

# **Emergency Preparedness and Response plan**

Extracted from:

Operation, Maintenance and Surveillance Manual ; Section 9

Prepared by BGC, June 31, 2013

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## 9.0 EMERGENCY PREPAREDNESS AND RESPONSE

From MAC guidelines:

- EPR plans to identify potential for accidents, respond to emergency situations, prevent and mitigate environmental and safety impacts
- List warning signs and potential consequences
- Specify call-out procedures
- Specify lines of communication – inside and outside site, with names and contact information
- Identify Process for notifying external parties
- Specify verification procedures to ensure parties have been contacted
- Ensure emergency response plans are widely distributed within the organization
- Typical contents of ERP
  - Identification of failure modes
  - Identification of roles and responsibilities
  - Regulatory requirements for reporting
  - Available resources
  - Public relations plans
  - Contact information of all relevant persons/organizations and communication system
  - Risk analysis of effects
  - Inundation maps
  - Basis to activate emergency response
  - How personnel will be trained
  - Post event investigation procedures
  - Contingency plans
  - How to restore normal operations
  - Tests/drills of the response plan

From Canadian Dam Association Guidelines:

- Emergency response plan should include
  - Roles and responsibilities
  - Priority of notifications
  - Should cover full range of potential flood issues (large storm and structural failures of dam)
  - How to address transition from normal conditions to emergency situation
- Method of assessing level of emergency, with predefined trigger levels
  - Hazardous condition or incident – does not pose immediate danger, but could develop into one
  - Potential emergency – need to prepare downstream areas for flood management
  - Imminent or actual emergency
- Emergency Identification and evaluation

- Conditions/events indicating a potential emergency – what are potential failure modes and what are warning signs?
- How to identify – what are monitoring and inspection procedures?
- How to assess severity of emergency – pre defined trigger levels
- Who is responsible to activate emergency response when required
- Preventative and remedial action – describe what can be do prevent and slow or make less severe an emergency situation
- Notification procedures
  - Provide all contact info
  - Should be in order of priority
  - Should include – local authorities, agencies involved in emergency response, owner of facility, downstream users, government authorities
  - Communication with media
- Provide information on site access
  - By various methods (road, foot, helicopter)
  - In various conditions (night, storm, winter)
  - Location of communication infrastructure and material available for emergency response
  - Site plans
- Inundation maps if available

### **9.1. Purpose and Introduction**

This Emergency Preparedness and Response Plan serves to establish a clear emergency response structure specific to the Huckleberry Mine tailings storage facilities. HML plans for and responds to emergency situations that could cause significant harm to people or the environment. In planning for emergencies, HML has developed a list of potential emergency situations and works cooperatively to ensure adequate response capabilities in case of an incident.

This plan details the conditions or events that indicate existing or potential emergencies, provides a means of identifying an existing or potential emergency, outlines procedures for assessing the severity and magnitude of an existing or potential emergency, and designates the persons(s) responsible for identifying and evaluating the emergency and activating the emergency response.

Additionally, this plan lists and classifies site-specific warning signs with reference to potential tailings and water management facility failure modes or emergencies—from both structural failure and failure due to environmental impacts. Notification procedures are both outlined and presented in figure form to ensure appropriate and effective lines of communication in the event of an emergency. Plan training, testing, and updating guidelines are also included to ensure uniformity across the organization.

## 9.2. Emergency Preparedness

### 9.2.1. Project Location, Description and Effects of Inundation

#### Project Location

The Huckleberry Project site is located in west central British Columbia, approximately 85 km southwest of Houston by air as shown in **Error! Reference source not found.**. Access to the site is obtained by traveling 113 km south of Houston along a gravel-surfaced, radio-controlled Forest Service Road then 8 km along the Huckleberry Connector Road from the junction at Whiting Creek. Alternative access from the Whiting Creek junction is by way of a secondary road which runs north of Huckleberry Mountain and Sweeney Lake, and enters the property from the west, at the limit of the TMF-3 facility. The site is located above Tahtsa Reach, to which run-out from any potential tailings dam failure would report (see **Error! Reference source not found.**).

#### Description

Detailed descriptions of the tailings management facilities layout and operation are included in Sections **Error! Reference source not found.** and **Error! Reference source not found.**.

