# ELKVIEW OPERATIONS
# Lagoon D Tailings Facility

## Emergency Preparedness Plan (EPP)
## &
## Emergency Response Plan (ERP)

**for**
**Lagoon Breach Emergencies**

*Prepared and Administered by Teck Coal Elkview Operations*
October, 2014

Teck

**ISSUING EMERGENCY PREPAREDNESS PLAN (EPP) FOR THE LAGOON D TAILINGS FACILITY**

The Lagoon D Tailings Facility Emergency Preparedness Plan (EPP) has been produced by Elkview's Geotechnical Group on behalf of Elkview Operations for Teck Coal and has been distributed to the following affected parties mentioned in the plan:

1. General Manager EVO
2. Manager Community and Aboriginal Affairs
3. Manager Public Affairs
4. Superintendent Processing
5. Superintendent Mine Operations
6. Superintendent Engineering
7. Superintendent Health Safety Environment
8. Superintendent Employee Relations
9. General Foreman Processing
10. General Foreman Mine Operations Projects
11. General Foreman Mine Operations Pits
12. Senior Forman Mine Operations
13. Forman Road Crew
14. Forman Plant
15. Forman Mine Operations
16. Senior Geotechnical Engineer
17. Senior Engineer Processing

Each party understands, and has agreed to fulfil, their role as detailed in the Emergency Preparedness Plan (EPP) and their approved Emergency Response Plan (ERP) or Municipal Emergency Response Plan (MEP).

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**PART 1**

# LAGOON D TAILINGS FACILITY
# EMERGENCY PREPAREDNESS PLAN (EPP)
# FOR LAGOON BREACH EMERGENCIES

# 1. INTRODUCTION

## 1.1 PURPOSE

This **Emergency Preparedness Plan (EPP)** is a guide to assist emergency planners in developing local response plans to deal with a major flood and/or dam breach events at the Lagoon D tailings facility (Figure 1**:** Facility Location ). Local authorities should use this plan as a guide to developing annexes to their existing **Municipal Emergency Plans (MEP)** that deal specifically with their response to a major flood and/or dam breach.

The plan specifically addresses what would happen downstream of the Lagoon D Tailings facility should a major flood or dam breach occur. The plan addresses how people and property could be affected, and how emergency responders would be notified in such an emergency.

In case of an emergency at the Lagoon D tailings facility Teck will contact local authorities, as shown on the Organization Response Matrix (Section 3.1). Teck will request that local authorities initiate their **Emergency Response and Recovery Plans**. Teck will attempt, as is feasible at the time, to provide any material or technical support for emergency services as requested by local authorities. Other responding agencies can use this plan to develop their own local plans.

