



MEL & ENID ZUCKERMAN COLLEGE OF PUBLIC HEALTH

**Western Mining Safety
and Health Training
Resource Center**

Mine Emergency Response Competency Model for Self-Escape

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Domain 1: Leadership and Decision-Making

Refers to the responsibility of each miner to stand up and contribute in all phases of an emergency and the ability to implement decisions in a continuous changing environment by demonstrating the following competencies:

Competency 1.1 Understand and support a coordinated operational structure to solve problems under emergency conditions.

| Individual Miner | Organizational Leadership | Command & Control |
|---|---|---|
| <i>Prioritize problems based on severity, urgency, and solvability. (S)</i> | <i>Differentiate among the consequences of specific decisions. (S)</i> | <i>Recognize the ethical and moral implications of decisions made to improve self –escape. (O)</i> |
| <i>Implement action to solve the problems(s) in a timely fashion. (S)</i> | <i>Assume responsibility for taking specific actions that further organizational mission in the presence of a mine emergency. (A)</i> | <i>Refer problems that fall outside one’s scope of authority to the appropriate person in the chain of command. (S)</i> |

Competency 1.2 Contribute expertise to the development of mine emergency plans for improved response roles during an emergency.

| Individual Miner | Organizational Leadership | Command & Control |
|---|---------------------------|---|
| <i>Locate (i.e. in ICC and elsewhere) operational plans for emergency response. (K)</i> | | <i>Implement Command and Control procedures according to emergency response plan. (S)</i> |

Competency 1.3 Manage stress-induced behaviors associated with emotional responses in self and others.

| Individual Miner | Organizational Leadership | Command & Control |
|--|---------------------------|---|
| <i>Apply techniques for maintaining awareness of possible signs of personal stress, burn-out, and vicarious trauma.(S)</i> | | <i>Assess individuals requiring immediate care. (S)</i> |
| <i>Demonstrate personal behavioral techniques for mitigating acute distress and fostering adaptive functioning and coping. (S)</i> | | |
| <i>Assess individuals requiring immediate care. (S)</i> | | |

Competency 1.4 Maintain situational awareness and demonstrate accountability to deliver enhanced information to reinforce ongoing lifesaving and life-sustaining activities to meet basic human needs and stabilize the incident.

| Individual Miner | Organizational Leadership | Command & Control |
|---|--|---|
| <i>Explain the importance of a shared mental model and your role in a coordinated response to</i> | <i>Detect cues that the situation may be rapidly changing. (K)</i> | <i>Cooperate with others to resolve discrepancies or misperceptions in an emergency and identify elements</i> |

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| <p><i>an emergency. (K)</i></p> <p><i>Cooperate with others to resolve discrepancies or misperceptions in an emergency and identify elements which may impact situational awareness. (S)</i></p> <p><i>Analyze emergency information regarding the status, attributes, and dynamics of relevant factors impacting response activities. (K)</i></p> <p><i>Detect cues that the situation may be rapidly changing. (K)</i></p> | <p><i>Classify key resources used in problem solving for specific types of incidents and the immediate needs of victims. (K)</i></p> | <p><i>which may impact situational awareness. (S)</i></p> <p><i>Use information and resources that identify changes in the situation and/or response. (S)</i></p> <p><i>Apply techniques that aid in recovery of situational awareness. (S)</i></p> <p><i>Analyze information regarding the status, attributes, and dynamics of relevant factors impacting response activities. (K)</i></p> <p><i>Detect cues that the situation may be rapidly changing. (K)</i></p> <p><i>Classify key resources used in problem solving for specific types of incidents and the immediate needs of victims. (K)</i></p> |
|--|--|--|

Competency 1.5 Manage and assess information related to an emergency to inform decision-making regarding the nature and extent of the hazard and any cascading effects.

