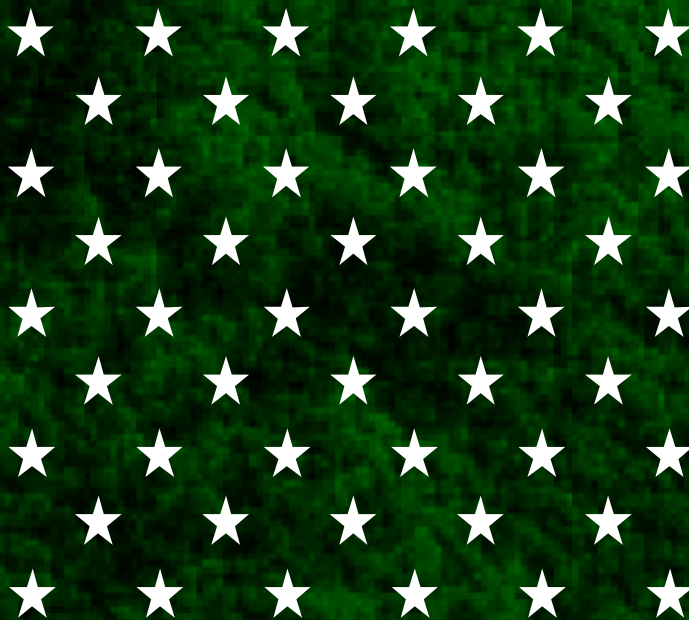




Independent
Oversight Review
of the

Rocky Flats Environmental Technology Site

Transportation Emergency
Management Program



March 2000

**Office of
Independent
Oversight and
Performance
Assurance**

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Abbreviations Used in This Report

CATS	DOE Headquarters Corrective Action Tracking System
DOE	U.S. Department of Energy
EAL	Emergency Action Level
EARM	Emergency Assessment Resource Manual
EM	DOE Office of Environmental Management
EOC	Emergency Operations Center
EPHA	Emergency Preparedness Hazards Assessment
EPZ	Emergency Planning Zone
ERAP	Emergency Readiness Assurance Plan
ERO	Emergency Response Organization
MOA	Memorandum of Agreement
NAERG	North American Emergency Response Guides
PATS	Plant Action Tracking System
RFETS	Rocky Flats Environmental Technology Site
RFFO	Rocky Flats Field Office
SAR	Safety Analysis Report
TCEAP	Transportation Compliance Evaluation/Assistance Program
WEMS	Waste and Environmental Monitoring System

OVERSIGHT

Executive Summary

EVALUATION:	Independent Oversight Review of the RFETS Transportation Emergency Management Program
SITE:	Rocky Flats Environmental Technology Site (RFETS)
DATE:	February 2000

Scope

The U.S. Department of Energy (DOE) Office of Emergency Management Oversight, within the Office of Independent Oversight and Performance Assurance, conducted a transportation emergency management review and a follow-up review of the emergency management program at Rocky Flats Environmental Technology Site (RFETS) in February 2000. The primary purpose of this review was to assess the effectiveness of the Department's emergency management programs for transportation events involving hazardous materials (not related to transuranic waste or nuclear weapons components) and to determine the adequacy of direction provided by DOE line management to sites under their cognizance. This review also examined the effectiveness of the Rocky Flats Field Office (RFFO) and contractor processes for feedback and continuous improvement as mechanisms for identifying, analyzing, and addressing program deficiencies, implementing corrective actions, and demonstrating and verifying the effectiveness of those actions. In addition, an assessment was made of the status of corrective actions taken to address program elements identified as needing management attention in the 1998 DOE complex-wide review of emergency management programs.

Background

DOE Order 151.1, *Comprehensive Emergency Management System*, provides the framework for developing, coordinating, controlling, and

directing all emergency planning, preparedness, response, and recovery functions for events at fixed facilities as well as for transportation activities. Field offices and DOE Headquarters elements are required to develop and participate in this integrated and comprehensive activity. Effective management of the site's emergency response to an onsite transportation event is contingent upon the same levels of preparation, preparedness, and response capability as the response to an event at a fixed facility.

Offsite transportation emergency management requires high levels of integration and coordination among the Department, sites, and state, local, and tribal governments. Shipments may traverse several regions and many states before reaching their destination. In addition, a significant increase in shipments of hazardous materials is expected upon implementation of the Office of Environmental Management's *Accelerated Cleanup: Paths to Closure*. The initial offsite emergency response to incidents involving shipments of non-weapons-related DOE hazardous materials is the responsibility of local authorities. Therefore, DOE must ensure that mechanisms are in place to provide, in a timely manner, initial responders with the information needed to safely and effectively respond to a transportation incident involving these materials. Under DOE Order 151.1, the Office of Environmental Management is responsible for transportation activities. In January 1998, the Energy Secretary established a Senior Executive Transportation Forum to coordinate the efforts of the Departmental elements involved in the transportation of radioactive materials and waste in response to stakeholders' concerns. The mission of the Senior Executive Transportation Forum was to assist other Federal, state, tribal, and local authorities in their preparations for response to a DOE transportation incident.

Results

RFETS has established effective programs to support a response to a wide range of transportation

operational emergencies on and off site. Kaiser-Hill has developed a hierarchy of comprehensive policies, plans, and procedures to support the transportation emergency management program, and RFFO oversight has contributed to the effectiveness of the program. Improvements since the 1998 complex-wide review are evident.

Kaiser-Hill has developed a comprehensive transportation hazards assessment and safety analysis report. These documents led to the development of facility and sitewide emergency action levels that are also comprehensive and are coupled with default protective actions. The well-designed transportation plans and procedures that govern planning, for hazardous material movements between facilities and for shipping off site, provide the necessary controls and guidance and have reduced the amount of handling required for hazardous material. Roles and responsibilities for implementing the plans and procedures are clearly defined by the RFETS Emergency Plan for operational emergencies resulting from transportation accidents. RFFO oversight activities include value-added reviews of the contractor-submitted program documents, such as the RFETS Emergency Plan. RFFO emergency preparedness personnel have substantive and frequent interactions with Kaiser-Hill on matters related to emergency management, including sitewide and building exercises.

While improvements are evident, some weaknesses identified during the 1998 complex-wide review have not been adequately addressed. Many useful resources and decision-making tools are available to the Shift Superintendent and Fire Dispatchers who staff a 24-hour center, but these individuals did not demonstrate proficiency in using some of them. The performance tests demonstrated that not all Shift Superintendents and Fire Dispatchers can interpret shipping manifests and the North American Emergency Response Guides (NAERG), which provide the information necessary to protect the public and the environment. Existing training and drill programs have not adequately prepared these key individuals. In addition, several procedural weaknesses were noted in sitewide emergency action levels, resulting in greater reliance on the knowledge and proficiency of key individuals for the timely and accurate classification of emergency events and formulation of protective actions.

