Office of Enterprise Assessments
Assessment of
Sandia National Laboratories/New Mexico
Emergency Management Exercise Program

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Acronyms

CA	Consequence Assessor
CAD	Computer Aided Dispatch
CAT	Consequence Assessment Team
CRAD	Criteria and Review Approach Document
DOE	U.S. Department of Energy
EA	Office of Enterprise Assessments
EAL	Emergency Action Level
EEG	Exercise Evaluation Guide
EMCC	Emergency Management Communications Center
EOC	Emergency Operations Center
EPHA	Emergency Planning Hazards Assessment
EPIP	Emergency Plan Implementing Procedure
ERO	Emergency Response Organization
ERS	Emergency Response Supervisor
ERT	Emergency Response Team
ERTL	Emergency Response Team Lead
HAZMAT	Hazardous Material
IC	Incident Commander
IZ	Isolation Zone
KAFB	Kirtland Air Force Base
lb	Pound
MESA	Microsystems and Engineering Sciences Applications
MOW	Member of the Workforce
NNSA	National Nuclear Security Administration
NTESS	National Technology and Engineering Solutions of Sandia, LLC
OFI	Opportunity for Improvement
PA	Protective Action
PAC	Protective Action Criterion
PAR	Protective Action Recommendation
PAZ	Protective Action Zone
SCC	Security Command Center
SFO	Sandia Field Office
SNL/NM	Sandia National Laboratories/New Mexico
TC	Telecommunicator
TST	Technical Support Team
TSTL	Technical Support Team Lead
VESTA	VESTA Communicator

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EXECUTIVE SUMMARY

The U.S. Department of Energy (DOE) Office of Emergency Management Assessments, within the independent Office of Enterprise Assessments (EA), conducted an assessment of the emergency management exercise program at Sandia National Laboratories/New Mexico (SNL/NM). The overall purpose of the assessment was to assess the effectiveness of the emergency management program by observing and evaluating the full-scale exercise, identifying performance strengths and weaknesses, and conducting limited causal analysis of observed weaknesses. The assessment also included a review of the exercise program and an appraisal of the closure of two previous findings. The SNL/NM emergency management program is currently making the transition from DOE Order 151.1C, *Comprehensive Emergency Management System*, to DOE Order 151.1D requirements.

Since May 2017, National Technology and Engineering Solutions of Sandia, LLC (NTESS) has been the operating contractor for SNL/NM and its satellite facilities, with responsibility for management, operation, and staffing to accomplish the missions assigned by the National Nuclear Security Administration (NNSA). Under the terms of the operating contract, NTESS is responsible for correcting issues it inherited from the previous operating contractor. NNSA's Sandia Field Office is responsible for operations oversight and contract administration for SNL/NM and operation of the NNSA Albuquerque Complex. SNL/NM had not completed several key documents in time for this 2018 exercise and in cases where the revised documents were not available, used the existing approved documents for the event response.

EA examined the SNL/NM exercise program and verified that over time the exercise program validates most of the site's overall response capabilities. The exercise program is mostly well structured and implemented and the use of *Exercise Builder* software is an important improvement. The 2018 exercise included many attributes of a properly prepared, well-executed exercise, and emergency responder performance was mostly effective.

Nonetheless, the current five-year exercise schedule, coupled with the previous five-year exercise schedule, does not fully address the analyzed hazards and postulated scenarios identified in building emergency planning hazards assessments, which is necessary to validate the site's overall response capabilities and responder proficiency. In addition, EA's exercise observation and evaluation revealed some performance weaknesses and opportunities for improvement in both the response and the exercise evaluation. For example, the response did not always lead to timely implementation of protective actions. The exercise evaluation methods did not fully support effective validation of emergency plans and procedures, because the improved exercise evaluation guides do not yet fully incorporate the detailed procedural steps that support a more objective set of evaluation criteria. Also, SNL/NM procedures contributed to somewhat diminished situational awareness in the emergency operations center and offsite command centers, because high level objectives or requirements do not always flow down to lower level implementing procedures and checklists, as specific tasks to be accomplished. Lastly, a sampling of the contractor readiness assurance program showed two previous EA findings were closed even though the corrective actions did not fully resolve the issues.

A number of improvements to the SNL/NM emergency plan and implementing procedures should be considered to improve the timeliness of protective actions. The improvements include more closely integrating the facility response with the site response. Fully incorporating the facility operating

organizations in the site emergency response organization (through the emergency plan and associated implementing procedures) supports early identification of upset conditions and prompt identification of the need for protective actions.

A number of related enhancements to the exercise program should also be considered to improve the emergency management program and prepare for the full range of potential emergencies at the SNL/NM hazardous material facilities. Adding more scope to full-scale exercises and revising the five-year exercise schedule to ensure it addresses the full spectrum of analyzed hazards and postulated scenarios at its hazardous material facilities would provide more effective means of evaluating exercises and validating the emergency program. Exercising the full spectrum of postulated scenarios also requires consideration of exercises that originate within buildings and transition from building abnormal events to site emergencies.

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1.0 PURPOSE

The U.S. Department of Energy (DOE) Office of Emergency Management Assessments, within the independent Office of Enterprise Assessments (EA), conducted an assessment of the emergency management exercise program at Sandia National Laboratories/New Mexico (SNL/NM). The overall purpose of the assessment was to assess the effectiveness of the SNL/NM emergency management program by evaluating its readiness to respond to emergencies and effectively identify and correct findings. This assessment was conducted within the broader context of a series of assessments of emergency management programs at DOE complex sites.

2.0 SCOPE

EA conducted this assessment in accordance with the *Plan for the Office of EA Assessment of the Emergency Management Exercise Program at the SNL/NM, January – April 2018*. This assessment evaluated specific aspects of the contractor's readiness assurance program, including a review of the SNL/NM exercise program, observation and evaluation of a full-scale exercise, and the closure of corrective actions for findings identified during exercises and the 2015 EA assessment of the SNL/NM emergency management exercise program. The assessment scope did not include Sandia Field Office's (SFO's) program oversight.

3.0 BACKGROUND

SNL/NM provides engineering, research, and development in support of the nation's nuclear weapons, defense systems, global security, and energy and climate programs. The primary mission of SNL/NM is to ensure the safety, security, and reliability of the U.S. nuclear weapons deterrent. Specific mission areas include stockpile stewardship, information operations, integrated military systems, global threat reduction, and cyber and infrastructure security. SNL/NM has sufficient quantities of radioactive material and hazardous chemicals to require an Operational Emergency hazardous material (HAZMAT) program in accordance with DOE Order 151.1D, *Comprehensive Emergency Management System*.

The SNL/NM emergency management program is currently making the transition from DOE Order 151.1C, *Comprehensive Emergency Management System*, to DOE Order 151.1D requirements, which is scheduled to be completed during calendar year 2020. The most significant program element that has not been updated to meet the requirements of DOE Order 151.1D is the technical planning basis, which affects the hazards surveys, emergency planning hazards assessments (EPHAs), emergency action levels (EALs), predetermined protective actions (PAs) and protective action recommendations (PARs), and the emergency planning zone. DOE Order 151.1D includes many response attributes and served as the basis for the 2018 full-scale exercise evaluation criteria where currently implemented. Previous EA findings that had been closed were assessed under DOE Order 151.1C requirements, which were in effect at the time of their disposition.

Since May 2017, National Technology and Engineering Solutions of Sandia, LLC (NTESS) has been the operating contractor for SNL/NM and its satellite facilities, with responsibility for management,

operation, and staffing to accomplish the missions assigned by the National Nuclear Security Administration (NNSA). Under the terms of the operating contract, NTESS is responsible for correcting issues it inherited from the previous operating contractor. Responsibilities for site operations include conduct of an effective emergency management program as well as establishment and use of a contractor assurance program to measure and improve performance. NNSA's SFO is responsible for operations oversight and contract administration for SNL/NM and operation of the NNSA Albuquerque Complex. The SFO Complex Management Team is responsible for emergency management at the Albuquerque Complex.

The EA assessment program is designed to enhance DOE safety and security programs by providing DOE and contractor managers, Congress, and other stakeholders with an independent evaluation of the adequacy of DOE policy and requirements and the effectiveness of DOE and contractor line management's performance in safety and security and other critical functions as directed by the Secretary of Energy.

This assessment is part of a series of assessments to observe and evaluate the performance of emergency response organizations (EROs) during exercises or limited-scope performance tests at a number of DOE sites, as well as to evaluate the sites' actions to identify and correct exercise and EA assessment findings (and thus improve the effectiveness of their emergency management programs) from previous reviews. Following observation of the exercise or limited-scope performance test, weaknesses in observed performance are used to guide the selection of program elements for more detailed assessment. Through these performance-based assessments, EA evaluates the ability of the sites to respond effectively and mitigate the impacts of a HAZMAT release or emergency incidents at DOE facilities, identifies areas of programmatic weakness requiring correction, and assesses whether corrective action programs are contributing to improvements in emergency response.

4.0 METHODOLOGY

The DOE independent oversight program is described in and governed by DOE Order 227.1A, *Independent Oversight Program*. EA implements the independent oversight program through a comprehensive set of internal protocols, operating practices, assessment guides, and process guides. Organizations and programs within DOE use varying terms to document specific assessment results. In this report, EA uses the terms "deficiencies, findings, and opportunities for improvement (OFIs)" as defined in DOE Order 227.1A. In accordance with DOE Order 227.1A, DOE line management and/or contractor organizations must develop and implement corrective action plans for the deficiencies identified as findings. Other important deficiencies not meeting the criteria for a finding are also highlighted in the report and summarized in Appendix C. These deficiencies should be addressed consistent with site-specific issues management procedures.

