

**Independent Oversight  
Inspection of  
Emergency Management  
at the**



# **Y-12 Site Office and Y-12 National Security Complex**

**February 2008**

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Office of Emergency Management Oversight  
Office of Independent Oversight  
Office of Health, Safety and Security  
Office of the Secretary of Energy



# Table of Contents

	Abbreviations	i
<b>1</b>	Introduction	1
<b>2</b>	Results	3
<b>3</b>	Conclusions	5
<b>4</b>	Ratings	7
<hr/>		
	Appendix A – Supplemental Information	9
	Appendix B – Site-Specific Findings	11
	Appendix C – Emergency Planning	12
	Appendix D – Emergency Preparedness	18
	Appendix E – Emergency Response	26
	Appendix F – Readiness Assurance	33

## Abbreviations Used in This Report

<b>ACN</b>	<i>Acetonitrile</i>
<b>B&amp;W Y-12</b>	<i>Babcock &amp; Wilcox Technical Services Y-12, L.L.C.</i>
<b>CCA</b>	<i>Control Center Assistant</i>
<b>CHARM</b>	<i>Complex Hazardous Air Release Model</i>
<b>DOE</b>	<i>U.S. Department of Energy</i>
<b>EAL</b>	<i>Emergency Action Level</i>
<b>ECC</b>	<i>Emergency Control Center</i>
<b>EMInS</b>	<i>Emergency Management Information System</i>
<b>EMPO</b>	<i>Emergency Management Program Organization</i>
<b>EOC</b>	<i>Emergency Operations Center</i>
<b>EPHA</b>	<i>Emergency Planning Hazards Assessment</i>
<b>EPI</b>	<i>Emergency Public Information</i>
<b>ERAP</b>	<i>Emergency Readiness Assurance Plan</i>
<b>ERO</b>	<i>Emergency Response Organization</i>
<b>FBI</b>	<i>Federal Bureau of Investigation</i>
<b>FY</b>	<i>Fiscal Year</i>
<b>IC</b>	<i>Incident Commander</i>
<b>JIC</b>	<i>Joint Information Center</i>
<b>LSPT</b>	<i>Limited Scope Performance Test</i>
<b>MAA</b>	<i>Material Access Area</i>
<b>NA-43</b>	<i>NNSA Office of Emergency Management Implementation</i>
<b>NARAC</b>	<i>National Atmospheric Release Advisory Capability</i>
<b>NNSA</b>	<i>National Nuclear Security Administration</i>
<b>ORO</b>	<i>Oak Ridge Office</i>
<b>PSS</b>	<i>Plant Shift Superintendent</i>
<b>REM</b>	<i>Roentgen Equivalent Man</i>
<b>TSC</b>	<i>Technical Support Center</i>
<b>WSI</b>	<i>Wackenhut Services, Inc. – Oak Ridge</i>
<b>Y-12</b>	<i>Y-12 National Security Complex</i>
<b>YSO</b>	<i>Y-12 Site Office</i>

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# 1 Introduction

The U.S. Department of Energy (DOE) Office of Independent Oversight inspected the emergency management program at DOE's Y-12 National Security Complex (Y-12) in October-November 2007. The inspection was performed by Independent Oversight's Office of Emergency Management Oversight (HS-63). Independent Oversight reports to the Chief, Office of Health, Safety and Security, who reports directly to the Secretary of Energy.

Within DOE, the National Nuclear Security Administration (NNSA) has line management responsibility for Y-12. NNSA provides programmatic direction for and funding of most activities, including emergency management program implementation at Y-12. At the site level, line management responsibility for Y-12 operations and emergency management falls under the Manager of the Y-12 Site Office (YSO). Under contract to DOE, Y-12 is managed and operated by Babcock & Wilcox Technical Services Y-12, L.L.C. (B&W Y-12), a limited liability enterprise of Babcock & Wilcox Technical Services Group and Bechtel National, Inc. Under a separate contract to DOE, Wackenhut Services, Inc., is the protective force contractor responsible for site physical security.

The primary Y-12 mission is to ensure a safe and reliable U.S. nuclear weapons deterrent by producing weapons components and supporting the NNSA stockpile stewardship program. Other activities under way at Y-12 include retrieving and storing nuclear materials; downblending of surplus highly enriched uranium; and providing unique and highly-specialized manufacturing and software technologies to other Federal agencies. Y-12 activities involve significant quantities of hazardous radiological materials and chemicals, in various forms, that pose potential hazards to site workers and the public.

The purpose of this Independent Oversight inspection was to assess the effectiveness of the emergency management program at Y-12, as implemented by B&W Y-12 under the direction of YSO. This evaluation included an examination of selected elements of the emergency management program at Y-12. Independent Oversight used a selective sampling approach to assess a representative sample of facilities and emergency responders at Y-12. Specifically, the sampling approach was used to evaluate:

- The effectiveness of the hazards surveys and emergency planning hazards assessments (EPHAs) in serving as an appropriate foundation for the Y-12 emergency management program.
- The effectiveness of the YSO and Y-12 emergency response organization (ERO) personnel in applying their skills, procedures, and training to make appropriate decisions and to properly execute actions to protect emergency responders, workers, and the public. To evaluate response performance, Independent Oversight conducted limited-scope performance tests (LSPTs) for initial responders and decision-makers. The performance tests were designed to evaluate the ability of responders to effectively execute their assigned duties during postulated site-specific emergencies. Independent

Oversight used trusted agents from the site to assist in developing and conducting the performance test scenarios and validating the results.

These activities, as well as reviews of corrective actions in other assessment areas developed in response to self-identified weaknesses and areas for improvement, provided insights into the effectiveness of YSO and contractor feedback and continuous improvement systems, as well as NNSA's emergency management oversight and operational awareness activities at Y-12.

Emergency management at Y-12 was last evaluated in November 2001 as part of a combined Independent Oversight inspection effort in the areas of safeguards and security, and emergency management. Overall, the 2001 inspection found that Y-12, under the direction of the previous contractor, BWXT, had satisfactorily addressed the large majority of emergency management program weaknesses previously identified by Independent Oversight. The Y-12 area office had been aggressively involved in the emergency management upgrade program. Although Independent Oversight identified some weaknesses that were due primarily to the magnitude of the overall task and various resource constraints, BWXT's notable progress was considered reflective of management commitment in this area and substantial efforts on the part of the emergency management department.

Section 2 of this report provides an overall discussion of the results of the review of the Y-12 emergency management program elements that were evaluated. Section 3 provides Independent Oversight's conclusions regarding the overall effectiveness of YSO and contractor management of the emergency management program. Section 4 presents the ratings assigned as a result of this inspection. Appendix A provides supplemental information, including team composition. Appendix B identifies the findings that require corrective action and follow-up. Appendices C through F detail the results of the reviews of individual emergency management program elements.

# 2

## Results

### 2.1 Positive Program Attributes

YSO and B&W Y-12 have established an emergency management program that, with very few exceptions, meets DOE expectations and affords adequate protection to site workers and the public. Positive attributes of the emergency management program are discussed below.

**YSO and B&W Y-12 have appropriately institutionalized the expectations and processes that support key emergency management program elements.** B&W Y-12 develops and maintains site hazards surveys, EPHAs, and emergency action levels (EALs) in accordance with detailed procedures that clearly delineate the methods, assumptions, and approach for identifying and analyzing hazardous materials for which emergency planning must be conducted. The B&W Y-12 plans and supporting implementing procedures for the training, drill, and exercise program provide, in most cases, a clear set of requirements that address the conduct of training, the verification of ERO candidate readiness, and the validation of emergency management program effectiveness through exercises. Additionally, the site has established comprehensive programs, plans, and processes for educating the public about the actions to take during a Y-12 emergency and providing emergency event information to the media and the public. Finally, with a few exceptions, the YSO and B&W Y-12 assessment and issues management processes describe a comprehensive approach for identifying programmatic weaknesses, and developing and implementing corrective actions.

**B&W Y-12 has assembled an emergency response capability that is well supported by an integrated set of facilities, equipment, response procedures, and other tools.** The Fire Department is appropriately equipped with the pre-fire plans, maps, checklists, status boards, and other command aids necessary to facilitate effective response at the event scene. The plant shift superintendents (PSSs), who continuously staff the emergency control center and fill the position of initial site emergency director, have ready access to the necessary communications systems. The PSSs have been provided semi-automated, computer-supported paging and notification systems that are intended to minimize the operational burdens posed by these important tasks, and therefore allow initial decision-makers to better focus on managing the event. The locations of the technical support center (TSC) – immediately adjacent to the emergency control center (ECC) and the emergency operations center (EOC), just outside the five-mile emergency planning zone at another DOE site – facilitate rapid assembly of initial support personnel on site while providing a venue for strategic decision-making (and an alternate site for technical support) that will remain unaffected by hazardous material releases at Y-12. Furthermore, ERO personnel have been provided with an integrated set of response procedures that appropriately identify the critical tasks that need to be performed in an emergency; however, a few EALs may not include all of the information necessary to provide full protection for workers in close proximity to highly-toxic releases.

**Emergency management feedback and improvement processes by YSO and B&W Y-12 are mostly effective in identifying and implementing needed program improvements.** YSO is actively engaged in maintaining operational awareness of the Y-12 emergency management program through regular interactions

with program personnel, contractor assessments (and some self-assessments), and exercise planning and evaluation activities; furthermore, the NNSA Office of Emergency Management Implementation (NA-43) is appropriately supporting YSO's efforts. B&W Y-12 is effectively using emergency response exercises, and to a lesser extent assessments, along with issues management processes to identify areas that require attention and to improve the site's emergency management program. For example, in response to weaknesses related to worker implementation of shelter-in-place protective instructions that were identified by their independent assessments group, the emergency management program organization (EMPO) informally completed an extent-of-condition review and implemented corrections in several building emergency plans.

## 2.2 Program Weaknesses and Items Requiring Attention

The Independent Oversight team identified some weaknesses in responder performance and related concerns about the implementation of certain program requirements intended to ensure that responders are appropriately prepared to execute ERO duties. Specific weaknesses are discussed below.

