, and as a result corrective actions that cross contractor organizations are not always effectively tracked and closed. For example,

EAL-related issues that required coordination of all contractor organizations were identified during self-assessments but were not adequately addressed.

Independent Oversight found that USEC event- and hazard-based EALs do not encompass the full range of events analyzed for non-leased DOE facilities. Although the EPHAs for the non-leased DOE facilities contain the EAL indicators and protective action distances for the hazardous material events that were analyzed, they were not carried forward into the associated EALs. In addition, because PORTS procedures and modeling software do not provide dispersion modeling capabilities for radiological releases, decision-makers must wait for the deployment of field monitoring teams and subsequent sampling results for radiological consequence assessment information. These weaknesses contributed to some of the performance problems that were observed during the LSPTs. Without facility-specific EALs and radiological dispersion modeling, the decision-makers had difficulty determining the hazardous material involved and the potential consequences of the event once the material was known. In these circumstances, decisions regarding protective actions and PARs for extended downwind areas were non-conservative. During LSPTs, performance weaknesses were also observed in formulating protective actions and PARs when response tools were available; for example, EAL-stipulated protective actions and the Emergency Response Guidebook were available, but were not fully utilized. Additionally, verbal notifications to offsite authorities and communications between site responders were sometimes incomplete, incorrect, or unnecessarily delayed, thus hindering the response effort.

Overall, the PORTS emergency management program is generally effective for responding to operational emergencies when the appropriate response tools are in place. However, PPPO and PORTS contractor line management attention is warranted to ensure that the necessary decision-making tools—most importantly EALs and

predictive consequence assessment capabilities—are implemented for non-leased DOE facilities. It is recognized that the recent PPPO self-assessment identified weaknesses similar to most of those discussed

in this Independent Oversight report. However, due to the recency of the self-assessment, corrective actions have not yet been developed.

4.0 Ratings

This inspection focused on a detailed assessment of three key emergency management programmatic elements, as well as the performance of selected emergency response decision-makers and support functions. The individual element ratings reflect the status of each PORTS emergency management program element at the time of the inspection. The ratings assigned below in the readiness assurance category are specific to those assessment, corrective action, and performance monitoring mechanisms applicable to the emergency management area.

The ratings for the individual program elements evaluated during this inspection are:

Emergency Planning

Hazards Survey and Hazards Assessments EFFECTIVE PERFORMANCE
Program Plans and Procedures NEEDS IMPROVEMENT

Emergency Response

PORTS Emergency Response NEEDS IMPROVEMENT

Readiness Assurance

DOE Line Program Management EFFECTIVE PERFORMANCE
PORTS Feedback and Improvement NEEDS IMPROVEMENT

APPENDIX A

SUPPLEMENTAL INFORMATION

A.1 Dates of Review

Limited Scope Performance Test Planning	July 11, 2006
Scoping Visit	July 25 – 26, 2006
Onsite Inspection Visit	August 21 – 29, 2006
Report Validation and Closeout	September 19 – 21, 2006

A.2 Review Team Composition

A.2.1 Management

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¹ Formerly the Office of Security and Safety Performance Assurance. The Office of Security and Safety Performance Assurance and the Office of Environment, Safety and Health were disestablished upon the creation of the new Office of Health, Safety and Security.

APPENDIX B

SITE-SPECIFIC FINDINGS

Table B-1. Site-Specific Findings Requiring Corrective Action Plans

FINDING STATEMENTS	REFER TO PAGES:
1. TPMC, LPP, and UDS have not issued emergency action levels to enable prompt decision-making for the formulation of protective actions that are based on analyzed hazards for non-leased facilities, as required by PORTS emergency plans and DOE Order 151.1B, <i>Comprehensive Emergency Management System</i> .	14
2. Emergency plan implementing procedures and dispersion modeling programs do not adequately address consequence assessment for releases of radiological materials or the toxicological effects of uranium, as required by DOE Order 151.1B, <i>Comprehensive Emergency Management System</i> .	14
3. During LSPTs, PORTS decision-makers did not always formulate protective actions and protective action recommendations to provide for the safety of responders and the public through the use of available response tools, as required by site procedures and DOE Order 151.1B, <i>Comprehensive Emergency Management System</i> .	19
4. During LSPTs, PORTS did not provide timely and accurate notifications to offsite authorities, and continuous and effective communications were not maintained throughout the operational emergency, as required by DOE Order 151.1B, <i>Comprehensive Emergency Management System</i> .	20
5. PPPO has not fully implemented some elements of the cognizant field element responsibilities for PORTS (such as timely EPHA reviews and exercise evaluations), as required by the PPPO Management Plan and DOE Order 151.1B.	24
6. The TPMC, LPP, UDS, and USEC issues management systems collectively do not ensure that all identified weaknesses are assigned to the responsible organization and that timely corrective actions are implemented, as required by DOE Order 151.1B, <i>Comprehensive Emergency Management System</i> .	25

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APPENDIX C

EMERGENCY PLANNING

C.1 Introduction

Emergency planning consists of identifying hazards, threats, and hazard mitigation mechanisms; developing and preparing emergency plans and procedures; and identifying personnel and resources needed to assure an effective emergency response. Key elements of emergency planning include developing a hazards survey and emergency planning hazards assessment (EPHA) to identify and assess the impact of site- and facility-specific hazards and threats. Based upon the results of these assessments, U.S. Department of Energy (DOE) sites and facilities must establish an emergency management program that is commensurate with the identified hazards. The emergency plan defines and conveys the management philosophy, organizational structure, administrative controls, decision-making authorities, and resources necessary to maintain the site's comprehensive emergency management program. Specific implementing procedures are then developed that conform to the plan and provide the necessary detail, including decision-making thresholds, for effectively executing the response to an emergency, irrespective of its magnitude. These plans and procedures must be closely coordinated and integrated with offsite authorities that support the response effort and receive emergency response recommendations.

This evaluation included a review of the Portsmouth Gaseous Diffusion Plant (PORTS) hazards surveys and EPHAs and their treatment of hazards associated with non-leased facility operations. The Independent Oversight team also evaluated the PORTS emergency plans, associated implementing procedures, and selected facility emergency procedures.

C.2 Status and Results

C.2.1 Hazards Survey and Hazards Assessment

The hazards surveys and EPHAs serve as the foundation of the emergency management program; consequently, their rigor and accuracy are key elements in developing effective emergency response procedures and other elements of the program. The degree to

which these documents effectively serve this function is primarily dependent upon the completeness of the institutional processes for developing a hazards survey and EPHA, the effectiveness of the screening process by which hazardous materials are initially identified and evaluated, and the rigor and accuracy of the analyses contained within the EPHA.

Theta Pro2Serve Management Company, LLC (TPMC), LATA-Parallax Portsmouth, LLC (LPP), and Uranium Disposition Services, LLC (UDS) have implemented an emergency management program standard developed by Oak Ridge Operations (ORO) for preparing the site emergency management hazards surveys and EPHAs. The standard effectively identifies requirements and expectations reflected in DOE Order 151.1B and the associated DOE *Emergency Management Guide* and standardize the content and format of the various subcontractor hazards survey and EPHA documents. The standard provides detailed instructions on the methodology, content, and format for developing the hazards survey and EPHA documents.