As identified in the EA assessment plan, this assessment considered requirements related to DOE Order 151.1C and was adjusted to include portions of DOE Order 151.1D (per the status of local implementation) at the request of SFO and NTESS during the assessment in-briefing. The criteria that were used to guide this assessment were based on specific objectives and criteria from Section 4.0 of EA Criteria and Review Approach Document (CRAD) 33-05, *Contractor Readiness Assurance and Exercise Program*; EA CRAD 33-07, *DOE/NNSA Emergency Management Exercise Review*; and portions of DOE Order 151.1.D.

This assessment was based on a sample of data and was not intended to represent a full programmatic assessment of the SNL/NM emergency management program. EA observed the 2018 full-scale exercise through completion of hot washes and exercise evaluation guides (EEGs), but did not evaluate the

exercise after-action report because it was not issued during EA's data collection period. EA used the exercise observations to assess the level of preparedness of the SNL/NM emergency responders and SNL/NM effectiveness in closing previous EA findings. EA chose to further examine some program elements to identify contributing causes to performance weaknesses observed during the exercise, leading to further investigation of the program areas of emergency plan implementing procedures (EPIPs), training and drills, and technical planning basis. EA examined key documents, such as the emergency plan, implementing procedures, and checklists. EA also conducted interviews with key personnel responsible for developing and executing the associated programs and responders participating in the exercise.

The members of the EA assessment team, the Quality Review Board, and EA management responsible for this assessment are listed in Appendix A. A detailed list of the documents reviewed, personnel interviewed, and observations made during this assessment, which are relevant to the findings and conclusions of this report, is provided in Appendix B. Deficiencies not meeting the criteria for a finding are also highlighted in the report and are summarized in Appendix C.

EA conducted a previous assessment of the SNL/NM emergency management exercise program in May and June 2015. This 2018 assessment examined the completion and effectiveness of corrective actions from two findings identified in the 2015 report. Results of the corrective action assessments are included in Section 5.4 of this report.

5.0 RESULTS

5.1 SNL/NM Exercise Program

Although NTESS has been the operating contractor for one year, it assumed responsibility for all exercise program requirements, including for the five-year exercise program. Implementation of DOE Order 151.1D requirements for the exercise program is complete, with the exception of a pending request to exercise three adjacent defense nuclear facilities with a common operational staff as a single entity rather than separately. A significant new order requirement is validation of ERO capabilities and proficiency by conducting exercises from the full spectrum of hazards and scenarios analyzed in EPHAs. In conjunction with the exercise observation, EA reviewed the exercise program to verify that SNL/NM has established and maintained a program that validates its overall response capabilities.

Criteria:

DOE sites/facilities/activities with an Emergency Management HAZMAT Program must establish and maintain a site-level exercise program that validates its emergency response capability to the hazards identified in EPHAs. These DOE sites/facilities/activities must accomplish the following.

- *Develop a formal exercise program that includes - a matrix that identifies planned exercises over the next five years and elements tested; (2) rotation among scenarios identified in the Technical Planning Basis; (3) exercise scenarios involving radiological hazardous materials, if applicable; (4) a method for determining the appropriate number of exercises, and rotation of exercise scenarios among hazardous material facilities over a five year period, to ensure demonstration of responder proficiency; (5) invitation of offsite responding agencies and national assets, (e.g., Centers for Disease Control, Department of Agriculture, etc.) every three years; (6) severe event scenarios every five years; (7) test of design control and/or mitigation features in multiple facilities; (8) demonstration of ERO capability; and (9) integration with local, State and Federal agencies.*

- *Develop challenging exercises based on scenarios identified in the technical planning basis that involve high-consequence scenarios; involve multiple response elements; and result in offsite effects.*

- *In order to test and demonstrate the site/facility/activity integrated emergency response capability, conduct the annual site-level exercise as a full-scale exercise involving site-level ERO elements and resources. Invite some offsite response organizations to participate in a full-scale or full participation exercise every 3 years. This exercise must use a scenario from the spectrum of potential Operational Emergencies identified in EPHAs (rotated among facilities and type of incident and/or initiator), and include demonstration of PAs. (DOE Order 151.1D, Attachment 4, paragraph 15)*

The exercise program is mostly well structured and implemented, but EA's assessment revealed two weaknesses related to program implementation (validation of responder proficiency and the exercise evaluation), which are discussed in Subsection 5.2.8. SNL/NM has adequate exercise program documentation and an extensive hierarchy of command media, such as plans, procedures, guides, job aids, and templates, to ensure sustainability of the program. Implementation of *Exercise Builder* software to assist in providing consistent exercise design is a recent improvement. *Exercise Builder* includes a method for incorporating specific EPIP action steps into the EEGs for evaluation criteria. SNL/NM (NTESS and its predecessor) has conducted an annual full-scale exercise in each of the last five years. During the past five years, many of the SNL/NM ERO capabilities and special requirements have been tested in exercises, such as active shooter and severe incident responses.

However, SNL/NM has not fully planned for and validated responder proficiency for all of its capabilities and circumstances using scenarios and hazards identified in EPHAs. For example:

- A number of ERO response capabilities requiring validation have not been identified and validated over a five-year period; these capabilities include use of the alternate emergency operations center (EOC) and emergency management communications center (EMCC), joint information center, Kirtland Air Force Base (KAFB) response to a major fire in an EPHA facility during normal and off-normal hours, and offsite organizations' interface with the site ERO for issuing PARs.

- The selected scenarios in the next five-year plan are identical to the previous five-year period and do not address the full spectrum of scenarios and hazards within the EPHAs. There are approximately 20 analyzed scenarios associated with a HAZMAT release listed in each of the 6 facility EPHAs, while SNL/NM has only exercised for 2 releases external to the facility during the last 5 years, including the 2018 full-scale exercise.

- The exercise program and five-year plan do not describe the method for determining the appropriate number of exercises and the rotation of exercise scenarios among the spectrum of scenarios identified in the EPHAs necessary to demonstrate ERO proficiency for all capabilities.

SNL/NM has not fully developed and implemented an exercise program that validates the capability and proficiency of the ERO to respond to the full spectrum of hazardous emergencies identified in the hazardous material facility EPHAs, including a methodology to ensure demonstration of responder proficiency. (See **Finding F-NTESS-1**.)

Overall, SNL/NM has developed an adequate framework through plans, procedures, guides, and job aides to ensure sustainability of the exercise program. The recent implementation of *Exercise Builder* software is an improvement. However, SNL/NM has not planned to fully validate proficiency for all of its response capabilities by incorporating an appropriate spectrum of postulated scenarios and analyzed hazards identified in EPHAs into its annual full-scale exercises.

5.2 Full-Scale Exercise

EA observed the ERO response to the SNL/NM 2018 full-scale exercise scenario to assess the effectiveness of the expected emergency response and to validate the effectiveness of corrective actions in resolving findings from EA's 2015 assessment.

Criteria:

Operational Emergencies must be categorized as promptly as possible, but no later than 15 minutes after identification by the predetermined decision maker for the categorization, in accordance with the emergency management plan, but no more than 30 minutes from initial discovery. (DOE Order 151.1D, Attachment 3, paragraph 8.b)

DOE sites/facilities/activities must identify protective actions commensurate for the potential hazards of the site/facility/activity and maintain procedures for prompt issuance of protective actions to workers. Protective actions must be predetermined and serve to minimize emergency-related consequences and maximize life safety and health. (DOE Order 151.1D, Attachment 3, paragraph 9)

DOE sites/facilities/activities will provide immediate notification and PAs to affected employees no later than 10 minutes after the PAs have been identified in accordance with the emergency management plans and related procedures. (DOE Order 151.1D, Attachment 3, paragraph 11.a (3))

Notify the Field Element or appropriate Federal Manager, Headquarters Watch Office, and state, local, and Tribal organizations within 30 minutes of declaration or termination of an Operational Emergency. (DOE Order 151.1D, Attachment 3, paragraph 11.a.(4))

Emergency notification to the Headquarters Watch Office must consist of initial notification by phone call providing as much information as is known at the time and subsequent notice electronically with receipt confirmation. If information is unknown at the time of the report, specify so in reporting. The initial notification must include the – description of the emergency; date and time emergency was discovered or terminated; damage and casualties; PAs implemented; potential and actual impacts; agencies involved; level of public/media attention; and contact information. (DOE Order 151.1D, Attachment 3, paragraph 11.a.(6))

DOE sites/facilities/activities must conduct an annual site-level exercise to test and validate emergency plans and procedures. (DOE Order 151.1D, Attachment 3, paragraph 14.a.(2))

DOE sites/facilities/activities with an emergency management hazardous material program must establish and maintain a site-level exercise program that validates its emergency response capability to the hazards identified in EPHAs. (DOE Order 151.1D, Attachment 4, paragraph 15)

In order to test and demonstrate the site/facility/activity integrated emergency response capability, conduct the annual site-level exercise as a full-scale exercise involving site-level ERO elements and resources. Invite some offsite response organizations to participate in a full-scale or full participation exercise every 3 years. This exercise must use a scenario from the spectrum of potential Operational Emergencies identified in EPHAs and include demonstration of PAs. (DOE Order 151.1D, Attachment 4, paragraph 15.c)

SNL/NM has a site-level ERO, which responds to all emergency incidents within the SNL/NM boundaries, and some facility-level emergency response teams (ERTs). As the 24-hour point of contact, the shift operations coordinator organization dispatches a member to an incident scene, who becomes the

incident commander (IC) for Operational Emergencies and directs site-level responses. While SNL/NM provides an IC and other response assets, KAFB provides firefighting capabilities. Facility responders are led by a team leader and have specific event response duties, including response to alarms, evacuation of personnel, accountability, and interface with incident command. At SNL, negative accountability is accomplished by verifying, for example, that a room, area, or building is empty, while positive accountability is achieved through contact with the members of the workforce (MOWs).