The relationship with offsite emergency management agencies is evolving as the focus shifts

from facility operations to site closure activities and as the frequency of waste shipments increases under accelerated site closure. DOE, through RFFO, has established multiple agreements to coordinate response activities with Federal, state, and local authorities. These agreements form an effective set of relationships for responding to transportation emergencies. Some of these agreements have expired, and a process designating accountability has not been established to annually review and modify them, if needed. However, the significance of the expired agreements is minimized by the close cooperation between RFETS and its stakeholders.

An issue that remains from the 1998 complex-wide evaluation is a demonstration of the effectiveness of the Joint Public Information Center. RFFO has made some progress on this issue, including the development of a draft memorandum of understanding with the Colorado Department of Public Health and Environment to assure coordination, participation, and readiness with respect to Joint Information Center operations.

The failure to fully address and correct previously identified weaknesses in Shift Superintendent proficiency and emergency action levels results in part from various weaknesses in the Kaiser-Hill and RFFO corrective action management process. Based on existing priority-setting thresholds, Kaiser-Hill has not conducted formal independent verification activities for some corrective actions, although a site requirement recommends such verifications. RFFO has not verified closure of Kaiser-Hill corrective actions in accordance with its procedures. In addition, as noted in 1998, RFFO has not established a corrective action management system, including a database for capturing, tracking, and trending weaknesses.

Conclusions

The review noted concerns about initial decision-makers' familiarity with and proficiency in using available documents to make timely, accurate decisions for onsite transportation events, and to assist offsite responders in reacting to postulated transportation emergencies. In addition, although the site has initiatives in place to further improve the emergency management program, RFETS and RFFO corrective action management systems are not verifying that previously identified weaknesses are being effectively addressed. RFFO has not implemented required programs to ensure continuous improvement. As a

result, RFFO has not corrected specific weaknesses, and does not have a system to ensure that Kaiser-Hill has effectively corrected deficiencies.

Notwithstanding the above, RFETS has made improvements in the areas that were identified as needing management attention in the 1998 complex-wide evaluation, specifically with regard to the transportation emergency management program. Kaiser-Hill has applied a substantial effort toward developing a comprehensive transportation hazards assessment and safety analysis report. These documents led to the development of facility and sitewide emergency action levels that are also

comprehensive and are coupled with default protective actions. The transportation plans and procedures that are in place for planning, moving hazardous material from one facility to another, and shipping material off site are generally good. Having well-designed transportation plans and procedures in place reduces the amount of handling required for hazardous material. The RFETS Emergency Plan addresses operational emergencies related to transportation accidents and clearly defines roles and responsibilities for these activities. The Independent Oversight team found overall that RFETS has an effective transportation emergency management program.

FINDINGS

As directed by the Office of the Secretary of Energy, DOE has established a process for recording, tracking, addressing, and resolving findings identified by the Office of Independent Oversight and Performance Assurance as defined by the *Protocols for Responding to Office of Independent Oversight and Performance Assurance Appraisal Reports* (August 1999). The DOE Assistant Secretary for Environmental Management, as the lead program secretarial office, and the DOE field element (RFFO), as the cognizant line manager, are required to develop a corrective action plan to address the findings identified in this report.

1. RFETS training and drill programs are not yet sufficiently rigorous and comprehensive to adequately prepare Shift Superintendents and Fire Dispatchers for fulfilling their roles and responsibilities in all emergency response situations.
2. RFFO has not implemented a comprehensive corrective action process for the emergency management program to address their own deficiencies or to independently verify the effectiveness of contractor corrective actions.

The legacy issue below is from the Department's Corrective Action Tracking System and reflects the weaknesses that were identified during the Independent Oversight evaluation of emergency management

programs across the DOE complex in 1998. The issue description is accompanied in the tracking system by two action items, both of which are identified in that system as open.

OPEN LEGACY ISSUE

Weaknesses in the RFETS emergency management program include coordination of program elements at the facility level; some elements of plans, procedures, and training; proficiency of personnel; public information; facilities and equipment; and hazard recognition and prioritization of response activities.

1.0 Introduction

The U.S. Department of Energy (DOE) Office of Emergency Management Oversight, within the Office of Independent Oversight and Performance Assurance, conducted a transportation emergency management review at the Rocky Flats Environmental Technology Site (RFETS) in February 2000. The primary purpose of this review was to assess the effectiveness of the Department's emergency management programs for transportation events involving hazardous materials (not related to transuranic waste or nuclear weapons components) and to determine the adequacy of direction provided by DOE line management to sites under their cognizance. This review also examined the effectiveness of the Rocky Flats Field Office (RFFO) and RFETS processes for feedback and continuous improvement as mechanisms for identifying, analyzing, and addressing program deficiencies, implementing corrective actions, and demonstrating and verifying the effectiveness of those actions. The status of corrective actions taken to address program elements identified as needing management attention in the 1998 DOE complex-wide oversight review of emergency management programs was the focus of this portion of the review.

The Rocky Flats nuclear production mission was curtailed in 1989. As a legacy from past operations, RFETS has excess plutonium in the form of metals, oxides, solutions, scrap, and residue. The current mission of RFETS is special nuclear material management, site cleanup, environmental restoration, deactivation, and preparation for decontamination and decommissioning of facilities. The current site goal is to achieve site closure by 2006. Transportation activities during the past year included:

- Shipment off site of more than 1,600 cubic meters of low-level waste
- Repackaging and verifying for shipment more than 1,600 cubic meters of backlogged low-level

waste (approximately 15 percent of the legacy waste inventory)

- Completion of the first shipment of transuranic waste to the Waste Isolation Pilot Plant in June 1999, with continued shipments of approximately two per week (more than 200 cubic meters during the fourth quarter of 1999)
- Shipment off site of all plutonium components and highly enriched uranium.



Cutaway Model of a Typical Waste Barrel

In January 1998, in response to stakeholders' concerns, the Energy Secretary established a Senior Executive Transportation Forum to coordinate the efforts of the Departmental elements involved in the transportation of radioactive materials and waste. The mission of the Senior Executive Transportation Forum was to assist other Federal, state, tribal, and local authorities in their preparations for responding to a DOE

transportation incident. Under DOE Order 151.1, the Office of Environmental Management (EM) is responsible for transportation activities.