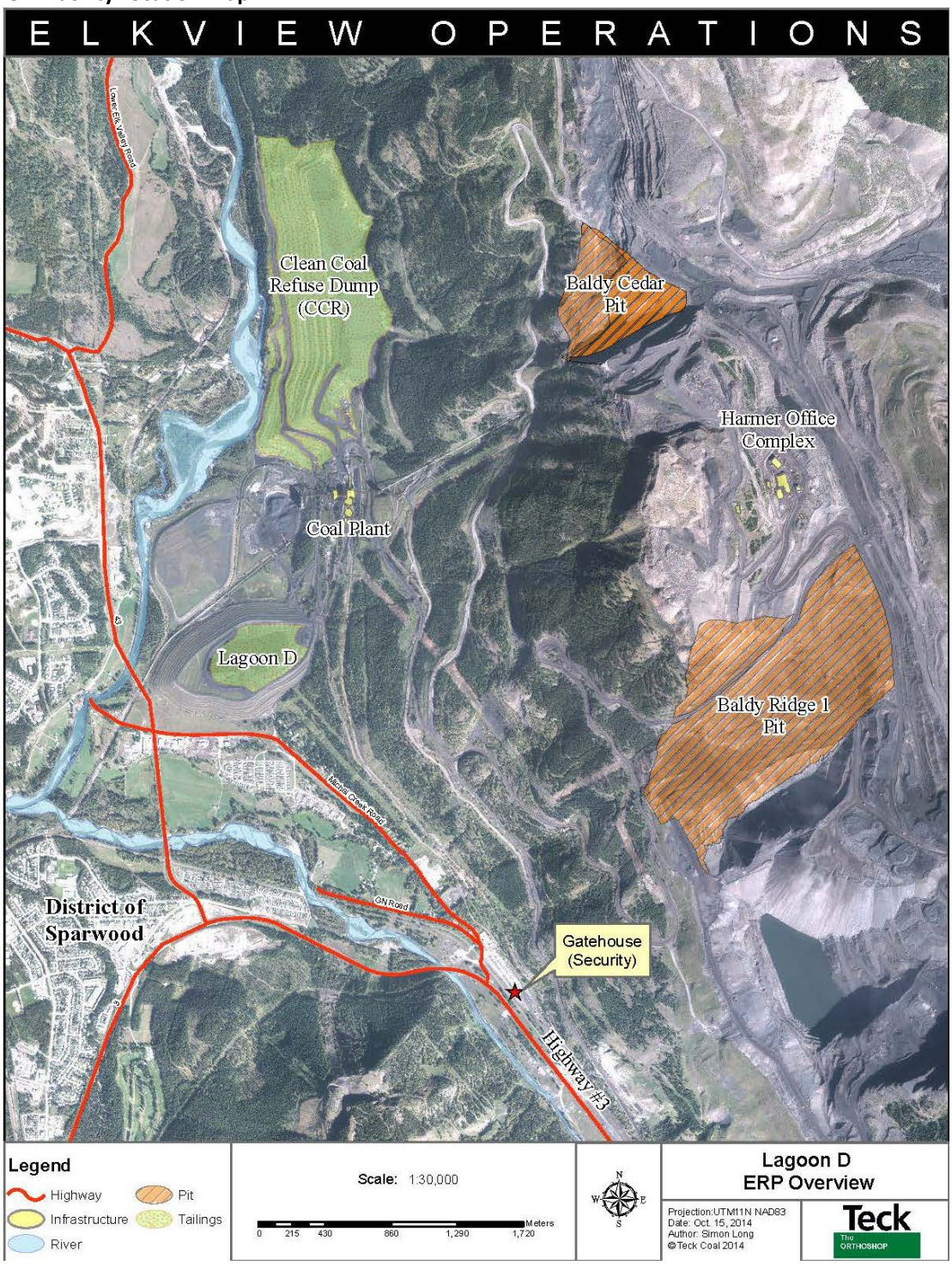
To assist emergency responders this plan contains the following information:

- The nature of the anticipated inundation (Section 2)
- Map showing the extent of the inundation (Section 2)
- Role of key responders (Section 4)

This Guide identifies two emergency levels at the lagoon: a Potential Flood Emergency and an Imminent Flood Emergency. It is incumbent upon each local authority to ensure their **Emergency Response and Recovery Plan** for a major flood or lagoon breach emergency is current and functional.

The Lagoon D Tailings facility **Emergency Preparedness Plan (EPP)** is a guide for emergency planners and is not to be used to replace or supersede any existing emergency plans of local authorities or other responding agencies.