### **During LSPTs, Y-12 emergency responders demonstrated inconsistent performance in some areas.**

The Independent Oversight inspection team evaluated the responses of two teams of ERO personnel to the same two event scenarios; several important differences were observed between the responses of the two teams. For example, in the ECC, PSSs specified different initial isolation zones and bomb threat distances for the same event conditions, and control center assistants demonstrated varying degrees of proficiency in filling out the computerized notification form. One team of ECC and TSC responders identified the need to provide protective actions for workers at a nearby construction project, whereas the other team did not. Additionally, the degree of formality in the turnover of site emergency director responsibilities varied between TSC managers and EOC crisis managers, which may have contributed to one instance in which the identity of the individual serving as the site emergency director was unclear (indicated by the TSC manager making an event classification after the EOC crisis manager had assumed the position of site emergency director). The performance of emergency public information personnel in the EOC also varied widely; for the same event, one team issued an initial press release in three minutes, whereas the other team needed over thirty minutes to accomplish the same task. Similarly, there were distinct differences in the proficiency of dispersion modeling, and consequently the timeliness, demonstrated between the two consequence assessment teams. Although most performance objectives were met, the extent of the various performance differences, particularly in the TSC and EOC, is attributed largely to varying degrees of participation in emergency response drills and exercises, as discussed further below.

**Some Y-12 emergency responders and workers may not have the proficiency necessary to effectively respond or react to all site emergencies.** Although the B&W Y-12 training and drill program requires ERO candidates to demonstrate proficiency in their assigned positions before becoming active ERO members, individuals can be, and have been, credited with meeting this requirement without demonstrating their ability to perform the required duties. Furthermore, all ERO members who sign the exercise attendance roster are considered to have participated in that exercise. In practice, this means that multiple ERO members filling the same position are given credit for meeting the site's annual exercise participation requirement without verifying which of the specific position functions were performed by each credited individual or their proficiency in doing so. Finally, although B&W Y-12 conducts required evacuation drills for all occupied buildings on site, the material access areas within these buildings are not included in the scope of the evacuation activity even though some site workers normally work within these areas. Similarly, even though shelter-in-place is a pre-determined protective action that would be directed for one or more facilities during nearly any emergency event, the site has not conducted any shelter-in-place drills or exercises. Consequently, site workers have not practiced all of the protective actions that they might be expected to take in an emergency.

# 3

## Conclusions

The previous inspection of the Y-12 emergency management program occurred in late 2001. That inspection, which included a relatively small scope and simpler approach compared to current Independent Oversight protocols, found that the site had substantially improved the program since an earlier 1998 Independent Oversight inspection, although a few weaknesses remained. This noteworthy change was attributed to a sustained commitment on the part of site management and the emergency management department. This 2007 inspection found that YSO and B&W Y-12 have established an emergency management program that generally protects site workers and the public, although a few program weaknesses may be negatively impacting responder preparedness.

The Y-12 emergency management program exhibits numerous strengths in nearly all areas. The most significant is that YSO and B&W Y-12 have developed a comprehensive and integrated set of plans, implementing procedures, and guidance documents designed to institutionalize the processes by which the site's emergency management program is defined, executed, and improved. In the planning area, defined processes have been used effectively to identify and analyze site hazards to establish a firm foundation for the overall program. B&W Y-12 has also implemented effective programs that ensure that the public receives and understands emergency event information and, with a few exceptions, prepare emergency responders for their duties. The response framework is implemented through an array of staffing approaches, communications systems, response tools and operational aids, appropriately-equipped facilities, and frequent practice opportunities that, collectively, can facilitate a timely and effective response to virtually any site emergency, as demonstrated by responders at most venues during performance tests. Furthermore, YSO and B&W Y-12 use the defined systems and processes to identify program weaknesses and continuously improve the Y-12 emergency management program.

Despite the comprehensive response infrastructure, the Independent Oversight inspection team observed a number of performance inconsistencies by Y-12 emergency responders during LSPTs. These inconsistencies involved various combinations of individual and team lapses in critical thinking, procedure compliance, and the execution of important tasks (e.g., assessing the potential consequences of a hazardous material release) that diminished the overall effectiveness of the response, and sometimes resulted in incomplete or incorrect decisions regarding protective actions for responders and site workers. Although most performance objectives were met, the response inconsistencies raise questions about the impact of certain training and drill program practices on the ERO's overall level of preparedness. Of specific concern are some weaknesses in the degree to which ERO candidates and existing ERO members are actually required to demonstrate proficiency in all of the important job elements applicable to their positions. Furthermore, some site workers may not be adequately prepared to implement necessary protective actions because the drill program does not require workers to practice any type of shelter-in-place or material access area evacuation activities.

Overall, the Y-12 emergency management program is well defined and appropriately implemented, and the program affords an adequate degree of protection for site workers and the public. Given the complexity of site operations and hazards, and attendant scope and breadth of the site's emergency management program, line

management attention is needed at YSO and B&W Y-12 to promote the proficiency of responders, to exercise workers in implementing protective actions, and to sustain the program's long-term effectiveness.

# 4 Ratings

This inspection focused on a detailed assessment of the emergency management programmatic elements listed below, as well as ERO performance during LSPTs. No overall program rating has been assigned. The individual element ratings reflect the status of each Y-12 emergency management program element at the time of the inspection. The ratings assigned below to 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 emergency management elements evaluated during this inspection are:

<b>EMERGENCY PLANNING</b>	
Hazards Survey and EPHAs	EFFECTIVE PERFORMANCE
Program Plans and Procedures	EFFECTIVE PERFORMANCE

  

<b>EMERGENCY PREPAREDNESS</b>	
Training and Drills	NEEDS IMPROVEMENT
Exercises	EFFECTIVE PERFORMANCE
Emergency Public Information	EFFECTIVE PERFORMANCE

  

<b>EMERGENCY RESPONSE</b>	
Incident Command Teams	EFFECTIVE PERFORMANCE
Emergency Control Center Teams	EFFECTIVE PERFORMANCE
TSC/EOC Decision-Making	NEEDS IMPROVEMENT

  

<b>READINESS ASSURANCE</b>	
NNSA Line Program Management	EFFECTIVE PERFORMANCE
B&W Y-12 Feedback and Improvement	EFFECTIVE PERFORMANCE

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## APPENDIX A

### Supplemental Information

#### A.1 Dates of Review

Scoping Visit	October 2 – 3, 2007
Planning Visit	October 16 – 18, 2007
Onsite Inspection Visit	October 29 – November 7, 2007
Report Validation and Closeout	November 28 – 29, 2007

#### A.2 Review Team Composition

##### A.2.1 Management

Glenn S. Podonsky, Chief, Office of Health, Safety and Security  
Michael A. Kilpatrick, Deputy Chief for Operations, Office of Health, Safety and Security  
Bradley A. Peterson, Director, Office of Independent Oversight  
Steven C. Simonson, Director, Office of Emergency Management Oversight

##### A.2.2 Quality Review Board

Michael A. Kilpatrick  
Bradley A. Peterson  
Dean C. Hickman  
William T. Sanders

##### A.2.3 Review Team

Steven Simonson (Team Leader)

John Bolling  
JR Dillenback  
Deborah Johnson  
Teri Lachman  
David Odland  
Tom Rogers

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## APPENDIX B

### Site-Specific Findings

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

FINDING STATEMENTS	REFER TO PAGES:
1. B&W Y-12 has not ensured that all ERO personnel demonstrate proficiency in performing their assigned response duties, as required by DOE Order 151.1C and the Y-12 Emergency Management Training Plan.	20
2. B&W Y-12 does not conduct periodic drills for all workers who may be required to evacuate MAAs or shelter in place, as required by DOE Order 151.1C and the Y-12 Emergency Plan.	20
3. During limited-scope performance tests, consequence assessment teams did not consistently provide information that ensured appropriate protective action decision-making, as required by DOE Order 151.1C and the Y-12 Emergency Plan.	30
4. YSO does not consistently conduct annual self-assessments of its emergency management program, as required by DOE Order 151.1C.	34

## APPENDIX C

# Emergency Planning

### C.1 Introduction

Key elements of emergency planning include developing hazards surveys and emergency planning hazards assessments (EPHAs) to identify and assess the impact of site- and facility-specific hazards and threats, and establishing an emergency planning zone. U.S. Department of Energy (DOE) and National Nuclear Security Administration (NNSA) sites and facilities use the results of these assessments to establish emergency management programs that are commensurate with the identified hazards. The site 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 DOE emergency response recommendations.

This evaluation included a review of the Babcock & Wilcox Technical Services Y-12, L.L.C. (B&W Y-12) Y-12 National Security Complex (Y-12) hazards surveys and EPHAs, and their treatment of hazards associated with the Y-12 site. Also reviewed were sitewide and facility-specific emergency plans and associated implementing procedures.

### C.2 Status and Results

#### C.2.1 Hazards Survey and Emergency Planning Hazards Assessments

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 the EPHAs effectively serve this function depends primarily on the completeness of the institutional processes for developing the hazards surveys and EPHAs; the effectiveness of the screening process by which hazardous materials are initially considered; and the rigor and accuracy of the analyses contained within the EPHAs.

B&W Y-12 has developed a formal, clearly-defined, and well-documented process for developing the site hazards surveys and EPHAs. The process effectively identifies requirements and expectations reflected in DOE Order 151.1C and the associated DOE emergency management guide. The process provides detailed instructions on the methodology, content, and format for developing hazards surveys and EPHAs, and identifies contractor and Y-12 Site Office (YSO) roles and responsibilities for reviewing and approving the hazards surveys and EPHAs. The process also includes mechanisms for facility managers to validate the contents of these documents through a review and approval requirement.

An effective hazardous material identification and screening process, which establishes the need for a quantitative EPHA, is based on 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, and appropriate screening thresholds. The hazardous material identification process at Y-12 appropriately identifies building/operations manager responsibilities to ensure that B&W Y-12 emergency management program organization

(EMPO) emergency planners are notified prior to significant changes in hazardous material inventories or operations involving hazardous materials. Specifically, the building/operations managers are procedurally required to establish the maximum anticipated quantities of their hazardous materials and to maintain their facility hazardous material identification document, which serves as a facility-specific hazardous material inventory list. In addition, building/operations managers are required to ensure that they will not exceed the maximum anticipated quantities established for the facility before purchasing or allowing additional hazardous materials; to report any increases in hazardous material inventories prior to changes occurring to ensure revision of their EPHA; and to verify the accuracy of their hazardous material information system quarterly, which is used as a tool for the annual update of the hazardous material identification document.