EM, as the lead program secretarial office, is responsible for providing overall program guidance and direction to RFFO. The Office of Transportation (EM-24) provides direction for on- and offsite transportation programs. The Office of Site Closure (EM-30) is responsible for the closure of RFETS. Within RFFO, the Office of the Assistant Manager of Engineering provides direction regarding the site emergency management program. In May 1999, the Secretary of Energy created the Office of Security and Emergency Operations, which consolidated the responsibility for all DOE emergency management system policy, guidance, and operational activities into a single organization reporting directly to the Secretary. This office can provide a central point of leadership for emergency management direction and is in a position within DOE where it can effect change across all DOE programs.

Kaiser-Hill Company, L.L.C. (a partnership between ICF-Kaiser and CH2M Hill) assumed responsibility as the integrating management contractor of RFETS on July 1, 1995. On January 24, 2000, DOE and Kaiser-Hill signed a contract retaining Kaiser-Hill as the integrating management contractor for the RFETS site closure project. Kaiser-Hill manages multiple subcontractors with emergency management roles and responsibilities at RFETS, including Rocky Mountain Remediation Services (waste operations and shipping); Safe Sites of Colorado (building operations, and highly enriched uranium shipments); Wackenhut Services, Inc. (security); Rocky Flats Closure Site

Services (transportation and infrastructure programs); and Excalibur Associates, Inc. (emergency management program support).

The 1998 complex-wide review of emergency management programs found that RFFO and Kaiser-Hill had established a good foundation for an effective emergency management program at RFETS, which was based on thorough and well-documented hazards assessments. The site had developed an excellent working relationship with the State of Colorado and local stakeholders. Other positive attributes included reduced site vulnerability to chemical incidents and releases, elements of RFFO oversight, and well understood and effectively implemented operational elements of the incident command system. However, at that time some fundamental weaknesses were noted in the RFETS emergency management program: coordination and implementation of some critical emergency management program elements at the facility level, formulation of protective actions for emergencies outside of fixed facilities, accuracy of hazardous material source terms used in hazards assessments, and processes for chemical consequence assessment. Tabletop walk-throughs with key members of the emergency response organization indicated a need for improvement in their proficiency and depth of knowledge with respect to emergency plans and procedures. The 1998 complex-wide oversight evaluation concluded that some fundamental elements of emergency preparedness and response were not adequately addressed in emergency plans and procedures, and that the deficiencies could cause unnecessary delays or inappropriate actions during response to an emergency at RFETS.



Low-level Waste Containers Being Shipped

2.0 Results

This evaluation addressed areas included in DOE Order 151.1, the results of the 1998 complex-wide review of emergency management programs, and selected RFFO and contractor corrective actions. Each section includes key observations, conclusions, and a rating of Satisfactory, Marginal, or Unsatisfactory. These ratings are used to communicate the effectiveness of corrective action implementation and to provide a perspective on where line management attention is warranted. Appendix A provides a more detailed explanation of the rating system.

Hazard Survey and Hazards Assessments

The 1998 complex-wide review at RFETS facilities concluded that emergency preparedness hazards assessments (EPHAs) were comprehensive and methodically prepared, and provided a good technical basis for development of other elements of the emergency management system. Concerns included inaccuracies in databases used to determine source term inventories and inadequate reporting of movements of hazardous materials within and among facilities. Additionally, an EPHA for on- and offsite transportation activities had not been prepared, although there were routine movements of hazardous material in excess of the screening thresholds (hazardous material amounts above which quantitative analysis of the consequences of release must be performed). Results of this transportation emergency management evaluation indicate that program enhancements since 1998 have improved the readiness of RFETS to respond to transportation emergency events.

Continuing efforts by the site have largely alleviated the concerns identified above. Identification, marking, and ongoing control of radiological hazardous material containers have significantly improved the accuracy of the database used to track the inventory of hazardous material in site facilities. The Waste and Environmental Monitoring System (WEMS) is used as the reference database for determining the “material

at risk” used in consequence determinations documented in the EPHA. Chemicals of particular concern, such as chlorine, have been removed from the site, and the few isolated chemicals remaining on site that exceed screening thresholds, such as nitric acid, are identified in hazards assessment documents. Mixed waste has been removed from the site to the extent that radiological concerns of the remaining mixed waste bound all chemical hazards; therefore, the analyses in the EPHA are based on the predominant radiological concern.

An RFETS transportation EPHA was completed in late 1998 and was revised and issued in August 1999. The assessment has been reviewed by RFFO and the State of Colorado. It includes a hazard survey of transportation activities and appropriately identifies hazardous materials in excess of screening thresholds that are routinely transported on and off site that could contribute to a chemical or radiological release. The hazards assessment was prepared in accordance with an RFETS procedure that incorporates DOE requirements and guidance, based on data from such documents as the site safety analysis report (May 1999), the chemical inventory management system database, and the WEMS database referred to above. Appropriate accident scenarios were analyzed and included detailed identification of the event and consequence assessment results. Hazardous material releases resulting from beyond-design-basis events, such as malevolent acts, were considered and determined to be bounded by the results of other analyzed accidents. Significant offsite rail transportation events (where DOE is not the shipper) that could impact RFETS were included in the EPHA; this addresses the large quantities of ammonia and chlorine that could be transported by rail approximately 2,800 meters west of the site. Incidents involving these hazardous materials were analyzed, and decision-making aids were prepared for inclusion in emergency response implementing procedures.

RFETS prepared an Emergency Assessment Resource Manual (EARM) for Transportation to improve the ease of use of the hazards assessments’ calculational results. The EARM summarizes the

assumptions used for each accident scenario analyzed in the EPHA, except releases from offsite sources noted above, and includes the predetermined scenario consequences for two different meteorological conditions. Hazards Assessment Center staff use this document to quickly determine the potential consequences of a release by comparing current parameters to the parameters assumed in the EPHA. EARMs are also available for hazardous material facilities.

In conclusion, RFETS continues to effectively reduce site hazards, implement facility procedures, and improve the accuracy of hazardous material inventory records. The process for developing and maintaining hazard surveys and assessments is effective, resulting in accurate, comprehensive documents to serve as the foundation of the emergency management program. The transportation hazards assessment accurately depicts the consequences of incidents associated with performance of transportation activities both on and off site.

Rating: Satisfactory ■

Program Plans and Procedures

The 1998 oversight evaluation concluded that some fundamental elements of emergency preparedness and response were not adequately addressed in emergency plans and procedures, and that the deficiencies could cause unnecessary delays or inappropriate actions during response to an emergency at RFETS. Examples included inadequate sitewide transportation and facility emergency action levels (EALs), and conflicting and confusing guidance for formulation of protective actions for events outside facilities. This review evaluated portions of the site safety analysis report (SAR), the Transportation Safety Manual, and transportation safety implementing procedures that relate directly to site transportation programs, procedures, and activities that collectively minimize risk and preclude off-normal event precursors. Although improvement in certain emergency response procedures is required to assure that emergency planning effectively addresses potential incidents, this review found that transportation activities are performed in a formal manner with strict adherence to applicable requirements.