#### Effects of Inundation

A dam break and Inundation Study was completed AMEC (2009e) for the TMF-2 Dam and the East Pit Plug Dam. That study is provided in Appendix N. Additionally, an inundation study has been done for TMF-3 to supplement this study so that all tailings and waste management facilities have an inundation study completed for them. Significant volumes of tailings could be released to the environment in the event of a breach of any of the tailings facilities. Limited infrastructure and no population are present in the immediate downstream area of any dam, so only impacts to minor infrastructure are anticipated in the event of a breach. Given the shape and depth of Tahtsa Reach, and the potential tailings and water volumes, the likelihood of potentially damaging waves being generated by the inflow of tailings and water is minimal.

### 9.2.2. Key Personnel and Government Agencies

Roles and responsibilities of key personnel for tailings facilities stewardship are as outlined in **Error! Reference source not found..** The communications directory is outlined in Table 9-1.

**Table 9-1. Key Personnel for Emergency Preparedness and Response**

<b>Position</b>	<b>Name</b>	<b>Office/Home Phone</b>	<b>Cell Phone</b>
VP Operations Business Development	Randall Thompson	(604) 685-8299	(250)-895-0916
General Manager	Kent Christensen	(604) 517-4735	(250) 877-3855
Manager of Mine Operations and Engineering	Shane Flynn	(604) 517-4724	(250) 877-3695
Environmental Superintendent	Marke Wong	(604) 517-4712	(250) 643-1725
Engineering Department	A/C Lee Ohara B/D Stephen Osasan	(604)759-4768 (604)759-4769	Shift – always one on site
Mill General Foreman	Kevin Topper Dave Unruh	(604) 517-4744	Shift – always one on site
Mine Supervisors	A – George Englehart B – Tom Heggie C – Randy Dahlgren D – Ron Cardinal	(604) 517-4731	Shift – always one on site
Health and Safety Coordinator	Dwayne Allen/Clifford Yuen	(604) 517-4705/(604)517- 4730	Always one onsite
<b><u>TAILINGS DAM CONSULTANT PERSONNEL</u></b>			
BGC Project Manager	Daryl Dufault	(604) 684-5900 Office ext. 41191 Home: (604) 931-6368	(778) 506-5191
BGC Project Director	Todd Martin	(604) 684-5900 Office ext. 41244 Home: (604) 327-6225	(604) 368-2016
<b><u>GOVERNMENT AGENCIES</u></b>			
Provincial Emergency Program (P.E.P.)	Director	24/7 contact number	1-800-663-3456
MOE (Smithers)	Emergency Response Officer	Norm Fallows	(250) 847-7259
MEM (Victoria)	Chief Inspector of Mines	Al Hoffman	(250) 952-0494
MEM (Smithers)	Senior Inspector of Mines	Doug Flynn	(250) 847-7386
Rio Tinto Alcan	RTA Kitimat Plant Protection	24/7 contact number	(250) 639-8273

### 9.3. Emergency Response Plan

#### 9.3.1. Activation of the Plan

The person who discovers a situation that may threaten the structural integrity of the dam will advise the following persons immediately:

- Mill General Foreman or Mine Shift Supervisor, as most appropriate to the situation; and
- Manager of Mine Operations and Engineering.

Manager of Mine Operations and Engineering or, if unavailable, Mill General Foreman or Mine Shift Supervisor will assess the situation and make an alert level determination. If the situation is determined to be Level 2 – Emergency, or Level 3 – Crisis, the Emergency Response Plan, per the communication procedure as outlined in Section 9.3.4, will be activated. The procedure for the determination and activation of the plan is as shown in Figure 9-1.

The communications directory for key personnel for Emergency Preparedness and Response is provided in Table 9-1.