| Individual Miner | Organizational Leadership | Command & Control |
|---|----------------------------------|---|
| <p><i>Verify the credibility of information sources. (K)</i></p> <p><i>Demonstrate composure when managing information. (O)</i></p> | | <p><i>Verify the credibility of information sources. (K)</i></p> <p><i>Demonstrate composure when managing information. (O)</i></p> |

Competency 1.6 Maintain good interpersonal listening and speaking skills to promote collaboration and cooperation to solve safety concerns.

| Individual Miner | Organizational Leadership | Command & Control |
|--|----------------------------------|--|
| <p><i>Assess and interpret meaning of information. (S)</i></p> <p><i>Transfer written information to appropriate personnel. (S)</i></p> <p><i>Talk clearly to negotiate process to solve immediate or imminent safety concerns. (K)</i></p> <p><i>Listen to information and clarify defined purpose, roles, responsibilities and accountabilities. (K)</i></p> | | <p><i>Talk clearly to negotiate process to solve immediate or imminent safety concerns. (K)</i></p> <p><i>Assess and interpret the meaning of information. (S)</i></p> <p><i>Demonstrate the ability to incorporate factors of diversity in emergency response and recovery efforts. (S)</i></p> |

Domain 2-Communications & Crisis Management

Refers to the miner's need to communicate before, during, and after an emergency and implementing crisis management activities by demonstrating the following competencies:

Competency 2.1 Use principles of crisis and risk communication to ensure information is concise and clearly understood among underground mine team.

| Individual Miner | Organizational Leadership | Command & Control |
|---|--|--|
| <p><i>Employ communication responsibilities for an event (before, during, and after). (S)</i></p> <p><i>Deliver messages using the guidelines for crisis and risk communication. (K)</i></p> <p><i>Maintain empathy when communicating during a crisis. (A)</i></p> | <p><i>Value cultural sensitivity as essential to communicating with diverse populations during a crisis. (O)</i></p> <p><i>Communicate within the organization's defined command structure (i.e. report up, communicate down). (S)</i></p> <p><i>Alert appropriate staff to unusual events based on identified trigger points and/or thresholds as outlined in mines' Communications Annex. (S)</i></p> <p><i>Communicate relevant information to personnel in a timely fashion. (S)</i></p> | <p><i>Employ communication responsibilities for an event (before, during, and after). (S)</i></p> <p><i>Deliver messages using the guidelines for crisis and risk communication. (K)</i></p> <p><i>Communicate within the organization's defined command structure (i.e. report up, communicate down). (S)</i></p> <p><i>Maintain empathy when communicating during a crisis. (A)</i></p> <p><i>Alert appropriate staff to unusual events based on identified trigger points and/or thresholds as outlined in mines' Communications Annex. (S)-</i></p> <p><i>Communicate relevant information to personnel in a timely fashion. (S)</i></p> |

Competency 2.2 Use psychological first aid to diminish physiological stress response and facilitate function and action toward self-escape and survivability.

| Individual Miner | Organizational Leadership | Command & Control |
|---|---------------------------|--|
| <p><i>Demonstrates the skills associated with the core PFA functions: Safety and Comfort, Stabilization, & Information Gathering. (S)</i></p> | | <p><i>Demonstrates the skills associated with the core PFA functions: Safety and Comfort, Stabilization, Information Gathering, Practical Assistance, Connection with Social Supports, Information on Coping, Linkage with Collaborative Services. (S)</i></p> |