The RFETS transportation emergency management program is based on the SAR, which comprehensively addresses the potential impact of

transportation incidents on the site. For example, the hazards associated with transporting hazardous and radioactive material on site and the impact on RFETS from rail accidents involving hazardous chemicals that occur off site (where DOE is not the shipper) are evaluated. In addition, manuals and procedures supporting the SAR are comprehensive in scope and content and include a transportation manual, which incorporates documents such as:

- Site Transportation Quality Assurance Program Plan
- Onsite Transportation of Hazardous and Radioactive Materials Manual
- Offsite Transportation Manual.

RFETS has developed a transportation infrastructure, described in manuals and procedures, to support the safe transportation of various materials on site. Manuals and procedures establish steps to be performed in the required sequence in a safe, secure manner. Examples include the procedures for conduct of operations for transportation security officers and transportation personnel, and procedures for the transfer of all categories of special nuclear material.



Waste Being Loaded for Transport

Onsite and offsite movements of hazardous materials are planned and scheduled so that all phases are smoothly integrated to minimize the time the material is vulnerable. The site has achieved excellent coordination and cooperation among the organizations responsible for transportation activities. The close

cooperation this system demands has resulted in improvements in methodology that enhance the safety and efficiency of the transportation function. Optimizing the loading of each vehicle has reduced the number of transfers. When problems occur, fact-finding investigations are performed to develop lessons learned that are then incorporated in procedures.

If the above described mechanisms should fail, defense in depth for transportation incidents is provided by implementation of a comprehensive emergency management system at the Federal, state, local, and site levels. The concept of operations specified by the DOE Region Six Transportation Emergency Plan for offsite events with DOE as the shipper of record provides for initial response by local and state initial responders, augmented as requested by the state with Federal assets. RFETS maintains a 24-hour per day emergency response telephone number (RFETS Emergency Operations Center) while shipments are in transport, including incidental storage. Uniform Hazardous Waste Manifests are immediately available to the Shift Superintendent (primary contact) in the 24-hour location to permit immediate response to offsite assistance requests and contain the emergency response information required by the Code of Federal Regulations. Fire dispatch, co-located with the Shift Superintendent in the Emergency Operations Center (EOC), is the alternate point of contact. The Shift Superintendent's office also maintains current lists of subject matter experts and contact information for supplemental technical in case the shipping manifest lacks the detailed information desired by offsite initial responders.

The RFETS Emergency Plan is a complete rewrite of the 1997 edition of the plan and has been approved by RFFO. The plan addresses operational emergencies related to transportation accidents, and it clearly defines roles and responsibilities for the emergency response organization (ERO). For transportation events occurring at the facility, building management assesses the situation, notifies the Shift Superintendent, implements the Building Emergency Response Operations, initiates Incident Command, and directs protective actions for building occupants. If an onsite event occurs after transfer of responsibility for the material movement to the driver, the event scene observer reports to the Shift Superintendent. As acting Crisis Manager, the Shift Superintendent has absolute authority and responsibility to implement the plan, including assessing and initiating emergency response, protecting onsite personnel, classifying the event, and

notifying, as well as issuing protective action recommendations to offsite officials. A conservative, graded approach based on event severity is used to activate the EOC.

A hierarchy of site procedures, organizational procedures, and individual procedures implements emergency plan requirements. Job aid checklists provide the ERO members with line-entry reminders of tasks to be completed, including references to the applicable procedure. Mechanisms, including procedures and equipment, are available to permit prompt notifications for operational emergency declarations. Procedures provide for timely notifications of non-operational emergencies and for occurrences less severe than operational emergencies.

Several procedural weaknesses should be addressed to improve the Shift Superintendent's ability to implement sitewide EALs and to support timely and accurate classification of emergency events and formulation of protective actions:

- The classification procedure directs the user to facility-specific EALs for all events, even if the event is a known transportation event, which could result in an incorrect classification since facility release barriers generally reduce event severity.
- Inconsistent site protective actions are prescribed for high radiological field measurements and hazardous material releases that result in 1 rem at the site boundary.
- Several RFETS EALs are inconsistent with DOE order requirements and other RFETS procedural guidance directing declaration of a Site Area Emergency for an actual or potential release of hazardous material from a RFETS facility or activity that causes protective action criteria to be exceeded on site. The following examples, currently categorized as RFETS Site Area Emergencies, should be categorized as operational emergencies not warranting classification because of the foregoing requirement:
 - Offsite events such as ammonia and chlorine spills from commercial rail cars 2,800 meters west of the site
 - A credible bomb threat, even if the target is a facility not containing hazardous material.

- DOE Order 151.1 offsite transportation activity event thresholds regarding declaration of an operational emergency not requiring further classification are not included in the RFETS EALs.

RFETS has effectively implemented a system of tiered directives flowing from the SAR that permit effective planning, scheduling, and control of transportation activities. Rigorous quality control at each step in the process, proactive application of lessons learned, and effective strategic planning, coupled with attention to detail in final preparations for shipment, have minimized the precursors to off-normal transportation events. Defense in depth is adequately provided by a comprehensive emergency plan, together with detailed implementing procedures and other tools. Notification systems and mechanisms allow RFETS to fulfill its statutory responsibilities related to transportation incidents and emergencies. Additional actions are needed to correct the identified weaknesses in the RFETS classification procedure that initial decision-makers use to categorize, classify, and formulate protective actions, but overall program plans and procedures are effective.

Rating: Satisfactory 

Emergency Responder Performance and Preparation

The 1998 complex-wide review of emergency management programs found that some members of the RFETS emergency response organization did not demonstrate adequate proficiency or depth of knowledge to fully perform their roles and responsibilities. Several different levels of responsibility were evaluated, including those for the Shift Superintendent and Crisis Manager. This evaluation focused on the Shift Superintendent, who has initial decision-making authority and responsibilities for both on- and offsite transportation events, and the RFETS Fire Dispatcher, who is the alternate 24-hour point of contact for emergency response information required by Department of Transportation requirements (49 CFR 172.602 – 604) for offsite events. This review found that Shift Superintendent performance has been improved through the implementation of improved decision-making tools for protective actions, classification, and notification. However, deficiencies remain concerning the ability of Shift Superintendents and Fire

Dispatchers to provide assistance to the initial decision-makers, thus indicating a weakness in training and drills.