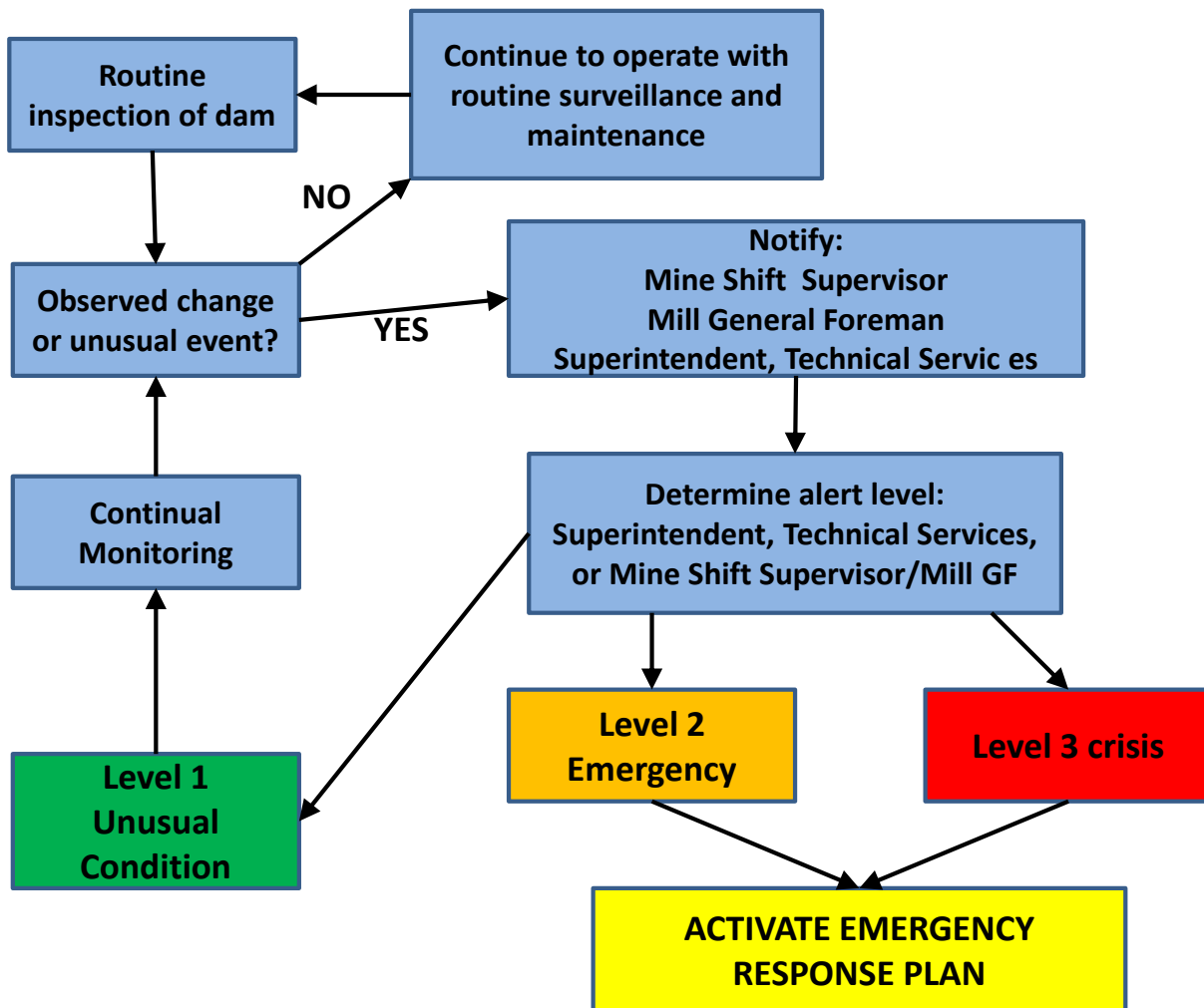


Figure 9-1. Alert Level Determination and Emergency Response Plan Activation

### 9.3.2. Emergency Identification and Evaluation

From CDA guidelines:

- Emergency Identification and evaluation
  - Conditions/events indicating a potential emergency – what are potential failure modes and what are warning signs?
  - How to identify – what are monitoring and inspection procedures?
  - How to assess severity of emergency – pre defined trigger levels
  - Who is responsible to activate emergency response when required

This section covers only those emergency situations that could potentially pose a threat to the structural integrity of the tailings dams or result in the release of tailings materials, tailings transportation water, and/or supernatant pond water into the surrounding environment. In the event of an emergency, prompt action shall be taken to avoid delays which could have serious consequences. Responsible persons and agencies listed in Table 9-1 shall be informed and contingency plans put into effect.