**Figure 1: Facility Location Map**




## 1.2 AUTHORITY

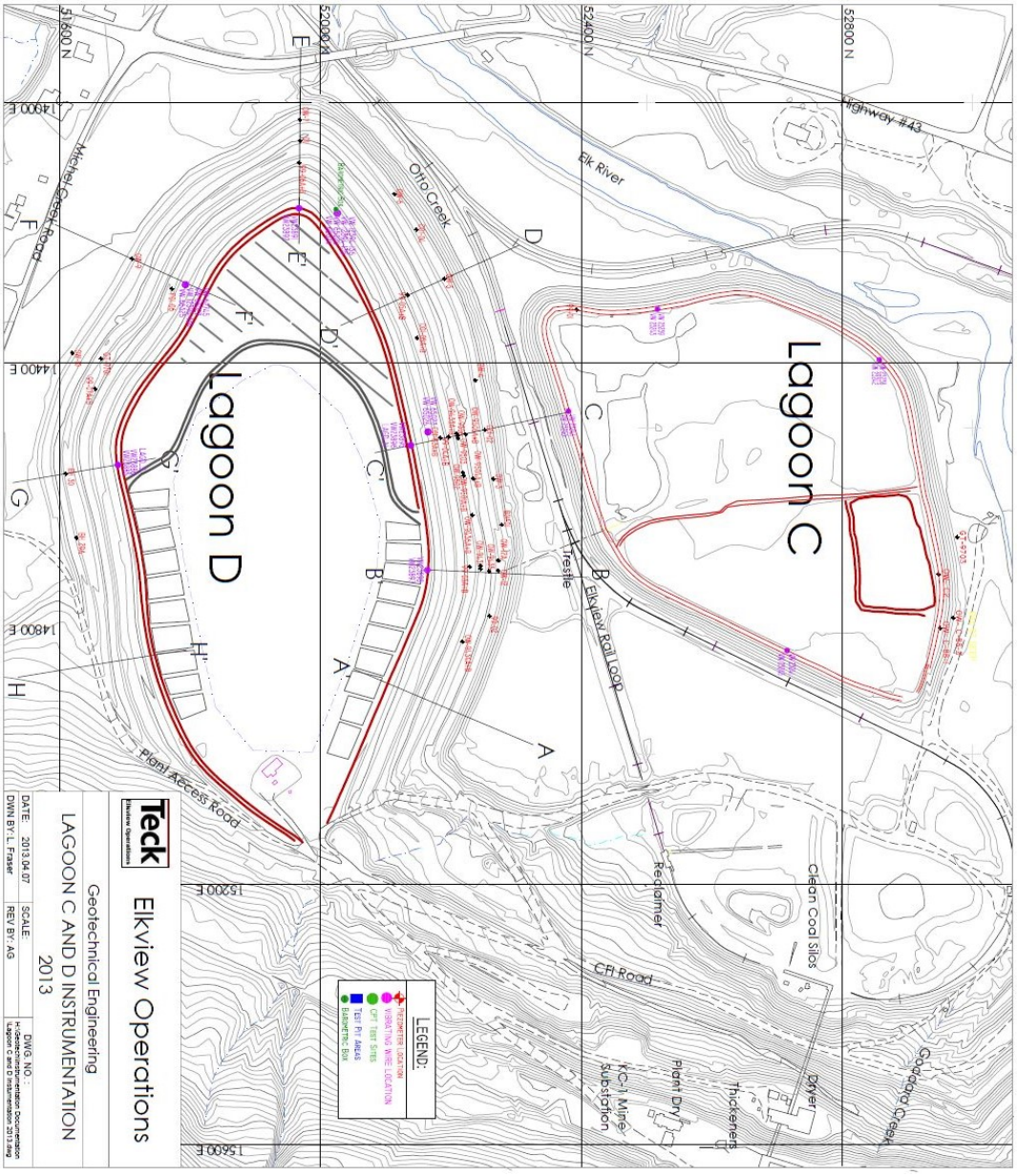
This **Emergency Preparedness Plan (EPP)** is issued for the Lagoon D Tailings impoundment facility by the owner and operator Teck Coal Elkview Operations (EVO). It has been prepared in compliance with Federal and Provincial Regulatory Bodies.

# 2. LAGOON D PHYSICAL CHARACTERISTICS

## 2.1 FACILITY LOCATION

The Lagoon D tailings Facility is located near the Elk River, approximately 0.8km from Sparwood Heights and 0.4km from the Spardell Trailer Park. Access to the site from Sparwood is via the Plant Gate on Michelle Creek Rd, off Highway 43 or Highway 3. Figure 2 shows a map of Lagoon D and surrounding infrastructure.

**Figure 2: Lagoon D and Surrounding Infrastructure**



## 2.2 DESCRIPTION OF THE FACILITY

Lagoon D Tailings facility is owned and operated by EVO and is primarily used as a fine refuse (tailings) storage area. Metallurgical coal washing creates two waste streams: a fine and a coarse refuse product. Fine refuse is currently stored in two engineered facilities: Lagoon D and the West Fork Tailing Storage Facility. These facilities are inspected annually by an independent engineering consultant and monthly by onsite personnel.

