

## F. EMERGENCY RESPONSE

- 40. Provide an emergency response plan that includes mechanisms and processes for addressing potential or actual failures of structures, equipment and material stockpiles, and programs for appropriate training to workers.**

The following Emergency Response Plan (ERP) is described in two sections. Section 40.1 describes the more general aspects of the ERP and Section 40.2 addresses the potential for or actual failure of the tailings impoundment.

### 40.1 General Emergency Response Plan

The major purpose of the Emergency Response Plan (ERP) is to provide a course of action for accidents, release of expected hazardous/toxic substances (primarily covered under the spill contingency plan; Section 39), system failure, or other emergency situation arising during mine construction and operations.

This plan briefly defines the responsibilities of key personnel and outlines general procedures to be followed when responding to emergencies in a way that will avoid or reduce health and safety risks, and minimize trauma, safety hazards and environmental damage. It is expected that the ERP will continue to be developed throughout the permitting and associated construction phases, culminating with further refinement during operations. The plan will be reviewed and updated on an annual basis. Furthermore, a documented program of updating, document control, training and testing will be established to ensure the effectiveness of the ERP during an emergency.

Having an ERP in place enables site personnel to be prepared in the event of a spill or emergency situation. It also provides one component of a comprehensive environmental management system for the site.

The scope of the ERP encompasses the extent of Wolverine operations including:

- The access road;
- The airstrip; and,
- Industrial complex (the mill, the mine, laboratories, etc.) and camp facilities

Typical emergencies situations to be dealt with in this plan include:

- Security Breaches
- Medical emergencies;
- Missing persons;
- Fires and explosions;
- Natural disasters; and,
- Site evacuation.

Spills of hazardous materials may constitute an emergency depending on the circumstances of the spill, and the nature and quantity of the substance spilled. However, the detailed spill contingency plan is provided in Section 39 in general, and will be a companion to the ERP during mine operations.

This ERP does not include details of a response to a catastrophic event and all the external agencies and services that will likely be involved. In the event of a major emergency, it is expected that local government, crown corporations and other territorial agencies, the federal and territorial emergency response programs as well as private sector support organizations in the region of the mine will be involved and will respond according to their capabilities and own emergency plans. A coordinated joint emergency response effort is expected in such a situation.

An assessment of a possible major accident and malfunction associated with dam failure is described separately below in Section 40.e.

The ERP applies to all site employees: mine personnel, contractor management and supervisors, subcontractor supervisors, as well as employees of contractors transporting, handling & transferring hazardous/toxic materials on site.

**a) Training**

All personnel will receive training that includes instruction in general emergency response, spill contingency measures and communication procedures. Training for preparedness will be conducted in accordance with both Occupational Health and Safety Regulations and regional legislation. At a minimum, a first responder awareness level training program will be implemented with all key staff and contractors. Emergency Response Team members will undergo more rigorous training and will be appropriately tested and certified in relevant emergency response procedures. Training will include pertinent emergency response issues such as:

- Internal/External communication networks;
- Available internal/external resources (equipment, emergency response teams, spill cleanup materials);
- Accessing and the deployment of equipment;
- Dealing with seasonal diversities, adverse weather conditions, terrain, snow/ice;
- Personal protective equipment use;
- Properties of substances transported, handled, stored and used on site (Material Safety Data Sheets; MSDS);
- Individual ‘Action Plans’ for each material/chemical handled;
- On/off-site transportation;
- Response procedure including initial action, clean-up procedures, storage, disposal, reporting and reclamation;
- Responsibilities for updating the ERP and the distribution list;
- Relevant Environmental Legislation and;

- Company Policy and Environmental Management Plan;
- Workplace Hazardous Materials Information System (WHMIS)
- Standard First Aid and CPR
- Transportation of Dangerous Goods (TDG) Regulations

The level of training required for site personnel will vary depending on their respective roles, for example,

- Emergency Response Teams - Training exercises for the ER teams will be organized by the Environmental Department and be designed to cover a comprehensive range of emergency situations. The Environmental Department will also maintain a list of names and training modules and specialized simulations completed.
- Loss Control Officer and any site personnel handling dangerous materials will be appropriately trained with TDG certification, as required.
- New employees – the training of new employees will include environmental awareness, spill cleanup procedures, emergency situations and accident/incident reporting as part of their comprehensive site orientation session.
- Drivers of trucks carrying hazardous materials and concentrate will have additional training including environmental awareness, spill response (along roads and into water bodies), emergency driving techniques, emergency communications, hazard avoidance, *etc.*
- All site personnel - Refresher training for all site personnel will be held at least once per year.