| Competency 2.3 Establish and maintain different types of communications (i.e. interoperable voice, data, etc.). | | |
|---|---|--|
| Individual Miner | Organizational Leadership | Command & Control |
| | <i>Select and utilize appropriate communication equipment and techniques that best meet the task, context and needs of the situation(S)</i> | <i>Establish clear communication protocols and notification chains. (K)</i> |
| Competency 2.4 Relay and document the six categories of critical information that should be provided during emergency communications: Who, Where, What, Miners, Event, and Response. | | |
| Individual Miner | Organizational Leadership | Command & Control |
| <i>Information is transmitted concisely and clearly to facilitate accurate reception of the message in accordance with mines' policy and procedures. (S)</i> | | <i>Contact is acknowledged, communication is confirmed and action initiated. (S)</i> <i>Information is transmitted concisely and clearly to facilitate accurate reception of the message in accordance with mines' policy and procedures. (S)</i> |
| Competency 2.5 Communicate information on the course of action and implementation to the relevant people. | | |
| Individual Miner | Organizational Leadership | Command & Control |
| <i>Communicate within the mines' defined command structure (i.e. report up, communicate down). (S)</i> <i>Assess relevant emergency situational information coming from command center (A)</i> | <i>Assess relevant emergency situational information coming from command center. (A)</i> | <i>Provide clear and accurate emergency situational information to organizational leadership. (S)(A)</i> |
| Competency 2.6 Ensure the capacity for timely communications in support of security, situational awareness, and operations by any and all means available. | | |
| Individual Miner | Organizational Leadership | Command & Control |
| | <i>Direct different types of communication through correct channels, hierarchies and frequency. (A)</i> | <i>Establish and maintain communication within the mine according to site procedures. (S)</i> <i>Maintain communication processes with other personnel to assist flow of emergency activities. (K)</i> |
| Competency 2.7 Understand mine communications plan to include protocols for family reunification, media control, & external management teams. | | |
| Individual Miner | Organizational Leadership | Command & Control |
| | <i>Implement family reunification plans and protocols to inform families of emergency situation. (S) (A)</i> | <i>Establish media control and use crisis and risk communication practices to deliver unified response messaging. (S)</i> |

Domain 3: Hazard Recognition & Avoidance

Refers to the miner's contribution of subject matter and mine hazard vulnerability to prepare for, and increase miner response in emergency situations by demonstrating the following competencies:

Competency 3.1 Identify threats and immediate hazards during a mine emergency (explosions, hazardous spill, etc.) and implement primary response methods to control the hazard and minimize injury and/or death.

| Individual Miner | Organizational Leadership | Command & Control |
|--|---|---|
| <i>Recognize the type and scope of unresolved hazards and their likely impact. (K)</i> | <i>Identify and consider all possible risk treatment options. (S)</i> | <i>Select most appropriate action for dealing with the situation. (A)</i> |
| <i>Identify and consider all possible risk treatment options. (S)</i> | | <i>Identify and consider all possible risk treatment options. (S)</i> |

Competency 3.2 Maintain familiarity with emergency escape route(s) according to mine site procedures.

| Individual Miner | Organizational Leadership | Command & Control |
|--|--|--|
| <i>Assess the incident and determine the appropriate method of escape. (S)</i> | <i>Assess the incident and determine the appropriate method of escape. (S)</i> | <i>Access, interpret and apply technical and safety information. (A)</i> |
| | <i>Conduct periodic reviews of controls and analysis of effectiveness of controls for response operations. (S)</i> | <i>Assess the incident and determine the appropriate method of escape. (S)</i> |

Competency 3.3 Select most appropriate action for dealing with the situation (i.e. hazard) according to mine site emergency response plans and procedures.

| Individual Miner | Organizational Leadership | Command & Control |
|--|---|---|
| <i>Select appropriate personal protective clothing and equipment to the types of hazard(s) identified. (S)</i> | <i>Identify appropriate containment strategies and resources. (K)</i> | <i>Identify appropriate containment strategies and resources. (K)</i> |
| <i>Identify appropriate containment strategies and resources. (K)</i> | | |

Competency 3.4 Continuously monitor threat/hazard and reassess controls (i.e. ventilation) in place to ensure the safety of personnel in the vicinity of threat (i.e. fire).