Emergency response is supported by telecommunicators (TCs), located in the EOC building, who operate the EMCC (or 911 call center) and perform dispatch, notification, and personnel accountability activities, with face-to-face access to all EOC staff. When an emergency occurs, the discoverer notifies the TCs, who in turn notify appropriate response personnel.

The IC initiates implementation of the emergency plan and EPIPs, determines the proper initial immediate PAs and PARs, and may request TCs to activate all or part of the site-level ERO to provide additional support. For HAZMAT releases at EPHA facilities, the IC uses EALs as a means for establishing initial immediate PAs by identifying a protective action zone (PAZ), where personnel should shelter-in-place, and an isolation zone (IZ), where evacuations should be employed.

The EOC staff provides site-level support to the IC, including activating and deploying additional site response assets to the scene; sending mutual aid requests to the adjacent KAFB; providing technical support, such as consequence assessment and site field monitoring; coordinating with state and local governments; and performing incident categorization, classification, notification, and communication functions. The EOC staff consists of a command team, located in the EOC primary room, and a technical support team (TST), located adjacent to the primary room. The command team consists of managers from SFO and NTESS, including the emergency director. The TST consists of a technical support team lead (TSTL), consequence assessors (CAs), a facility subject matter expert, and a technical support staff recorder.

5.2.1 Exercise Scenario

The exercise scenario involved two interrelated events. The exercise began with a small fire in the Microsystems Fabrication Facility (building 858EF, a HAZMAT facility within the Microsystems and Engineering Sciences Applications (MESA) Complex) as the initiating incident that was followed closely by a HAZMAT release in the building outside area. An occupant actuated the fire alarm and called 911 (the EMCC), resulting in occupants evacuating the building, an IC (fire IC) and the KAFB fire department responding to the scene, the TST assembling in the EOC, and building operations shutdown. No HAZMAT was released directly from the fire incident. Meanwhile, personnel unloading two 16-pound (lb) cylinders of chlorine from a truck to a storage area just outside building 858EF dropped the cylinders, resulting in a chlorine release from one cylinder and injury to the delivery vendor. Because of the chlorine release, a second shift operations coordinator was deployed as the HAZMAT IC. The HAZMAT IC identified the PAZ and IZ for the chlorine release, notified on-scene responders to relocate farther from building 858EF at a safe location outside the PAZ, and requested the EMCC to activate the site-level ERO. The release met the definition of a General Emergency, because per EPHA calculations the protective action criterion (PAC) for chlorine was exceeded beyond the SNL/NM site boundary (approximately 230 feet) onto KAFB, which is considered offsite property. The affected KAFB area is natural desert terrain adjacent to a major road on the SNL/NM property with no buildings.

5.2.2 Building 858EF Emergency Response Team

The overall response of the building 858EF ERT was appropriate and in accordance with ADM_ERT, *Emergency Response for MESA Fabs*, but the building ERT members were unfamiliar with the

terminology used (grid zones) in the initial shelter-in-place order. The emergency response team lead (ERTL) and emergency response supervisor (ERS) responded promptly (the ERTL responded to the backup response center in building 858N and the ERS responded to the incident command post). The ERS and ERTL communicated effectively to convey information regarding the status of the incident to the IC, including the status of the victim. After mustering in the backup response center (since the initiating fire incident was in the vicinity of the MESA emergency response center), the building ERT promptly initiated a building sweep for negative accountability. Following turnover of incident command from the ERTL to the IC, the ERT provided effective support to the incident response. For example, in response to an announced shelter-in-place in building 858N (an exercise artificiality), the building ERT posted personnel at the doors, as required by procedure. Also, after a thorough safety briefing, two building ERT members conducted a field monitoring evolution to survey for chlorine.

Although the overall building ERT response was effective, building ERT members were unfamiliar with the use and meaning of the grid terminology to designate the buildings that are to take PAs, contributing to a delay in implementing the PA. (See Subsection 5.3.2 below for further discussion.)

5.2.3 Field Emergency Response and Protective Actions

The ICs established and maintained adequate command and control within the field elements and maintained effective internal field communications throughout the exercise. Nevertheless, the ICs did not always promptly identify and promulgate accurate PAs and ensure that situational awareness information was communicated to the EMCC and EOC, and thus to other appropriate entities.

The ICs responded in accordance with EPIPs, such as EM-SOP-8, *Incident Command Procedures*, and EM-SOP-10, *HAZMAT Operations*; used position checklists to respond to the incident; and maintained a well-organized unified command post throughout the exercise. Initially, the fire IC deployed to meet the KAFB fire department near gate 33, just north of the MESA complex. The initial responders were quickly informed by the HAZMAT IC (via radio) that the incident also involved HAZMAT. The HAZMAT IC determined the PAZ and IZ from the EAL for a single chlorine cylinder release and recommended that the incident command post relocate to a position outside the PAZ. However, in accordance with scripted message in the exercise plan, the scenario postulated that two cylinders were initially involved, which necessitated a larger PAZ and IZ. (See Subsection 5.3.3 below for further discussion.) SNL/NM does not have an EAL for the multiple cylinder release within the outside/transportation zone. The fire IC then announced that the response was in a defensive strategy and all responders were to move to the new location. At the new command post, the HAZMAT IC arrived and relieved the fire IC. Unified command consisted of the KAFB fire department and command staff, such as the research officer, incident safety officer, and support officer, and personnel from organizations such as the building 858EF ERT, security, and medical.

The IC concentrated on the extraction of the chlorine victim, who was relocated to building 858N, and effectively coordinated and communicated a plan for the victim and the medical response team to safely transport the victim to the hospital. The IC conducted a briefing with appropriate individuals and developed a well understood incident action plan (for rendering the chlorine cylinder safe). When the research officer announced that the consequence assessment team had calculated a new, smaller PAZ and IZ, the IC appropriately relocated the command post to a small parking lot just north of gate 33, with a staging area just to the south of gate 33. The IC used entry teams effectively to initially assess the scene, retrieve shipping information, render the cylinder safe, and inspect the fire area.

Although the command post was well organized and the fire IC took steps to protect the MOWs who had evacuated the buildings due to the fire, some PAs were not promptly identified, issued, and implemented. For example:

- Two shift operations coordinators, responding separately as the fire and HAZMAT ICs, issued immediate PAs. Early in the incident, the fire IC ordered the MOWs evacuated from building 858EF to move to building 897 and those from building 858N to move to building 720. The HAZMAT IC ordered MOWs in the grid zone that includes the Mesa complex to shelter-in-place. The fire IC order to move the building 858N evacuees was not implemented, the shelter-in-place order was not communicated to the 858 complex for 25 minutes after the hazard zones were identified, and the 858 complex evacuation notification was sent 37 minutes after hazard zone identification.

- In response to the HAZMAT release, the HAZMAT IC ordered shelter-in-place by grid zones, rather than building numbers. Although procedures allow the use of grid numbers to execute PAs over large areas, grid zone numbers (sent via its VESTA® Communicator (VESTA) automated telephone message system) were not understood by the MOWs and the building 858EF ERT, prompting a number of personnel to contact the TCs for clarification of the grid numbers and leading to a delay in implementing the PAs and additional work load and distractions for TCs.

Delays and errors in formulating, promulgating, and implementing appropriate PAs increase the risk of MOW exposure to the release. (See **Finding F-NTESS-2** and **OFI-NTESS-1**.) (See also the discussion in section 5.2.4, below.)

Additionally, although the research officer communicated on-scene information to the TST (as documented in EM-FORM-4050) and the EMCC recorded key information in the Computer Aided Dispatch (CAD) system, the IC did not always ensure that situational awareness was maintained with the EMCC and EOC.

- The IC provided minimal periodic situational reports or status reports to the EOC command team (contrary to the EPIPs), so the EOC staff members had limited or delayed awareness of activities at the scene.

- Contrary to EPIPs, incident command did not provide incident action plan details to the EMCC to record in the CAD, hence EMCC, TST, and EOC had limited awareness of the on-scene strategy. (See **OFI-NTESS-2**.)

Overall, ERO personnel performed most field response activities well. The IC clearly established himself as the person in charge under a unified command and exhibited good command and control of the situation. The incident command effectively coordinated field activities, developed a comprehensive incident action plan, and communicated effectively among the various field elements. Nevertheless, responders did not consistently provide clear and understandable PAs to MOWs. Delays and errors in formulating and implementing PAs can place MOWs at increased risk of exposure to HAZMAT. In addition, responders did not always provide adequate information to the EMCC and EOC to maintain complete situational awareness. The difficulties with implementing PAs and maintaining situational awareness are further discussed in Subsection 5.2.4 and Section 5.3.

5.2.4 EMCC Telecommunicators

The TCs responded effectively during the initial few minutes and after the first hour of the response by dispatching resources, recording information in the CAD, and answering calls, but they experienced a period of overwhelming activity during the first hour. The three TCs, who normally staff the EMCC on a 24/7 basis for notification and dispatch purposes, performed their tasks in accordance with a number of applicable EPIPs, including EM-SOP-9, *Radio Communication Procedure*; EM-SOP-20, *Computer Aided Dispatch*; EM-SOP-21, *EMCC Call Taking*; Communication Center Operator Aid 436, *Protective Actions*

and Protective Action Recommendations; and EM-FORM-92, *EMCC Incident Checklist*. Each TC focused on a different general area of responsibility: dispatch, onsite notifications and offsite notifications, and personnel accountability. During the first hour, the TCs primarily recorded field activities on a CAD form, issued PA notifications, verified that offsite notifications were received, and recalled the ERO. After the initial hour, the team primarily supported the positive personnel accountability effort, recorded field response activities, and completed follow-up notifications and announcements.