As part of the Department's ongoing Transportation Compliance Evaluation/Assistance Program (TCEAP), a team of RFFO and EM-24 representatives performed an assessment of RFETS transportation activities in November 1999. The focus of the assessment included transportation emergency response and evaluation of the RFETS ERO's ability to immediately provide the emergency response information required by the above-referenced regulation. TCEAP assessment results concluded that the Shift Superintendent who was interviewed could readily identify the applicable shipping manifest and could provide some initial response information based on the North American Emergency Response Guides (NAERG). The assessment also found that the superintendent could not contact any identified technical experts within a reasonable period of time for detailed information on the commodities being shipped, such as boiling point and specific gravity. The TCEAP assessment did not include a detailed evaluation of the Shift Superintendent's ability to interpret the shipping manifest and the NAERG and provide "immediate access" to emergency response information, such as health hazards and required protective clothing, without undue delay. Based on TCEAP results (regarding the long delay in providing detailed technical information on commodities) and the results of this Oversight evaluation, the Oversight team concluded that TCEAP assessment mechanisms may require adjustment to provide additional performance-based evaluation results.

As part of this Oversight evaluation, the team developed hypothetical scenarios for onsite and offsite transportation accidents that could reasonably occur at or affect RFETS. These scenarios were presented to three Shift Superintendents, who serve as the site's initial Crisis Managers, to test their ability to formulate and implement the time-urgent decisions that are required in the initial stages of a transportation response effort. Offsite events were postulated and presented as tabletop exercises to the three Shift Superintendents and two Fire Dispatchers. The objectives were to confirm that a person is immediately available for initial crisis management, is knowledgeable of the hazardous material being shipped, and has comprehensive information about the material that is useful and required for emergency response and incident mitigation. The offsite scenario

utilized a current shipment manifest. Shift Superintendents and Fire Dispatchers were encouraged to make use of all reference materials and resources that would normally be available to them in responding to an incident or emergency. Each performance test was conducted by a member of the Oversight team and one or more individuals from the RFETS emergency management staff to ensure clear communications using site-specific terminology, and to help validate the observations of the evaluation team.

The performance tests indicate that the RFETS Shift Superintendents and Fire Dispatchers clearly understand the roles and responsibilities associated with being a site initial responder and decision-maker during the early stages of an onsite event. They also demonstrated good knowledge of their roles and responsibilities in interfacing with offsite initial responders to a transportation event involving DOE as the shipper of record.

For scenarios related to onsite transportation activities, all superintendents initiated actions to assess the scene conditions and determine event parameters to initiate the correct response. However, one superintendent did not recognize the importance of scene reports of a possible explosion associated with the spill of a residue drum, and therefore improperly classified the postulated event as a Site Area Emergency rather than a General Emergency. All superintendents promptly initiated precautionary site worker protective actions (sheltering), but subsequent protective action orders placed certain population segments at risk. For example, one superintendent ordered evacuation of downwind buildings for a short-term (“puff”) release, which was contrary to the classification procedure, and did not issue precautionary orders to security forces concerning required personal protective equipment when establishing an isolation zone. Another superintendent did not issue supplemental orders directed by procedure concerning ventilation systems or ad hoc personal protection measures, such as shelter-in-place actions, and inappropriately delayed rescue of injured persons for a long period of time. Two superintendents incorrectly determined protective action recommendations. For example, one superintendent recommended, “shelter the EPZ,” although wind characteristics dictated sheltering of specific emergency planning zone (EPZ) sectors. Notifications were performed in a timely manner, but attention to detail in completing message entries was lacking in some cases.

The performance tests also indicated that the Shift Superintendents and Fire Dispatchers did not demonstrate proficiency in interpreting and employing shipping manifests and the primary field emergency response guide, the NAERG. Deficiencies demonstrated by one or more Shift Superintendents and/or Fire Dispatchers include:

- Failure to confirm the correct shipping manifest and list of commodities with the scene observer
- Difficulty in finding the correct manifest, resulting in a significant delay in providing the information needed for immediate response
- Inability to differentiate between large and small spills
- Failure to implement additional protective actions for extremely hazardous substances and for adverse meteorological conditions.

FINDING: RFETS training and drill programs are not yet sufficiently rigorous and comprehensive to adequately prepare Shift Superintendents and Fire Dispatchers for fulfilling their roles and responsibilities in all emergency response situations.

In conclusion, improvements in procedures and training have improved the response posture of the RFETS ERO. The Shift Superintendents’ ability to formulate protective actions, categorize and classify emergencies, and perform required notifications has improved since the 1998 Oversight evaluation. However, training and drill programs are not yet sufficiently rigorous and comprehensive to adequately prepare Shift Superintendents and Fire Dispatchers for fulfilling their roles and responsibilities in all emergency response situations. Kaiser-Hill verbally acknowledged this weakness and indicated that actions would be taken to modify the applicable transportation training programs.

Rating: Marginal 

Offsite Interfaces

In 1998 it was noted that a very strong working relationship and systematic approach was in place between RFFO, Kaiser-Hill, the State of Colorado, and

local stakeholders on emergency management issues. DOE recognized its fundamental responsibility to protect the public effectively in the event of an operational emergency. This responsibility is shared with a range of external organizations and stakeholders. Among these stakeholders are the other Federal agencies; state, county, and local governments; regulatory agencies; law enforcement agencies; citizen organizations; and hospitals. Each of these relationships was individually and collectively fostered in a comprehensive program of planning, preparedness, and response to establish and sustain an effective working partnership. The details of the partnership with the stakeholders have been interwoven with virtually every element of emergency management planning, preparedness, and response. Offsite organizations need training to ensure that they are well informed about facilities, hazards, and methods for response and interface with the site. This training is provided through the effective coordination of emergency exercises, drills, notification tests, and input to exercise objectives and scenarios. Emergency public information interfaces must be strong to establish and implement joint information centers that effectively coordinate emergency information, press briefings, news releases, and rumor control.

This review included determining the status of numerous memoranda of agreement (MOAs) with state and local emergency response organizations and hospitals. Interviews were conducted with external agencies, as well as RFETS site management and emergency management staff, to determine the current nature and effectiveness of offsite interfaces associated with transportation emergency management.



Sitewide Drill: Radiological Assistance Program Team Monitoring Radiation Levels

The RFETS Emergency Plan contains numerous MOAs that have been established with State of Colorado emergency management organizations; county and state law enforcement agencies; local Fire Protection Districts, rescue, and hazardous material (HazMat) authorities; two local hospitals; and the DOE Idaho Operations Office for the radiological assistance program. These agreements are comprehensive and form a basis for communicating roles and responsibilities, dispatching mutual aid, carrying out security operations, and providing for treatment and care of patients, which may be necessary in an emergency. However, some of these MOAs have been recognized within the FY 2000 Emergency Readiness Assurance Plan (ERAP) as having expired, while others require annual reviews to ensure continuing appropriateness. While no immediate concerns were identified, RFFO has not established a process designating accountability for ensuring that these agreements are routinely reviewed and updated when necessary.