B&W Y-12's hazardous material screening process (and its application) contains several notable attributes. EMPO emergency planners currently use the criteria described in DOE Order 151.1C, and are effectively in applying the sections of DOE's emergency management guide (DOE Guide 151.1-2) related to the hazardous material screening process. In particular, EMPO retained for further analysis a few hazardous materials that would be screened out under typical industrial or laboratory use if DOE Order 151.1C screening criteria had been rigorously followed. These materials were retained for analysis because of site-specific circumstances that increased the possibility for unique health and safety concerns involving those materials. For example, acetonitrile (ACN, also known as methyl cyanide) was analyzed in large part because of site-specific concerns regarding the potential for highly-toxic byproducts (i.e., hydrogen cyanide) from reactions and energetic releases associated with its high volatility; the volume of ACN stored on site; the conditions of storage; the relatively high frequency of movement of material containers; and the frequent need for workers to be in the vicinity of the material. Furthermore, B&W Y-12 effectively used the results of the analyses to identify the need for special emergency planning considerations, such as making atropine injection kits readily available to site medical personnel in case of overexposure to hydrogen cyanide and providing specialized training for emergency responders to events involving ACN. The application of this aspect of DOE screening guidance by the EMPO emergency planners indicates a reasonable use of the approach to analyze special site-specific situations within the bounds and intent of the DOE order and guidance.

Although the screening process is comprehensive, one weakness was noted in the current hazards survey for the enriched uranium operations facility. The facility's hazards survey and EPHA have been reviewed annually since 2003. However, there was no documentation of the results of screening (performed in accordance with DOE Order 151.1B requirements) for numerous hazardous materials that are listed on the facility's hazardous material identification document and that have maximum allowable quantities exceeding their published regulatory screening thresholds (for example, acetic acid, ammonium hydroxide, lithium metal, and phosphoric acid). This shortcoming was recently self-identified by EMPO personnel and a revision to the hazards survey, intended to apply until DOE Order 151.1C requirements have been fully incorporated, has been drafted.

B&W Y-12 EMPO personnel have developed stand-alone hazards surveys and EPHAs, consistent with the defined process, for each of their hazardous material facilities. These documents include such appropriate elements as descriptions of emergency events and conditions; external hazards (for example, transportation accidents and the impact of events at nearby, offsite hazardous material facilities); and onsite temporary/transitory hazards that might affect hazardous material facilities. The EPHAs consider a wide range of accident scenarios; include the appropriate barrier analyses; use consistent release fractions for determining estimated source terms; and identify the dose receptors of interest. Furthermore, B&W Y-12 is implementing an aggressive implementation plan to revise the numerous (34+) hazards surveys and EPHAs to incorporate the provisions of DOE Order 151.1C and the 2005 design basis threat criteria. EMPO has revised some of the hazards surveys and EPHAs, and the remaining documents are scheduled for completion by March 1, 2009. In the interim, the hazards surveys and EPHAs that were previously developed continue to provide an adequate basis for the Y-12 emergency management program, primarily because the hazardous material screening criteria used are essentially equivalent to those specified by DOE Order 151.1C.

Emergency action levels (EALs) are critically important response tools that are based on the technical analyses contained in the EPHAs. B&W Y-12 has documented a formal process for developing their EALs that largely

incorporates the provisions of DOE Order 151.1C and the accompanying emergency management guide. The EAL process appropriately ensures that:

- EALs are tested for completeness and modified or augmented with additional EALs, if necessary.
- The full range of possible emergency events can be classified in a timely manner.
- Sitewide and discretionary EALs are developed.
- Initial (pre-determined) protective actions and protective action recommendations are included.

To ensure usability of the EALs, EMPO has incorporated input from the end-users who have the initial responsibility of categorizing and classifying emergency events, specifically the plant shift superintendents (PSSs). The collective result is that the Y-12 EALs contain predetermined, observable criteria that can be used to quickly classify an emergency event according to its severity for the purpose of implementing emergency response actions. More importantly, as observed during limited scope performance tests, the PSSs use the guidance provided in the EALs for quickly identifying the protective actions intended to ensure the health and safety of onsite personnel and to provide protective action recommendations to offsite authorities.

Although the EALs provide appropriate protective action recommendations, a few EALs associated with the postulated release of hydrofluoric acid and hydrogen cyanide do not provide adequate protection for site workers. Typically, Y-12 EALs direct the evacuation of site workers within a pre-determined initial isolation zone and shelter-in-place downwind for personnel outside the isolation zone. However, inside the isolation zone, application of the EALs may result in unprotected workers being exposed to a highly-toxic plume if the plume arrives during the evacuation to assembly stations. Furthermore, for this subset of release scenarios, the EALs do not address whether site personnel outside the initial isolation zone should shelter in place. Enhancing the guidance in the EALs associated with hydrofluoric acid and hydrogen cyanide releases would help to ensure that PSSs provide the most appropriate protective actions for workers.

A final positive EPHA attribute is that minor, moderate, and extreme malevolent act scenarios have been considered in the EPHAs and are usually referenced appropriately to other EPHA event scenarios that provide equivalent release estimates. However, the EALs developed for the malevolent act scenarios sometimes do not correlate with the consequence analysis data contained in the associated EPHA. For example, EALs have not been developed for use by emergency responders for each of the malevolent act scenarios analyzed in the associated EPHA, and in a few cases, an extreme malevolent act EAL has not been developed, even though the consequence analyses in the EPHA indicate that a release resulting in exposures above applicable protective action criteria would occur. Instead, the EAL malevolent act scenarios indicate erroneously that no release is expected.

To summarize, B&W Y-12 has implemented effective processes for developing hazards surveys, EPHAs, and EALs that meet DOE requirements and expectations. EMPO has established an effective hazardous material identification process that ensures that facility managers and emergency planners can maintain the validity of EPHAs. The site hazards surveys identify applicable emergency conditions and, with one self-identified exception, appropriately screen identified hazardous materials. EMPO has also established a comprehensive screening process that uses criteria specified by DOE Order 151.1 and that also carefully considers the site- and material-specific hazards posed by certain hazardous materials that might satisfy the screening criteria, but whose release might cause impacts consistent with the definition of an Operational Emergency. The EPHAs are comprehensive in considering events and hazards, consistent in development of source terms, and adequate in supporting the development of EALs. EALs support timely event classification, provide predetermined protective actions for onsite and offsite populations, and include malevolent act scenarios. However, a few EALs do not explicitly address the hazards posed if personnel inside the isolation zone are evacuated into a

highly-toxic plume, and EALs have not been developed for some malevolent act scenarios analyzed in the EPHAs. These weaknesses do not substantially impact the EALs' overall effectiveness, although they are important concerns that warrant attention.

## C.2.2 Program Plans and Procedures

B&W Y-12 emergency planners have expended substantial effort in planning for a Y-12 response that can address a wide spectrum of onsite and offsite operational emergencies. B&W Y-12 has established a number of formal plans, mutual aid agreements, and memoranda of understanding with the remainder of the Oak Ridge Reservation, the City of Oak Ridge, the State of Tennessee, surrounding counties, nearby hospitals, and external Federal agencies. This degree of planning should facilitate an effective response for events that cross jurisdictional boundaries or overwhelm site or local response assets, consistent with the *National Response Plan*.

Emergency planners have established emergency response plans that consider the site's unique hazards and facility configurations. Pre-fire plans are formally developed and kept current using an institutional process guide to provide building-specific information, enabling a safe and efficient tactical response by fire fighters. Pre-fire plans are complemented by a chemical emergency response guide, developed by B&W Y-12 to make information available about the site's dominant chemical hazards, and a fire-fighting guideline, approved by the site's criticality safety organization, to identify safe fire-fighting practices in areas containing fissile materials. Likewise, building emergency plans are formally and consistently developed using an institutional process guide and are readily available at key locations to describe such important considerations for workers as shelter-in-place protective actions, evacuation routes and assembly stations, and building-specific personnel accountability protocols.

The Y-12 emergency plan adequately documents the site's emergency management program and describes the Y-12 response to operational emergencies, consistent with the applicable DOE emergency management guide. However, the plan does not fully reflect a few operational concepts contained in implementing procedures, supplemental plans, and DOE Order 151.1C. Specifically, the emergency plan references Federal plans superseded by the *National Response Plan*; is inconsistent with bomb threat procedures in identifying providers of explosive ordnance demolition assets; and does not describe the policy for administering the prophylactic potassium iodide, whose use is included in the nuclear criticality response procedure. Additionally, the emergency plan does not identify the two offsite joint operations centers that are described in the B&W Y-12/Federal Bureau of Investigation joint plan for a backup joint operations center and in an implementing procedure for a large scale response involving the Federal Bureau of Investigation.

The emergency plan implementing procedures adequately describe how the provisions of the emergency response plans are executed. These response procedures address all of the response functions described in the emergency plan, including the important functions of categorizing and classifying emergency events; formulating protective actions and protective action recommendations; notifying onsite personnel and offsite agencies; providing command, control, and communication; and specifying required record-keeping. Procedure action steps are assigned to members of the emergency response organization (ERO) to establish clear roles and responsibilities. Furthermore, B&W Y-12 has developed ERO position checklists to enable trained ERO members to quickly execute assigned tasks. Finally, mechanisms are in place to ensure that up-to-date response procedures are available at key locations.

The Independent Oversight team noted a few weaknesses in keeping procedures current and a number of minor inconsistencies within and between the set of emergency plans and response procedures. These include the use of a five-year procedure update period, which has contributed to some procedures not accurately describing current response practices and that may preclude timely revision of response procedures to reflect the use of acute exposure guideline levels as protective action criteria, as required by DOE Order 151.1C.

Another example is that contrary to the concepts described in the *National Response Plan*, the B&W Y-12 incident command procedure and the Wackenhut Services, Inc. – Oak Ridge (WSI) tactical plan use different terminology in identifying the security and fire department incident commanders; additionally, response procedures do not address the development of incident action plans, which are intended for use by the incident commander to establish the overall incident objectives and strategies. Inconsistencies were also noted between the B&W Y-12/City of Oak Ridge joint emergency response plan and the associated implementing procedures regarding the protocols for requesting the City of Oak Ridge police (i.e., request through the City of Oak Ridge 911 dispatch center as opposed to directly calling the police department), and in the fact that the B&W Y-12/City of Oak Ridge emergency response plan describes a feature for “credentialing” of Y-12 responders (i.e., to allow Y-12 ERO members to pass through city police roadblocks) that has never been implemented. Finally, the Independent Oversight team observed the PSSs, control center assistants, and accountability coordinators using several informal, unapproved position checklists during limited-scope performance tests.

To summarize, B&W Y-12 has made a significant effort to plan for an effective response to a postulated release of hazardous materials on or near the Y-12 site. With very few exceptions, response planning is well documented, comprehensive, and coordinated with nearby jurisdictions that can provide additional response assets. Mechanisms are in place to activate response assets, perform emergency response functions, and provide notifications for the protection of site and offsite personnel. B&W Y-12 has implemented an adequate set of procedures and job aids to provide necessary implementing details, task assignments, and to identify required records. However, some weaknesses were noted in the timeliness of revisions to procedures and the formality of position checklists. In addition, some minor updates are needed to completely integrate plans and procedures and to fully reflect DOE Order 151.1C requirements and the *National Response Plan*.