| Individual Miner | Organizational Leadership | Command & Control |
|---|---|--|
| <i>Take and interpret atmospheric readings of contaminants and take appropriate actions based on readings and recommendations from Command and Control. (A)</i> | <i>Record and analyze and/or compare with specifications and exposure limits. (A)</i> | <i>Provide concrete strategies to miners in response to the atmospheric readings of contaminants communicated. (A)</i> |

| | | |
|--|---|--|
| <i>Record and analyze and/or compare with specifications and exposure limits. (A)</i> | | |
| Competency 3.5 Perform primary and secondary assessments of miners (i.e. each team member) condition to recognize and implement life support measures. | | |
| Individual Miner | Organizational Leadership | Command & Control |
| <i>Conduct initial assessment to identify extent and nature of emergency care required. (S)</i> <i>Identify and communicate additional or specific resource requirements to command center. (S)</i> <i>Demonstrate calm, caring and reassuring manner in interaction with the casualty of a team member. (K)</i> | | <i>Conduct initial assessment to identify extent and nature of emergency care required. (S)</i> <i>Demonstrate calm, caring and reassuring manner in interaction with miners involved in emergency. (K)</i> |
| Competency 3.6 Understand and apply the hierarchy of controls to reduce and/or eliminate immediate risks. | | |
| Individual Miner | Organizational Leadership | Command & Control |
| <i>To access, interpret and apply mine site information on risk control systems relevant to response operations. (A)</i> <i>Knowledge of procedures, requirements and instructions to conduct local risk assessment appropriate to a mine site. (K)</i> | <i>Knowledge of mine site communication, reporting and recording procedures. (K)</i> <i>Implementation of appropriate risk management procedures and techniques during escape appropriate to a mine site, while complying with Miner safety. (S)</i> | <i>Knowledge of mine site safety systems information. (K)</i> |

Domain 4: Regulatory Compliance

Refers to the miner's adherence to regulatory compliance and maintaining emergency response standards and mine specifications by demonstrating the following competencies:

NOTE: Regulatory Compliance is a proactive activity and occurs during preparedness planning phase. In addition, regulatory compliance is evaluated post- crisis. As such there are no emergency response competencies for self-escape relevant to this domain.

Competency 4.1 Apply appropriate site safety procedures during mine emergencies according to mine standards to improve self-escape (i.e. use of directional lifelines, donning and doffing of SCSR, knowledge of mine escape way maps, etc.).

| Individual Miner | Organizational Leadership | Command & Control |
|--|----------------------------------|------------------------------|
| N/A | N/A | N/A |
| Competency 4.2 Collect and record all potential hazards, risks, injuries, and incidents and communicate details of the event or changes in circumstances to Incident Command for advice on actions to be taken. | | |
| Individual Miner | Organizational Leadership | Command & Control |
| N/A | N/A | N/A |
| Competency 4.3 Achieve and maintain quality mine operations/work conditions by monitoring individual work processes and applying local risk control measures. | | |
| Individual Miner | Organizational Leadership | Command & Control |
| N/A | N/A | N/A |

Domain 5: Worker Safety and Health

Refers to the need of individual miners and miners deployed in teams to take protective actions to threats by demonstrating the following competencies:

Competency 5.1 Use appropriate personal protective equipment and apply appropriate procedures (i.e. self-rescue equipment, confined spaces, noise, isolation, etc.) for managing hazards, risks, and emergencies.

| Individual Miner | Organizational Leadership | Command & Control |
|---|---------------------------|-------------------|
| <i>Don personal protective clothing and equipment appropriate to the types of hazards identified. (S)</i> | | |

Competency 5.2 Recognize, access, and respond to alarms and warning devices according to mine site procedures.

| Individual Miner | Organizational Leadership | Command & Control |
|---|---------------------------|---|
| <i>Respond to alarms and warning devices according to mine emergency response plan. (S)</i> | | <i>Provide actionable information to miners to assist them in making best decision for self-escape. (S)</i> |

Competency 5.3 Report unresolved threats to physical and mental health through the chain of command.

| Individual Miner | Organizational Leadership | Command & Control |
|--|---------------------------|---|
| <i>Distinguish between potential threats to physical and mental well-being in the response environment. (S)</i> <i>Recognize the signs and symptoms of fatigue, mental distress and unresolved physical injury in the response environment and during escape. (K)</i> | | <i>Distinguish between potential threats to physical and mental well-being in the response environment. (S)</i> |

Competency 5.4 Implement and maintain risk-informed physical protections, countermeasures, and policies protecting people, structures, materials, products, and systems associated with key mine operational activities.