Jointly TPMC and LPP, and separately UDS, have developed stand-alone hazards survey documents that address appropriate elements such as an overall description of facilities and activities on site; the hazardous material identification and screening processes; a summary of the potential health, safety, and environmental impacts of events internal to the facilities; and the applicable planning and preparedness requirements. A process that includes facility management review and approval validates the contents of the hazards survey documents.

An effective hazardous material screening process (which establishes the need for a quantitative EPHA) is based on appropriate screening thresholds and a thorough identification of the hazardous materials present in the facility, which in turn relies to a great extent on an accurate site inventory of hazardous materials. The standard used at PORTS for performing a hazards survey properly defines the hazardous material identification and screening processes and requires the use of up-to-date bounding chemical inventories and screening criteria specified by DOE Order 151.1C. EPHAs are required if chemical or radiological hazardous materials exceed the lower of

the threshold quantities listed in the Code of Federal Regulations, if National Fire Protection Association hazard ratings are exceeded for hazardous chemicals, or if the release of these hazardous materials could result in exceeding a protective action criterion beyond the vicinity of the release location under worst-case analyzed conditions.

To evaluate the effectiveness of the hazards identification process employed for the hazards survey and quantities assumed in the EPHAs, Independent Oversight conducted walkdowns of multiple facilities with Facility Representatives. The EPHAs and, where applicable, the facility active chemical list were reviewed prior to the walkdown. These walkdowns confirmed that the active chemical list for each of the facilities was accurate for material type and quantity. Furthermore, facility managers were familiar with these documents and their signature authority is required for procurement of hazardous materials, thus providing assurance that planned additions or increases in hazardous materials will be evaluated. If inventories of hazardous materials are expected to exceed applicable emergency planning screening threshold limits, a quantitative analysis is performed to determine whether a revision to the hazards survey and/or an EPHA is required before the materials are procured.

EPHAs are well organized and appropriately identify facility and site boundaries and critical receptors of interest for use in performing consequence assessment calculations, developing emergency action levels (EALs), and establishing the emergency planning zone (EPZ). The EPHAs contain the expected attributes, such as: (1) characterizing the physical properties of hazardous materials to support development of scenarios; (2) including transportation events within facility boundaries; (3) incorporating a wide spectrum of events for radiological/chemical materials; (4) including emergency event indicators of barrier failure and protective action criteria distances for use in development of EALs; and (5) calculating the consequences of potential toxicological hazards due to a release of depleted uranium. Other positive aspects include using two sets of meteorological conditions in calculating the event consequences and appropriately documenting source term quantity and form, analytical assumptions, and results. In addition, EPZ determinations are adequately calculated and documented for the events analyzed in each facility EPHA. Furthermore to ensure accuracy and to increase facility manager awareness of emergency planning for their facility, facility managers are involved in

developing, reviewing, and approving EPHAs. Once completed, EPHAs are submitted to DOE Portsmouth/Paducah Project Office (PPPO) for review, comment, and approval.

Finally, EPHAs were evaluated by Independent Oversight to determine their usefulness in the development of EALs for non-leased facilities. This effort determined that EPHAs contain the appropriate EAL indicators and protective-action distances for the analyzed hazardous-material events; however, this information was not carried forward into EALs. This issue is discussed in more detail in Section C.2.2 of this report.

In conclusion, PORTS has issued procedures for preparing the hazards survey, EPHAs, and EALs that are intended to standardize the content and format of the multiple facility documents. The site hazards survey appropriately identifies generic applicable emergency conditions and screens identified radiological and chemical material. The EPHAs are clearly documented, well organized, and consistently formatted, facilitating their review and update. The EPHAs also clearly present consequence analyses and results, and appropriate classification and protective-action distance information.

C.2.2 Program Plans and Procedures

In general, emergency response concepts developed for managing an emergency at PORTS are thoroughly documented in the emergency plans and implementing procedures. Detailed implementing procedures have been developed for emergency response functions to provide consistency among contractor organizations. The concept of emergency operations identifies the United States Enrichment Corporation (USEC) as the lead for managing the emergency response organization (ERO) during operational emergencies and for providing initial response assets. TPMC, LPP, and UDS provide emergency response support through local emergency directors, who represent the affected facility, and also provide ERO members who participate in the emergency operations center (EOC). This collaborative effort is described within three PORTS emergency plans: a USEC plan, a joint TPMC and LPP plan, and a UDS plan. Collectively, these emergency plans clearly establish unambiguous roles and responsibilities for PORTS ERO functional positions and establish a chain of command; however, one exception was noted.

There is a procedural conflict between USEC procedures and the joint TPMC/LPP emergency plan

regarding the assignment of a response manager. If an event occurs in a non-leased DOE facility, USEC procedures give the USEC Crisis Manager the option to assign someone from TPMC, LPP, or UDS as response manager; however, the joint emergency plan directs that DOE contractors “will be” assigned to hold the position of response manager. In the particular instances observed during the limited scope performance tests (LSPTs), this inconsistency did not result in any confusion or performance weakness; however, the stress of an actual event could exacerbate the effects of this inconsistency.

TPMC, LPP, and UDS have developed additional plans and procedures to establish facility level planning and response functions. Facility emergency packets (FEPs) consolidate information useful to the facility management and the incident commander during an emergency, such as primary contact phone numbers, exist/assembly points, utility shutdowns, facility layout drawings, nuclear criticality concerns, bomb search procedure, fire plans, major hazard concerns, and material safety data sheets. Emergency action plans prescribe worker responses to general events, such as fire reporting; locating exits, assembly points, and nearest monitoring station; and response actions for bomb threats, tornadoes, emergency evacuation, and personnel accountability. TPMC, LPP, and UDS are also responsible for developing hazards surveys, EPHAs, and EALs for their facilities and for providing those documents to USEC for incorporation into the sitewide program. Although facility-level plans and procedures are generally comprehensive and consistent, many TPMC and LPP FEPs have not been updated annually as required by procedure. Additionally, the procedure for evacuation and shelter-in-place requires securing sources of outside air; however, administrative buildings’ FEPs do not contain the necessary information for securing ventilation.

Emergency plan implementing procedures (EPIPs) are in place to provide an appropriate level of detail for implementing the provisions of the emergency plans for key response activities, such as establishing the incident command system, performing event classification and protective action decision-making, warning site workers and the public, performing personnel accountability, and implementing evacuation and shelter-in-place. EPIPs are generally clearly written, well organized, and easy to use through supplemental checklists. Effective document control processes are established to ensure the use of the current procedure revision. However, procedures do not adequately address two key elements

of the emergency management program: EALs and consequence assessment.