The building 858EF fire alarm and the call to 911 prompted an effective dispatch of the site ERT and KAFB fire department. In addition, a TC immediately recalled the TST via its VESTA® Communicator (VESTA) automated telephone message system. Shortly afterwards, a call from an 858EF employee, who was assisting with the unloading of two chlorine cylinders at a gas storage area between 858EF and 858N, initiated the HAZMAT incident. When the EMCC did not pick up quickly, the security command center (SCC) operator answered the call and subsequently called the EMCC to relay the information from the 911 caller that one 15-lb cylinder of chlorine was leaking, which was a miscommunication because the number of leaking cylinders was unknown at this time. One TC accurately followed the call taking process while a second TC dispatched additional site ERT assets for the HAZMAT incident. Shortly afterwards, a TST member announced to the EMCC staff that the offsite notification had been sent via electronic mail (as expected), prompting a TC to appropriately send a VESTA communication to the offsite agencies, which was quickly followed by a fax of the notification form. Also, after receiving the IZ and PAZ from the HAZMAT IC, a TC immediately conveyed the information to the SCC for responder safe routing. Finally, a TC appropriately verified that notifications were received by all participating offsite agencies.

However, the staff of the EMCC and SCC did not completely perform the assigned duties during the first hour of response, impacting notifications of PAs, timely recall of the EOC command team, and situational awareness. For example:

- During the initial HAZMAT 911 call, the SCC operator relayed the incorrect amount of chlorine (one cylinder) to the TC, impacting the situational awareness of the actual hazard and size of the IZ and PAZ requiring PAs.

- Although 30 minutes later the research officer communicated the correct amount of HAZMAT involved, the TCs did not reflect the updated amount in the CAD.

- A TC received specific PA directions from two different ICs within a minute of each other. One directed the relocation of the evacuees from buildings 858EF and 858N. The other directed shelter-in-place for four grids, including the buildings in the IZ. The TC did not record the direction or notify the building 858N evacuees as initially ordered, keeping personnel in the IZ for an extended period of time.

- Although the TC began the shelter-in-place notifications approximately 7 minutes following the IC's direction, because of the cumbersome nature of the VESTA and tone alert receiver systems, the TC took 18 minutes to complete the PA notification messages. This extended the time to notify workers of PAs by up to 25 minutes, which is well beyond the 10-minute requirement. (Note: SNL/NM indicated that the tone alert receiver system will be replaced by another system, Alertus, which provides desktop computer alert capability – enhancing the ability to send notifications to multiple platforms.)

- Due to competing activities, such as PA notifications, the TCs did not issue a timely recall of the EOC command team after the declaration of an Operational Emergency. Also, the TC incorrectly used a pager test scenario during the first attempt to recall the EOC command team.

(See **Finding F-NTESS-2** and **OFI-NTESS-3**.)

Overall, the EMCC TCs responded effectively during the initial few minutes and after the first hour of the response by dispatching resources, recording response information in the CAD, and answering calls. The TCs properly dispatched the ERT and KAFB fire department, notified the SCC and TST of safe routing, and verified that notifications were received by the participating offsite agencies. However, the TCs were not able to effectively perform all key duties during the first hour of response, negatively impacting situational awareness, notifications of PAs, and timely recall of the EOC cadre. The number of tasks, the lack of a consolidated EPIP governing EMCC operation, and the cumbersome notification systems contributed to these performance weaknesses, leading to the potential for MOWs to experience increased exposure to HAZMAT.

5.2.5 Technical Support Team

The TST responded adequately in accordance with EPIPs EM-SOP-5, *TST Operations*, and EM-SOP-32, *Consequence Assessment Team (CAT) Operations*, using position checklists to implement initial immediate actions. The TST, consisting of a TSTL, three CAs (the CAT), a facility management and operations center subject matter expert, and a support staff member, arrived in a timely manner for a fire in 858EF. As CAT members were arriving, the TST staff was made aware of a 15-lb chlorine release, from the EMCC's CAD report, and the HAZMAT IC's determination of a PAZ of 1380 feet (expressed in the radius of the area) and an IZ of 390 feet, from a radio report. CAs immediately reviewed the EALs for incident classification and validation of PAs and, with agreement from the TSTL, appropriately declared a General Emergency. CAs then proceeded to complete and distribute the initial offsite notification form, satisfactorily completing the initial response actions established in procedures.

The CAs classified the incident 8 minutes after acquiring details of the chlorine release and 10 minutes after receiving initial notification of the chlorine release. The CAT sent the initial offsite notification to designated Albuquerque city authorities, Bernalillo county authorities, DOE Headquarters, the DOE transportation emergency control center, the Federal Bureau of Investigation, Isleta Pueblo police, KAFB command post, KAFB law enforcement, and New Mexico state police and state EOC within eight minutes of the General Emergency declaration, completing all response actions within required response times.

The TSTL effectively performed ongoing tasks, as described in EPIPs and guided by a position checklist. The TSTL monitored the CAT activities; consulted with the facilities management and operations center subject matter expert for shutting down ventilation systems, securing fire suppressions systems, and securing building power; monitored personnel accountability results; monitored status of offsite notifications; provided periodic incident status updates to the EOC command team; and participated in incident termination decision making. The TSTL also monitored the status of personnel accountability via the TCs and communications with an evacuation team lead at the facility. Negative accountability was reported as complete later in the exercise, but positive accountability remained an ongoing activity when the exercise was terminated.

The CAT performed timely and accurate ongoing assessments and provided update notifications to offsite authorities when required by its EPIP and checklist. The CAT updated projected consequences using three dispersion modeling programs. During the first projection, the CAT learned of the possibility of two chlorine cylinders leaking and immediately analyzed a 30-lb chlorine release. The results indicated a

PAZ of 329 feet and an IZ of 111 feet, and the CAT informed the TSTL and on-scene research officer and provided a recommendation to reduce the areas under PA orders. The results were significant in that the projected dose did not exceed PAC off site. The CAT appropriately prepared and distributed a second offsite notification form, indicating no offsite PARs and maintaining the General Emergency classification, although no derivative classifier reviewed the form before distributing. (See **OFI-NTESS-4**.)

The CAT effectively continued to monitor incident conditions via the on-scene research officer and update the projected incident consequences using the latest data and corroborating dispersion modeling programs. Once confirmed that only one chlorine cylinder was leaking, the CAT returned to a 15-lb release source term and adjusted its analysis based on leak duration. The CAT appropriately monitored for changes in weather conditions. The CAT frequently modeled chlorine dispersion as the leak duration was extended, which continued to reduce the PAZ and IZ as expected. The CAT continued its assessments by requesting readings from fixed chlorine detectors near the scene, monitoring the entry team reports of chlorine measurements, and following the mitigation activities (encapsulating the leaking cylinder) reported through the research officer. A CA used WebEOC, a computer-aided information management system, to display pertinent records throughout the EOC and inform the EOC command team of its updated analysis. This continued until the incident was terminated and a CAT member prepared and distributed a termination offsite notification form. EA noted that the termination notification was also not reviewed by a derivative classifier prior to distribution.

The CAT sent three incident notification forms to offsite authorities, but the notification forms did not provide all the information required by DOE Order 151.1D, and at the time the initial notification was submitted, no TST member telephoned the DOE Headquarters Watch Office to discuss the incident. The offsite notifications, which were sent to Headquarters and offsite entities such as KAFB via electronic mail, provided the information solicited by the form, but the form does not address the topical list of information required by Order 151.1D (either to provide the necessary information to the DOE Headquarters Watch Office or indicate that the information is currently unknown). The first notification form, which was sent within a minute of the General Emergency declaration, correctly identified the offsite area where EPHA calculations projected that PAC was exceeded but did not provide explicit PARs or additional incident information. The second offsite notification form, which was sent 25 minutes later after modeling results were available, informed offsite authorities that the PAC was not projected to be exceeded off site and no PARs were necessary. The final offsite notification form was sent at the termination of the incident, informing offsite authorities of incident termination. SFO provided the required information and discussed the incident with the DOE Headquarters Watch Office after the delayed EOC activation. (See Subsection 5.2.6 below for further discussion.) (**Deficiency**)

Overall, the TST completed all essential functions in a timely and accurate manner as instructed in its EPIPs and checklists. EPIPs, however, do not implement the DOE Order 151.1D requirements to provide, in writing and with a phone call, pertinent incident information to the DOE Headquarters Watch Office. Consequently, the TST did not perform these activities. These programmatic weaknesses are further discussed in Section 5.3.

5.2.6 EOC Command Team

EOC personnel adequately performed executive notifications, worker notifications, and press releases in accordance with EPIP EM-SOP-4, *SNL/NM Emergency Management EOC*. However, the EMCC did not recall the EOC command team, as required by its EPIP, to report to their duty station immediately following the General Emergency declaration, and the EOC command team did not receive an activation page until 33 minutes later, because the EMCC was overwhelmed with PA implementation tasks. In

addition, not all of the important information from the field was disseminated to the EOC or offsite command centers through the supporting information systems.

The SNL/NM emergency director and SFO EOC manager appropriately determined goals, tasks, and priorities for EOC operations and tracked the completion of assigned tasks in the EOC action plan. In addition, the emergency director conducted frequent EOC briefings to keep command team members informed and focused on EOC response tasks. The SFO representative was the first EOC command team member to report to the EOC because of a separate notification protocol used to inform SNL leadership and SFO of an abnormal or emergency incident in progress. Consequently, SFO completed and issued a timely initial situation report to DOE Headquarters eight minutes after the EOC became operational.