Training records will be maintained at both the on-site office by the training coordinator. The trainees will receive a certificate indicating the title of the course, dates attended and the type of simulation training received. These records will be updated regularly and a summary list provided to Site Manager monthly. Based on a predetermined schedule (typically every 2-3 years), a multi-department emergency response scenario will be organized by the Environmental Department.

Contractors will be required to be familiar with the most recent version of the Emergency Response Plan and to assist response measures in the following ways:

- Advise all employees of the existence of these procedures;
- Assist with evacuation practice sessions and equipment tests;
- Maintain daily employee lists to be used in the event of employee head counts at assembly areas during an evacuation;
- Assist with notification, first-aid, securing of site, etc., during an emergency; and,
- Provide manpower and equipment on a priority basis as requested to assist in emergency evacuation or response.

Both contractors and employees are required to have WHMIS training (provided by the Training Coordinator Contractor or a third party) as is necessary to suit their job

responsibilities. Documentation of such training is to be provided to the Safety Supervisor prior to commencement of their employment on the site.

**b) Documentation and Updating**

Emergency Response Plan and Spill Contingency Plan

The ERP and Spill Contingency Plan (SCP) are to be reviewed on a yearly basis and following any emergency, spill, incident or emergency simulation exercise. The annual review will ensure that the EPR is consistent with current best management practices in the field of emergency response and spill management. This review will involve a debriefing to allow the assessment and documenting of what went right, what went wrong, and what changes should be implemented to improve the performance/outcome. Furthermore, the updating process provides a mechanism that allows for timely adjustments to the ERP and SPC (outside of the annual review), if required, as the circumstances at the mine site evolve.

The original ERP and SCP will be maintained by the Environmental Department and the Environmental Department will be responsible for updating the environmental components of the ERP at least once per year. The list of personnel on the Emergency Response Teams is the responsibility of the individual department heads (or designates) with any updates are to be forwarded to the Environmental Department in a timely manner. The Loss Prevention Department will maintain and update the communication hierarchy and the Contact List of all the appropriate site and company personnel. All changes to the plan are to be accompanied by a revised title page showing the latest revision date as well a revision summary page. Revisions are to be forwarded to all personnel on the primary distribution list. Outdated copies are to be returned to Environmental Department for disposal. Each new hardcopy is to include an updated distribution list on its cover. If changes to either of the Plans are minor or involve only one section, to minimize waste, only those sections relevant to the changes need be distributed with instructions as to the replacement of the out-dated sections. In all cases, whether complete or partial replacement of the hard copy, the revised title page with the latest revision date and the revision summary page are required.

Material Safety Data Sheets (MSDS)

The ER team will be provided with an inventory of chemicals and the Material Safety Data Sheets (MSDS) of all materials transported, stored and used on-site. The MSDS will be made available in all strategic locations on-site and near to the hazardous substances storage locations and points of use. Ideally, each registrar will be organized by location and the specific substances relevant to that location in order to facilitate the rapid finding of pertinent information in the event of a spill or emergency. A copy of the MSDS documents will also be available in Environmental Supervisor's Office, Safety Supervisor's Office, Occupational Health & Safety Committee and First Aid centre. They will be updated regularly as the project develops.

### Resources Inventory

There will be a resources inventory which will provide information regarding emergency response personnel (manpower), machinery, equipment, first-aid kits, spill kits and tools for clean-up works that will be available to respond to incidental spills, emergency situations or clean-up situations. These resources include on-site support as well as external support from other bodies/organizations like the fire department, RCMP, and similar mining establishments or exploration camps in the vicinity. This resource list will be reviewed and updated regularly.

### Inspections

Periodic inspections will be carried out to verify that all resources and equipment for emergency response are available and in good working condition. The inspections will also check to ensure that the records of maintenance and repairs for each piece of equipment are current, the repair service is completed, and that appropriate recommendations are made. Inspections will also be carried out at each of the facilities handling or storing hazardous materials or waste streams. An inspection reporting schedule and checklist for relevant site locations will be provided by the Environmental Department.

#### **c) Emergency Response Situations**

For all situations, the first person on the scene of an emergency is designated the On-Scene Coordinator until such time as the Security Officer, Environmental or Safety Supervisor or Management delegates someone else and releases him/her of this duty. The general emergency response procedure is outlined in Figure 40.1.