NOTE: Only a preparedness competency

| Individual Miner | Organizational Leadership | Command & Control |
|------------------|---------------------------|-------------------|
| N/A | N/A | N/A |

Domain 6: Miner Resiliency

Refers to the need of individual miners to reduce their risk and recover from emergency situations by demonstrating the following competencies:

Competency 6.1 Employ protective behaviors according to changing conditions, personal limitations, and threats.

| Individual Miner | Organizational Leadership | Command & Control |
|--|--|-------------------|
| <i>Understands the principles of crisis stress management and demonstrate associated skills. (K)(S)-</i> | <i>Understands the principles of crisis stress management and demonstrate associated skills. (K)(S)-</i> | |

Competency 6.2 Conduct health and safety hazard assessments and ensure the availability and dissemination of guidance and resources (i.e. deploying hazardous materials teams).

| Individual Miner | Organizational Leadership | Command & Control |
|------------------|--|--|
| | <i>Apply organizational policies and plans during an emergency response. (S)</i> <i>Adapt skill sets to meet organizational needs during an emergency response situation. (K)</i> | <i>Communicate the need for and importance of a coordinated response with other agencies to emergencies and disasters. (S)</i> <i>Apply organizational policies and plans during an emergency response. (S)</i> |

Competency 6.3 Take precautions to safeguard workers and maintain standards of health, fitness and well-being.

| Individual Miner | Organizational Leadership | Command & Control |
|---|---|---|
| <i>Demonstrates a capacity to recognize, operate effectively within, and manage crisis and extreme stress. (S)</i> <i>Adopts an ethical approach in all actions. (O)</i> | <i>Adopts an ethical approach in all actions. (O)</i> <i>Demonstrates a capacity to recognize, operate effectively within, and manage crisis and extreme stress. (S)</i> | <i>Adopts an ethical approach in all actions. (O)</i> <i>Demonstrates a capacity to recognize, operate effectively within, and manage crisis and extreme stress. (S)</i> |

Competency 6.4 Focus on timely restoration of mine infrastructure and revitalization post incident to promote resilience of miner health, and environmental fabric of community (i.e. social, cultural, historic, and economy, etc.).

| Individual Miner | Organizational Leadership | Command & Control |
|------------------|---|-------------------|
| | <i>Knowledge of mine emergency response plan and recovery elements of the plan. (K)</i> | |

Competency 6.5 Participate in risk and disaster resilience assessments so that mine community (decision makers, responders, and community members) can take informed action to reduce their entity’s risk and increase their resilience.

| Individual Miner | Organizational Leadership | Command & Control |
|--|--|--|
| <p><i>Participate in post-event de-brief and assessment. (K)</i></p> | <p><i>Communicate procedural improvements. (S)</i></p> <p><i>Participate in post-event de-brief and assessment. (K)</i></p> <p><i>Access and analyze relevant safety systems information to eliminate situations covered by existing and adequate procedures. (A)</i></p> <p><i>Based upon this assessment, incorporate improvements into ICC and mine emergency response plans. (S)</i></p> | <p><i>Plan and prepare the course of action in detail and acquire/obtain required resources. (K)</i></p> <p><i>Participate in post-event de-brief and assessment. (K)</i></p> <p><i>Based upon this assessment, incorporate improvements into ICC and mine emergency response plans. (S)</i></p> |