Emergency situations may include, but are not limited to, the following:

- Failure or suspect impending failure of the tailings dams
- Overtopping of the tailings dams
- Slumping, sliding, cracking or bulging of tailings dams
- Discharge of seepage from well above the dam fill to foundation contact
- Rapid increase or unexplained cloudy appearance of seepage through the tailings dams and/or their foundations
- Formation of sinkholes on the tailings beach or dams
- Breakage of tailings pipelines, which may result in dam erosion and/or release of tailings slurry
- Large earthquakes
- Extreme flood
- Severe storms
- Sabotages and other criminal activities

Particular attention shall be given to inspecting and, where necessary, repairing the facilities following unusual or extreme events. All unusual events shall be reported to supervisory personnel. In an unlikely event that anomalously high seepage flows occur downstream of the tailings dams, and particularly if seepage water is carrying soil particles from the dams or their foundations, an early indication of a potential piping problem, it shall be reported immediately and the Tailings Dam Consultant notified.

In the event of an emergency or unusual situation, all instrumentation in the affected area shall be monitored during and/or immediately following the event by mine engineering personnel. This information shall be forwarded to the Tailings Dam Consultant immediately so that the situation can be assessed and any required remedial actions taken promptly.

Unusual conditions are corresponding alert levels are outlined in Table 9-2.

**Table 9-2. Guidelines for Alert Level Ranking for Unusual Conditions**

<b>Alert Level Rankings for Unusual Conditions and Emergencies at Huckleberry Mine Tailings Management or Water Storage Facilities</b>		
<b>Event or Observation</b>	<b>Situation</b>	<b>Alert Level</b>
Rising Water Levels, Freshet, and Overtopping	Impoundment water level is rising and approaching specified depth below embankment crest (impinging upon required IDF storage)	1
	Impoundment water level above specified depth to embankment crest or freeboard (e.g., 1 meter)	2
	Water is flowing over the dam	3
	Water is flowing over an abutment or saddleback rim of impoundment	3
Extreme Precipitation Event	Threat of flash flood condition from excessive rain or rapid snow melt	1
	Threat of avalanche into pool	1
	Threat of land slide/pit wall failure into pool	1
	Observed ground saturation near or on dam embankment	1
	Water starting to flow through emergency spillways of SC6, SC7, SC8	1
	Localized slumping or instability on dam face	1
	Impoundment water level is rising (see 'Rising Water Levels and Overtopping' section above)	*
Extreme Wind Event	Wave erosion of tailings beach	1
	Severe wind erosion/dusting from exposed tailings beaches	1
Extreme Snowpack	See 'Rising Water Levels and Overtopping' section above	*
Spillway Erosion or Blockage	Minor erosion / turbidity apparent in SC6, SC7, SC8 emergency spillway flow	1
	Emergency spillway flowing with bottom erosion with active headcut advancing toward control section (SC ponds)	2
	Emergency spillway blocked by significant debris or landslide material with impoundment level approaching minimum freeboard elevation (SC ponds)	2
	Emergency spillway flowing with erosion at control section (SC ponds)	3
Seepage	Change in vegetation growth indicating increased embankment saturation	1
	New seepage areas or increased discharge	1
	Rapid and substantial increase in seepage discharge, but seepage running clear	1
	New seepage areas or internal drain discharge with cloudy flow (increasing turbidity) and increasing flow rate	2
	Seepage at greater than a specified flow rate or causing erosion (excessive turbidity or sediment) of the dam or foundation	3
Tailings Delivery Pipe Failure	Leaking outlet or tailings pipelines causing minor dam surface erosion and/or release of tailings slurry	1
	Leaking outlet or tailings pipelines causing down cutting in dam surface erosion and/or release of tailings slurry	2