### Security Breaches

The mine site will be relatively secure due to its remote location and single access road. The road will not be a public thoroughfare and access will be controlled with a gate.

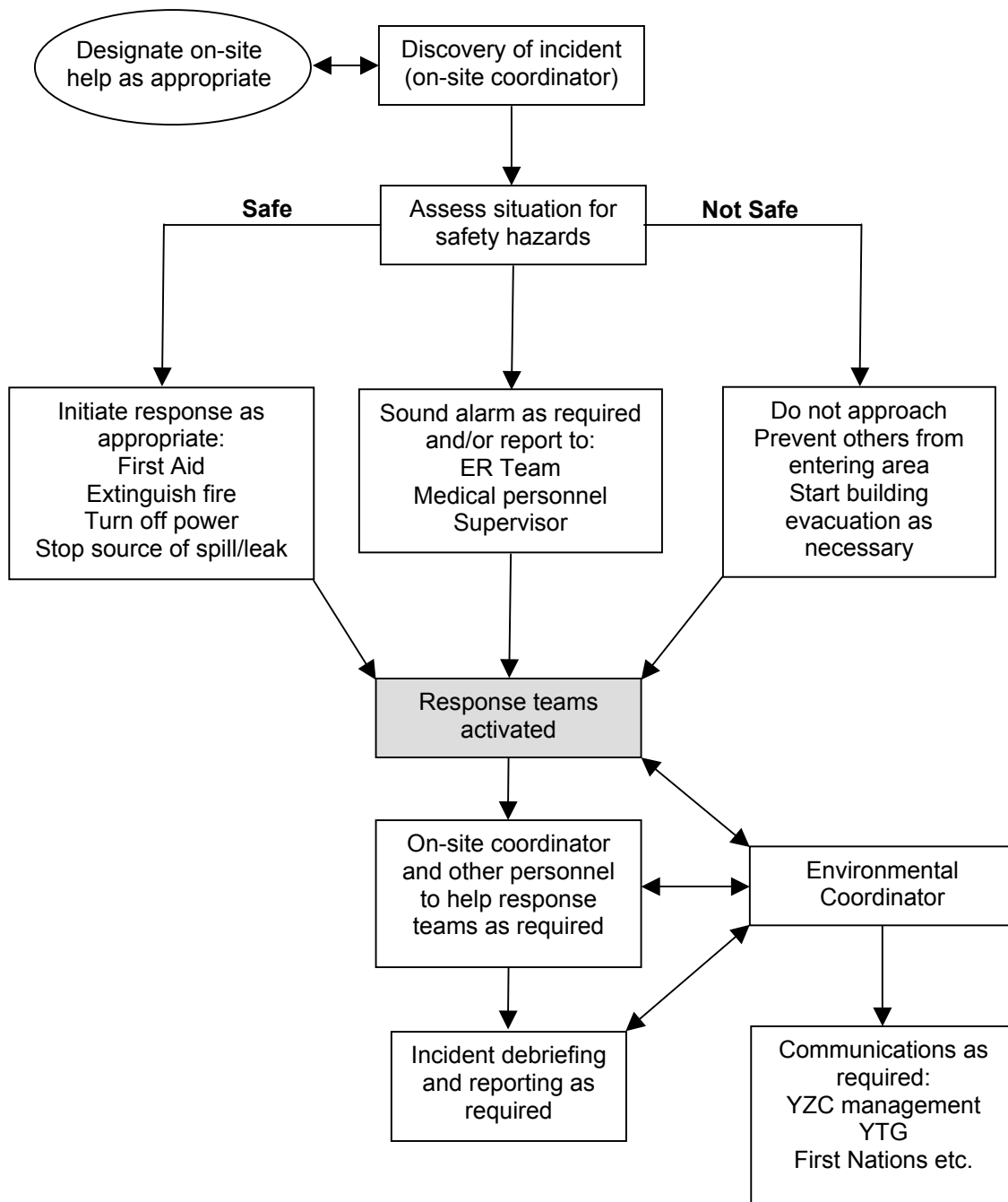
In cases where a security breach is suspected, specific procedures will be developed and will be followed by site employees.

### Bomb Threats

A bomb threat cannot be regarded as a meaningless nuisance and is always considered an emergency situation. The project will require storage of large quantities petroleum products and explosive chemicals; therefore a plan, commensurate with the assessed risk, will be developed to specifically deal with potential bomb threats. Any bomb threat will be considered authentic until confirmed otherwise.