EALs are specific, predetermined, observable criteria used to quickly classify an emergency event according to its severity for the purpose of implementing emergency response actions (protective action decision making, activation and notification of response organizations, etc.) commensurate with the hazards. TPMC, LPP, and UDS procedures reference an emergency management program standard developed by ORO for preparing their EALs. The standard incorporates the provisions of DOE Order 151.1B and the *Emergency Management Guide*, and standardizes the content and format of the EALs. Furthermore, TPMC, LPP, and UDS have implemented procedures that provide roles, responsibilities, and requirements for preparing EALs. These procedures require TPMC, LPP, and UDS to provide approved EALs to USEC for incorporation in the USEC classification procedure. Furthermore, to promote consistency and appropriate coverage, TPMC, LPP, and UDS formed a joint committee with USEC ERO personnel to develop EALs for their respective facilities. Nevertheless, although EAL development procedures are in place, EALs have not been developed for non-leased DOE facilities to be incorporated in the USEC classification procedure.

The decision to not develop non-leased facility EALs was based on discussions among PORTS contractors that concluded that the USEC EALs adequately addressed the range of release scenarios relevant to the non-leased facilities. However, Independent Oversight’s review of the USEC EALs determined that USEC EALs do not consider the same release scenarios as those used in the non-leased facility EPHAs. For example, the UDS EPHA considers explosions, medium and large fires, and loss of confinement with respect to uranium hexafluoride emergency events, with protective actions distances ranging from less than 30 meters to 9.905 km. The USEC EALs, with respect to uranium hexafluoride emergency events, consider leaking or ruptured transfer or process piping, damaged or ruptured liquid cylinder valve, gaseous or liquid flow from a cylinder, cell overheat or rupture, catastrophic rupture of a liquid cylinder, and catastrophic process failure in any facility with protective action distances ranging from 400 feet from the point of release to the site boundary. Although the USEC EALs do recommend offsite protective action recommendations be provided to offsite authorities, a distance is not specified. The absence

of EALs for non-leased facilities resulted in observed performance weaknesses during LSPTs as described in Appendix D. This issue was also identified in a PPO self-assessment, but because the self-assessment was only recently completed (August 2006) corrective actions have not yet been developed.

Finding #1: TPMC, LPP, and UDS have not issued emergency action levels to enable prompt decision-making for the formulation of protective actions that are based on analyzed hazards for non-leased facilities, as required by PORTS emergency plans and DOE Order 151.1B, *Comprehensive Emergency Management System*.

Consequence assessment implementing procedures adequately address chemical modeling using the Areal Locations of Hazardous Atmospheres (ALOHA) dispersion modeling software. The procedure indicates that other modeling programs should be used for chemical releases that extend over an hour in duration; however, there is no other modeling program specified or available in the EOC where this function is performed. Additionally, there is no procedure or software capability, such as HotSpot or National Atmospheric Release Advisory Center (NARAC), in the EOC for dispersion modeling of radioactive releases. Further, during the LSPTs, the toxicological effects of uranium could not be predicted for use in formulating protective actions and protective action recommendations because the properties of uranium were not readily available as input into the ALOHA chemical library. These consequence assessment weaknesses contributed to some of the performance problems that were observed during the LSPTs discussed in Appendix D.

Finding #2: Emergency plan implementing procedures and dispersion modeling programs do not adequately address consequence assessment for releases of radiological materials or the toxicological effects of uranium, as required by DOE Order 151.1B, *Comprehensive Emergency Management System*.

In conclusion, the PORTS emergency management program is generally well defined by a hierarchy of plans and procedures. PORTS contractors have developed integrated emergency plans that comprehensively address most of the functional elements necessary to plan, prepare, and respond to an emergency event. Generally, plans and procedures for

emergency management clearly and consistently define roles and responsibilities for program administration and sitewide response actions. Facility-level planning and response activities are also well documented in FEPs and emergency action plans. However, the current set of EALs, developed for USEC hazardous material activities, do not encompass emergency events at non-leased DOE facilities and, as a result, do not provide a technically accurate and adequate basis for protective action decision-making. Plans and procedures for consequence assessments do not address dispersion modeling for radioactive releases or the toxicity of uranium. During LSPTs, these weaknesses significantly contributed to decision-makers' problems in determining appropriate and timely protective actions and protective action recommendations for events at non-leased facilities.

C.3 Conclusions

PORTS has institutionalized a robust standard that generally incorporates the provisions of DOE Order 151.1B and the *Emergency Management Guide* for developing hazards surveys and EPHAs that results in user-friendly documents that contain similar information in a consistent format among the various contractors and facilities. Hazards surveys appropriately identify generic applicable emergency conditions and effectively identify and screen hazardous materials for a quantitative assessment using appropriate radiological and chemical screening criteria. Similarly, the EPHAs clearly document the quantitative assessment assumptions, analyses, and results for use in the development of EALs over an appropriate spectrum of events. Additionally, controls are in place to ensure that planned changes in hazardous material inventories are appropriately evaluated. Thus, the PORTS hazards survey and EPHA processes provide for a technically based emergency management program.

The PORTS emergency management program is generally well defined by a hierarchy of plans and procedures representing the multiple contractor approach. PORTS contractors have developed integrated emergency plans that collectively address most of the functional elements necessary to plan and prepare for, and respond to, an emergency event. The procedures provide clear and consistent roles and responsibilities for program administration and sitewide response actions. Likewise, facility-level planning and response activities are well documented in FEPs and emergency action plans that reflect the sitewide

requirements. However, two important functional elements—EALs and consequence assessment—are not fully addressed. EALs were not developed from non-leased facility EPHA results, and the current set of EALs, developed for USEC hazardous material activities, do not encompass the analyzed events for non-leased facilities. Additionally, procedures for consequence assessments do not address predictive dispersion modeling for radioactive releases or the toxicity of uranium, and the EOC has no capability for performing this function. During LSPTs, these weaknesses directly contributed to decision-makers' problems in identifying the hazardous material involved in postulated scenarios and formulating protective actions and protective action recommendations. PPPO made similar findings for non-leased facility EALs and consequence assessment weaknesses during a recent self-assessment.

C.4 Ratings

A rating of EFFECTIVE PERFORMANCE is assigned to the area of hazards survey and hazards assessments.

A rating of NEEDS IMPROVEMENT is assigned to the area of program plans and procedures.

C.5 Opportunities for Improvement

This Independent Oversight inspection identified the following opportunities for improvement. These potential enhancements are not intended to be prescriptive. Rather, they are intended to be reviewed and evaluated by the responsible federal and contractor line managers and prioritized and modified as appropriate, in accordance with site-specific programmatic emergency management objectives.

USEC

- When improving the consequence assessment capabilities, consider the following specific actions.
 - Provide additional consequence analysis tools (e.g., HotSpot, EPIcode, NARAC) in the EOC

to provide a continuous, ongoing assessment capability for all hazardous materials on site over a spectrum of initiating events.

- Develop a procedure that details the use of the consequence analysis tools, and train personnel on the procedure and dispersion modeling software.
- Upload the consequence assessment data files, used for the analysis contained in the EPHAs, to the EOC modeler's computer to provide readily available technical assumptions.