Alert Level Rankings for Unusual Conditions and Emergencies at Huckleberry Mine Tailings Management or Water Storage Facilities		
Event or Observation	Situation	Alert Level
	Breakage of outlet or tailings pipelines possible causing significant to catastrophic dam surface erosion and/or release of tailings slurry	3
Sinkholes	Sinkhole with non-structural impacts	1
	Sinkhole observed on the dam crest, within the till core	2
	Observation of new sinkhole in impoundment area or on embankment	2
	Rapidly enlarging sinkhole	3
Embankment and Abutment Cracking	New cracks in the embankment or abutments at greater than specified width	1
	New cracks in the embankment with associated seepage	2
	New cracks in the abutment with seepage and increasing flow rate	3
Embankment Movement	Observed movement/slippage or bulging of embankment toe, slope, or crest	1
	Observed movement/slippage or bulging of embankment toe, slope, or crest where there is a direct threat to the structural integrity of the dam	2
	Sudden or rapidly proceeding slides at embankment slope	3
	Sudden or rapidly proceeding subsidence at embankment crest	3
Animal Evidence	Damage to monitoring instruments from animals	1
	Animal burrows present on dam face or abutment	1
Instrumentation	Measurement instrument readings beyond specified threshold values (see Section <b>Error! Reference source not found.</b> )	1
Earthquake	Measurable earthquake felt or recorded within specified distance of dam	1
	Measurable earthquake with observed structural damage to facility and or dam controls	2
	Measurable earthquake resulting damage to outlet/inlet controls, dam or appurtenances that has resulted in uncontrolled water release	3
Security Threat	Verified bomb threat that, if carried out, could result in damage to the dam	2
	Detonated bomb that has resulted in damage to the dam or appurtenances	3
Vandalism	Vandalism to tailings delivery pipeline system with no leaking evident	1
	Vandalism to outlet/inlet controls, dam or appurtenances with no impacts to the functioning of the dam	1
	Vandalism to measurement instrumentation	1
	Vandalism to tailings delivery pipeline system resulting in leak (See 'Delivery Pipe Failure' section above)	*
	Vandalism with damage to outlet/inlet controls, dam or appurtenances that has resulted in seepage flow	2
	Vandalism with damage to outlet/inlet controls, dam or appurtenances that has resulted in uncontrolled water release	3

Alert Level Rankings for Unusual Conditions and Emergencies at Huckleberry Mine Tailings Management or Water Storage Facilities		
Event or Observation	Situation	Alert Level
Other Situations	Any unusual event or condition on or around the dam with potential to harm the dam	1
	Any unusual event or condition that has caused visible damage to the dam and requires mitigation efforts to restore structural integrity of the dam	2
	Any unusual event or condition that has resulted in, or will likely result in, an uncontrolled release of water or tailings from the impoundment	3
	*See other section specified in for this item for a more detailed description of circumstances	

### 9.3.3. Preventive and Remedial Action

In an unlikely event, the tailings dams could fail due to breach with ensuing flood of water and liquefied tailings threatening the downstream area. The dam breach could be triggered by piping or overtopping. It is difficult to predict where a dam breach would be initiated and precisely what corrective actions would be required. Nevertheless, to assist the mine in dealing with emergency situations threatening the TMF-2 Dam, East Pit Plug Dam, or TMF-3 Dam<sup>1</sup>, this section describes the resources available to the mine and potential course of actions that could be taken promptly to avert a dam breach. These actions could be summarized as: (1) lower tailings pond level; (2) arrest or retard dam internal erosion; and (3) arrest or retard dam external erosion.

The current mining operation involves continual personnel presence around the Huckleberry Mine tailings storage facilities. If a situation arises that requires immediate attention, HML has at its disposal the equipment, material, labour and engineering expertise to respond immediately. These resources include those within the mine and those available through outside contractors and consultants.

Some remedial or preventative actions include:

- Lowering the pond levels
  - West Cell water level could be lowered via the mill reclaim/Tahtsa Reach discharge system in the event of impending failure of the East Pit Plug Dam.
  - 2 million m<sup>3</sup> of emergency water storage is available in the TMF-2 NAG Quarry (abandoned). Immediately adjacent to the TRO discharge line.
  - TMF-3 Pond level could be lowered via cessation of operation and pumping out at the full reclaim rate (about 50,000 m<sup>3</sup>/day)
- Methods to stabilize potentially unstable embankment
  - Place downstream buttress fill in the area of indicated movement

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<sup>1</sup> East Dam not included as this dam impounds neither water nor tailings.