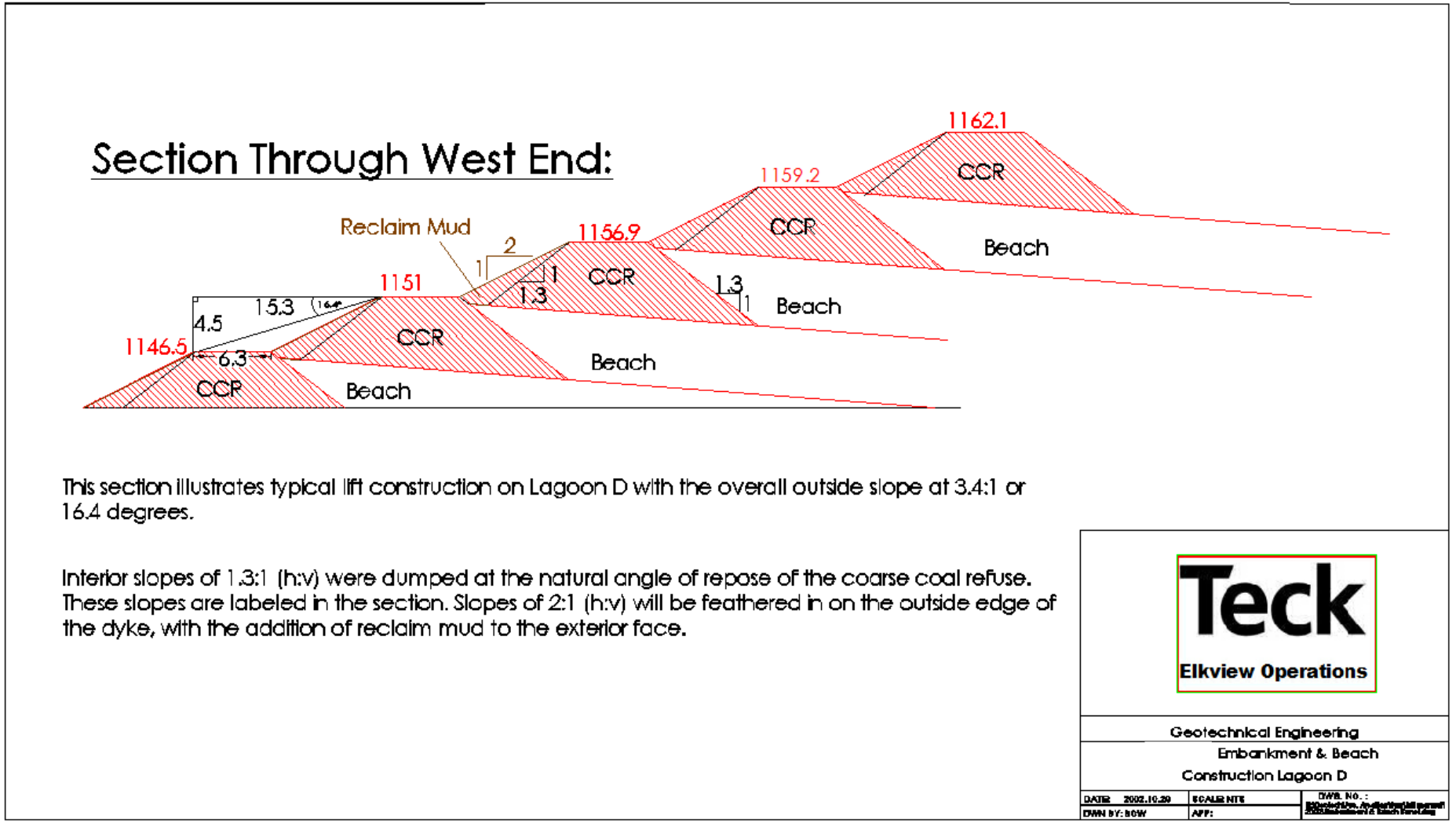
Lagoon D utilises an upstream construction exfiltration design. The structure was originally developed to an elevation of 1,133m using sand and gravel. Coarse rejects were utilised to raise the elevation to the current 1,166m. The table below illustrates key facts in regard to the Lagoon D tailings facility.