### C.3 Rating

A rating of EFFECTIVE PERFORMANCE is assigned to the area of hazards surveys and EPHAs.

A rating of EFFECTIVE PERFORMANCE is assigned to the area of program plans and procedures.

### C.4 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 offered to the site to be reviewed and evaluated by the responsible line management and accepted, rejected, or modified as appropriate, in accordance with site-specific emergency management program objectives and priorities.

#### B&W Y-12

- Consider verifying that the inventories listed in the hazards survey correlate with those identified on the hazardous material identification document for each facility in order to ensure the accuracy of the hazardous material inventories evaluated in the hazards surveys.
- Enhance the usefulness of the EALs by providing additional specificity to the protective action guidance. Specific actions to consider include:
  - For EALs associated with postulated hydrofluoric acid and hydrogen cyanide releases, evaluate the effectiveness of shelter-in-place for those facilities that would be exposed to toxic gas

concentrations exceeding the threshold for early lethality, and consider shelter-in-place or controlled evacuation of personnel within the isolation zone.

- Conduct a detailed cross-walk of existing EALs against EALs that are proposed in EPHAs (including malevolent act EALs) to ensure completeness and accuracy.
- Consider improving emergency plans and procedures by identifying the documents that are impacted by the changes in DOE Order 151.1C requirements and concepts contained in the *National Response Plan* and updating the affected documents on an accelerated schedule. Specific items should include:
  - Documents (such as categorization and classification procedures) that contain references to protective action criteria (for example, emergency response planning guidelines)
  - Documents that contain references superseded by the *National Response Plan*, such as the *Federal Response Plan*, the *Federal Radiological Emergency Response Plan*, and the *U.S. Government Domestic Terrorism Concepts of Operation Plan*. Refer to the letter of instruction issued for the *National Response Plan*.
- Enhance the consistency of the *Y-12 National Security Complex Emergency Plan* with its implementing procedures and the set of multi-jurisdictional plans. Consider performing a cross-walk between plans and procedures to identify inconsistencies and revising plans and procedures accordingly. Specific items to evaluate include:
  - Credentialing of Y-12 responders
  - Providers of explosive ordnance demolition assets
  - Use of potassium iodide and/or sodium iodide as a prophylactic
  - Protocols for Federal Bureau of Investigation approvals of press releases.
- Consider evaluating the unapproved checklists used by ERO members during limited-scope performance tests and including desired information in the approved position checklists.

### **B&W Y-12 and WSI**

- Clarify the roles and responsibilities of the on-scene command and promote the use of consistent terminology. Consider developing a joint response procedure that provides a seamless integration of response efforts regardless of the type of event; ensures a unified command structure, when appropriate; and supports the transition from a security command to a fire department command.

### **WSI**

- Consider developing a position checklist and equipping responders with a bomb threat standoff table to enhance the response of security on-scene commanders.

## APPENDIX D

# Emergency Preparedness

### D.1 Introduction

A coordinated program of training, drills, and exercises is necessary to ensure that emergency response personnel and organizations can effectively respond to emergencies impacting a specific facility or the site as a whole. This response includes the ability to make time-urgent decisions and take action to minimize the consequences of the emergency and to protect the health and safety of responders, workers, and the public. To be effective improvement tools, exercises should be used to validate all elements of an emergency management program over a multi-year period using realistic, simulated emergency events and conditions, and to provide emergency response organization (ERO) members an opportunity to practice their skills. An effective emergency public information (EPI) program provides the public, media, and U.S. Department of Energy (DOE) employees with accurate and timely information during an emergency event. In part, effectiveness is based on having in place a long-term, documented program to educate the public and the media about actions that may be required during an emergency response.

The Office of Independent Oversight team evaluated the training, drill, and exercise program used to support the Y-12 National Security Complex (Y-12) ERO. As part of the programmatic review of the training, drill, and exercise elements, the Independent Oversight team evaluated the plans and procedures that support these elements, and reviewed training and proficiency records for key site emergency responders. Drill documentation and exercise reports were also reviewed for indications that they are being used effectively to enhance responder proficiency and evaluate the level of the site's response preparedness. The Office of Independent Oversight team also evaluated EPI plans and applicable processes for an emergency at the Y-12 site.

### D.2 Status and Results

#### D.2.1 Training, Drill, and Exercise Program

##### Training and Drills

The Babcock & Wilcox Technical Services Y-12, L.L.C. (B&W Y-12) emergency management program organization (EMPO) has established a comprehensive and well-documented ERO training program that encompasses all ERO members, except for the Wackenhut Services, Inc. – Oak Ridge (WSI) incident commanders (ICs) and their support staff (who are included in the WSI training program). Training requirements for the ERO were determined by a detailed job and task analysis that linked critical knowledge, skills, and abilities to the appropriate training courses and procedures. EMPO provides an extensive set of ERO training courses that contains mostly accurate information. Training courses cover all aspects of emergency response; most training courses are computer-based, readily available to the ERO cadre (regardless of assigned ERO position), and require the successful completion of a test. Instructors teach two of the key ERO training courses in order to facilitate discussion, understanding, and feedback. These training courses are also held frequently and are readily available to the ERO cadre. ERO candidates must complete all initial training requirements and demonstrate the ability to perform the duties of their assigned emergency positions

in an exercise before becoming part of the ERO cadre. Site annual requalification requirements include completion of a refresher course that highlights changes and lessons learned, and participation in an annual exercise to demonstrate continued proficiency.

WSI provides limited training on incident command responsibilities to their incident command staff. The WSI tactical defense plan provides a comprehensive list of response actions for the WSI ICs and their support staff. However, WSI did not perform an analysis to determine the appropriate training courses to support the successful completion of emergency response actions by security personnel, and WSI does not require the WSI ICs or their support staff to complete any of the B&W Y-12 ERO training courses. The WSI ICs and lieutenants have completed a basic national incident management system training course, although WSI has not formally documented this as a training requirement. Further, the WSI sergeants who respond to the emergency scene have not taken any incident command training. Another training content weakness is that the incident command overview training course contains erroneous information on the location of the WSI IC during an emergency and does not explain how the incident command structure differs between WSI and the fire department. Additionally, although the 2007 ERO annual refresher training contained information on acute exposure guideline levels, whose use (instead of emergency response planning guidelines) is required by DOE Order 151.1C, the discussions of protective action criteria for the other training courses that are provided to new ERO members have not been updated.

Recognizing that an effective initial response by plant shift superintendents (PSSs) and responders at the scene is essential for a successful site response to an emergency event, the PSS organization instituted a program of informal monthly tabletop drills that include the PSSs, fire department ICs, WSI ICs, and their respective support staffs. This positive program feature mitigates some of the weaknesses in the WSI training program. The tabletop drills focus on enhancing the teamwork and familiarity between the groups and have been effective in improving performance. The PSS organization develops the scenarios for the tabletop drills based on current topics of interest and prepares detailed drill packages that include the purpose, scope, and objectives to be demonstrated. Drill participants use maps to simulate the field response and discuss the actions that would be taken in response to the given situation. The PSS organization prepares a summary report containing the issues identified during the drills, and the PSS manager resolves issues informally with the appropriate organizations.

The ERO training program is fully implemented for most Y-12 personnel, although implementation is not always effective. Most ERO members have completed their assigned training courses and participated in an annual exercise as required by site protocols. The computerized training database used to track completion of training sends reminders when required training is due and is effective in keeping ERO members current on their training and exercise participation requirements. However, some ERO members did not have the correct training profiles entered into the computerized training database when they were re-assigned to a new ERO position, and therefore did not receive reminders that they were required to complete additional training courses, and were placed on the ERO cadre without having completed all additional required training.

A more significant implementation weakness is that new ERO candidates are required to demonstrate their ability to perform the duties of their assigned ERO positions, yet in most cases, credit for meeting this requirement is given without verifying that the individual demonstrated the requisite degree of proficiency. Furthermore, in several instances, multiple ERO members were given credit for participating in the same exercise in the same ERO position. Existing ERO members are given credit for meeting the site's annual exercise participation requirement if they simply sign the exercise attendance roster; there is no verification that an individual demonstrated proficiency in performing ERO duties. Consequently, ERO members may not be prepared adequately to perform their assigned response duties, likely contributing to the performance inconsistencies observed during the limited-scope performance tests conducted as part of this inspection, as discussed in Appendix E.

**Finding #1: B&W Y-12 has not ensured that all ERO personnel demonstrate proficiency in performing their assigned response duties, as required by DOE Order 151.1C and the Y-12 Emergency Management Training Plan.**

B&W Y-12 provides employees with detailed information on their responsibilities in an emergency, including how to take the proper protective actions. All employees complete general employee training, which includes a comprehensive emergency management component, when they are first hired and every two years thereafter. In addition, B&W Y-12 provides annual training to all employees on the building/facility emergency plan for their assigned work locations and conducts annual evacuation and accountability exercises. Evacuation and accountability exercise packages are well documented, as are the critiques containing the observations from the conduct of the exercises. The building emergency wardens receive copies of the critiques for their facilities and resolve any identified facility issues. EMPO summarizes issues of a more programmatic nature in a year-end report and takes appropriate actions to resolve the issues. However, two weaknesses diminish the effectiveness of the protective-action practice activities. EMPO does not include material access areas (MAAs) in the evacuation and accountability exercises, nor do the facilities conduct drills or exercises to practice evacuating the MAAs. In addition, B&W Y-12 does not conduct drills to allow facility personnel to practice sheltering in place. As a result, B&W Y-12 does not provide facility personnel with sufficient opportunities to practice how to take all of the protective actions that may be necessary in an emergency.

**Finding #2: B&W Y-12 does not conduct periodic drills for all workers who may be required to evacuate MAAs or shelter in place, as required by DOE Order 151.1C and the Y-12 Emergency Plan.**

To summarize, B&W Y-12 has a comprehensive ERO training program that provides for appropriate training of the ERO cadre. Program requirements for training and for demonstrating and maintaining proficiency are clearly established for ERO candidates and existing ERO members, and training courses encompass all aspects of emergency response and are readily available to personnel. WSI ICs and lieutenants have completed a basic national incident management system training course, supported by a detailed list of expected response actions delineated in the WSI tactical defense plan. In addition, a series of informal monthly tabletop drills have enhanced the teamwork between the PSSs, fire department, and WSI. Employees receive detailed information on their emergency responsibilities through initial and annual refresher training, and they participate in annual evacuation and accountability exercises. Finally, most ERO members have completed their required training courses and annual exercise participation, assisted by the computerized training database that reminds ERO members when training is due. However, training provided by B&W Y-12 does not accurately portray the WSI incident command structure, and WSI has not provided any incident command training for the WSI sergeants who respond to the scene of an emergency as the field commander or documented their incident command training requirements. In addition, some ERO members did not complete their additional training courses as required before being reassigned to the ERO cadre. Furthermore, ERO members are given credit for meeting initial and annual exercise requirements if they simply attend an exercise; however, the training plan requires that ERO members must demonstrate proficiency, not just attendance, in order to meet these requirements. Finally, facility personnel do not practice evacuating the MAAs or implementing shelter-in-place protective actions.