- Methods to slow or stop internal erosion
  - Lower pond levels as listed above
  - Place weighted, inverted filter over the area of discharging seepage if this is from foundation soils. Use of Zone 5 sand and gravel filter as the first layer, weighed down by rockfill, would be an appropriate response.
  - If sinkholes appear in conjunction with turbid seepage discharge indicative of internal erosion, dumping of Zone 5 sand and gravel filter material, or, if unavailable relatively fine, well-graded waste rock (PAG would be acceptable under such emergency conditions) should be undertaken.
- Methods to slow or stop external erosion
  - Construction diversions to route any concentrated abutment stream flow away from the face and/or toe of the dams
  - Place coarse rockfill against areas of surface erosion
- Methods to mitigate downstream consequences
  - Evacuate any HML personnel working downslope of the tailings dams

#### 9.3.4. Notification Procedures

##### ***CDA guidelines: Notification procedures:***

- Provide all contact info
- Should be in order of priority
- Should include – local authorities, agencies involved in emergency response, owner of facility, downstream users, government authorities
- Communication with media

In the event of an emergency or unusual situation, the standard reporting procedure described below shall be followed as quickly as possible:

1. The person first noticing an emergency or unusual situation shall notify one of the following:
  - Mill General Foreman
  - Mine Shift Supervisor
  - Manager of Mine Operations and Engineering
2. The responsible Supervisor/Superintendent who has been notified above shall initiate corrective actions (see Section 9.3.3), and notify
  - Mill Manager
  - Mine General Foreman
  - Senior Mine General Foreman
  - Environmental Superintendent
  - Engineering Department Shift Engineer
  - Engineering Department Supervisor
  - Health and Safety Coordinator
3. The Manager of Mine Operations and Engineering shall notify:

- General Manager
  - Tailings Dam Consultant – Project Director
4. The General Manager shall notify:
    - Vice President, Operations & Business Development
    - President, Huckleberry Mines Ltd.
  5. In the event of an emergency situation which may threaten the stability of the tailings dams or the integrity of the tailings storage facility, the most senior person informed of the situation must notify:
    - Senior Inspector of Mines, Smithers
    - Chief Inspector of Mines, Victoria
    - MOE Emergency Response Officer, Smithers
    - The Provincial Emergency Program
    - Rio Tinto Alcan
  6. The above personnel can be contacted by:
    - Mine radio
    - Telephone numbers given in the communications directory (Table 9-1)
  7. A report of the incident shall be submitted by the General Manager to the Ministry of Energy and Mines, and the Ministry of Environment, and shall include:
    - Location and nature of incident
    - Steps taken to correct the problem
    - Personnel involved
    - Time frame

#### 9.3.5. Site Access

**CDA guidelines:** *Provide information on site access.*

- By various methods (road, foot, helicopter)
- In various conditions (night, storm, winter)
- Location of communication infrastructure and material available for emergency response
- Site plans

The Huckleberry Copper Mine site is located in west central British Columbia, approximately 85 km southwest of Houston (**Error! Reference source not found.**). Access to the site is attained by travelling 115 km south from Houston on a gravel-surfaced forest service road and west 8 km from the junction at Whiting Creek on the Huckleberry Connector road. An alternate means of accessing the site is via the Sweeney Lake road, accessed via the turnoff at Whiting Creek. Mine haul roads on the property connect the main mine area to the various tailings facilities.

#### 9.4. Municipal or Local Emergency Plans

The CDA (2007) guidelines state that “*The care and control of citizens and property rest with the local authority in most jurisdictions. Local authorities are generally required to prepare municipal*

*or regional emergency plans with procedures for warning and evacuating residents within floodplains.”*

Given the remote location of the Huckleberry Mine, there is no requirement for coordination with municipal or local emergency plans.

## **9.5. Training, Testing and Updating**

### ***CDA guidelines:***

- *Training provided so that site personnel are familiar with contents of ERP and EPP*
- *Qualified personnel are trained to deal with an emergency and implement remedial measures (both emergency and on emergency)*
- *Tests of the ERP should be conducted (eg drills)*
- *Plan should be updated annually or as frequently as deemed appropriate, contact information should be updated annually*

#### **9.5.1. Training**

Training for the Emergency Preparedness and Response Plan will be undertaken in conjunction with the annual OMS workshop to be held at site.

#### **9.5.2. Testing**

An annual tabletop exercise shall be conducted to test the plan.

#### **9.5.3. Updating**

HML's Manager of Mine Operations and Engineering, is responsible for coordinating updates to the Emergency Preparedness and Response section of this OMS manual, as part of the annual OMS manual review process. Updates may include but are not limited to: procedures, phone list, roles and responsibilities. Revisions will be circulated to all affected agencies identified earlier in this section.