**Figure 40.1 General Emergency Response Procedures**

**General Emergency Response Procedure**



### Accidents Resulting in Injuries

The emergency response station in the secondary building will be equipped for first aid, environmental and mine rescue activities. The first aid room will be separate from the environmental response and mine rescue room where specialized equipment must be stored and maintained. The first aid room will be fully serviced with hot and cold water, toilets and communications. A subsidiary first aid room will be located in the camp. The existing helipad at the southwest corner of the industrial complex area, will be retained as part of the emergency response facilities.

In the event of a major accident or incident, the Safety Supervisor and Medical Personnel should be immediately called to the scene by radio. He or she will then delegate upward depending on the severity of the situation/incident. The following procedures are recommended depending on the seriousness of the injury (all employees will be advised of these procedures).

#### *Minor Injuries - Non-Medical Aid*

- Administer first aid on location, either personally or with assistance;
- Record the first-aid actions taken in the First Aid Log-Book;
- Advise the Supervisor of the incident; and,
- Fill out an Incident Report for incident tracking purposes and to prevent reoccurrence to individual/peers

#### *Major Injury - Medical Aid*

- Seek medical attention, either personally or with assistance;
- Administer first aid, either personally or with assistance;
- Advise the Supervisor, either personally or with assistance; and,
- The Supervisor is to:
  - Provide or arrange for further aid
  - Debrief relevant personnel
  - Prepare an Incident Report
  - Follow Company reporting guidelines and hierarchy as required.

#### *Fatalities*

In case of an accident/incident leading to a fatality, the following procedures will be carried out:

- The On-Scene Coordinator (until released of his/her duty) is to:
  - Ensure the safety of personnel near the site/incident;
  - Call RCMP, ambulance, and fire department as required;

- Call ER team and medical personnel;
- Shut down/turn off any equipment/machinery that may represent an additional safety hazard;
- All material and equipment involved in a fatality are to remain untouched until cleared by the RCMP; and
- Advise immediate Supervisor of the incident.
- The Supervisor is to:
  - Provide or arrange for further aid
  - Prepare Incident Report; and,
  - Follow Company reporting guidelines and hierarchy as required.
- Next of kin to be notified only by RCMP and/or Senior Management

#### Missing Persons

In the event of a missing person(s), the Site Manager will be notified immediately. The responsible persons will take charge and initiate the following actions:

- Assess emergency situation;
- Initiate the following, if required;
  - Mobilize search personnel and equipment
  - Divide areas into quadrants and assign Quadrant Leaders
  - Ensure communications equipment is available and distribute it as required
  - Establish routine call-in times
  - Coordinate the search process with RCMP
  - Prepare necessary reports
  - Debrief Search Team once emergency search is over
  - Notify as applicable

Senior Management

Environmental Supervisor

### Fire or Explosion

In the event of a fire or explosion, the On-Scene Co-coordinator's role will be turned over to the Environmental Manager or Safety Supervisor, as they arrive on the scene. In the event of a fire or explosion, the On-Scene Coordinator will:

- Assess the situation and determine emergency response needs;
- Direct and ensure evacuation of personnel on-site;
- If evacuation is required, a head-count is to be conducted to ensure all personnel have been evacuated;
- Activate the fire alarm and call the Emergency Response team;
- Secure area to prevent unauthorized access and to protect equipment, facilities and records;
- Take other actions as required to control the emergency situation.

Examples of General Fire Fighting Procedures include:

- Employees will be trained and equipped to fight fires in the initial stages only:
  - If a fire is small enough and the risk deemed minimal, extinguish the fire with nearby hand-held or wheeled fire extinguishers;
  - Wear SCBA and eye protection when responding to fires;
  - Extinguish fires with CO<sub>2</sub>, dry chemical, alcohol foam or water fog (note that water or foam may cause frothing);
  - Use water to cool containers exposed to fire.
- Firefighting efforts by employees for larger fires will not be encouraged.
  - Notify the Emergency Response Team; providing details of the fire and, if advising of a major fire(s), the requirement for professional fire-fighters.
  - Shut off the fuel/power supply.
  - YZC personnel will assist in non-fire-fighting duties (i.e. control of facilities, evacuation, traffic control, medical assistance, communication, etc.).