TPMC, LPP, and UDS

- Ensure that the USEC EAL set is complete and up to date, and that it identifies appropriate areas for use in formulating protective actions and protective action recommendations. Specific actions to consider include:
 - Perform a detailed EPHA-to-EAL comparison to verify that all EPHA analyses indicating a classifiable emergency have a corresponding EAL.
 - Specify downwind areas, consistent with the EPHA, for consideration of protective actions and protective action recommendations, particularly when they exceed the two-mile immediate notification zone.
 - Issue EALs concurrently with corresponding EPHA revisions.
 - Evaluate EAL thresholds to determine whether they can be enhanced by the addition of symptom-based EALs that use existing installed instrument displays or setpoints rather than relying on field measurements and use of published protective action criteria.
- To provide a process for making timely classifications and formulating protective actions and protective action recommendations for events that are outside of analyzed scenarios described in EPHAs, consider developing discretionary EALs that enable conservative decision-making.

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APPENDIX D

EMERGENCY RESPONSE

D.1 Introduction

The ultimate objective of emergency planning and preparedness is to prepare emergency responders so that they can apply their skills, procedures, and training to make appropriate decisions and to properly execute actions to protect emergency responders, workers, and the public. Critical elements of the initial response include formulating protective actions, categorizing and classifying the emergency, and notifying onsite personnel and offsite authorities. Concurrent response actions include reentry and rescue, provision of medical care, and ongoing assessment of event consequences using additional data and/or field monitoring results.

The information provided in this section is based on observations made during limited scope performance tests (LSPTs), response activities of two field emergency response organizations (FEROs) performing on-scene emergency responses, and two emergency response organization (ERO) teams performing emergency responses from the emergency operation center (EOC). The FEROs are led by a United States Enrichment Corporation (USEC) plant shift superintendent (PSS), who serves as the incident commander (IC) and the initial crisis manager (CM). The ICs were supported by players who complete the Portsmouth Gaseous Diffusion Plant's (PORTS) incident command system, consisting of sector officers from PORTS Fire and Security organizations; a safety officer; a field team coordinator, who leads the field monitoring team; and the assistant PSS, who remains in the PSS office. The EROs were fully staffed shifts led by a USEC CM supported by a staff that executes important functions, such as event classification, protective action formulation, onsite and offsite notifications, consequence assessments, and press releases. The ERO represents the multiple contract organizations from leased and non-leased PORTS facilities and the U.S. Department of Energy (DOE).

The FEROs and EROs responded to essentially the same two LSPT scenarios. The only significant difference in the LSPT scenarios was that one of the FERO LSPTs was conducted at night, when there is limited staff and the night table of the Emergency Response Guidebook is used for establishing areas in need of protective actions. The EROs started

their scenarios at an Alert classification with the initial protective actions and protective action recommendations (PARs) established by the FEROs for this classification. One scenario concerned a non-leased facility in which a fire, initiated by an airplane crash, engulfed a radioactive material warehouse. The other scenario was a security event in which an expected chlorine delivery truck was unexpectedly rigged with explosives and crashed on the site's roadway when the driver sped away from the security gate. The LSPT scenarios, which were developed by USEC trusted agents in conjunction with Independent Oversight, were presented to the participants by several trusted agents to ensure scenario validity and delivery of accurate event cues. Some trusted agents also played the roles of several unmanned positions, through simulation cells, to simulate responses by site personnel and offsite authorities.

D.2 Status and Results

At PORTS, the initial emergency response is led by the PSS, who assumes the role of the IC and the initial CM. After notified of an operational emergency, the PSS establishes the location of the incident command post (ICP), relocates there (if necessary), and notifies the FERO to collocate there. The IC determines event classifications and initiates notifications, which are executed by the assistant PSS, until relieved of these duties by the ERO CM, if the EOC is activated. The PSS, as the IC, continues to lead the FERO and oversees mitigating activities and field measurements for consequent assessment determinations. The PORTS response concepts differ from those of other DOE sites in that PORTS has no event categorization, and only classifications of Alert and Site Area Emergency (SAE) are used, which are closely aligned to DOE's SAE and General Emergency classifications; and PORTS makes notifications to DOE Oak Ridge Operations (ORO), rather than DOE Headquarters, and ORO is expected to notify DOE Headquarters. These differences reflect governmental agreements between DOE and the Nuclear Regulatory Commission (NRC), which licenses the PORTS leased facilities, and departmental agreements among DOE organizations.

D.2.1 Emergency Response Activation and Command and Control

During all LSPTs, FEROs and EROs were activated early in the event using an array of communication systems. The PSSs were notified through a direct-line contact to the PSS office and/or through a ring-down phone system that enables conferencing among the PSS and PORTS Fire and Security organizations. Upon determination of an operational emergency, the PSSs assumed the roles of IC and CM. In this capacity, the PSSs determined the location of the ICP, activated the FERO and the ERO, provided ICP location information, and relocated themselves to the ICP. These organizations were activated effectively through use of pagers and the site's public address system. After the ICs gathered additional information regarding the event scene and available response personnel, the ICs demonstrated methods to augment field teams through a PORTS emergency squad, recall of employees, and/or local offsite fire and law enforcement organizations, as established in mutual aid agreements. Methods were employed to easily identify emergency responders by their position within the FERO and for security personnel to recognize emergency responders (including the ERO) so that security personnel allowed responders to pass, even during a site lockdown.

ERO CMs demonstrated familiarity with EOC operations and their assigned responsibilities. During all scenarios, CMs verified that EOC minimum staffing requirements were met and made appropriate use of checklists, briefing forms, and logs. Formality was maintained for the transfer of CM functions from the field to the EOC and for declaring the EOC operational.

D.2.2 Emergency Event Classification

With one exception, classifications were determined using USEC emergency action levels (EALs). USEC EALs are organized by the hazardous material at risk or the initiating event type, such as a security, fire, or explosion event; they are not linked to site buildings. If an EAL exists for an event type, it is used in conjunction with an EAL for the hazardous material involved. USEC EAL tables include prescribed protective actions and PARs. Early identification of the material at risk is important to understand the event and to enable a timely classification, accurate notifications, the selection of a safe ICP, and the formulation of appropriate protective actions and PARs. During the

LSPTs, classification determinations were made using a USEC EAL for the specified conditions, or by CM judgments. Since EALs were not available to identify the hazardous materials in non-leased facilities, as in the uranium fire scenario, the ICs had to obtain information by reading the affected building's facility emergency packet (if a building was involved), contacting the building's local emergency director (if available), and/or awaiting the results of field monitoring measurements. This process, in conjunction with the IC's urgency to classify, caused the IC to classify the uranium fire scenario based only on an observed smoke plume without adequate information on the hazardous materials involved in the fire.

After activation of the EOC, the CMs had more support than the ICs in determining areas where protective action criteria may extend for use in discerning the event classification. In addition to all the response tools used by the ICs, the CMs had a cadre of subject matter experts available, some plume modeling capability, and readily available emergency planning hazards assessments (EPHAs). However, like one IC, one CM classified the uranium fire scenario without knowing that uranium (or any other hazardous material) was involved. Similarly, during the chlorine scenario, one CM did not know that chlorine was involved for over 30 minutes after it was introduced by placard number, while many ERO members knew almost immediately. In this case, many ERO members had identified chlorine on their own, but did not communicate this information to the CM directly or have it posted on the status board. The CM became aware that the event involved chlorine after tasking an ERO member to look up the shipment's placard number. Consequently, the ICs and CMs sometimes determined event classifications without knowing whether a hazardous material was involved, or, if it was known, the distance from the release point where protective action criteria could be exceeded.