**Table 1: Lagoon D Key Facts**

| | |
|---|---|
| Dam Type | Flow through-pervious |
| Storage Capacity | 22.7 million $m^3$ |
| Max Downstream Face Height | 53m |
| Permitted Elevation | 1,166m |
| Crest Perimeter | 2,190m |
| Design Storm Return Period | 100 year return (24hr event) |
| Seismic Design Acceleration | 475 year return—0.044g<br>975 year return—0.061 g |
| Static Stability | 2.2FS @ 1,166m elevation |

EVO used an upstream dam construction method for the current tailings impoundment, shown schematically in Figure 3: Upstream Lift Construction. Each lift is generally 2 to 4.5 meters in height with allowance for a $27^o$ exterior reclamation face. The step-in distance for subsequent lifts is 6.3 meters, resulting in a $16.4^o$ overall slope angle (from crest to crest). Lift heights may exceed 4.5 meters in a particular construction year; however, subsequent construction must readjust step-in further to return to the designed $16.4^o$ overall slope angle. Construction of each embankment lift is accomplished by utilizing the coarse coal reject (CCR) material from the plant. The material is placed in 0.3 meter layers that are compacted with mechanical packers to a minimum dry density of 95% of the standard proctor maximum dry density as determined by ASTM D698.

**Figure 3: Upstream Lift Construction**



The coarse nature of the embankment material allows the water inside the impoundment to flow into the ground water table. The level of water within the facility is known as the phreatic surface and is measured through a series of monitoring well standpipes and vibrating wire piezometers. Changes in water levels indicate changing conditions within the structure. This may be a result of something as simple as spigotting (the directed release of tailings via set pipes) in one area, application of dust suppressant, or may indicate something more serious. As the phreatic surface rises, the water pressure may reduce the effective strength of the embankment materials. Geotechnical personnel routinely evaluate the monitoring data as it is collected. At EVO, geotechnical personnel are composed of the onsite Geotechnical Group, Corporate Geotechnical Engineers and Specialists, and the Engineer of Record.

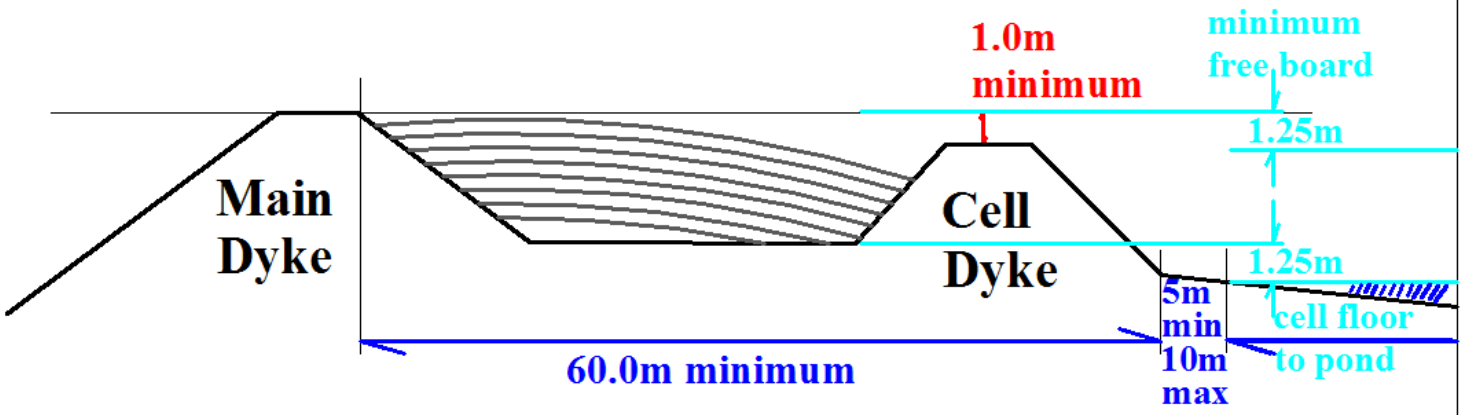
The Geotechnical Group, working with the Engineer of Record, has established conservative Ru thresholds that indicate changing conditions and the need more attention and potential for increased surveillance. Ru values indicate the pore pressure ratio, which is the ratio of the well pressure to the insitu confining stress. This ratio indicates overall stability and is a more useful way to view piezometric results. EVO has three levels for Ru values: Green indicates no concerns to dike stability, Yellow indicates the need for more diligent monitoring but dike stability is still within design parameters, and Red indicates a value that **could potentially** lead to an instability issue and requires immediate investigation.