The site water tank will be heated, insulated tank and designed to provide a guaranteed minimum 2 h of storage for fire fighting at 340 m<sup>3</sup>/h in addition to 4 h of storage for potable and process make up water. Water for fire-fighting purposes will be reserved in the bottom of the tank. The storage tank will be re-filled continuously from the existing Wolverine Creek well west of the industrial area. Potable water will be treated and distributed in a pressurized loop. The firewater distribution system will be installed to provide for wall hydrants at strategic locations. Outdoor supply lines will be buried, insulated and heat traced. The fire pump will be diesel operated and underwriter approved to ensure an uninterrupted supply of firewater in case of power failure.

### Natural Disasters

In the event of a natural disaster or severe weather causing damage to a facility and possibly requiring evacuation, the Site Manager assumes the position of On-Scene Coordinator. All site employees must follow the Manager's (or designate's) directions through the emergency broadcast system or other means.

#### **d) General Evacuation Plan**

A General Evacuation Plan shall go into effect upon the sounding of an alarm at any or all of the buildings and facilities on site. The Evacuation Plan may be triggered:

- Automatically by fire or gas detectors;
- Manually by an individual upon awareness that an incident requires evacuation; and,
- Manually by Site Management in control during an emergency who has decided that evacuation is necessary.

The General Evacuation Plan will provide for quick, safe evacuation of all employees in the event of an emergency and establish the necessary teams and equipment required to respond to the emergency by rescue personnel. Muster stations will be clearly identified around the project area and site personnel will have been made aware of them during orientation and follow-up training programs.

Site evacuation will be under the control of the Site Manager, or his designate. A site-wide notification and alarm system will be established prior to major on-site construction activities. Primary evacuation from the various project areas will be by road. In the event the road is impassable, evacuation by air may be required. Specific evacuation procedures will be developed as this plan is revised prior to site construction commencement. Procedures will include steps to be taken during various scenarios and depending on the severity of the emergency.

Site-wide evacuation drills will be a part of the regular testing of the emergency response systems. Personnel will receive desktop updates at annual refresher training sessions and major practical drills will occur every two years.

### Air Support Operations

Air support will be a very important component of an emergency situation at the site. The airstrip may be used during a major emergency to expedite the movement of emergency resources (manpower and equipment) and to help evacuate site personnel (if required). The responsibility for the operation of the airstrip during an emergency situation will fall under the Site Manager (or designate). Details of the issues relating to the airstrip will be provided in the Airstrip and Aircraft Operations Management Plan.

#### **e) General Evacuation Guidelines**

- Keep calm;
- If in a room, take sufficient outdoor clothing (to be kept in rooms at all times) and proceed quickly to the main muster area;

- Follow instructions of immediate Supervisor or Environment or Safety Supervisor;
- When evacuating, leave personal property such as lunch containers, briefcases, etc.; and
- Do not congregate in an Office, Control Room or on-site buildings.

**f) Communications**

Communications during an emergency situation are of utmost importance, and a plan will be prepared that provides direction for how communications are to be undertaken during such a situation. The Communications Plan will provide an organizational structure with specific responsibilities and communications protocols. Generally, in the event of an emergency, only absolutely necessary information should be relayed via the site communication system (e.g., radios and/or cell phones).

Public Relations

The Communications Plan will address issues concerning the public, First Nations and affected nearby communities on matters relevant to the situation. The Plan will provide a system to ensure dialogue between YZC and stakeholders of the Wolverine Project. Any reporting to the public or media regarding Emergency Response events or actions will be made directly by, or on authority of, the VP Environment and Community Affairs only, in accordance with the Communications Plan.

After Action Report

The follow-up reporting procedures are organized by type of incident. The relevant report(s) should be written and distributed to the appropriate persons in a timely fashion.

Family Liaison

The Safety Supervisor will contact the emergency contacts supplied by YZC and other emergency personnel, as appropriate. In the case of a fatality, only RCMP and/or Senior Management will contact the next of kin. At all times during an emergency, personnel using the site communication system should only disclose immediately pertinent information to aid the emergency response and should not disclose names or personal details of the casualties.

**40.2 ERP for Tailings Impoundment**

The following section describes the ERP developed for the Tailings Facility as described in Section 37. It contains the main features of the Tailings Facility Emergency Response Plan, and will be updated with more details regarding the site communication protocols prior to the start up of mining operation.

The EPR Plan will be widely distributed to personnel within YZC, interested government agencies and members of the local emergency response units that may become involved in case of an emergency.