Routine meetings are conducted to keep stakeholders apprised of emergency management program activities. For example, at Joint Planning Team and Emergency Planning Zone meetings, updates are provided on hazards assessments and materials at risk that impact emergency planning zones.

During this review, an external stakeholder expressed some concern with the communications from DOE regarding transportation of waste. The primary interest involved transuranic waste shipments to the Waste Isolation Pilot Plant, and additional information related to the types, volume, and shipping frequency of these and other hazardous materials was desired. Stakeholders also expressed concern about an anticipated decrease in the level of funding that DOE had provided to them to support transportation emergency management programs, including training and drill participation, in light of increases in shipments of hazardous waste associated with the accelerated site cleanup.

The 1998 complex-wide review noted concerns about the shared roles and responsibilities associated with the operation of the Joint Public Information Center, as well as its availability for RFETS drill and exercises. Although somewhat improved due to the reassignment of certain duties to RFETS personnel, concerns regarding the level of state participation have not been completely resolved. As a result, operation of the Joint Public Information Center was not formally evaluated in the most recent site full-participation

exercise, and consequently, RFETS management cannot ensure that it can function effectively in an emergency. To resolve this issue, RFFO has developed a draft memorandum of understanding with the Colorado Department of Public Health and Environment to address current Joint Information Center coordination, participation, and readiness assurance activities. To maintain a close relationship with stakeholders, RFFO has routine meetings to keep them apprised of emergency management program activities.

Overall offsite interfaces related to transportation emergency management are well founded and understood through a comprehensive set of agreements. RFFO has developed a draft memorandum of understanding with the Colorado Department of Public Health and Environment to address current coordination, participation, and readiness assurance of the Joint Information Center. The relationship with offsite agencies is important as shipments of waste increase during accelerated site closure. DOE must maintain continued diligence to ensure that communications remain open and that concerns are identified and resolved.

Rating: Satisfactory 

Feedback and Continuous Improvement Process

The 1998 complex-wide review identified a number of fundamental weaknesses in the RFETS emergency management program. The current review determined that the site has appropriately addressed nearly all of the weaknesses identified in 1998, and that Kaiser-Hill has the mechanisms and processes in place to continue to improve the site's emergency management program. However, deficiencies were identified in site corrective action management systems, particularly in the processes by which corrective actions are verified to be effective.

Kaiser-Hill has implemented effective processes intended to support the goal of continuous improvement in the site's emergency management program. The Kaiser-Hill emergency management program includes critical assessments of sitewide and building-specific emergency preparedness programs, and the subsequent preparation and implementation of well-conceived corrective action plans. A rigorous drill/exercise program involving both facility-specific and sitewide emergency responders is used to maintain

responder proficiency, identify areas needing improvement, and help verify the effectiveness of previously implemented corrective actions. Senior Kaiser-Hill management's commitment to an effective emergency management program is clear, as evidenced by the series of follow-up corrective actions implemented to address the significant performance weaknesses identified during "READY-99," the most recent full-participation site exercise. Kaiser-Hill has also implemented several longer-term initiatives designed to strengthen various aspects of the site's emergency management program, including increasing the frequency of both facility-specific and sitewide drills/exercises and baselining the status of facility-specific emergency preparedness programs to identify areas most in need of improvement. Additionally, lessons learned from other sites' problems have rapidly been incorporated by RFETS. For example, RFETS immediately inspected all crates of the type that leaked during a shipment from Fernald and corrected the defects. Recently, transportation personnel detected an improperly labeled shipping container, corrected the problem, and promptly notified all other applicable DOE sites.

Kaiser-Hill's continuous improvement efforts are being hampered by two weaknesses: the limited nature of Kaiser-Hill's activities for verifying corrective action effectiveness, which is discussed in more detail later in this section, and the inconsistent use of the Plant Action Tracking System (PATS) for tracking deficiencies and improvement items. For example, the FY 1999 ERAP lists various weaknesses and improvement items identified during the conduct of FY 1999 sitewide exercises (including READY-99), but only the items resulting from the exercise conducted in October 1998 and READY-99 were entered in PATS. In addition, PATS was not used to capture deficiencies identified in a building-specific emergency response exercise and follow-up exercise, despite the recurrence of one item and the uncertainty expressed by building management regarding problem resolution.

The Kaiser-Hill emergency preparedness organization has expended a significant level of effort to address the weaknesses identified in the RFETS emergency management field report developed in conjunction with the 1998 complex-wide review. Kaiser-Hill emergency services staff conducted a disciplined review of that report and, using input from RFFO emergency management staff, developed and implemented a corrective action plan that was both

well conceived and comprehensive. This process included utilizing Kaiser-Hill's PATS to capture specific weaknesses and associated corrective actions, identify responsible persons, and track the items to completion. Kaiser-Hill has corrected most of the weaknesses that appear in the field report, and the remaining items are at least partially addressed.

Three areas in which the corrective actions were not entirely successful include uncorrected weaknesses in the wording of certain facility and site-wide EALs, continuing proficiency weaknesses demonstrated by initial emergency decision-makers in responding to certain emergency events, and concerns regarding the site's ability to provide timely emergency medical response. The first two were discussed in more detail previously in this report. Unnecessary delay in treating and transporting potentially-contaminated victims was a weakness that reappeared in READY-99 as well as in the tabletop scenarios conducted as a part of this evaluation. Two weaknesses in the Kaiser-Hill corrective action processes likely contributed to the limited success of some corrective actions. First, there was no independent verification of closure of these items because the significance threshold (defined by Kaiser-Hill corrective action process implementing procedures) was not reached. Secondly, there were a few errors of omission in the process of translating weaknesses identified in the 1998 field report to a corrective action plan, and then to PATS entries.

The Kaiser-Hill corrective action process requires a formal independent verification of closure for those items characterized as meeting certain specific criteria. Otherwise, closure verification is at the discretion of the responsible manager, although the site corrective action requirements manual recommends that such verification be considered. Because none of the corrective actions for the 1998 items underwent formal verification, even on a sampling basis, drills and exercises were the dominant source of information regarding corrective action effectiveness. While drills and exercises can be effective vehicles for verification, they do not provide assurance in all circumstances, particularly when the corrective action is a training activity and the follow-up drill or exercise does not involve the same responders. Also of concern is the effectiveness of the Emergency Response Council, which was identified in the Kaiser-Hill corrective action plan as a key element in improving the emergency response capability at the facility level. The purpose of the Emergency Response Council is to

facilitate the implementation of certain critical emergency management program elements at the facility level through regular meetings of individuals with emergency preparedness responsibilities at the facility and site level. Since its inception approximately one year ago, the Council has held only three meetings.