## Exercises

The B&W Y-12 exercise program is well defined and includes many positive attributes. Exercise packages are detailed and comprehensive, and the exercise evaluation criteria in the packages are observable, measurable, and appropriate for the exercise scenario and objectives. EMPO procedures clearly describe the process used to place administrative holds or terminate exercises, and require pre-exercise briefings for all exercise

participants, evaluators, and controllers. The critique process gathers observations from the exercise participants, and exercise reports present a summary of the results of the exercise along with any issues noted.

The EMPO exercise plan establishes a schedule for conducting exercises over a five-year period. Most emergency management response program elements are included in an exercise annually, with the exception of offsite response interfaces and termination and recovery, which are included every three years. A schedule to rotate the exercises between the site-specific hazards and initiating events is also included, as well as a nuclear criticality exercise every three years.

EMPO conducts numerous exercises each year, testing a substantial portion of the Y-12 emergency management program. Six exercises were conducted in fiscal year (FY) 2006, with three of the exercises involving an Office of Secure Transportation shipment and the other three exercises postulating a radiological release, a chemical release, and a criticality accident. EMPO conducted five exercises in FY 2007, with two of the exercises involving a security condition change with no specific hazard, and the other three exercises involving a radiological release, two of which were held at the same facility. Exercise after-action reports provide a structured analysis of program and performance weaknesses and areas for improvement. The reports contain a concise summary of the response actions taken along with a timeline, performance summary, identification of findings and improvement items, and an overall exercise rating. Numerous improvement items are identified in each exercise report along with appropriate corrective actions.

Although the B&W Y-12 exercise program provides for comprehensive testing of the ERO, a few weaknesses in exercise planning reduce the usefulness of the exercise component in validating the site's response capability. The five-year exercise plan does not demonstrate how all site-level ERO elements will participate in a minimum of one exercise annually and does not indicate which emergency management response program elements, hazards, facilities, and ERO elements were included in exercises over the previous five years, thereby limiting somewhat the value and usefulness of the plan. In addition, some infrequently exercised response aspects, such as WSI serving as the IC, event termination, and such initiating events as natural disasters, limit the breadth of experience provided to the ERO. Finally, the exercise after-action reports provide few details regarding issues identified during the exercise, their significance, and need for senior management attention, which decreases the usefulness of the reports to management as a means to gauge the state of the emergency program.

To summarize, B&W Y-12 has implemented a comprehensive exercise program that provides for detailed exercise packages with appropriate evaluation criteria and well-defined processes for conducting and evaluating the exercises. The five-year exercise plan provides a mostly effective mechanism for identifying the program elements and hazards to be included in each year's exercises. B&W Y-12 conducts numerous exercises each year, and the exercise results, including issues requiring corrective actions, are clearly documented in exercise reports. However, a few aspects of the five-year exercise plan somewhat lessen its value in ensuring long-term coverage of the necessary program elements and providing a breadth of ERO experiences, and exercise reports provide few details regarding issue significance.

## D.2.2 Emergency Public Information

The EPI program is a coordinated effort among Oak Ridge Office (ORO), Y-12 Site Office (YSO), and B&W Y-12 public information offices. Collectively, and with strong support from cognizant managers, these organizations have developed comprehensive integrated plans and implementing checklists that, with few exceptions, include well-conceived concepts and processes that effectively address nearly all elements required by DOE Order 151.1C. The plans appropriately provide for an initial news release within one hour of the event; provide pre-approved templates for the initial news release; detail the approval and rumor control processes, and include provisions for a joint information center (JIC) that is staffed based on the nature,

severity, duration, and public and media perception of the event. Of particular note is the operation of the JIC, which is automatically activated for either a site area emergency or general emergency event classification and staffed by representatives from all Oak Ridge Reservation sites. Additionally, ORO, YSO, and B&W Y-12 have established a clear set of roles and responsibilities for maintaining and staffing the JIC.

The EPI program includes an extensive public education component that effectively informs site workers and the public of emergency plans and protective actions. This program, which is primarily the responsibility of ORO and is developed in coordination with YSO, B&W Y-12, and offsite officials, includes an outreach strategy consisting of public mailings, a JIC Working Group, an annual DOE-sponsored emergency management forum, and other routinely scheduled intergovernmental meetings. Offsite officials interviewed during this inspection described an improving trend in the ongoing outreach efforts and information coordination in the JIC.

Although the program is mostly positive, the EPI plans do not fully reflect all of the operational concepts required for the integrated release of timely and accurate information. Consequently, some implementing mechanisms are incomplete or inconsistent. In particular, in an effort to ensure the release of information within one hour of an event, as required by their plan, EMPO included in its computer-based information program (EMInS) a feature that immediately generates a pre-approved initial news release based on the initial notification parameters entered by the PSS. However, when emergency control center staff did not use EMInS properly during the limited-scope performance tests, reliance on this automated system by public information staff proved to be problematic. As discussed in Section E.2.3 of this report, for the same exercise event and conditions, one public affairs team rapidly issued the initial news release, whereas the other team took 35 minutes to do so. In large part, this variation in performance can be attributed to the absence of clear and complete instructions for preparing news releases by an alternate method; other contributing factors include inconsistent checklist usage and varying degrees of familiarity with the EMInS process.

Additionally, for events involving Y-12 that are not solely the responsibility of B&W Y-12, the Independent Oversight team noted a few examples of incomplete or unclear implementing mechanisms for integrating the flow of information. While various ORO, YSO, and B&W Y-12 planning documents refer to multi-site events, the plans and accompanying procedures do not include the requisite details or actions to ensure that the flow of public information is coordinated. For example, the Oak Ridge Reservation emergency plan excludes the area inside the Y-12 emergency response boundary and states that the ORO EOC manager is not involved in a Y-12 emergency response unless National Nuclear Security Administration (NNSA) requests support or a multi-site event occurs that involves Y-12 (in which case the Oak Ridge Reservation emergency plan would apply). The *Oak Ridge Reservation Lead Federal Manager Response and Communication Plan*, which is the governing document for a multi-site event, calls for the Y-12 EOC emergency manager to approve news release information specific to Y-12, and then forward that news release to the ORO EOC public information advisor for approval by the lead Federal manager, who then provides this news release to the JIC. The Y-12 emergency plan includes the multi-site event governing document as an attachment to the emergency plan section that addresses offsite response interfaces. However, none of these plans or their supporting checklists clearly reflect how news releases for multi-site events will be developed and coordinated with the various responsible approval authorities. Additionally, when the Federal Bureau of Investigation (FBI) is in charge of an event, there are no clear guidelines regarding the development or release of emergency information.

Finally, Independent Oversight found the training of EPI personnel to be extensive. Training includes all essential programmatic components to ensure that B&W Y-12, YSO, and ORO public affairs personnel understand their roles in the EOC and JIC. The EPI training program is appropriately based on a job task analyses for each EPI cadre position. Course material is appropriate and comprehensive, and the information is delivered through a mix of settings that includes classroom and web-based training; participation in functional drills, exercises, and tabletops drills is also required. Adequate training records are maintained by both B&W Y-12 and ORO, which facilitates the determination of training status for all EPI cadre members.

To summarize, various EPI-related plans and checklists appropriately detail the EPI program, are for the most part well integrated, and with few exceptions, include well-conceived concepts and processes that effectively address most elements required by DOE Order 151.1C. JIC operations are supported by a comprehensive training program that effectively prepares the EPI cadre to activate and operate a JIC and includes specialized guidance for dealing with the media, public, and offsite agencies. An extensive public education program supports the EPI program, informing the public of emergency plans and protective actions before and during emergencies. However, a few EPI program areas require clarification or additional detail, particularly the development of processes and checklists for preparing integrated timely and accurate information during events that are not solely the responsibility of Y-12.

### D.3 Rating

A rating of NEEDS IMPROVEMENT is assigned to the area of training and drills.

A rating of EFFECTIVE PERFORMANCE is assigned to the area of exercises.

A rating of EFFECTIVE PERFORMANCE is assigned to the area of emergency public information.

### D.4 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 offered to the site to be reviewed and evaluated by the responsible line management and accepted, rejected, or modified as appropriate, in accordance with site-specific emergency management program objectives and priorities.

#### Oak Ridge Office, Y-12 Site Office, and B&W Y-12

- Strengthen and clarify the emergency public information roles and responsibilities regarding the development and release of information during multi-site events and during events when the FBI is in charge. Specific actions to consider include:
  - Complete the review and update of the *Oak Ridge Reservation Lead Federal Manager Response and Communication Plan*. [Oak Ridge Office only]
  - Review the Oak Ridge Reservation emergency plan and associated procedures, YSO operating procedures manual, and B&W Y-12 emergency plan to clarify expectations for each organization during multi-site events.
  - Review the offsite interface procedure, B&W Y-12 emergency plan, and the B&W Y-12 FBI response plan to clarify expectations for each organization during an event when the FBI is in charge. [Y-12 Site Office and B&W Y-12 only]
  - Clearly define the roles and responsibilities for each EPI venue.
  - Specify the process for how information will be coordinated.
  - Identify who will develop, approve, and release the initial and subsequent news releases.
  - Revise and update the appropriate emergency plans and supporting procedures and all corresponding ERO checklists to reflect the clarified roles, responsibilities, and actions.

**Y-12 Site Office and B&W Y-12**

- Enhance the effectiveness of the EOC EPI cadre and clarify their responsibilities and titles. Specific actions to consider include:
  - Define (and include in the EOC Public Relations Procedure, Y40-135, as appropriate) the action steps required to develop a news release when EMInS is available and also when EMInS is not activated or data input is erroneous.
  - Revise the EOC Public Affairs Director and NNSA Public Affairs Coordinator checklists to incorporate these action steps.
  - Incorporate additional EMInS training into the EPI training requirements.
  - Review and update EOC checklists and emergency management plans to reflect the correct titles for the EOC EPI cadre.