The goals of the EPR Plan are firstly to *prevent the occurrence of emergencies* and secondly to *reduce the impact of emergencies*, should they arise. In both cases, the ultimate goal is to protect:

- Human life and health;
- Social well-being of the local community and employees;
- Public infrastructure and company facilities; and
- Environment.

The objective of the EPR plan is to ensure timely and appropriate response to emergencies, and compliance with applicable laws, industry standards, and legal codes of practice. Effort has been made to ensure that response guidelines to possible site scenarios are included to better enable timely and appropriate actions. Emergency preparedness begins with prevention of emergency situations. This is achieved through constructing, operating and maintaining systems to high standards, and by implementing continuous monitoring and surveillance programs to identify potential issues.

#### **40.2.1 Consequences of Dam Failure**

The tailings facility is located in a remote area of the Yukon and, except for a campsite on Frances Lake, there are no major population centres or commercial or industrial activities downstream of the impoundment. In the event of an incident at the tailings impoundment, the discharge from the facility would enter Go Creek and then Money Creek. Money Creek discharges into Frances Lake, which is located east of the mine about 40 km downstream of the tailings impoundment. The most significant infrastructure crossing along this flow path is the Robert Campbell Highway, which crosses over Money Creek just before the creek enters Frances Lake.

The estimated total storage volume of 1.02 million m<sup>3</sup> (Mm<sup>3</sup>) at closure in the Wolverine tailings pond will comprise of approximately 0.5 Mm<sup>3</sup> of tailings, 0.38 Mm<sup>3</sup> of DMS float and 0.14 Mm<sup>3</sup> of water. The expected peak flood outflow from the tailings pond occurring as a result of a dam breach was estimated using charts compiled by MacDonald and Monopolis (1984) and Wahl (1998), based on dam failure case studies. To estimate the peak discharge resulting from a potential breach at the Wolverine tailings dam, the following simplifying assumptions were made:

- The total storage volume was taken as 100% of the free water in the pond plus 30% of the stored tailings and DMS float, based on data presented in USCOLD (1995); and
- The released tailings and DMS float were assumed to behave the same as water.

The estimated peak outflow released from the dam is 1,850 m<sup>3</sup>/s, which is expected to attenuate as the flood wave travels downstream. The downstream flows were estimated using the attenuation charts prepared by Petrascheck and Sydler (1984) and the results are summarized in Table 40.3.

**Table 40.3: Estimated Dam Breach Flood Peaks Downstream of Tailings Dam**

LOCATION	DISTANCE FROM DAM (KM)	ESTIMATED PEAK FLOW (M <sup>3</sup> /S)
At Wolverine Tailings Dam	0	1,850
Confluence of Go Creek and Money Creek	5	1,670
Robert Campbell Highway and Frances Lake	40	1,100

The assumptions made and the charts used herein provide approximate estimates of expected dam breach discharge and downstream attenuation. A more detailed dam breach and inundation analysis should be carried out for determining the flows for finalizing the EPR Plan.

As Table 40.3 indicates, little attenuation of the flow is expected by the time the flood peak reaches Money Creek. However, it is expected to decrease to about 60% of the original flow by the time the flood peak reaches Robert Campbell Highway and Frances Lake. A comparison of the estimated flood peak resulting from a breach at the tailings dam with the natural stream flows indicates that the dam breach flood peak will be about 150 times the naturally expected 200-year peak flow in Go Creek above Money Creek. It will be about 10 times the naturally expected 200-year peak flow in Money Creek at the Robert Campbell Highway.

The tailings released from the pond, as well as those left in the pond are expected to become acid generating if left exposed to the atmosphere and would remain acid generating indefinitely until the oxidation process is complete. The potential environmental damage in that case could be substantial and could require recovery of all of the tailings and construction of a new containment facility. Given the potential for release of relatively large flood and substantial environmental clean-up costs, the tailings impoundment is classified as a “high” consequence facility.

#### **40.2.2 Emergency Situations and Response Procedures**

##### **a) Emergency Situations**

Possible emergencies and unusual situations at the Wolverine Tailings Facility may range from a potentially minor incident such as a pipeline breakage to the highly unlikely and extreme event of a dam instability.

All of these situations require site personnel to first be observant and recognize a potential emergency or unusual situation, then follow an established communication procedure and finally, respond appropriately.