Another important consideration is the method of deposition of the fine tailings slurry into the Lagoon D facility. Prior to November 2005 the slurry was spigotted from the lagoon's perimeter main dike directly into the pond. A beach was created when the coarser particles of the tailings settled out first. The water and finer particles then flowed into the middle of the lagoon forming a pond. Encroachment of ponded water towards the main dike could have resulted in a higher phreatic surface and fines settling closer to the outside edge of the impoundment. A fines layer near the outside edge could impede vertical drainage and potentially result in a weak layer that would have been built over with a future upstream lifts.

To prevent raising the phreatic surface, the pond had to be kept a minimum distance of 60m from the main dike. This was done by alternating the spigotting locations regularly so that the deposition of fines would be spread evenly around the perimeter of the impoundment.

After November 2005, the design of the Lagoon was changed so that the slurry is spigotted into cells (see Figure 4). These cells are internal to the main dike but separated from the pond by a cell dike. A cell is typically constructed with the dimension of 60m x less than 60m; where the longest side is measured from the main dike to the cell dike. Control valves in the tailings line are operated so that spigotting is alternated between cells to promote maximum settlement of solids within the cells. A bleeder, or overflow pipe, in the cell dike releases fine tailings and water from each cell into the pond.

# Lagoon D Filling Limits




1) minimum pond freeboard is 1.25m from the low point on the main dyke
   - the low point for construction is at the west end of Lagoon D
2) cell dyke to be built a minimum of 1.0m below the adjacent main dyke
3) main pond edge to be at least 60m from the main dyke
4) 5m to 10m beach from the pond to the inner dyke

Dec.8, 2008 bcw

lagoon\dwg\filling limits.dwg

Figure 4: Lagoon D Filling Limits

## 2.3 EFFECT OF INUNDATION

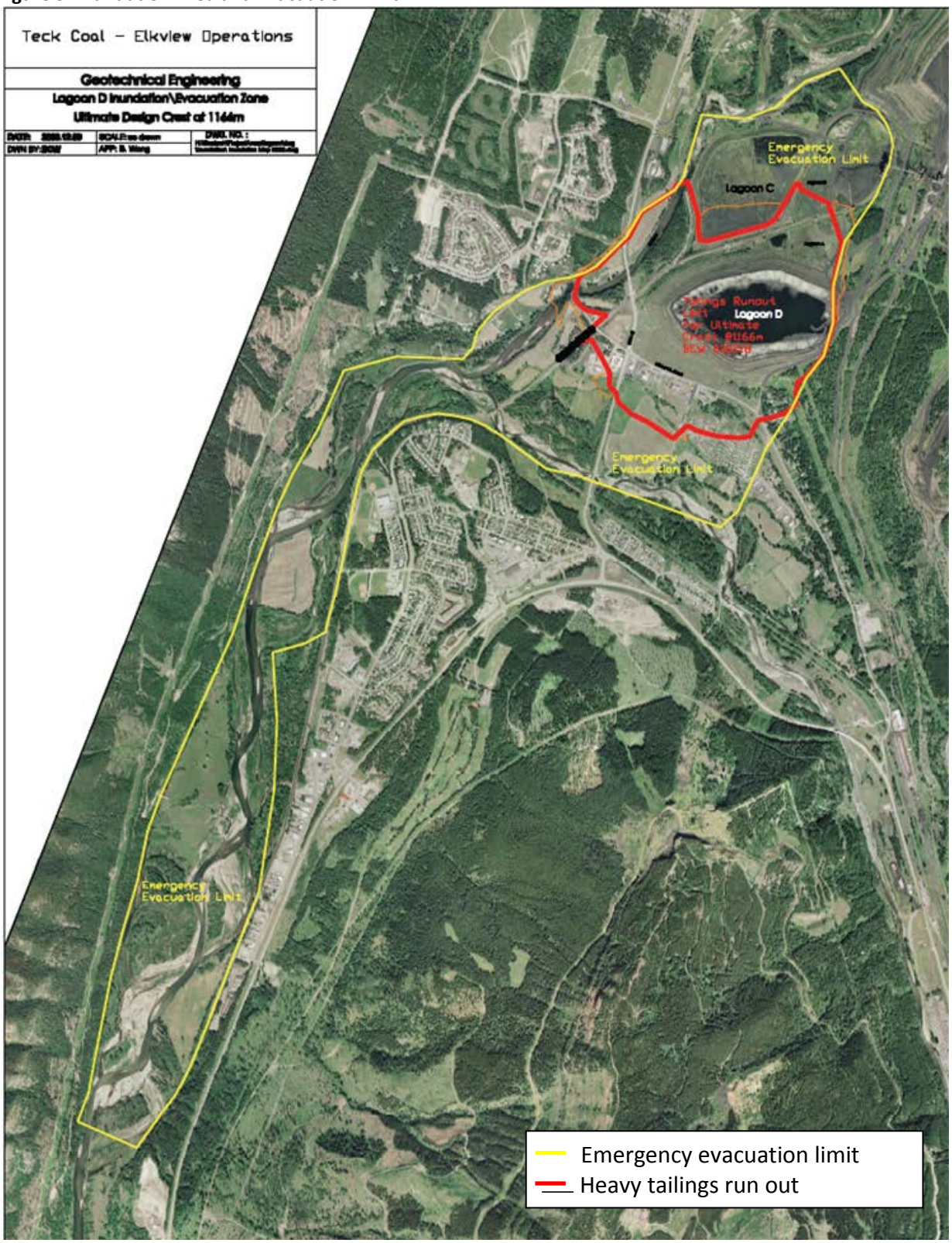
The Lagoon D Tailings facility has a documented history of geotechnical monitoring and surveillance in compliance with Canadian Dam Association (CDA) and Mining Association of Canada (MAC) Operational Guidelines. In 2006, the annual Dam Safety Review (DSR) for the tailings facilities completed by AMEC highlighted the need for an inundation study to formulate an integrated company and regional response to a potential breach of Lagoon D.