D.2.3 Protective Actions and Protective Action Recommendations

The ICs were familiar with their responsibilities and were effective in keeping personnel safe in areas close to the event, when appropriate response tools were available. ICs questioned their safety officer, as a safety overseer, and their field team coordinator concerning atmospheric monitoring. For the chlorine and the uranium fire scenarios, the ICs demonstrated concern for employee safety by inquiring about potential injuries and the status of site worker

accountability. ICs nearly always initiated orders to activate site warning announcements, public warning sirens, and the emergency alert system, to provide early warning to site personnel and the public, within a two-mile immediate notification area. Finally, the ICs always directed and coordinated safe site ingress points, routes, and staging areas for incoming mutual aid with their sector officers. For the chlorine scenario, ICs used meteorological data, maps, map overlays, USEC EALs, and a bomb blast stand-off distance table to select safe ICP locations and formulated appropriate protective actions that ensured safety in the immediate area (defined as the isolation zone). A similar approach was used for the uranium fire scenario; however, in the absence of an event-specific EAL, the ICs used response tools for a criticality event, based on the loss of the building's criticality accident alarm system, that was non-conservative for the presented scenario, as further described below.

During all LSPTs, FERO and ERO formulation of protective actions and PARs were not conservative for extended areas downwind (outside of the isolation zone). USEC EALs and the Emergency Response Guidebook were immediately available on the incident command vehicle and in the EOC. These response tools contain information for use in formulating protective actions for the chlorine scenario but were not used for this purpose. Later, the EROs also had a chlorine plume plot displayed in the EOC; however, during one scenario, the CM did not recognize that the plot extended beyond the two-mile immediate notification area. For the same scenario during a different LSPT, a second CM recognized the extended area, but could not formulate a method to implement a PAR outside of the two-mile zone. Consequently, the PARs issued by the CM did not go beyond the site's two-mile immediate notification area in an event for which the Emergency Response Guidebook recommends protective actions well beyond that distance (4.6 miles to 9.2 miles downwind at night and 1.5 to 3 miles downwind during the day). Additionally, the USEC EAL for a one-ton chlorine cylinder release (two one-ton cylinders were involved in the scenario) states that all areas downwind from the release point to the site boundary should be evacuated; however, traffic control officers were not evacuated in downwind sectors within the site boundary.

The absence of facility-specific EALs not only created problems in event classification for the uranium fire, as discussed previously, but also caused the ICs and CMs to implement non-conservative protective actions and PARs. In the absence of EALs directly

applicable to the event, the ICs implemented an EAL for a criticality event, believing this was conservative because the criticality alarm system was inoperable. The ICs ensured that the area within 180 feet of the fire was evacuated with the exception of fire fighters, who were required to wear electronic personal dosimeters. For this scenario, both ICs located their ICP in the same place, which was approximately 400 feet upwind from the fire, and positioned some of their traffic control officers in downwind sectors within the site's boundary. Field monitoring did not start at the traffic control points to ensure the safety of the traffic control officers, but instead started much farther away from the plume's estimated centerline. In contrast, the Emergency Response Guidebook, which could have been used in the absence of an EAL, prescribes an evacuation zone of 1000 feet for a large quantity of radioactive material involved in a major fire. These conditions were not recognized as unsafe, even though the EROs used a tool to display the placement of field assets and in one LSPT the ERO knew from the EPHA that the affected area could extend 1.8 miles downwind. Plume plots were not developed to predict the consequences of radiological dispersion or toxicity from the uranium fire, even though they would have helped define potentially unsafe areas, because the necessary consequence assessment tools were not available in the EOC, as discussed in Appendix C.

Finding #3: During LSPTs, PORTS decision-makers did not always formulate protective actions and protective action recommendations to provide for the safety of responders and the public through the use of available response tools, as required by site procedures and DOE Order 151.1B, *Comprehensive Emergency Management System*.

D.2.4 Notifications and Communications

Communications among responders were effective during ERO activation, as previously mentioned, and during the initial data gathering activities on scene and in the EOC. The ICs interacted frequently with the sector commanders, the local emergency director (when available), the assistant PSS, and the CM to formulate strategies and to inform responders and offsite authorities of known conditions. Communications in the EOC were equally effective while the EOC was becoming operational. The CMs consulted with their IC, received a formal turnover briefing, and provided initial and periodic briefings to the EOC cadre.

CMs announced when the EOC became operational and periodically solicited the EOC cadre for their recommendations throughout the LSPTs.

However, the FEROs and the EROs did not provide to offsite authorities timely, accurate, and/or completely current information that reflected all known conditions. Most of these shortfalls are attributable to the cumbersome PORTS notification process and, as previously mentioned, the lack of an EAL to address the uranium fire scenario. The notification process used by the assistant PSS during the early stages of events, and later by the ERO, requires offsite authorities to be individually telephoned in the order listed on the emergency notification form and the form's content is read to them. After notifications to state and local authorities, ORO is notified and is expected to relay the event information to DOE Headquarters. During the LSPTs, notification forms were not typically approved for release within 15 minutes of an event classification; in the worst case, approval took more than 30 minutes. DOE's Portsmouth/Paducah Project Office (PPPO) also identified the cumbersome notification process in a recent assessment.

The information provided to offsite authorities was often incomplete or incorrect and did not meet DOE expectations. Examples of omissions and errors in notification form content include: no identification of the hazardous materials involved; an incorrect classification; no PARs for an SAE (required by the EAL); inconsistent information provided to offsite authorities; and incorrect designation of an SAE as a release only on site. The notification form was principally designed to satisfy NRC requirements and does not require some of the information desired by DOE. For example, the following information is not recorded on the notification form: date and time the emergency was discovered; protective actions taken; notifications made; damage and casualties; impact on nearby facilities; level of media interest; and contact information of the DOE on-scene point of contact. Additionally, no written notifications were provided.

Notwithstanding the effective communications demonstrated during the activation phase of the response and for early warnings to site workers and the public, significant delays or lapses in decision-making resulted from weaknesses in subsequent communications between members of the response organizations. In addition to delays in communicating the material at risk to the CM, the following observations were many examples of poor communications that hindered an effective response:

- During one chlorine scenario, the CM did not consult with the IC before announcing the relocation of personnel to their normal work place for the purpose of sitewide accountability. At the time, the CM did not know what facilities the IC had previously evacuated, and the proposed announcement could have placed workers back in harm's way.
- The CMs received no informational briefings on the chlorine plume plots.
- When consequence assessment results became known to the ERO, they were not provided to the ICs for use in protecting responders.
- EOC information management systems do not provide a formal method to record, sequence, validate, and track the flow and chronology of emergency information for use as a legal record and post-event analysis. (The computerized records logged in by the EOC historian were updated in a manner that did not retain the information that was initially recorded.)
- EOC status boards indicating the status of event classification and notifications were available but were not used.
- Protective actions implemented by the IC were not always recorded in the EOC.
- No press release was approved for issue during two of the four ERO LSPTs.