This section covers only those emergency situations that could potentially pose a threat to the structural integrity of the tailings dam 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 will be taken to avoid delays which could have serious consequences. Responsible persons and agencies listed in the ERP Plan will 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 dam;
- Slumping, sliding, cracking or bulging of the tailings dam;
- Rapid increase or unexplained cloudy appearance of seepage through the tailings dam and/or its foundation;
- Formation of sinkholes on the tailings beach or dam;
- Breakage of tailings pipelines, which may result in dam erosion and/or release of tailings slurry;
- Large earthquakes;
- Extreme floods; and
- Sabotage and other criminal activities.

Particular attention will be given to inspecting and, where necessary, repairing the tailings facility following unusual or extreme events. All unusual events will be reported to supervisory personnel. In an unlikely event that high seepage flows occur downstream of the tailings dam, and particularly if seepage water is carrying soil particles from the dam or its foundation, which is an early indication of a potential "piping", i.e., internal erosion problem, it will be reported immediately and the engineering consultant notified.

In the event of an emergency or unusual situation, all instrumentation in the affected area will be monitored during and/or immediately following the event by either the engineering consultant, if on-site, or by YZC personnel. This information will be forwarded to the design engineer(s) immediately so that the situation can be assessed and any required remedial actions taken promptly.

#### **b) Emergency Response Procedures and Communications**

Communication of a potential or actual emergency is essential, in order to get others more qualified to assess the situation or to assist in response. Good communication will allow for a more complete and rapid response. In virtually all situations, *Notification*, at a minimum to the Site Manager, is required. If there is imminent and substantial danger to people, the environment, or to company property that overwhelms on-site resources, outside assistance must be summoned quickly. Possible examples include: a spill that threatens the environment and cannot be contained, or a catastrophic dam failure that threatens personnel, the public and the environment.

##### **(1) Emergency Response Procedures**

- Respond to the incident, ensuring safety of yourself and others.
- Notify as soon as possible the supervisor(s), including the Site Manager, as appropriate.
- In case of an emergency requiring immediate outside assistance, take the following steps:
  - Call 911 and other appropriate emergency numbers (to request for assistance by police and/or other emergency personnel).
  - Be prepared to give the following information:

- your name and telephone number;
- the location and time of the incident;
- (if dam emergency) the dam structure involved;
- the nature of the emergency situation (e.g., spill, dam incident, etc.);
- the cause of the emergency (e.g., pipeline break, slope instability, or other unknown causes);
- actions taken to control the problem and their effect (e.g., close off isolation valves, repair dam slope);
- the names of the agencies on the scene; and
- the names of other persons or agencies advised concerning the incident.

(2) Notification and Communication

Notification is done to alert others of an unusual condition that has occurred or is still occurring, that may require action. It is to be done promptly, but there is typically time to first gather more information on a situation, to analyze possible causes, and to perhaps take some initial remedial measures.

1. *Internal Notification* - is given to the supervisor(s) according to the chain of command including the Site Manager, as appropriate. As a general rule, always inform the supervisor(s) of any unusual incident that has occurred on site, any anomalous monitoring results, or any potentially hazardous condition. If in doubt about the significance or importance of something you have observed, err on the side of caution - report it to the supervisor(s). The supervisor(s) will then investigate and determine necessary actions.
2. *External Notification* - is communication to persons or agencies outside of the Wolverine Mine site. Typically, external notification is done by the Site Manager, or his designate. Contact details (names of key individuals, their agencies and telephone numbers) will be provided prior to the start up of mining operations. Some key persons or agencies that will be notified of an incident include:
  - a) Government: in the event of a significant spill, or dam incident, the site manager will notify the Department of Energy, Mines and Resources and Department of Environment, Yukon Territory, and other appropriate agencies.
  - b) Downstream-Affected Persons: a dam incident could result in off-site effects, for example a spill, water quality issue, or dam breach. In this case, effort must be made to ensure that all those potentially affected by the situation are notified and given directions to reduce their exposure. Actions must also be taken to prevent the public from unknowingly being affected by the situation (e.g., possibly by restricting access to nearby roads and waterways). The site manager will work closely with territorial and appropriate authorities to ensure that notification of downstream-affected persons is timely and comprehensive.
  - c) Dam Consultant: in the unlikely event of a potential dam instability or leakage situation, the dam consultant will be immediately contacted, and investigative and mitigate actions will be taken as recommended by the consultant.

- d) Corporate: corporate personnel are typically notified in the event of significant incidents on site, particularly events where external notifications to government agencies or downstream-affected persons has been necessary.
3. *Other Communications* - During and after a significant event, it may be necessary to respond to questions and concerns by the media, general public, special interest groups, and other stakeholders. The corporate office is responsible for this communication.