Key conclusions from the inundation study:

- A potential breach could result in the release of 330,000 $m^3$ (~10 %) of the total volume of tailings stored in Lagoon D
- Assuming the breach outflow entered the Elk River, the discharged tailings could travel ~5km downstream
- Peak outflow at the breach is estimated to be approximately 270 $m^3/s$
- Peak flow 4.6 km downstream would be about 90 $m^3/s$ with consideration for attenuation effects
- Maximum inundation 4.6 km downstream would occur 1.6 hours after breach initiation at Lagoon D

Based on the above conclusions, the study supported Lagoon D's classification as a high consequence facility. During the 2013 Lagoon D Dam Safety Review, the consequence rating for Lagoon D was upgraded to very high, mainly due to increased infrastructure downstream of the lagoon. According to HSRC Section 10.6.8 an impoundment facility that has a very high classification is required to have an **Emergency Preparedness Plan (EPP).** Figure 5 shows the required evacuation area in the event of a breaching event at the Lagoon D Tailings facility.

**Figure 5: Inundation Area and Evacuation Limit**



## 3. OVERVIEW OF EMERGENCY RESPONSE STRUCTURE

In the event the Lagoon D tailings facility experiences a lagoon breach emergency, Elkview employees are trained to activate the on-site **Emergency Response Plan (ERP).** Activation of the plan facilitates a standard "Incident Command" system and mobilizes the following response mechanisms:

1. **Site Command Post (SCP)** will manage the emergency related to a likely breach. It will attempt mitigation measures if required and also perform initial notifications as described in the ERP. Site staff will man the **SCP** that will be located in **Room 301** at the main Harmer office.