Finding #4: During LSPTs, PORTS did not provide timely and accurate notifications to offsite authorities, and continuous and effective communications were not maintained throughout the operational emergency, as required by DOE Order 151.1B, *Comprehensive Emergency Management System*.

D.3 Conclusions

PORTS implements a viable emergency response that uses an array of communication systems, appropriate response authorities, and subject matter experts for the protection of personnel and mitigation of event consequences. The ICs and EOC CMs demonstrated effective command and control of their applicable response teams and were knowledgeable

of their responsibilities. Mechanisms are in place to quickly and safely augment the initial response team from onsite resources, employee residences, and local fire and law enforcement organizations. When response tools were available, protective actions were appropriately taken to protect site workers in the immediate vicinity of the scene and to warn other site workers and the public, as necessary. However, for extended downwind areas, decision makers did not make full use of EAL-stipulated protective actions and the Emergency Response Guidebook to establish adequate protective actions and PARs. Additionally, the absence of tools to enable continuous consequence assessments and weaknesses in communications further hampered an effective response, particularly for timely identification of any hazardous material involved and for protection of onsite and offsite personnel in downwind areas. These weaknesses are partially offset by default protective actions taken when sirens and warning systems are actuated early, by equipping security personnel with respirators, and by performing periodic air monitoring at the ICP. Nevertheless, the overall weaknesses, along with a cumbersome notification process, contributed to untimely, inaccurate, and not fully up-to-date information provided to offsite authorities. The cumbersome notification process and the absence of needed plume modeling capability were also identified by the PPPO in a recent emergency management self-assessment.

D.4 Rating

A rating of NEEDS IMPROVEMENT is assigned to the area of emergency response.

D.5 Opportunities for Improvement

This Independent Oversight inspection identified the following opportunities for improvement. These potential enhancements are not intended to be prescriptive. Rather, they are intended to be reviewed and evaluated by the responsible Office of Environmental Management and contractor line management and prioritized and modified as appropriate, in accordance with site-specific programmatic emergency management objectives.

PPPO

- Consider formalizing, by procedure, the involvement of the ERO's DOE representative in developing press releases and site public address announcements.
- Consider formalizing, by procedure, the responsibilities of the ERO's DOE representative for classification, protective actions, and PAR functions.

USEC

- As part of the corrective actions to improve offsite notifications, consider the following:
 - Clarifying expectations in procedures regarding when update notifications are required
 - Incorporate a written form that can be immediately faxed to offsite authorities
 - For content guidance, make use of DOE's situation report requirements.
- To improve compliance with EAL-prescribed protective actions and PARs and Emergency Response Guidebook usage, consider:
 - Developing a procedure that clearly defines the expectations for using response tools
 - Train and drill decision-makers with emphasis on expectations for response tool usage, the entire contents and application of the Emergency Response Guidebook, requirements for activation of the Joint Public Information Center, as well as the timing for activation and use of public warning sirens and emergency alert messages.
- To improve the timeliness of the initial press release, consider the following:
 - Establish written guidance to define the expectations for a "timely" initial press release.
 - Institute a pre-scripted press release using a "fill-in-the-blank" form that can be quickly

completed to reflect the most significant event conditions known.

- To improve overall response effectiveness, strengthen communications among all participants. Specific actions to consider include:
 - Formally, by procedure, assign the responsibility for identifying the material at risk in an event and providing the information to the CM in a timely manner.
 - Require informational briefings to the CM from consequence assessment personnel that include the analyses contained in relevant EPHAs and any dispersion plume plots that are developed. Ensure that plume plots appropriately reflect the event by instituting a review and approval process before they are presented to the CM.
 - Require that the CM inform the IC of all relevant consequence assessments. In the absence of EALs and additional predictive analysis, use the Emergency Response Guidebook to assess the safety of personnel at

the ICP and traffic control points and for use in planning field monitoring team activities.

- Make use of available classification and notification status boards throughout the EOC.
- Add information on protective actions implemented and PARs to the EOC status boards. Ensure that any ERO changes to protective actions are discussed with the IC before they are implemented.
- Implement a system that keeps a historical record of significant events and when they occurred (or were known to have occurred).

LPP

- To enhance the value of LATA-Parallax Portsmouth, LLC (LPP) ERO representatives, consider providing them additional training, focusing on the materials at risk in LPP buildings and their potential consequences.

APPENDIX E

READINESS ASSURANCE

E.1 Introduction

Emergency management program administration includes elements of readiness assurance as well as performance of some planning and response functions. Readiness assurance activities ensure that emergency management program plans, procedures, and resources of the Portsmouth/Paducah Project Office (PPPO) and Portsmouth Gaseous Diffusion Plant (PORTS) will facilitate an effective response to an emergency at the site. Readiness assurance activities include implementation of a coordinated schedule of program evaluations, appraisals, and assessments. Key elements of the readiness assurance program include the active involvement of the U.S. Department of Energy (DOE) Office of Environmental Management (EM) line organizations in monitoring program effectiveness; implementing self-assessment programs; and ensuring that timely corrective actions for identified weaknesses are identified, implemented, and appropriately closed. EM field elements also have direct responsibility for performing some emergency response activities, including oversight of the site's emergency response and activities related to the release of emergency public information to site workers and the public.

EM has line management responsibility for PORTS, with overall responsibility for programmatic direction, policy guidance, management overview, performance accountability, and funding of landlord activities and infrastructure operations, including emergency management. Operation of PORTS falls under PPPO, which reports directly to EM and is responsible for providing direction and oversight for the emergency management program. Within PPPO, responsibility for direction and oversight of the contractor's activities rests with the programmatic line manager. Consequently, the PPPO Site Lead is responsible for oversight of the United States Uranium Enrichment Corp. (USEC) in its role as the lead contractor in the PORTS emergency management program and Theta Pro2Serve Management Company, LLC (TPMC), Uranium Disposition Services, LLC (UDS), and LATA-Parallax Portsmouth, LLC (LPP) in their roles as event contractors.

E.2 Status and Results

E.2.1 DOE Line Program Management

Established in January 2004, PPPO has achieved notable progress toward the development and implementation of their oversight plans and implementing procedures that govern the roles, responsibilities, and processes for oversight of the emergency management program at PORTS. The PPPO Management Plan establishes clear, unambiguous lines of authority and responsibility for oversight and assessments of the emergency management program that flow from the PPPO Manager to the Site Lead. The processes clearly define the requirements for conducting assessments and self-assessments, specify an appropriate variety of assessment methods, and clearly assign responsibility for ensuring completion of corrective actions. PPPO maintains an integrated oversight schedule that includes the required triennial emergency management assessments of LPP, TPMC, and USEC in 2008 and an operational readiness review that will include emergency management for UDS in 2008.