The delay in EOC recall affected timely performance of some important EOC command team response tasks, including messages to MOWs outside of the PAZ and news releases. The first non-PA message to MOWs occurred 1 hour and 20 minutes after the General Emergency declaration, and the first news release occurred 1 hour and 48 minutes after the declaration, which was procedurally within one hour of having an operational EOC. The delay in the communications following the emergency declaration significantly diminished the usefulness of the information. (See **OFI-NTESS-5**.)

Also, EOC resources for informing command centers external to the EOC were not effective in keeping all stakeholders up-to-date with the response. SNL/NM primarily used the EMCC CAD system to record and distribute real-time incident information, which is critical to maintaining situational awareness. The EOC information management system, WebEOC, provided some additional information, including a partial chronology of incident information. However, CAD and WebEOC did not capture all of the important information from the field, such as detailed information provided in incident command situation reports and the incident action plan. The situation reports and incident action plan, which contain confirmed or verified information regarding the explicit details relating to the incident, are required by procedure on a regular and recurring basis.

Further, although a corrective action plan is in place, SNL/NM has not established complete communications between SNL/NM response facilities and offsite command centers to provide a full common operating picture of the emergency response and shared situational awareness among all teams, by providing access to unclassified emergency response information. EA confirmed an ongoing issue with inadequate interoperability between the SNL/NM EOC and offsite command centers, such as the DOE Headquarters EOC. Key personnel outside of the SNL/NM EOC are unable to view unclassified WebEOC information (such as notification forms, emergency status updates, plume projections, significant incident data, and field monitoring data); offsite officials must specifically request this information from SFO to establish and maintain a common operating picture of the emergency response and shared situational awareness among all teams. SNL/NM has an existing corrective action plan (CAP 17SEP11-NM-EMM-EX.11-001) to provide a documented process for establishing and maintaining a common operating picture between the SNL/NM EOC and the KAFB EOC, but the existing corrective action plan does not include corrective actions to provide a common operating picture with other offsite command centers. (**Deficiency**)

Overall, EOC command team personnel adequately responded in accordance with EPIPs and effectively performed most tasks. Nevertheless, due to the delay in staffing the EOC, EA observed some weaknesses related to the timeliness of a few important tasks, such as the initial messages to the MOWs and the news media. In addition, the SNL/NM and SFO communications that are needed to provide a common operating picture and shared situational awareness with offsite command centers, including DOE Headquarters, have not improved since the observations in the 2015 full-scale exercise. Weaknesses in communications can lead to increased risk of exposure of MOWs or the public to HAZMAT.

5.2.7 Exercise Design and Conduct

During the full-scale exercise, EA assessed whether the design and conduct of the full-scale exercise (using a plausible scenario under reasonably realistic conditions) enabled the site to effectively test and validate its emergency management plan and EPIPs and identify areas for further program improvements.

The exercise plan was properly designed and included a plausible scenario, a classifiable incident, exercise objectives, prepared injects and simulations, a timeline of activities, and safety and security plans. The scenario design provided a potentially challenging response because two separate, but related, incidents occurred through a fire and HAZMAT release. Although the exercise scenario provided a plausible incident that tested many response elements, additional areas could have been tested or presented in a more realistic manner. For example:

- Only one building in the affected IZ and PAZ participated in the exercise.

- Exercise planners did not design an integrated response with offsite entities to test offsite interfaces, as expected for a full-scale exercise. (Note: Several offsite organizations participated in the 2017 full scale exercise.)

- The exercise did not test joint information center functions for this General Emergency incident scenario.

- The exercise did not test the mechanisms for plume plot and informational table approvals and their distribution to offsite authorities.

- Evaluators were not properly located to observe critical decision making by two separate responding shift operations coordinators.

- The exercise did not test the impact of offsite calls on TST activities by simulating offsite queries through injects. Simulated calls would provide an effective means for enhancing the realism of exercise scenarios involving declared General Emergencies.

- Controllers injected both command post locations, resulting in a missed opportunity to evaluate the independent, spontaneous decision-making ability of the responders. (See **OFI-NTESS-6**.)

SNL/NM conducted the exercise through a controller organization that was well staffed by subject matter experts. Controllers conducted their activities using available resources in the exercise plan, ensured the exercise followed the plan activities, and made adjustments where necessary to respond to unanticipated events.

Overall, the design of this exercise included many attributes of a properly prepared exercise to support the overall exercise program and schedule. The exercise scenario entailed a potentially challenging response because two separate, but related, incidents occurred through a fire and HAZMAT release, resulting in a classifiable incident. However, many aspects of a full-scale exercise (which is the most complex and resource-intensive type of exercise, involving multiple agencies, organizations, and jurisdictions, and validates many facets of preparedness) were not included. A broader scope, along with the inclusion of additional organizations (both internal and external) and resources, would have provided a more comprehensive and thorough test and validation of the emergency management program.

5.2.8 Evaluation Resources and Methods

EA observed evaluators using the exercise evaluation resources in order to determine their effectiveness in identifying weaknesses and supporting further program improvements. EA evaluated the EEGs and controller/evaluator hot washes, but did not assess further exercise follow-up activities and the after-action report, which were completed after the EA data collection period.

In response to a 2015 EA assessment finding (See Section 5.4 below.), SNL/NM has improved the evaluation process through implementation of *Exercise Builder*, which provides a method for incorporating specific EPIP action steps into the EEGs for evaluation criteria, as a tool for planning and evaluating both exercises and drills. In addition, SNL/NM recently held an EEG workshop involving stakeholders to add specific response actions, and some objectives, such as Emergency Management Communications Call Taking (Objective EMCC.2), have been effectively updated with specific EPIP actions and excerpts. Furthermore, SNL/NM used dedicated evaluators at most venues, rather than dual responsibility controller/evaluators, to prevent distraction with controlling and evaluating the exercise. Finally, SNL/NM supplemented the evaluator cadre with experts from the Pantex Plant and Los Alamos National Laboratory.

Although the exercise evaluation resources and methods are significantly improved, they are not fully effective in validating emergency plans and procedures. Several of the EEGs used for the 2018 exercise evaluation did not have all of the necessary performance criteria for evaluators to objectively identify weaknesses. For example:

- The IC, TST, and EMCC EEGs did not collectively assess whether the PA process (from the initial prompt recognition of the need for PAs through the PA notification to workers within the IZ and PAZ) was completed in less than 10 minutes. (See Subsection 5.2.3, above, for further discussion about PAs.)

- The TST EEG did not identify that the offsite notification form does not provide the DOE Headquarters Watch Office with all required information delineated in DOE Order 151.1D. (See Subsection 5.2.5, above, for further discussion.)

- The IC, EMCC, and EOC EEGs did not provide the necessary evaluation criteria to validate the method used to ensure that communications among response facilities, field response elements, and offsite command centers provide a common operating picture of the emergency response and shared situational awareness among all teams. (See Subsections 5.2.3, 5.2.4, and 5.2.6, above.)

(See **Finding F-NTESS-3** and **OFI- NTESS-7**.)

In addition, many EEGs are not yet fully effective because the evaluation criteria did not fully incorporate EPIP steps, and, more significantly, the EPIPs do not contain explicit instructions for implementing tasks (which would then be used as criteria). Both weaknesses allow the evaluation to become subjective in nature and do not promote consistent validation and improvement of the EPIPs. For instance, the performance criteria for the EMCC objective for PA notification are imbedded in multiple EPIPSs or job aids and were not all included in the EEG for that objective. Also, procedures do not define the moment when PAs are identified as required by DOE Order 151.1D, resulting in an ambiguous start of the 10-minute requirement and decreased objectivity in evaluating the response in the applicable EEG. Only the minor procedure, Communications Center Operator Aid-436, *Protective Actions and Protective Action Requirements*, requires implementation of the PAs within 10 minutes.

Exercise participants conducted hot washes at each venue immediately following the exercise, and controllers and evaluators completed their hot wash the following day. The hot washes provided an adequate forum, using EEGs, to discuss strengths and weaknesses of the exercise to foster program improvements. These well-attended discussions and activities addressed many EA exercise observations, but some important analytical methods were not used and some potential performance issues were not discussed. For example:

- A consolidated timeline of critical activities at the separated venues was not assembled to provide a clear perspective of the integrated response.

- Evaluators did not discuss how the release of 15-lbs of chlorine was communicated to the IC, EMCC, and CAT, while the exercise plan identified that two 16-lb cylinders were dropped and possibly leaking. (Note: EA determined that this was a communications error by the SCC to the EMCC.)

- Evaluators did not use exercise data that was completed by responders, such as forms, logs, checklists, and radio transmission recordings, in their assessments. (See **OFI-NTESS-8**.)

SNL/NM evaluated the exercise using a set of improved EEGs and a well-staffed evaluation team, including use of Pantex Plant and Los Alamos National Laboratory subject matter experts (fostering the sharing of complex-wide knowledge). EEGs have been recently improved through the use of *Exercise Builder* and an EEG workshop. The hot washes provided adequate forums to identify program strengths and weaknesses for further improvements and initiate the process to develop the exercise after-action report. However, opportunities exist to improve the EEGs through an upgrade in the details of procedure steps used as evaluation criteria. Hot washes can be improved by establishing and assessing a timeline of critical activities, performing in-depth reviews of response activities using data created by responders, and investigating programmatic contributors to performance weaknesses. These enhancements to the exercise program can lead to improved effectiveness in identifying weaknesses and support further improvements in emergency response.

Overall, the 2018 exercise included many attributes of a properly prepared, potentially challenging, and well-executed exercise to support the overall exercise program and schedule. Emergency responder performance was mostly effective and exercise evaluation was improved through use of *Exercise Builder* and upgraded EEGs. ERO personnel at building 858EF and the incident command performed most of the response activities well. The EMCC TCs responded effectively during the initial few minutes and after the first hour of the response, and the TST completed all essential functions in a timely and accurate manner. EOC command team personnel responded adequately. However, some weaknesses in the identification and communication of PAs were observed, and a broader exercise scope would have provided a more comprehensive test of the emergency response organization. In addition, opportunities exist to improve the EEGs through an upgrade in the details of procedure steps used as evaluation criteria.