**B&W Y-12**

- Consider the following enhancements to the Y-12 Emergency Management Training Plan to ensure clearly defined requirements and expectations:
  - Specify the minimum number of trained personnel needed for each ERO position.
  - Stipulate that personnel assigned to more than one ERO position demonstrate their proficiency in each position.
  - Describe the process used to ensure that personnel have the correct training profile loaded in the computerized training database and have completed all required training before being added to the ERO roster.
  - Identify the criteria for evaluating successful demonstration of proficiency in an exercise to meet ERO members' initial and annual exercise participation requirements.
  - Describe the process for removing personnel from the ERO roster when their annual training and exercise requirements are not satisfied.
  - Describe the process for ensuring that training materials are up to date.
- Further strengthen the PSS tabletop drill program. Specific actions to consider include:
  - Modify the scope of the existing emergency response drill procedure to include the PSS tabletop drills.
  - Ensure that issues identified during the PSS tabletop drills are entered into the Y-12 issues management system.
- Enhance the scope of the EMPO five-year exercise plan to ensure that all elements of the emergency management program are evaluated over a multi-year period. Specific actions to consider include:
  - Add information on the exercises conducted over the previous five years that specifies the initiating event, facilities, hazards, emergency response program elements, and site-level ERO elements that were included.

- Develop a strategy for ensuring that all hazard types and a range of facilities are included in exercises over the multi-year period.
- Improve exercise after action reports by including additional supporting information on identified issues, along with a rationale for why each issue was categorized as a finding or an improvement item.

### **B&W Y-12 and WSI**

- Formalize existing training practices and establish clear IC and support staff training requirements by completing and implementing a training plan. Specific attributes to consider in providing an adequate framework for the training plan include:
  - Define and document the prerequisite qualifications and training for all individuals expected to perform as ICs.
  - Develop a job task and training matrix for the position of WSI IC and the lieutenants and sergeants that comprise the IC’s support staff, and correlate each job task with the available training, including B&W Y-12 ERO training, as appropriate.
  - Ensure that WSI ICs and their support staff have received all necessary training to respond effectively to an emergency event.

## APPENDIX E

# Emergency Response

### E.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 from two sets of emergency management limited-scope performance tests (LSPTs) evaluated by the Office of Independent Oversight. Each set of LSPTs involved a combined assessment of response activities within the incident command team, the emergency control center (ECC), the technical support center (TSC), and the emergency operations center (EOC). The Y-12 National Security Complex (Y-12) incident command decision-making team consisted of a Wackenhut Services Inc. – Oak Ridge (WSI) shift lieutenant, the facility manager for the affected facility, a Babcock & Wilcox Technical Services Y-12, L.L.C. (B&W Y-12) fire battalion chief, an operations chief, and selected support staff. The ECC participants included the plant shift superintendent (PSS), control center assistant (CCA), and ECC support staff. TSC teams consisted of a B&W Y-12 TSC manager; Y-12 Site Office (YSO) representative; TSC coordinator; environment, safety, and health manager; and selected TSC support staff. EOC teams consisted of a YSO EOC emergency manager; B&W Y-12 crisis manager; YSO and B&W Y-12 public affairs officers; and selected EOC support staff, including a consequence assessment team.

Two operational emergency scenarios were developed for the LSPTs: a facility operational event resulting in a release of a hazardous radiological material, and a malevolent act involving a release of a hazardous chemical. The LSPT scenarios, which were developed by Independent Oversight in conjunction with YSO and B&W Y-12 trusted agents, were presented to the participants by the trusted agents to ensure scenario validity and delivery of accurate event cues.

### E.2 Status and Results

In the event of an emergency, the PSS assumes the role of site emergency director and provides initial direction and control of the emergency response organization (ERO), performs initial emergency classification and protective action decision-making, and initiates notifications. B&W Y-12 fire or WSI protective force officers lead the on-scene response and are supported by personnel in the ECC and central alarm station, both of which are staffed 24 hours per day. After the TSC is operational, the PSS transfers emergency director authority to the TSC manager, who eventually transfers this authority to the EOC crisis manager after the EOC is operational. Key EOC emergency manager responsibilities are to coordinate with state and local governments and DOE Headquarters elements, and to review and approve emergency press releases. The consequence assessment team, including plume modelers in the EOC, supports both the incident commander and EOC crisis manager by identifying areas that could be affected by the hazardous material release.

## E.2.1 Y-12 Incident Commander Team Decision-Making

Overall, Y-12 incident commanders (ICs) effectively demonstrated the capability to implement an incident command system, with a clear understanding of protocols for which function (fire or security) becomes the IC, and to lead the field response. Throughout the response, ICs verbalized operational control of the response at the event scenes and constantly transmitted information to the ECC and TSC. Fire department ICs effectively used checklists, status boards, command staff identification vests, and appropriate communications to maintain control of the emergency response. Incident command staffs were sensitive to responder safety by ensuring that responders used appropriate personal protective equipment, maintained positions upwind of any potential hazardous material release, closely monitored weather conditions, and periodically assessed the habitability of the command post. Safety officers maintained accountability of firefighters, and the incident command staff recognized appropriate contamination control measures. Additionally, Oak Ridge Reservation common response plan assets and mutual aid assistance from the City of Oak Ridge were appropriately integrated into the incident response.

A key incident command task is to identify clear strategic goals and tactical objectives in a flexible incident action plan. Although a written plan was not developed during any of the LSPTs, fire ICs verbalized an integrated action plan. On the other hand, an integrated plan was not demonstrated for the security events, and security field commanders were not familiar with all of the resources and capabilities under their command. Additionally, WSI implementation of the incident command system was inconsistent with the non-security event response. For example, the security field commanders did not use a checklist or other response guides to guide their actions and are not equipped with any type of incident command system identifier. However, these inconsistencies were partially mitigated through effective lines of authority and the assertiveness of the fire department on scene.

Y-12 ICs continually assessed the event situation and evaluated potential threats to responder safety associated with response at the incident scene. Nonetheless, a few weaknesses were observed regarding the safety of on-scene responders. For example, ICs did not direct, nor did incident scene responders observe, any stand-off distance based on a potential bomb threat. Additionally, during one of the fire events, the command staff did not discuss and evaluate the placement of the command post, which was within the isolation zone identified by the PSS; status boards at the command post indicated that the isolation zone was located in the immediate vicinity of the initial fire. Furthermore, relocation of the staging area to a safe place outside the initial isolation zone was not discussed in either fire event.

To summarize, Y-12 ICs led a coordinated and effective response to security and operational events involving hazardous materials. Incident command teams demonstrated adequate incident assessment, established strategic goals and tactical objectives, and implemented a generally integrated event response in the field. Communications with the ECC and TSC were frequent and informative, and the safety of responders was continually monitored. However, a few weaknesses and inconsistencies were observed between the incident command system used for the security emergencies and that used for the fire emergencies. Additionally, in a few instances, ICs did not adequately consider the risks to responders posed by the postulated threat, although the conservatism designed into the protective actions compensated for most of these weaknesses.

## E.2.2 Emergency Control Center Team Decision-Making

Overall, Y-12 PSSs immediately assumed the emergency director role upon event initiation, quickly established a response organization, and exercised their authority to implement the Y-12 emergency plan. The PSSs consistently initiated an appropriate response by fire and security emergency resources and dispatched personnel using safe route information. TSC, EOC, and incident command technical support teams were

quickly activated using the automated paging system. After the Y-12 TSC became operational, PSSs formally transferred emergency director authority to the TSC manager and became part of the TSC staff.

Y-12 ECC teams effectively recognized emergency events and consistently categorized and classified events promptly and accurately using appropriate emergency action levels (EALs). ECC teams completed verbal notifications to onsite workers and offsite authorities in a timely manner; most notifications were made prior to completing the notification form, and the PSSs relied on memory to ensure repeatability of information. Typically, notification forms were completed by CCAs 30-40 minutes after event classification. Information needed to complete the forms was acquired from the recollection of information provided by PSSs during verbal notifications and from other ECC staff; however, the amount of time required to complete the forms indicates that the process for completing the notification form was not efficient.

ECC teams were largely effective in identifying and communicating protective actions for onsite workers. Most protective actions were initiated quickly and in accordance with EALs. When required, the PSSs activated the public warning sirens and issued the pre-determined protective action recommendations to local and state agencies. However, some inconsistencies were observed in formulating protective actions. For example:

- During one scenario, no protective actions were issued for personnel at the Highly Enriched Uranium Materials Facility construction site, which was in the projected plume.
- One PSS identified an initial isolation zone of 200 feet using the EAL; however, the CCA used a 500 foot (worst case) default value in the emergency management information system (EMInS) to generate the list of buildings to evacuate and shelter-in-place. During another event, the PSS established an initial isolation zone for a General Emergency rather than the distance identified in the EAL for the declared Alert classification. In both cases, this resulted in an overly conservative protective action announcement, thereby making it more difficult to manage the implementation of protective actions.
- During one bomb threat event, nearby facilities were evacuated to an assembly station that brought workers in proximity to the threat and the potential hazardous material release.
- One PSS appropriately used discretionary EALs to assess stand-off distances (although no stand-off distances were ordered) for the potential bomb threat; the other PSS did not assess stand-off distances.

To summarize, ECC teams effectively demonstrated their ability to recognize operational emergencies, dispatch appropriate response units, and activate the ERO. Event classifications were consistently accurate, verbal notifications were timely, and protective actions were promptly implemented to protect site workers and the public during all performance tests. However, the notification process does not ensure that verbal notifications are consistent or that written notifications are timely. In addition, some inconsistencies were observed in formulating protective actions regarding inclusion of construction workers in protective actions, size of initial isolation zones, evacuation routes, and stand-off distances. These process and performance weaknesses did not substantially impact the overall effectiveness of the ECC teams.

### E.2.3 TSC/EOC Team Decision-Making

Y-12 TSC and EOC venues established their operational status based on staffing ERO positions within one hour of event recognition, and both facilities successfully demonstrated the capability to maintain effective and efficient emergency operations. EOC staff verified safe habitability of the EOC, which is located outside the Y-12 emergency response boundary and five-mile emergency planning zone, based on worst-case consequence assessments. The TSC and EOC staffs effectively exchanged information, and EOC liaisons provided timely information to external organizations in the form of updated notification forms and situation reports.