#### **40.2.3 Actions to Prevent Tailings Dam Breach**

In an unlikely event, the Wolverine tailings impoundment could fail due to the breach of the tailings dam with ensuing flood threatening the downstream area. The dam breach could be triggered by "piping" i.e., internal erosion 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 tailings dam, 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. Section 40.5 describes the necessary actions to be taken to mitigate potential impacts on the downstream area, as the efforts to control the dam incident are underway.

##### **a) Construction Equipment, Materials, Labour and Engineering Expertise**

During mining operations there is continual personnel presence around the Wolverine Tailings Facility. If a situation arises that requires immediate attention, YZC 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.

##### **b) Lower Tailings Pond Level**

In the early stage of either a "piping" or overtopping scenario, the most effective action to reduce the threat of further development of the failure mechanism is to lower as fast as practical the level of water in the tailings pond upstream of the tailings dam. The potential actions are grouped under internal actions and actions that requiring governmental approval as follows:

- (1) Internal Actions
  - Tailings discharge into the tailings impoundment will be stopped (shut down mill). This action can be taken without acquiring governmental approval, as it would not affect the environment outside of the mine. If this action alone is unable to lower the pond level sufficiently to improve the dam condition, the following actions can be pursued.
- (2) Actions Requiring Governmental Approval

The mine will request the Yukon Department of Energy, Mines and Resources and Department of Environment to declare a state of emergency, and to allow YZC to release tailings pond water downstream of the tailings dam into Go Creek.

If the permission is not granted, YZC could consider returning tailings pond water to the underground mine. The above actions will further lower the tailings pond level at higher rates, as the water could either leave the mine site or be stored in the underground mine.

**c) Arrest or Retard Dam Internal Erosion**

Once excess and/or murky seepage caused by internal erosion of the tailings dam is detected, additional actions can be taken to arrest the further development of the erosion, which could lead to piping failure of the dam. If sinkholes develop, they should be immediately filled with damfill materials compatible with the internal zoning of the dam. If the sinkholes are located upstream of the dam, efforts should be made to prevent pond water from flowing into the sinkholes. This could be accomplished by placing additional earthfill in the surrounding area to block any potential access of pond water to the sinkholes, and/or discharging tailings materials to move the tailings beach/water contact further away from the sinkholes.

In the area where excess and/or murky seepage exiting from the tailings dam toe, a weighted filter buttress berm should be promptly placed along the seepage exit area. The filter berm would allow free exit of seepage water without carrying away existing damfill and/or foundation materials. The filter berm is to be constructed of filter and drainage materials with progressively increasing particle size towards the berm outer surface.

**d) Arrest or Retard Dam External Erosion**

As the dam freeboard decreases during a major hydrologic event, additional actions can be taken to arrest external erosion of the dam. Concurrent to lowering the tailings pond level, the existing dam crest should be raised by placing additional dam fill on the crest. While raising the crest uniformly across the entire dam, additional dam fill material should be placed in local areas where signs of weakening such as slope slumps, crest deformations and cracks are discovered.

In an event that an open channel begins to form on the dam crest, granular materials should be used to plug the channel. Materials of sufficient size and weight can be dozed into the breach from alternate side of the channel. As the channel is gradually being closed, the materials used to plug the channel should increase in size and weight to cope with the increasing flow velocity. After the channel is completely closed, additional fill material with sufficient fines should be placed upstream of the granular-fill plug in order to stop the seepage through the plug.

**40.2.4 Actions to Mitigate Downstream Consequence**

As soon as a dangerous situation is perceived to be developing, downstream communities should be notified and alerted to the fact that YZC has an unusual situation related to its tailings facility occurring. In the unlikely event that the flood storage available in the pond is being used up, while the storm is not abating and the condition of the dam is deteriorating, the conditions may warrant the notification of imminent threat of dam breach, and the restriction of access to downstream low-lying areas threatened by the dam-breach flood. By providing effective communications with agencies and downstream affected communities, the impact to the downstream area can be kept to a minimum.

#### **40.2.5 Training**

During mining operations, the Site Manager will provide annual training workshops for personnel working at the Wolverine Tailings Facility including: YZC foremen, operators, contractors and site engineers. The workshop will focus on operational procedures, improvements planned for the tailings operation system and an overview of planned construction and maintenance activities. Moreover, a more detailed version of this Emergency Response Plan will be covered. Participants will be required to pass a written examination to demonstrate their understanding of the workshop material.