5.3 SNL/NM Program Elements

EA analyzed specific response weaknesses observed during the exercise to evaluate whether the weaknesses could be attributed to errors in programmatic areas, such as the EPIPs, training and drills, and technical planning basis. In its analysis, EA considered the design of the exercise and observed responder actions in executing DOE Order 151.1, as well as SNL/NM procedure requirements. EA excluded DOE Order 151.1D requirements that have not yet been implemented per the site's implementation plan. Specifically, EA applied DOE Order 151.1C requirements in analyzing the technical planning program element and its products. This section discusses EA's assessment of specific exercise performance weaknesses attributed to program weaknesses.

Criteria:

Develop and maintain procedures that describe how the emergency management plan must be implemented and maintained. (DOE Order 151.1D, Attachment 3, paragraph 1.d.)

DOE sites/facilities/activities must identify protective actions commensurate for the potential hazards of the site/facility/activity and maintain procedures for prompt issuance of protective actions to workers. Protective actions must be predetermined and serve to minimize emergency-related consequences and maximize life safety and health. (DOE Order 151.1D, Attachment 3, paragraph 9)

DOE sites/facilities/activities will provide immediate notification and PAs to affected employees no later than 10 minutes after the PAs have been identified in accordance with the emergency management plans and related procedures. (DOE Order 151.1D, Attachment 3, paragraph 11.a (3))

Site/facility-specific EALs must be developed for the spectrum of potential Operational Emergencies identified by the EPHA and must include PAs corresponding to each EAL. (DOE Order 151.1C, Attachment 2, paragraph 11. a.2. b. (2))

Notify the Field Element or designee, Headquarters Watch Office, and state, local, and Tribal organizations of operational emergencies in accordance with site facility emergency management plan timelines. Complete notification within 30 minutes of declaration or termination of an Operational Emergency. (DOE Order 151.1D, Attachment 3, paragraph 11.a.(4))

Emergency notification to the Headquarters Watch Office must consist of initial notification by phone call providing as much information as is known at the time and subsequent notice electronically with receipt confirmation. If information is unknown at the time of the report, specify so in reporting. The initial notification must include the – description of the emergency; date and time emergency was discovered or terminated; damage and casualties; PAs implemented; potential and actual impacts; agencies involved; level of public/media attention; and contact information. (DOE Order 151.1D, Attachment 3, paragraph 11.a.(6))

A comprehensive, coordinated, and documented program of training and drills must be an integral part of the emergency program to ensure that preparedness activities for establishing and maintaining program-specific emergency response capabilities are accomplished. (DOE Order 151.1D, Attachment 3, paragraph 5.)

5.3.1 Emergency Plan and Implementing Procedures

Although SNL/NM has made numerous changes and improvements to its command media (including a plan to address establishing a common operating picture), SNL/NM has not yet achieved a fully integrated, effective set of command media to govern its emergency response. The structure of the current SNL/NM emergency operating system reflects a flow down from the emergency plan (program description) to documents (e.g., procedures and checklists) that provide the "how-to" instructions for the emergency management program elements (referred to as the command media). The 2018 full-scale exercise demonstrated weaknesses in establishing integrated emergency response actions within the emergency plan and implementing documents. For example, procedures (and processes) did not lead responders to promptly formulate and issue PAs; due in part to the lack of integration of the building ERO response into the site ERO response, weaknesses in integration among the implementing procedures, and inefficiencies in EMCC procedures.

Although a number of changes to EPIPs have been made to implement DOE Order 151.1D and improve the emergency management program, the emergency plan has not been revised to describe a fully integrated, comprehensive response that is implemented through the EPIPs. The emergency plan does not describe the provisions for a response to events that requires successful interaction with both internal operating organizations and external response agencies (e.g., KAFB and the city of Albuquerque). Significantly, SNL/NM has revised EPIPs without first establishing the necessary concepts of operation in the emergency plan, which results in decision-making problems and limited situational awareness, as observed during the exercise.

In addition, the emergency plan includes operational concepts, responsibilities, and procedures applicable to SNL/NM Emergency Management, the KAFB fire department, protective force, and SFO, but, as noted above, does not fully address the roles and responsibilities of facility operating organizations at its HAZMAT facilities. For example:

- The building 858EF ERTL is designated as the IC in the building response procedure (ADM_ERT), and EPIPs provide for a turnover from the building ERT to the responding site IC, but these roles and responsibilities are not discussed in the emergency plan.

- Other SNL/NM EPIPs, such as EM-SOP-8 and EM-PLAN-4, *ERO Interface Action Plan*, do not address the role of the building ERT or ERTL in, for example, determining PAs.

- The ERTL, as the first responding IC, was the first IC with sufficient knowledge of the incident to promptly determine the need for PAs, but the emergency plan and procedures do not assign the ERTL responsibility for determining PAs.

(**Deficiency)**

Finally, procedures and processes did not lead to prompt identification and issuance of PAs. For example,

- ADM_ERT does not make reference to the need to assess PAs for adjacent buildings (for example, for an external event or for an escalating incident).

- ADM_ERT does not specifically address chemical releases external to the facility, when time-critical response may be required to protect MOWs in nearby buildings. For example, the ERTL did not consider PAs for buildings other than 858EF. (Note: The EAL for this incident leads to PAs for adjacent buildings.)

- The deferral (by procedure) to the site IC to identify the PAs (the IZ and PAZ) resulted in a delay of seven minutes in identifying PAs.

- Procedures and processes direct the communication of specific PA instructions to the EMCC for subsequent transmittal once determined by the IC. During the exercise, it took the IC seven minutes to formulate the PAs and it took a further five minutes before the EMCC began issuing the PA instructions (which took a total of 13 additional minutes to complete).

- The significant number of EMCC responsibilities imbedded in multiple EPIPs (for example, EM-SOP-8, *Incident Command Procedures*; EM-SOP-10, *HAZMAT Operations*; and EM-SOP-19, *Fire Support*), with no consolidating EPIP specifically governing EMCC operations, contributes in part to the EMCC not being fully effective.

- No procedures or job aids assisted building responders and MOWs in determining whether their building or location were in an affected grid. Although the buildings are marked and the numbers are used in normal daily activities, grid numbers and their locations are not widely used, there are no signs or placards in the buildings identifying the grid number, and there are no readily available job aids to determine whether the grid associated with a particular building.

(See **Finding F-NTESS-2** and **OFI-NTESS-1**.)

EPIP EM-SOP-32, *CAT Operations*, does not promulgate all notification requirements in DOE Order 151.1D. The CAT did not satisfy all notification information requirements to the DOE Headquarters Watch Office and perform associated telephone calls, because the offsite notification process does not require these actions. SNL/NM defers these actions to SFO, which provides event information via situation reports and phone communications with DOE Headquarters after EOC activation. SNL/NM minimized the type and amount of information in the initial offsite notification form to avoid a derivative classifier review in order to expedite the communication of a declared Operational Emergency and any PARs. DOE Order 151.1D also states that the initial DOE Headquarters Watch Office notification must address a list of itemized topics whether the information is known or not. Missing information (i.e., information that was known but not included) on the initial notification form prepared by the CAT included:

- Description of incident – chlorine was not identified as the HAZMAT released, and the fire was not mentioned.

- Time of incident discovery – only the offsite notification form date and time was provided.

- Facilities that were shut down – a fire alarm pull box interlock shuts down facility operations.

- Casualties – no mention was made of the injured vendor who received medical treatment.

- PAs taken and offsite PARs – evacuations and sheltering were executed on site, and ambiguous PARs were issued to KAFB.

- Agencies involved – KAFB response was not included. (**Deficiency**)

The CAT did not have the last two offsite notification forms reviewed by a derivative classifier because the requirement is provided in a note in EPIP EM-SOP-32. The CAT conducted activities that guided their actions using a checklist that did not identify the review. (See **OFI-NTESS-4**.)

Finally, SNL/NM procedures contributed to some limits in the situational awareness in the EOC and offsite command centers. Situational awareness in the EOC was impacted because not all high level objectives and requirements flow down to lower level implementing procedures and checklists as tasks to be accomplished. The SNL/NM emergency plan contains a requirement for the incident command to provide the EOC with information to enhance situational awareness, but the necessary tasks are not specified in the implementing procedures and checklists. For example, EM-SOP-8 contains a requirement for the command to provide the EOC information to enhance situational awareness and to provide essential information in a timely manner. The IC provides this essential information via situational reports and status reports; however, EM-FORM-1/SOP-8, *IC Checklist*, and EM-FORM-108/SOP-10, *Command HAZMAT Checklist*, do not contain any situational awareness or status report requirements or reminders. Also, most procedural steps are vague on how to provide offsite command centers access to unclassified emergency response information, such as notification forms, emergency

status updates, plume projections, significant incidents data, and field monitoring data. (See **OFI-NTESS-2**.)

5.3.2 Training and Drills

Since areas and grids are included in the ERO procedures as methods to designate PAs, the misunderstanding with their use indicates that the training and drill program has not provided sufficient opportunity for personnel to become familiar with the terminology. EA observed that:

- Unfamiliarity with the use of grids to designate the buildings affected by the PA resulted in many calls to the EMCC, negatively impacting the implementation of the PA and severely hindering the EMCC in performing its response tasks.

- During an interview, building 858EF responders indicated that they were not familiar with (or trained on) the use of grids for PAs.