In addition to the oversight functions, PPPO has taken positive steps toward implementing their emergency management programmatic responsibilities. These steps include PPPO-initiated actions that were responsible for resolving a longstanding issue regarding the appropriate protective action criteria for uranium hexafluoride, thus removing the impediment to finalizing several emergency planning hazards assessments (EPHAs). In addition, PPPO reviewed and approved PORTS emergency plans and emergency planning zones (EPZs) and provided copies to EM. PPPO personnel have also participated in and observed drills and exercises, and followed up on selected problem reports that USEC prepared after drills and exercises that document the issues requiring resolution. Additionally, several processes are in place that enable PPPO to maintain operational awareness of the PORTS contractors' emergency management programs. Specifically, PPPO has recently started attending monthly meetings held by the PORTS contractors' emergency management program managers to provide routine feedback on emergency

management program performance. Further, the PPPO Facility Representatives hold frequent meetings with senior PPPO management and share the results of their assessments activities, including emergency management program status and issues.

To augment limited staff resources, PPPO obtained the long-term assistance of an emergency management subject matter expert from the EM Consolidated Business Center. This subject matter expert recently completed a self-assessment of the PPPO emergency management program that also included a high-level review of the PORTS contractors' emergency management programs. The self-assessment report, completed in early August 2006, clearly identified objectives, issues requiring corrective action, and recommendations for consideration in the corrective action development process. For the common inspection elements, the results of the PPPO self-assessment are generally consistent with those of this Independent Oversight assessment. Specifically, the report identified the need for incorporating emergency action levels (EALs) and protective actions for non-leased DOE facilities into USEC procedures, reducing the time PPPO takes to approve EPHAs, changing the process for making DOE Headquarters notifications, and establishing National Atmospheric Release Advisory Center (NARAC) capabilities for modeling radiological releases. PPPO plans to develop a single corrective action plan to address issues identified in their self-assessment and this Independent Oversight inspection.

The PPPO issues management process is generally comprehensive. To close an issue, the process requires the responsible individual to document the verification of closure by identifying the specific areas investigated, the objective evidence reviewed, and the results of the verification. Additionally, three signatures are required to close an issue: corrective action verifier, assessment team leader, and Federal project director. This documented process provides assurance that identified weaknesses will be effectively addressed; however, because the first assessment of emergency management was only recently completed, there is no history by which to evaluate the overall effectiveness of the issues management process for emergency management.

While the PPPO emergency management oversight program includes the basic attributes of an effective oversight program, some emergency management programmatic responsibilities are not fully implemented. For example:

- Review/approval of EPHAs has not been timely. Six EPHAs have been awaiting PPPO approval (in accordance with PORTS procedures) for an extended time. However, implementation has not been delayed, because the contractor is allowed to implement the EPHAs awaiting PPPO review.
- PPPO has not participated in the evaluation of PORTS exercises.
- PPPO has not sent copies of the approved PORTS emergency plans and EPZs to DOE/NA-40 as required by DOE Order 151.1B, *Comprehensive Emergency Management System*.
- PPPO did not prepare an Emergency Readiness Assurance Plan (ERAP) for fiscal year (FY) 2006-FY 2010.
- The draft FY 2007 USEC work authorization that delineates the emergency management services that USEC will provide for PORTS refers to DOE Order 151.1B, and PPPO does not plan to update the document to reflect DOE Order 151.1C. The other DOE contractors at PORTS will be contractually committed to DOE Order 151.1C.
- The PPPO Management Plan is overdue for revision and omits two paragraphs from DOE Order 151.1B in the functions, responsibilities, and authorities appendix regarding ensuring effective communications with DOE Headquarters and pre-designating DOE employees to serve as the site lead for national responses.

Finding #5: PPPO has not fully implemented some elements of the cognizant field element responsibilities for PORTS (such as timely EPHA reviews and exercise evaluations), as required by the PPPO Management Plan and DOE Order 151.1B.

In summary, PPPO has instituted plans and procedures that govern the roles, responsibilities, and processes for oversight of the emergency management program at PORTS, including establishing clear lines of authority and responsibility for oversight, creating assessment and issues management processes that are generally comprehensive, and maintaining an integrated oversight schedule that includes emergency management assessments. Further, implementation of the PPPO plans and procedures is making notable progress through obtaining the

assistance of an emergency management subject matter expert, completing a self-assessment of the PPPO emergency management program, and enhancing the operational awareness of the PORTS emergency management program. However, several programmatic responsibilities are not yet fully implemented; these include conducting timely reviews of EPHAs, taking part in the evaluation of PORTS exercises, and resolving issues. Further, PPPO plans do not include updating the USEC work authorization to include DOE Order 151.1C, which will lead to differences between the emergency management services provided by USEC and the requirements that the remaining PORTS contractors must meet. Although these issues require correction, they do not significantly degrade the overall effectiveness of the line management oversight of the PORTS emergency management program.

E.2.2 PORTS Feedback and Improvement

PORTS contractors utilize comprehensive assessment processes that have been effective in identifying weaknesses and improvement items for emergency management. TPMC performs most of the assessments using the draft DOE Emergency Management Evaluations Guide criteria, and the activities of the other PORTS contractors are included in many of those assessments. For example, TPMC recently completed an assessment of the LPP facility emergency packets, which resulted in a number of findings that LPP entered into their corrective action tracking system. USEC conducts and evaluates the drills and exercises for PORTS and includes the other PORTS contractors and PPPO as participants. However, there is no documentation between the PORTS contractors that delineate which organization is responsible for performing assessments of the various emergency management elements in order to ensure coverage of all applicable elements annually. For example, TPMC assessed EPHAs and emergency response organization (ERO) training in February 2006. Although LPP and USEC were included in the scope of the assessments, UDS was not included, even though they also have an EPHA and ERO members. Assessments that would include the UDS EPHA and UDS ERO members do not appear on any of the PORTS contractor assessment schedules for 2006. As a result, there is no coordinated assessment schedule or plan to ensure that all applicable aspects of all PORTS contractors' emergency management programs receive an annual assessment.

PORTS contractors have instituted issues management processes that provide for effective tracking and closure of corrective actions for issues identified by their own organizations. All of the issues management processes provide for the clear assignment of responsibility for completion of corrective actions, a formal process for due date changes, and a requirement for verifying the completion of corrective actions. Each PORTS contractor has an issues management system used to track the issues and corrective actions for their organization. However, the resolution of findings and observations is not always adequately coordinated between contractor organizations. For example, TPMC conducted a comprehensive assessment of the PORTS emergency management program in 2005 that resulted in findings and observations for various contractors in key areas, such as EALs, protective action recommendations, and habitability of emergency facilities. It cannot be easily determined whether the responsible organization took corrective actions, because only TPMC tracked the corrective actions, usually without reference to the responsible contractor organization and with limited closure documentation. Coordination problems result in part from differing requirements for what types of issues require tracking and corrective action. TPMC and USEC require corrective actions for all issues identified as findings or observations, while LPP and UDS only require corrective actions for findings. More significant is the absence of a sitewide document that clearly describes the interrelationship of the PORTS assessment processes and establishes requirements and responsibilities for issues management when issues are assigned outside the assessing contractor organization. As a result, there is no formal mechanism to ensure that findings and observations discovered during an assessment by a PORTS contractor reach the corrective action tracking system of the responsible organization. Similarly, there is no mechanism for reporting the completion of corrective actions to the assessing organization.