RFFO worked with Kaiser-Hill to develop a comprehensive corrective action plan to address the weaknesses identified in 1998. As a result of RFFO's involvement in the development of the final corrective action plan, the initial Kaiser-Hill plan was modified to address weaknesses that had been initially overlooked or for which additional corrective actions were considered appropriate, particularly in addressing the implementation of building emergency preparedness programs. RFFO also took other actions to close the identified weaknesses and concerns, including a careful consideration of the best approach for RFETS to handle EOC-generated press releases and periodic reviews of the status of the Kaiser-Hill corrective action plan.

For the most part, RFFO is providing an appropriate level of contractor oversight, including substantive interactions with Kaiser-Hill emergency preparedness personnel at least weekly; observations of sitewide and building exercises and attendance at associated critiques; and meaningful reviews of contractor-submitted programmatic documents and exercise reports. Responsibilities for the conduct of assessments and other oversight activities by the RFFO emergency preparedness specialist are clearly spelled out in the associated position description, including the responsibility for reviewing contractor corrective actions for appropriateness and ensuring their effectiveness by performing follow-up assessments. The RFFO assessment process guidance document emphasizes performance-based assessments, such as the RFFO critical assessment of READY-99.

The RFFO corrective action process is currently limited by the absence of any formal verification of Kaiser-Hill corrective action effectiveness. These have not been performed, primarily because of the workload of the one full-time RFFO emergency management specialist. While RFFO management has taken action to reassign some duties, it is not likely that this individual will be able to provide adequate oversight, attend to the numerous external stakeholder groups, conduct the necessary formal program management, and complete technical qualification program requirements.

FINDING: RFFO has not implemented a comprehensive corrective action process for the emergency management program to address their own deficiencies or to independently verify the effectiveness of contractor corrective actions.

RFFO did not develop a formal, internal corrective action plan to address and resolve the four 1998 weaknesses for which RFFO was initially responsible. As a result, only two of these items were addressed effectively. For example, the 1998 evaluation noted that RFFO had not established a comprehensive corrective action management system even though the concern was identified in two earlier reviews. RFFO also did not independently verify and document the closure of Kaiser-Hill corrective actions in accordance with the process described in RFFO Order 220.1A, *RFFO Assessment Program*, and RFFO Order 221.1, *RFFO Issues Management Program*. Consequently, opportunities to identify potential lapses in the Kaiser-Hill closure process were lost. For example, there is no record that RFFO carefully considered or formally approved the Kaiser-Hill decision not to take action on a 1998 weakness regarding the adequacy of the life safety/disaster warning system. As a result of this process weakness, there is no formally documented indication that, given the lapses in life safety/disaster warning system coverage outside the buffer area, the compensatory measures identified by Kaiser-Hill are adequate for communicating emergency information to all site areas where workers are present.

Although not contributing directly to any lapses in resolving weaknesses identified in the 1998 evaluation, deficiencies in the process by which RFFO identified items for entry into the Department's complex-wide Corrective Action Tracking System (CATS) and data entry errors resulted in a distorted view of progress. Nearly 40 separate items were identified in Kaiser-Hill's final corrective action plan; however, only two items specific to the 1998 field report were ever formally entered into CATS as corrective actions. At the time of this evaluation, the

CATS corrective action plan had not been updated since June 1999, even though Kaiser-Hill has closed all associated PATS items. Also noted was the fact that CATS erroneously indicates that the emergency management corrective action plan is complete. Furthermore, there is no well-defined process within RFFO for keeping the CATS database current, as required by DOE Order 414.1A, *Quality Assurance*. As a result, the CATS database is not accurate, and the emergency management staff was unsure of the status of the CATS items.

In conclusion, the team found that with few exceptions, Kaiser-Hill has effectively addressed the weaknesses identified during the 1998 emergency management evaluation, and has in place the continuous improvement and corrective action management processes necessary to assure an effective site emergency management program. Weaknesses in certain important areas remain, although improvements were noted across the board. RFFO is generally providing an appropriate level of oversight to facilitate contractor programmatic improvements, but the current level of staffing in that function does not provide assurance that long-term improvements in the site's program can be sustained. Weaknesses exist in both Kaiser-Hill's and RFFO's independent verifications of the effectiveness of corrective actions taken by Kaiser-Hill; if not appropriately addressed by management, these weaknesses will likely jeopardize the site's continuous improvement efforts. Finally, RFFO still lacks a formal, well-defined corrective action process, and inconsistencies between the information contained in the Kaiser-Hill corrective action plan, PATS, and CATS make it difficult to discern the true status of the site's corrective actions in the emergency management arena.

Rating:

Contractor Feedback and Continuous Improvement Process - Satisfactory 

RFFO Feedback and Continuous Improvement Process - Marginal 







3.0 Conclusions and Overall Rating

The review noted concerns about initial decision-makers' familiarity with and proficiency in using available documents to make timely, accurate decisions for onsite transportation events and to assist offsite responders in reacting to postulated transportation emergencies. In addition, although the site has initiatives in place to further improve the emergency management program, RFETS and RFFO corrective action management systems are not verifying that previously identified weakness are being addressed effectively. RFFO has not implemented the required programs to ensure continuous improvement. As a result, RFFO has not corrected specific weaknesses and does not have a system to ensure that Kaiser-Hill has effectively corrected deficiencies.

Notwithstanding the above, RFETS has made improvements in the areas that were identified as needing management attention in the 1998 complex-wide evaluation, specifically with regard to the transportation emergency management

program. Kaiser-Hill has applied a substantial effort toward developing a comprehensive transportation hazards assessment and safety analysis report. These documents led to the development of facility and sitewide EALs that are also comprehensive and are coupled with default protective actions. The transportation plans and procedures that are in place for planning, moving hazardous material from one facility to another, and shipping material off site are generally good. Having well-designed transportation plans and procedures in place reduces the amount of handling required for hazardous material. The RFETS Emergency Plan addresses operational emergencies related to transportation accidents and clearly defines roles and responsibilities for these activities. The Independent Oversight team found overall that RFETS has an effective transportation emergency management program.