- Although the drill packages provided by SNL/NM included a drill to practice receiving calls for a HAZMAT release at building 858EF, there was no evidence that the drill included sending PA instructions to the building.

Further, training and drills for response to a combined fire and HAZMAT event did not ensure that a single individual ERO position had the authority to implement the plan and procedures and control all aspects of the response. Initially, two shift operations coordinators responded, one to the fire (as fire IC) and the second to the HAZMAT release (as HAZMAT IC). Although SNL/NM procedures state that the initial IC must quickly transfer to a subsequent IC for incidents that are not quickly controlled, are escalating, or are significant in scope and size, the turnover did not occur until both ICs had responded to the IC post. Consequently, two individuals issued two different sets of immediate PAs for the MOWs during the exercise. (**Deficiency**)

5.3.3 Technical Planning Basis

The exercise scenario presented the possibility of leakage from two 16-lb cylinders of chlorine at an outside storage area, matching the planning quantities in *EPHA Buildings 858EF Microsystems Fabrication Facility Volume 2: Tables*. The planning quantities are two 16-lb cylinders in the gas cylinder storage outside zone and four 16-lb cylinders in the specialty gas room exterior zone. Although leakage from two chlorine cylinders is considered a plausible scenario, an EAL for a release from two 16-lb cylinders is not provided in the EPHA, only for the release from one 16-lb cylinder. Increasing the quantity of chlorine beyond the currently analyzed quantities significantly enlarges the area requiring protection, therefore requiring a different set of predetermined PAs to support IC decision making. SNL/NM is currently updating the SNL/NM technical planning basis, which is scheduled for completion in calendar year 2020, to DOE Order 151.1D requirements. (See **OFI-NTESS-9**.)

Overall, using performance data from the full-scale exercise, EA identified weaknesses in the emergency plan, the EPIPs, and the technical planning basis. The EPIPs are the most significant area for improvement because they also serve as the basis for training and drills and EEG criteria. A detailed set of EEGs will also serve as an effective tool for validating EPIPs by experienced evaluators for further improvements. Also, the technical planning basis did not provide the EAL needed to respond to the exercise scenario. As a result of a communications error, this oversight was not apparent during the exercise. SNL/NM does not have a full spectrum of incidents in the EAL set in the SNL/NM technical planning basis. Current plans are to revise the EALs over the next two years to meet the new DOE Order 151.1D requirements.

5.4 Corrective Actions

This section discusses EA's assessment of the closure of corrective actions for findings identified during the 2015 EA assessment of the SNL/NM emergency management exercise program, using DOE Order 151.1C criteria. In addition, SFO requested that EA identify any shortcomings in the implementation of the SNL/NM emergency management corrective action program using DOE Order 151.1D criteria.

Criteria:

Corrective action items identified as a result of the critique process must be incorporated into the emergency management program. (DOE Order 151.1C, Attachment 2, paragraph 6.b)

Completion of corrective actions for facility and site exercises must include a verification and validation process, independent of those who performed the corrective action, that verifies that the corrective action has been put in place and that validates the corrective action has been effective in resolving the original finding. (DOE Order 151.1C, Attachment 2, paragraph 6.b.(7)

Defense Nuclear Facilities must perform the following.

- *Conduct causal analysis to determine corrective actions for findings identified as a result of noncompliance for life safety.*
- *Develop formal corrective action plans for identified findings. The corrective action plan must be approved by the Cognizant Field Element Manager. The Cognizant Field Element Manager must ensure effective corrective actions are tracked, identified, and implemented.*
- *Evaluate the effectiveness of corrective actions through verification and validations conducted by an independent reviewer.*
- *Identify compensatory measures for findings until causal analysis is performed and corrective actions are identified and implemented. (DOE Order 151.1D, Attachment 4, paragraph 15. (j).(1)-(4))*

EA assessed two of the findings identified during the 2015 assessment, paying particular attention to the validation of effectiveness of the corrective actions. The first finding involved deficiencies in the exercise evaluation process, and the second finding addressed deficiencies in conducting independent validation of the effectiveness of corrective actions for all exercise after-action report findings. Although SNL/NM implemented corrective actions to address the findings, the corrective actions were not fully effective in resolving the underlying deficiencies.

The first 2015 finding (Finding F-SANDIA-1) concluded, "SNL Emergency Management does not provide evaluation criteria for each exercise objective." SNL/NM Emergency Management did not provide evaluation criteria for each exercise objective, and the EEGs did not facilitate an objective evaluation by including evaluation criteria with observable and/or measurable response steps that must be completed to demonstrate successful performance of the objective. In a number of cases, SNL/NM Emergency Management relied on evaluators' subjective determination of whether responders successfully accomplished an objective. When processing this finding per the SNL/NM issues management program, emergency management determined the impact of this finding was insignificant and therefore did not require an in-depth causal analysis. SNL/NM used an apparent cause determination and implemented corrective actions to acquire and implement *Exercise Builder* software, which EA had identified as a best practice for achieving an effective exercise program.

SNL/NM Emergency Management closed the 2015 finding without fully developing the evaluation criteria database and site-specific EEGs or validating the effectiveness of the corrective action. Several EEGs that were used during the 2018 full-scale exercise were incomplete and lacked appropriate

objectives and/or evaluation criteria derived from the EPIPs. In addition, some EPIPs did not provide clear performance expectations and response steps, as previously discussed in this report. Consequently, evaluators did not have all the necessary resources to perform an objective evaluation (using relevant criteria with observable and measurable response steps, which the responders must complete to demonstrate successful performance of the objective). (See Subsection 5.2.8, above.) Additionally, the response organization revised numerous EPIPs and did not capture the changes in the EEGs because they occurred in the last 30 days before the exercise. Further, review of the completed EEGs and observation of the SNL/NM hot washes indicate that some of the performance issues during the full-scale exercise, previously discussed in this report, were not captured. Lastly, when SNL/NM closed the 2015 finding, they did not perform the required validation to ensure that finding corrective actions were effective in resolving the original finding.

The second 2015 finding (Finding F-SANDIA-2) stated, "SNL Emergency Management does not independently validate that corrective actions were effective in resolving the findings identified in exercise after-action reports." The SNL/NM emergency management issues related to management procedures required independent validation that corrective actions were effective only when the responsible manager elected to do a causal analysis, rather than for all exercise after-action report findings. EA found that SNL/NM Emergency Management typically decided against doing a causal analysis for findings. EA also noted several examples where the corrective actions would not prevent recurrence or where SNL/NM Emergency Management closed findings before the underlying issues were adequately resolved.

SNL/NM Emergency Management also determined the impact of this 2015 finding was insignificant and did not require a causal analysis or validation of effectiveness of corrective actions. SNL/NM Emergency Management used an apparent cause determination and addressed the finding through corrective actions that revised corrective action management processes, as documented in S&S-BS-016, *Security and Emergency Management Corrective Actions Management*. SNL/NM Emergency Management followed these processes through the contractor transition in May 2017 until replacing S&S-BS-016 with EM-SOP-45, *Emergency Management Corrective Action Management*. However, SNL/NM removed some steps needed for an effective corrective action program in the emergency management corrective action procedure. Specifically, the procedure revision removed requirements and implementation steps for validation to ensure that the corrective actions were effective. (See **Finding F-NTESS-4** and **OFI-NTESS-10**.)

Additionally, EA determined that the SNL/NM emergency management corrective action program did not include DOE O 151.1D required reviews and approvals by SFO. EA shared this observation with SNL/NM Emergency Management during data collection, and SNL/NM revised the corrective action procedure to add SFO to the review and approval process.

Overall, corrective action implementation for the previous EA findings resulted in some improvements to the SNL/NM emergency management program; most significantly, the implementation of *Exercise Builder* to plan and execute exercises should provide long-term benefits. However, SNL/NM closed the two findings when corrective actions did not fully resolve issues in the original findings, and the corrective action plans did not include verification and validation of the effectiveness of the corrective actions.

6.0 FINDINGS

Findings are deficiencies that warrant a high level of attention from management. If left uncorrected, findings could adversely affect the DOE mission, the environment, the safety or health of workers and the public, or national security. DOE line management and/or contractor organizations must develop and implement corrective action plans for EA appraisal findings. Cognizant DOE managers must use site- and program-specific issues management processes and systems developed in accordance with DOE Order 227.1A to manage these corrective action plans and track them to completion. In addition to the findings, deficiencies that did not meet the criteria for a finding are listed in Appendix C, with the expectation from DOE Order 227.1A for site managers to apply their local issues management processes for resolution.

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Finding F-NTESS-1: NTESS has not fully developed and implemented an exercise program that validates the capability and proficiency of the emergency response organization to respond to the full spectrum of hazardous emergencies identified in the hazardous material facility emergency planning hazard analyses, including a methodology to ensure demonstration of responder proficiency. (DOE Order 151.1.D, Attachment 4, paragraph 15)

Finding F-NTESS-2: During the 2018 full scale exercise, NTESS did not promptly identify and issue worker protective actions that were commensurate with the potential hazards of the facility. (DOE Order 151.1D, Attachment 3, paragraphs 9 and 11.a.(3))

Finding F-NTESS-3: NTESS has not fully implemented exercise program resources to effectively evaluate emergency plans, procedures, and resources. (DOE Order 151.1D, Attachment 3, paragraph 14)

Finding F-NTESS-4: NTESS corrective actions did not fully address two of the findings from EA's 2015 assessment report, and the corrective actions did not include validation of the effectiveness of corrective actions in resolving the original finding. (DOE Order 151.1C, Attachment 2, paragraph 7.b.(1)(b)) and (DOE Order 151.1D, Attachment 4, paragraph 15.j.(3))

Deficiencies that did not meet the criteria for a finding are listed in Appendix C of this report, with the expectation from DOE Order 227.1A for site managers to apply their local issues management processes for resolution.