Finding #6: The TPMC, LPP, UDS, and USEC issues management systems collectively do not ensure that all identified weaknesses are assigned to the responsible organization and that timely corrective actions are implemented, as required by DOE Order 151.1B, *Comprehensive Emergency Management System*.

ERAPs for PORTS were prepared by TPMC and LPP jointly and UDS. The significant changes from

the previous year were included, and the resources needed to implement and maintain the emergency management programs were identified; however, in some areas, inaccurate and/or insufficient information minimizes the usefulness of the ERAPs in serving as planning tool. Specific examples include:

- Neither ERAP listed the facilities associated with the PORTS exercises to allow a determination that the facilities requiring EPHAs are being sufficiently exercised.
- The TPMC/LPP ERAP did not contain the results of annual readiness assurance assessments.
- The TPMC/LPP ERAP includes a table of current facility EPHAs that does not match the list of facilities in another table of dominant potential operational emergencies.
- The planned assessments listed in the UDS ERAP incorrectly listed TPMC instead of UDS as the organization that would be conducting the assessments.

In summary, PORTS contractors use assessment and issues management processes that are effective for issues identified and corrected by their own organizations. The assessment processes are comprehensive, with TPMC performing the majority of the assessments, often including the activities of some of the other PORTS contractors in those assessments. USEC manages the drills and exercises program and includes the other PORTS contractors and PPPO as participants. However, there is no assurance that all elements of the emergency management programs for all PORTS contractors are assessed annually, because the interrelationship of the assessment processes for the PORTS contractors is not formally documented and weaknesses in coordinating the resolution of issues within PORTS were noted. Further, no formal mechanism exists to ensure that findings and observations discovered during an assessment lead to corrective actions by the responsible PORTS contractor. Finally, ERAPs prepared by TPMC, LPP, and UDS do not always include complete and accurate information, reducing their effectiveness as planning tools.

E.3 Conclusions

In conclusion, PPPO has effective plans and procedures in place that govern the roles,

responsibilities, and processes for oversight of the emergency management program at PORTS and has made significant progress toward full implementation. Additionally, each PORTS contractor has comprehensive assessment and issue management processes that are effective for identifying and correcting issues within their own organization. Furthermore, USEC has an extensive program of drills and exercises that includes the other PORTS contractors and PPPO. Although some PPPO programmatic responsibilities are not yet fully implemented, the overall effectiveness of PPPO line management oversight is not significantly diminished. While the PORTS contractors have a highly integrated program for emergency response, assessments of the emergency management program are not adequately coordinated to ensure that all elements of the emergency management program receive an annual assessment. In addition, weaknesses in coordinating the resolution of issues between PORTS contractors lead to gaps where the responsible PORTS contractor may not correct issues discovered during an assessment by another PORTS contractor. Finally, because ERAPs contain some incomplete or inaccurate information, they are not fully effective as planning tools.

E.4 Ratings

A rating of EFFECTIVE PERFORMANCE is assigned to the area of DOE line program management.

A rating of NEEDS IMPROVEMENT is assigned to the area of PORTS feedback and improvement.

E.5 Opportunities for Improvement

This Independent Oversight inspection identified the following opportunities for improvement. These potential enhancements are not intended to be prescriptive. Rather, they are intended to be reviewed and evaluated by the responsible Federal and contractor line managers and prioritized and modified as appropriate, in accordance with site-specific programmatic emergency management objectives.

PPPO

- Consider developing a procedure to ensure that hazards survey and EPHA reviews are timely and performed by appropriate PPPO

disciplines (e.g. safety analysis experts and Facility Representatives).

- Consider updating the USEC work authorization to reflect DOE Order 151.1C requirements and to establish a date for its implementation by USEC that ensures consistency among all PORTS operating contractors.
- To strengthen and clarify the emergency management oversight program, consider the following actions:
 - Update the PPPO Management Plan to include provisions for ensuring that effective communications with DOE Headquarters are established and pre-designating DOE employees to serve as the site lead for national responses.
 - Require an annual review of contractor self-assessments.
 - Specify criteria used for self-assessments.
- To formalize and promote timely reviews and submittals of the emergency plan, ERAPs, and documentation that establishes the EPZ, with reviews by appropriate technical disciplines, consider developing written protocols that:
 - Identify the technical disciplines required within PPPO for the review of the emergency plan, ERAPs, and EPZ documentation.
 - Establish an overall timeline and a discipline-specific due date for all specified reviews.
 - Incorporate a mechanism that confirms DOE/NA-40's receipt of approved EPZs and emergency plans.
- To increase the involvement of PPPO in the PORTS exercise program, consider the following actions:
 - Review exercise packages, exercise final reports, and exercise problem reports issued by USEC.
 - Assign PPPO personnel as evaluators for PORTS exercises.

- Verify the implementation of corrective actions identified in exercise problem reports.

- To strengthen and formalize the PPPO corrective action process, consider adding verification steps to the corrective action procedure that require an assessment of corrective action effectiveness prior to action item closure.
- To promote improvements for all PORTS contractor emergency management programs, consider adding emergency management performance measures to the LPP, TPMC, and UDS contracts.

USEC

- To ensure that reviews are performed for all USEC emergency management program functional areas and to establish clear boundaries for all PORTS contractors, consider developing a document that describes all arrangements and assignments for completing USEC annual program assessments.
- To enhance the usefulness and completeness of the exercise final reports, consider including:
 - A summary of the issues identified during the exercise and the corresponding problem report tracking numbers
 - A listing of all organizations that participated in the exercise.

TPMC

- Consider evaluating the backlog of overdue corrective actions to identify those items that will adversely affect ongoing work or will require significant rework if they are not completed in the near term.
- To enhance the focus of improvement efforts, consider clarifying assessment results by using a single rating for each criterion, and by providing contact information for follow-up.

LPP

- To promote consistent results in the identification and resolution of self-identified emergency management program weaknesses, consider formalizing the LPP emergency management

program assessment processes through written protocols that clearly describe thresholds for requiring use of the LPP corrective action tracking system.

TPMC, LPP, and UDS

- To ensure that reviews are performed for all TPMC, LPP and UDS emergency management program functional areas and to establish clear boundaries for all PORTS contractors, consider developing a document that describes all arrangements and assignments for completing each contractor's annual program assessments. Consider including a common definition for findings and observations, and establish tracking requirements for each.
- To enhance the usefulness of TPMC, LLP, and UDS ERAPs, consider the following:

- Provide new due dates for overdue EPHA reviews and revisions.
- Provide the most dominant potential operational emergencies listed for each EPHA facility.
- List facility(ies) involved in each exercise.
- List exercises completed during the past FY.
- List assessments completed during the past FY.
- List emergency management functional areas scheduled for near-term assessments.