Overall Rating: Satisfactory 

Ratings by Report Element		
Hazards Surveys and Hazards Assessment	Satisfactory	
Program Plans and Procedures	Satisfactory	
Emergency Responder Performance and Preparation	Marginal	
Offsite Interfaces	Satisfactory	
Feedback and Continuous Improvement Process: Kaiser-Hill	Satisfactory	
RFFO	Marginal	

4.0 Opportunities for Improvement

This transportation and follow-up review conducted by the Independent Oversight team identified several opportunities for improvement. These potential enhancements are not intended to be prescriptive. Rather, they are intended to be reviewed and evaluated by the responsible DOE and contractor line managers and prioritized and modified as appropriate, in accordance with site-specific programmatic and emergency management objectives.

- Review the results of the transportation hazards assessments and ensure that the derived EALs and their associated protective actions are included in all pertinent sections of the emergency plan implementing procedures and the emergency assessment resource manual.
- Continue developing and improving classification and protective action formulation tools to permit timely and accurate decision-making for events outside facilities by making them more user-friendly. Use the suggestions of the Shift Superintendents and Fire Dispatchers in the improvement process.
- Make the sitewide EALs consistent with DOE Order 151.1 and applicable guidance. Use the isolation zones prescribed by the NAERG as a classification tool for onsite hazardous material releases for which hazards assessments have not been performed.
- Routinely evaluate the proficiency and level of knowledge of emergency responders in using site emergency plans and procedures. Develop and implement strategies to improve performance for those individuals who are identified as lacking proficiency and understanding. Encourage Shift Superintendents to exercise Fire Dispatchers (and vice versa), during slow times during the shift, with challenging tabletop transportation events.
- Ensure that all emergency responders, including external mutual support members, are adequately trained and understand the urgency

of emergency medical treatment of contaminated victims over radiological concerns.

- Evaluate the effectiveness of the Joint Public Information Center organizational structure, equipment, and facilities. Coordinate with state and local officials to develop an exercise that will test each organization's ability.
- Implement a staffing strategy for RFFO that will facilitate effective oversight of the emergency management functional area and permit staff to fulfill assigned duties and responsibilities.
- Resume Emergency Response Council meetings in accordance with a published schedule. Develop minutes for each meeting, and include RFFO on the distribution list for agendas and minutes.
- Reevaluate the thresholds established by Kaiser-Hill for performing independent assessments of corrective action effectiveness to consider both the significance and the specific nature of the corrective action.
- Revise RFFO Order 221.1, *RFFO Issues Management Program*, to clearly indicate management expectations regarding verification of corrective action closure, including the determination of corrective action effectiveness.
- In the emergency plan implementing procedures for offsite transportation emergency response actions, recognize the distinction (by providing expectations of time to respond) between the information that the RFETS point of contact must provide immediately to the on-scene responder versus the more hazard-specific, technically detailed information provided later in the event. This latter information is normally provided by a site subject matter expert and then relayed by the RFETS point of contact to the on-scene responder.

APPENDIX A

FINDINGS FOR CORRECTIVE ACTION AND FOLLOW-UP

This appendix summarizes the significant findings identified during the Office of Independent Oversight and Performance Assurance transportation and follow-up review of the Rocky Flats Environmental Technology Site transportation emergency management program. The findings identified in this appendix will be formally tracked in accordance with the *Protocols for Responding to Office of Independent Oversight and Performance Assurance Appraisal*

Reports (August 1999) and will require a formal corrective action plan. The DOE Assistant Secretary for Environmental Management and the Rocky Flats Field Office need to specifically address these findings in the corrective action plan. Other weaknesses and/or deficiencies identified in this report should be addressed by line management but need not be included in the formal corrective action plan.

FINDING STATEMENT	REFER TO PAGES:
1. RFETS training and drill programs are not yet sufficiently rigorous and comprehensive to adequately prepare Shift Superintendents and Fire Dispatchers for fulfilling their roles and responsibilities in all emergency response situations.	10
2. RFFO has not implemented a comprehensive corrective action process for the emergency management program to address their own deficiencies or to independently verify the effectiveness of contractor corrective actions.	14

OPEN LEGACY ISSUE

Weaknesses in the RFETS emergency management program include coordination of program elements at the facility level; some elements of plans, procedures, and training; proficiency of personnel; public information; facilities and equipment; and hazard recognition and prioritization of response activities.


APPENDIX B

EVALUATION PROCESS AND TEAM COMPOSITION


The evaluation was conducted under the direction of the Secretary of Energy's Office of Independent Oversight and Performance Assurance. The evaluation was performed according to formal protocols and procedures, including an Appraisal Process Guide, which provides the general procedures used by Independent Oversight to conduct inspections and reviews, and the evaluation plan that was developed specifically for this activity, which outlines the scope and conduct of the process. Planning discussions were conducted to ensure that all team members were informed of the review objectives, procedures, and methods.

Explanation of Rating System


The Office of Independent Oversight and Performance Assurance assigns an overall rating to the emergency management program; ratings are also assigned to selected individual elements of the program. The rating process involves the critical consideration of all evaluation results, particularly the identified strengths and weaknesses. In the case of weaknesses, the importance and impact of those conditions are analyzed both individually and collectively, and balanced against any strengths and mitigating factors to determine their impact on the overall goal of protecting emergency responders, site workers, and the public. The Office of Independent Oversight and Performance Assurance uses three rating categories—Satisfactory, Marginal, and Unsatisfactory—which are also depicted by colors as Green, Yellow, and Red, respectively.

 **Satisfactory** (Green): An overall rating of *Satisfactory* is assigned when the emergency management program being evaluated provides reasonable assurance that all of the site's emergency responders are ready to respond promptly and effectively to an emergency event or condition.

An emergency management element being evaluated would normally be rated Satisfactory if the emergency management function is implemented effectively. An element would also normally be rated as Satisfactory if, for any applicable standards that are not met, other compensatory factors exist that provide equivalent protection to workers and the public, or the impact is minimal and does not significantly degrade the response.

 **Marginal** (Yellow): An overall rating of *Marginal* is assigned when the emergency management program being evaluated provides questionable assurance that site workers and the public can be protected following an emergency event or condition.

An emergency management element being evaluated would normally be rated Marginal if one or more applicable standards are not met and are only partially compensated for by other measures, and the resulting deficiencies in the emergency management function degrade the ability of the emergency responders to protect site workers and the public.

 **Unsatisfactory** (Red): An overall rating of *Unsatisfactory* is assigned when the emergency management program being evaluated does not provide adequate assurance that site workers and the public can be protected following an emergency event or condition.

An emergency management element being evaluated would normally be rated Unsatisfactory if one or more applicable standards are not met, there are no compensating factors, and the resulting deficiencies in the emergency management function seriously degrade the ability of the emergency responders to protect site workers and the public.

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