Periodic briefings in the TSC and EOC provided staff with up-to-date information and the status of response activities; and, most teams focused on priority tasks and actions. However, some response tasks were inconsistently performed. For example, issuance of the initial news release was inconsistent between teams; one team issued the news release within three minutes of the public information director's arrival in the EOC, whereas the other team took 35 minutes. Additionally, in one instance, unclear transfer of emergency director authority may have contributed to an unauthorized action that upgraded the event classification from an Alert to a General Emergency, without the approval of the EOC crisis manager. Lastly, many TSC and EOC personnel demonstrated adequate but inconsistent use of their checklists, which may have contributed to varying levels of performance of some tasks. For example, the public information director's use of the checklist supported rapid issuance of one news release, whereas in another instance, for the same event and conditions, no checklist was used, and the news release was not issued for 35 minutes.

As emergency directors, several TSC managers and EOC crisis managers implemented a well-planned course of action based on their current knowledge of the event situation; however, some weaknesses were observed related to situational awareness and assessment. The most significant instance involved the formulation of protective actions during one of the fire events, when responders in the EOC and TSC did not recognize the significance of 100 roentgen equivalent man (rem) doses projected to onsite workers or the impact of a 10 rem dose beyond the Y-12 site boundary. Although the dose information was incorrect, the consequence assessment determination was presented as factual by the consequence assessment team manager and should have resulted in a prompt decision to increase protective actions. Other examples of incomplete, inaccurate, or inconsistent team performance include:

- TSC and EOC teams did not fully assess the potential consequences and corresponding stand-off distances from the blast effects of an explosive device detonation during the security event.
- Senior staff in one of the two TSC teams fully discussed the appropriateness of locating the incident command post inside the initial isolation zone; however, senior staff on neither TSC team questioned the appropriateness of the staging area also being located in the isolation zone.
- TSC and EOC personnel did not verify the status of shelter-in-place protective actions.

Consequence assessment team personnel, who are located in the EOC, were knowledgeable of their required tasks, including the need to support such other key activities as event classification and protective action decision-making. Most consequence assessment personnel used their position-specific checklists; plume modelers confirmed appropriate EALs, initial event classifications, and protective actions implemented. Furthermore, consequence assessment team managers briefed EOC personnel, provided information regarding the hazards involved in the event, and posted numerous consequence assessment products on EMInS, which provided TSC and EOC staff access to current data, information, and projections.

One consequence assessment team accurately computed and correctly assessed onsite and offsite consequences of hazardous material releases and demonstrated proficiency in using the complex hazardous air release model (CHARM), the HOTSPOT health physics code, and National Atmospheric Release Advisory Center (NARAC) dispersion modeling programs. For example, an initial plume plot was completed using the appropriate parameters and was posted on EMInS within seven minutes of the plume modelers' arrival in the EOC. Additionally, for the bomb threat event, the consequence assessment team prepared accurate initial consequence assessments using CHARM (12-drums ACN, or acetonitrile) and follow-up CHARM and NARAC assessments (8-drums and 2-drums ACN) and posted the plume plots on EMInS.

However, performance was inconsistent between the two consequence assessment teams, and the performance of the second team was marked by several weaknesses. For example:

- The plume modeler made an error when entering material-at-risk data into the uranium isotopic distribution worksheet, which resulted in a source term 1000 times too large. Although the error was self-identified, the incorrect HOTSPOT dispersion model plume plot was widely disseminated and presented to the TSC and EOC.
- The consequence assessment teams were not consistently familiar with emergency planning hazards assessments (EPHAs) and source term determinations used in the EPHAs, resulting in worst-case consequence assessment projections that were not compared with EPHA results. Because this comparison was not performed during the radiological fire event, the second consequence assessment team did not promptly recognize their computational error.
- Differences in dispersion modeling proficiency were distinctly evident and adversely affected the timeliness of the second team's consequence assessment results.

Neither consequence assessment team performed anticipatory consequence assessments to determine the blast effects of an explosive device detonation during the security event.

**Finding #3: During limited-scope performance tests, consequence assessment teams did not consistently provide information that ensured appropriate protective action decision-making, as required by DOE Order 151.1C and the Y-12 Emergency Plan.**

To summarize, the TSC and EOC teams provided timely information to decision-makers, coordinated their activities, and communicated frequently with external organizations. Overall, responders in the TSC and EOC demonstrated effective capabilities for determining and implementing a well-planned course of action to mitigate emergency events. Consequence assessment teams are equipped with an appropriate array of consequence assessment tools, and the consequence assessment process is integrated with other decision-making processes. However, some weaknesses were observed regarding maintaining overall awareness of reported event conditions, determining implementation status of protective actions, and evaluating the continued adequacy of protective-actions versus consequence assessment dose projections. Furthermore, inconsistent performance by the consequence assessment teams resulted in significant differences in the source terms used and in the timeliness of consequence assessment results. Lastly, inconsistent performance (and associated instances of performance weaknesses) was observed in some transfers of emergency director authority between the TSC and EOC and in issuing news releases.

### E.3 Rating

A rating of EFFECTIVE PERFORMANCE is assigned to Y-12 incident command team decision-making.

A rating of EFFECTIVE PERFORMANCE is assigned to emergency control center team decision-making.

A rating of NEEDS IMPROVEMENT is assigned to TSC/EOC team decision-making.

### E.4 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 offered to the site to be reviewed and evaluated by the responsible line management and accepted, rejected, or modified as appropriate, in accordance with site-specific emergency management program objectives and priorities.

**B&W Y-12**

- To further enhance command and control functions, consider the following actions:
  - Ensure that periodic training and drills are provided on incident command protocols, procedures, and checklists, and the use of command post resources.
  - Conduct security event exercises that include scenarios with competing priorities between security, fire, and operations teams to validate concepts and procedures for unified command.
- Strengthen initial notifications and communications with offsite organizations. Specific actions to consider include:
  - Implement a verbal notification process that utilizes ring-down circuits to permit concurrent notifications with all required offsite authorities, based on event categorization and classification requirements.
  - Improve the efficiency of ECC personnel in completing the initial notification form by differentiating between critical information on the notification form and other less urgent information and reporting requirements.
  - Document verbal information communicated during the initial notification process to ensure repeatability and information transfer.
- To enhance consequence assessment team proficiency and the usefulness of their output products, consider the following:
  - Define and document the prerequisite qualifications and training for all individuals expected to perform as consequence assessment team members.
  - Maintain adequate depth and proficiency for each required response position.
  - Develop procedures, checklists, or other tools that provide specific guidance (e.g., use of software tools and modeling assumptions) on the development of required output products.
  - Perform drills with the consequence assessment team to ensure integration and proficiency of activities (e.g., familiarization with EPHAs and EALs, source term determinations, and use of consequence assessment tools).
  - Periodically brief key decision-makers on the current status of consequence assessment capabilities and products, and promote a collective understanding of consequence assessment support for emergency decision-making processes.
- During exercises, consider limiting ERO participation to only the number of roster positions to permit evaluating individual proficiency as well as performance with minimum staffing.
- To improve exercise assessment and evaluation of functional response needs affecting ERO structure, emergency response facilities, and response capabilities, consider the following:
  - Refrain from using exercise contingency injects that disallow a realistic impact or prevent an appropriate response to scenarios involving hazardous material releases.
  - To the extent possible, allow free play in order to evaluate and validate actual response to the impact of hazardous material releases on positions in facilities or associated with activities that require occupancy for safe operation, security, or monitoring.

- Minimize the amount of simulation allowed in the ECC so as to duplicate the sense of stress inherent in a real emergency situation and permit the evaluation of notification and emergency communication processes.
- Strengthen the process for implementing onsite shelter-in-place protective actions. Specific actions to consider include:
  - Validate shelter-in-place performance during exercises.
  - Develop a process to verify that shelter-in-place orders have been implemented in facilities required to do so.
  - Post designated shelter-in-place locations and facilities.

# APPENDIX F

## Readiness Assurance

### F.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 the emergency management program plans, procedures, and resources of the Y-12 Site Office (YSO) and Y-12 National Security Complex (Y-12) 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 National Nuclear Security Administration (NNSA) line organizations in monitoring program effectiveness, implementing self-assessment programs, and ensuring that timely corrective actions are taken for identified weaknesses. NNSA 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.

This Independent Oversight inspection examined the processes by which YSO provides guidance and direction to and maintains operational awareness of the Y-12 emergency management program. The inspection included reviews of YSO emergency management program assessment and issues management processes, and Babcock & Wilcox Technical Services Y-12, L.L.C. (B&W Y-12) emergency management self-assessment and issues management processes.

### F.2 Status and Results

#### F.2.1 NNSA Line Program Management

YSO has established clear roles and responsibilities for performing line management oversight of the emergency management program at Y-12, and is actively engaged in monitoring program status and providing appropriate guidance and direction, as necessary. The YSO emergency management program manager conducts regular meetings with the B&W Y-12 emergency management program organization (EMPO) manager participates in planning and execution of site exercises, reviews and approves documents, and conducts a variety of contractor assessments, both as an observer and as an independent evaluator. YSO includes the Y-12 emergency management program in the performance evaluation program as another means of providing guidance and measuring contractor performance. YSO also receives an appropriate level of support and guidance from the NNSA Office of Emergency Management Implementation (NA-43). NA-43 personnel maintain regular contact with the YSO program manager, observe the annual site exercises, and provided the emergency management subject matter expert for the Chief of Defense Nuclear Safety review of YSO in 2006. YSO has included DOE Order 151.1C in the B&W Y-12 contract, and the site has incorporated the new requirements in many of its plans and procedures, although implementation of some aspects of the requirements will not be completed for several years.

YSO has defined a comprehensive oversight and assessment program that includes emergency management. Roles and responsibilities for conducting assessments and self-assessments are clearly defined in plans and procedures. Procedures address all aspects of assessments of the emergency management functional elements

including scheduling, preparation, conduct, reporting, and follow-up for the assessments. The assessment processes provide for the use of a mostly appropriate set of supporting criteria, and assessment procedures include steps for identifying issues and transferring those issues to an issues management system.

YSO has adequately implemented the emergency management assessment and self-assessment programs. YSO personnel have completed a number of observations, assessments, and shadow assessments of the Y-12 program in the past two years. As prescribed in the governing documents, assessments are graded in scope, depth, and detail of documentation; and most of the completed assessments reviewed during this inspection were found to be thorough and well documented. In some instances, the assessment identified significant weaknesses (such as not including evacuation from the material access areas during annual evacuation drills) that required contractor follow-up actions or that opened issues based on identifying repetitive weaknesses (particularly from exercises) and perceived trends in performance. The YSO program manager has assessed eight of thirteen functional elements to some degree over the past two fiscal years, indicating that the schedule for assessing the contractor's program every three years is on track. In addition, a self-assessment of the YSO program was performed in preparation for the fiscal year (FY) 2006 Chief of Defense Nuclear Safety review using criteria that broadly address the emergency management program. Nevertheless, some weaknesses in program implementation were observed. Although several recent assessments were completed using evaluation criteria that were published by NA-43, several older assessments did not incorporate criteria or checklists. Additionally, YSO did not complete a program self-assessment in FY 2007.