7.0 OPPORTUNITIES FOR IMPROVEMENT

EA identified some OFIs to assist cognizant managers in improving programs and operations. While OFIs may identify potential solutions to findings and deficiencies identified in appraisal reports, they may also address other conditions observed during the appraisal process. EA offers these OFIs only as recommendations for line management consideration; they do not require formal resolution by management through a corrective action process and are not intended to be prescriptive or mandatory. Rather, they are suggestions that may assist site management in implementing best practices or provide potential solutions to issues identified during the assessment.

National Technology and Engineering Solutions of Sandia, LLC

OFI-NTESS-1: In order to improve the determination, implementation, and verification of employee PA notifications and achieve the 10-minute notification requirement, consider improving the response process, procedures, and checklists by:

- Mapping the process for determining and disseminating PAs using a cross functional flowchart to define organizational handoff points.
- Defining the moment when PAs are identified.
- Determining specific tasks and associated times to achieve the notification requirement.
- Developing a site-level EPIP that integrates the responsibilities and actions of all organizations.
- Revising appropriate position-specific procedures and checklists, such as those for the IC and EMCC TCs, to address and support meeting the performance requirements.
- Stating the performance requirements in the applicable EEGs to enable objective evaluation of PA implementation.
- Implementing an upgraded notification system.

OFI-NTESS-2: To improve communications among response facilities and offsite command centers, and to provide a common operating picture of the emergency response and shared situational awareness among all teams, consider:

- Providing connectivity to the SNL/NM WebEOC information management system to offsite command centers.
- Implementing WebEOC in the EMCC to replace the CAD system and avoid the need to re-type the information into WebEOC.
- Revising appropriate IC checklists, such as EM-FORM-1/SOP-8, *IC Checklist*, and EM-FORM-108/SOP-10, *Command Hazmat Procedures*, to include a reminder for periodic situational and status reports to the EMCC and EOC.

OFI-NTESS-3: In order to improve the effectiveness of the EMCC activities, consider:

- Conducting a time analysis of critical tasks required of the TCs during the first hour of HAZMAT, mass casualty, and fire incidents to understand proper work balance within the EMCC.
- Consolidating the EMCC response tasks into a single EPIP.
- Including additional EMCC support staff in the TST recall list.
- Enlisting the EMCC support staff to record information from the ERT, such as the incident action plan, directly in WebEOC rather than transcribing from the CAD.

OFI-NTESS-4: In order to provide timely and informative offsite notification forms, consider training CAT members as derivative classifiers.

OFI-NTESS-5: To improve the timeliness of initial emergency information to the workers, the news media, and the public, consider releasing information within one hour of the declaration of an emergency, in accordance with the standards of other Federal agencies and private industry.

OFI-NTESS-6: In order to increase the effectiveness of a full-scale exercise to test and validate the emergency management program, consider:

- Using scenarios that include an integrated response from offsite and more participation from onsite personnel.
- Using a simulation cell replicating interactions with external personnel when offsite personnel decline participation to interact with responders.
- Providing injects to test seldom used features, such as plume plot distribution and communicating sensitive or classified information.

OFI-NTESS-7: In order to improve the validation of the emergency plans and procedures, consider:

- Expanding the scope of *Exercise Builder*-based EEGs by developing a complete baseline of ERO and response organization objectives, response steps, and evaluation checklists and criteria.
- Providing a verbatim reference from the applicable SNL/NM plans or procedure for each evaluation criterion in the EEG.
- Including updates of the EEGs in the change process for emergency response plans and procedures.
- Ensuring that organizations responsible for completing the evaluation criteria have concurred with the EEGs.

OFI-NTESS-8: In order to improve the exercise evaluation methods, consider:

- Constructing a master timeline for key response actions and decisions during the strategic hot wash.
- Recording the response activities during the exercise while considering the criteria within the EEGs and completing the EEGs after the exercise.
- Focusing on documentation of weaknesses (and not solutions) in the strategic hot wash.
- Automating the retrieval of WebEOC data, including plume plots and EPI information.
- Discussing conditions that occurred that changed the planned scenario.
- Reviewing records created by responders to support evaluation conclusions.

OFI-NTESS-9: While updating the SNL/NM technical planning basis to DOE Order 151.1D requirements, ensure that EPHAs analyze the full spectrum of plausible quantities of DOE HAZMAT and EALs are developed accordingly with predetermined PAs and predetermined PARs.

OFI-NTESS-10: To improve the emergency management issues management validation and verification process, consider:

- Assigning the emergency management program administration manager overall responsibility for corrective action implementation on all of the SNL/NM corrective actions that originate from drill and exercise findings.

- Revising the emergency management corrective action implementing procedure to incorporate verification and validation steps for all drill and exercise performance findings and externally identified programmatic findings.

- Incorporating a summary of finding validation into drill and exercise after-action reports.

Appendix A
Supplemental Information

Dates of Assessment

Onsite Assessment: February 6-8, 2018
March 13-15, 2018
April 3-5, 2018

Office of Enterprise Assessments (EA) Management

William A. Eckroade, Acting Director, Office of Enterprise Assessments
Thomas R. Staker, Director, Office of Environment, Safety and Health Assessments
William E. Miller, Deputy Director, Office of Environment, Safety and Health Assessments
C.E. (Gene) Carpenter, Jr., Director, Office of Nuclear Safety and Environmental Assessments
Kevin G. Kilp, Director, Office of Worker Safety and Health Assessments
Gerald M. McAteer, Director, Office of Emergency Management Assessments

Quality Review Board

Steven C. Simonson
John S. Boulden III
Michael A. Kilpatrick
Kevin Nowak

EA Site Lead for SNL/NM

Timothy F. Mengers

EA Assessors

Randy L. Griffin – Lead
John D. Bolling
Dirk Foster
David J. Odland
Terry B. Olberding
Thomas Rogers
William J. Scheib

Appendix B
Key Documents Reviewed, Interviews, and Observations

Documents Reviewed

- ADM_ERT, *Emergency Response for MESA Fabs*, Rev. 9, undated
- CAP 16JAN006-EA33-501-SPEC-EM.6-001, *Emergency Management Corrective Action Plan*, 1/27/2016
- CAP 16JAN006-EA33-501-SPEC-EM.7-002, *Emergency Management Corrective Action Plan*, 1/27/2016
- CAP 17SEP11-NM-EMM-EX.11-001, *Emergency Management Corrective Action Plan*, 10/31/2017
- Communication Center Operator Aid 436, *Protective Actions and Protective Action Recommendations*, 1/5/2018
- EM-FORM-1/SOP-8, *IC Checklist*, 1/16/2018
- EM-FORM-6/SOP-32, *Offsite Notification Form*, 1/19/2018
- EM-FORM-92, *EMCC Incident Checklist*, 2/12/2018
- EM-FORM-108/SOP-10, *Command Hazmat Procedures*, 3/8/2018
- EM-PLAN-4, *ERO Interface Action Plan*, 1/23/2018
- EM-SOP-4, *EOC*, 1/23/2018
- EM-SOP-5, *TST Operations*, 1/23/2018
- EM-SOP-8, *Incident Command Procedures*, 2/16/2018
- EM-SOP-9, *Radio Communication Procedure*, 1/15/2018
- EM-SOP-10, *HAZMAT Operations*, 2/16/2018
- EM-SOP-19, *Fire Support*, 1/4/2017
- EM-SOP-20, *Computer Aided Dispatch (CAD)*, 2/7/2018
- EM-SOP-21, *Emergency Management Call Center Call Taking*, 2/16/2018
- EM-SOP-32, *CAT Operations*, 1/23/2018
- EM-SOP-45, *Emergency Management Corrective Action Management*, 1/23/2018
- *EPHA Buildings 858EF Microsystems Fabrication Facility Volume 2: Tables*, November 2017
- NM-EM-PLAN-01, *Emergency Plan*, Rev. 4, 1/20/2016
- NM-FLD-SOP-2105, *Chemical Field Monitoring Operations*, 1/22/2018
- S&S-BS-016, *Security and Emergency Management Corrective Actions Management*, Rev. 0, 9/12/2016

Interviews

- Building 858 ERTL
- Building 858 ERS
- CA (3)
- EMCC Lead
- Exercise Program Manager
- Incident Commander
- Technical Support Team Lead
- SNL/NM Emergency Management Program Administration Manager
- SNL/NM Emergency Management Program Administration Training, Drills, and Exercise Manager
- SNL/NM Emergency Management Planning and Support Manager
- SNL/NM Emergency Management Planner

Observations

- 2018 Full-Scale Exercise

Appendix C
Deficiencies

Deficiencies that did not meet the criteria for a finding are listed below, with the expectation from DOE Order 227.1A for site managers to apply their local issues management processes for resolution.

- The initial notification form sent to offsite authorities did not provide all the information required by DOE Order 151.1D, and at the time the initial notification was submitted, no ERO member telephoned the DOE Headquarters Watch Office to discuss the incident, as required by DOE Order 151.1D, Attachment 3, paragraph 11.a.(6).

- Although a corrective action plan is in place to improve some aspects of communications, SNL/NM has not established complete communications between SNL/NM response facilities and offsite command centers to provide a full common operating picture of the emergency response and shared situational awareness, by providing access to unclassified emergency response information; such as notification forms, emergency status updates, plume projections, significant incident data, and field monitoring data, as required by DOE Order 151.1D, Attachment 3, paragraph 11.b.(6).

- Although SNL/NM has made numerous changes and improvements to its command media, SNL/NM has not yet achieved a fully integrated, effective set of command media to govern its sitewide emergency response., as required by DOE Order 151.1D, Attachment 3, paragraph 1.