**Finding #4: YSO does not consistently conduct annual self-assessments of its emergency management program, as required by DOE Order 151.1C.**

YSO has established and implemented an adequate system to manage issues and associated corrective actions. The issues management process is well supported by a computer-based system that provides tracking and closure of corrective actions and is integrated with the B&W Y-12 issues management system. Issues are identified as deficiencies, weaknesses, or observations, and issues are submitted automatically to the contractor's issue management system following approval in the site office monthly assessment report. Issues identified by YSO or external organizations are managed with an appropriately graded approach. For deficiencies, procedures require the contractor to develop a corrective action plan, which is reviewed and validated by YSO prior to implementation, and corrective actions are tracked and formally verified as closed. Most deficiencies identified by YSO have been appropriately entered in the system, tracked to completion, closed, and verified; although in one instance the corrective action plan for a deficiency relating to inadequate execution of annual evacuation drills did not address the underlying root cause, as discussed further in Section F.2.2. Several aspects of the issues management process diminish its overall effectiveness. For example, weaknesses do not require a corrective action plan, and follow-up by the YSO subject matter expert is necessary to ensure closure by the contractor. YSO and external observations are provided informally to the contractor and do not require a response.

Finally, the YSO emergency response organization (ERO) cadre's initial and annual training requirements are specified in YSO and B&W Y-12 procedures, and some aspects of the program are effectively implemented; however, senior YSO ERO members were not assigned the training specified in the Y-12 emergency management training plan. The YSO emergency management program procedure indicates that ERO cadre training requirements are specified in the YSO qualification standard and the B&W Y-12 emergency plan, which outlines the training categories and refers to the Y-12 emergency management training plan for detailed training requirements. The Y-12 training plan specifies training for ERO members in a table that includes an NNSA training group, as well as a group of senior positions in the emergency operations center and technical support center. The training plan includes the YSO emergency manager and technical support center representative in the list of senior positions, and the supporting job and task analyses for these two positions affirm the training plan designation of these positions as senior. Nevertheless, review of a sample of YSO

personnel training records, including several emergency managers and technical support center representatives, revealed that all had received only the generic training for the NNSA group, and none had received the senior position training.

To summarize, YSO has clearly established roles and responsibilities for line management oversight and is actively engaged in providing direction and oversight to the Y-12 emergency management program. YSO is appropriately supported by NA-43 and has implemented most aspects of DOE Order 151.1C. Assessments are thorough and well documented, and the use of assessment criteria is improving. Further, assessments have been effective in identifying significant weaknesses that require contractor action. The issues management system is well structured and integrated with the contractor's system, and most identified issues are appropriately addressed and corrected. However, YSO has not consistently conducted required annual self-assessments of its program, and weaknesses in the issues management process diminish its effectiveness. In addition, YSO requirements for training of its ERO cadre are inconsistent with some aspects of the B&W Y-12 training plan. These line management oversight weaknesses do not substantially impact the overall effectiveness of this section.

## F.2.2 B&W Y-12 Feedback and Improvement

B&W Y-12 has developed a suitably detailed set of procedures to define the Y-12 assessment program for emergency management. Procedures provide for management assessments by functional area managers (for example, emergency management) and line managers, as well as independent assessments by the Performance Assurance Department. Site procedures address roles, responsibilities, and actions for scheduling, preparation, conduct, reporting, and follow-up for assessments, and also provide for the use of an appropriate set of criteria to support the assessments. Procedures also provide for identifying and transferring those issues to an issues management system. The EMPO self-assessment process document addresses the emergency management program functional elements, but the process document inappropriately excluded from the FY 2007 self-assessment checklists the criteria (designated for both program and exercise evaluations) in DOE's emergency management guide.

B&W Y-12 has recently implemented a generally acceptable, formal emergency management assessment program that addresses many aspects of the emergency management program. In FY 2006, EMPO completed a compliance review of emergency management requirements; and in FY 2007, self-assessments for twelve of fifteen programmatic elements were scheduled and completed. EMPO self-assessments are thoroughly documented against a set of self-assessment criteria for the assessed element. In addition, the B&W Y-12 independent assessment group conducted one assessment directed specifically at building emergency plans; and in several facility assessments included some emergency management criteria, primarily related to assembly point operation and accountability. Further, the production division completed one self-assessment of building emergency plans at its facilities in 2005 and scheduled another assessment of emergency management at its facilities for this fiscal year.

The Independent Oversight inspection team identified some weaknesses in program implementation. Although thoroughly documented, EMPO FY 2007 self-assessments did not fully address program implementation. As noted above, the criteria intended to be used for evaluating both the program and exercise performance were not included in the self-assessment criteria (only in the exercise criteria). As a result, three functional elements, including notifications and protective actions, were excluded from the self-assessment schedule (because the elements have no programmatic-only criteria), and the number of review criteria was limited in some of the other elements (for example, categorization and classification had only one review criterion). In addition, the assessments focused primarily on whether or not a criterion was addressed in a procedure, rather than on implementation of the procedure through review of output products or other indicators of performance. Finally, independent and line management assessments focused primarily on items in the building/facility

emergency plans relating to accountability and assembly station actions, and not on the overall ability of the buildings to execute their emergency plans. Overall, the assessment program effectively implements most expectations, but the observed weaknesses somewhat limit the site's effectiveness in self-identifying and correcting problems.

EMPO has effectively used the site's issues management processes for managing issues identified in exercises and self-assessments. B&W Y-12 has a detailed procedure and process for identifying issues and tracking corrective actions. The issues management system uses an appropriate method to grade issues, and it adjusts the level of analysis of the issue, and the tracking and closure of the corrective actions, based on the assessed risk. EMPO uses the site's issues management system exclusively to manage identified issues. Most issues had an appropriate risk assignment; and corrective actions were developed, implemented, and verified to be effective. Findings and improvement items identified during exercises and self-assessments (beginning in 2007) are entered and tracked to closure in the issues management system. However, some weaknesses in the issues management process were identified. Observations from YSO assessments, external assessments, and internal independent assessments are not entered in the issues management system for review and/or action by the responsible line manager. In addition, improvement items are sometimes closed without verification of completion of the action or its effectiveness, so although the items are being tracked appropriately, some actions were closed without actually being completed. Finally, in one instance, a recurring issue concerning building shelter-in-place implementation (implying a systemic problem) identified in an independent assessment was not given sufficient importance; the issue was not assigned for follow-up assessment, root cause analysis, and correction by the site, although EMPO did follow up informally to ensure that building plans were upgraded.

As noted in Section F.2.1, most deficiencies identified by YSO were addressed appropriately, but in one instance, corrective actions for a deficiency involving inadequate execution of annual evacuation drills did not address the underlying root cause (i.e., training that was less than adequate). In late 2005, YSO identified that annual evacuation drills were inadequate due to artificialities in execution; specifically, building personnel were not required to exit the facility using the emergency egress routes from the material access areas (their normal work places). After lengthy negotiations, building emergency wardens were issued a "flexible continuing training" (i.e., required reading) assignment reiterating the need to train personnel on the evacuation routes. Subsequently, a March 2007 occurrence involving a minor uranium chip fire in one of the affected facilities resulted in a facility evacuation that YSO subsequently determined required an unnecessarily long period of time to complete.

To summarize, B&W Y-12 has established a suitable framework for its feedback and improvement program. EMPO has implemented a generally acceptable self-assessment process, and feedback and improvement is supported by a site issues management system that provides for adequate analysis of issues, as well as follow-up and closure of corrective actions. Issues and improvement items, stemming particularly from exercises, have been used effectively to improve the sitewide program, although weaknesses in handling several facility-related issues were observed. In addition, self-assessments did not always use an appropriate set of evaluation criteria, resulting in some missed opportunities for program improvement, although this has not seriously detracted from the general effectiveness of the feedback and improvement program in identifying and correcting issues.

### F.3 Rating

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

A rating of EFFECTIVE PERFORMANCE is assigned to the area of B&W Y-12 feedback and improvement.

## F.4 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 offered to the site to be reviewed and evaluated by the responsible line management and accepted, rejected, or modified as appropriate, in accordance with site-specific emergency management program objectives and priorities.

### Y-12 Site Office

- Strengthen the ability of the YSO readiness assurance program to facilitate improvements in the Y-12 emergency management program. Specific attributes to consider include:
  - Balance formal assessments with observations and shadow assessments to ensure that each functional element receives a formal assessment over a three-year period.
  - Continue and expand the use of criteria and checklists to support the conduct of the assessments, including some observations and shadow assessments.
  - Augment document reviews with assessments of field implementation of those documents.
  - Conduct targeted, in-depth assessments of critical portions of a functional area, as well as broad assessments of the entire functional area.
  - Adjust the expectations of the issues management process so that contractor follow-up and closure of actions related to weaknesses are provided automatically to YSO, and contractor review and disposition is required for observations by YSO and external organizations.
- Improve the ability of senior YSO members of the ERO to execute their oversight and implementation responsibilities during an emergency. Consider the following actions:
  - Correct the inconsistencies in the senior YSO position training requirements in the Y-12 emergency management training plan.
  - Consider responsibilities of the YSO senior positions during emergencies affecting Y-12 only and those affecting the entire Oak Ridge Reservation in establishing training requirements.
  - Review, revise (if necessary), and utilize the completed job task analyses for these positions in establishing the training requirements.

### B&W Y-12

- Enhance the ability of the self-assessment program to identify and correct weaknesses in the emergency management program. Consider the following actions:
  - Revise the self-assessment process document to include the program/exercise evaluation criteria in the self-assessment program.
  - Revise the assessment schedule to include all functional elements of the program.
  - Revise the assessments to focus on the evaluation of implementation of procedures and processes.
  - Conduct targeted, in-depth assessments of critical portions of a functional element, as well as broad assessments of entire functional elements.

- Include implementation of all aspects of the building/facility emergency plans in the overall assessment program.
- Review the training and experience of personnel conducting self-assessments to ensure that the expected standards of performance in the areas being evaluated are understood.
- To further improve the site’s corrective action processes, consider implementing the following actions:
  - Ensure that closure statements for improvement items reflect completed corrective actions or final dispositions, rather than interim actions or intentions.
  - Include observations from YSO and external agencies in the Y-12 issues management system/process.
  - Conduct training on significance determination to ensure that personnel understand that an implementation issue represents a “noncompliance” with a management requirement and that the same, or similar, issue identified at several facilities is “indicative of a programmatic or systemic” problem.