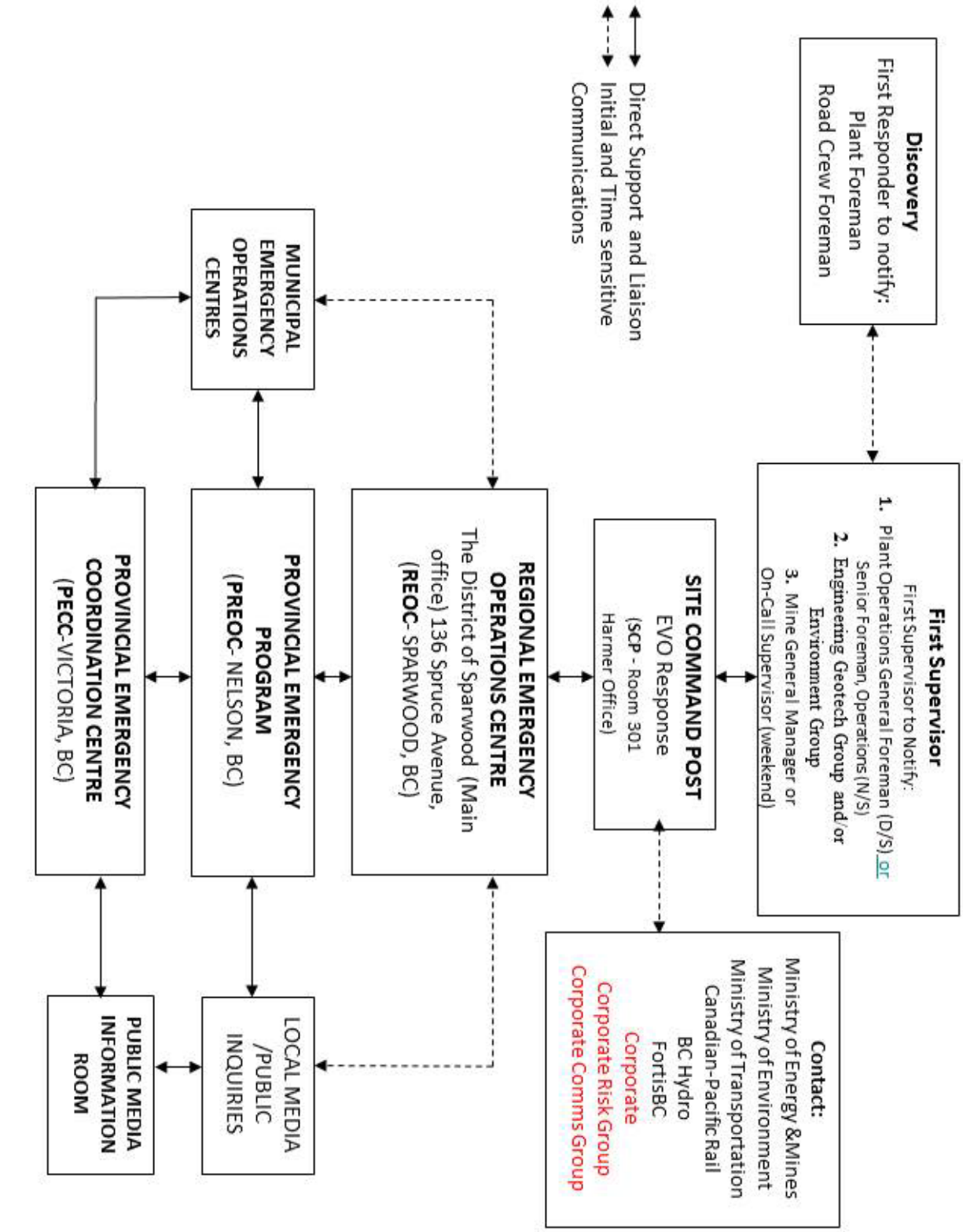
2. **Regional Emergency Operations Centre (REOC)** will be established by local authorities to provide support to the site level response activities. The District of Sparwood (Main office) 136 Spruce Avenue, will provide community notification of a major flood event (if required). The centre will provide comprehensive support to site activities by co-ordinating logistical requirements, communications and administrative support. The **REOC** primary function is to support the activities of the **SCP** and will be manned by the Sparwood emergency program coordinator and municipal representatives with disaster and emergency response duties. The **REOC** would work directly with **Provincial Regional Emergency Operations Centre (PREOC)** established by the province to address the emergency.

3. **Provincial Regional Emergency Operations Centre (PREOC)** located in Nelson will be activated to support any emergency response activities occurring by a **REOC** within the Southeast BC Region. It may also be activated to direct, control, or coordinate any provincially-led response measures. Primary **PREOC** staffing will be provided by **Provincial Emergency Program (PEP)** staff and team members.

4. **Provincial Emergency Coordination Centre (PECC)** directs and coordinates the overall emergency response, recovery and support activities of the provincial government. The **PECC** will be activated in support of any activated **PREOC**. In addition, it will be activated during any major emergency/disaster. The **PECC** manages provincial level resources on behalf of the **Central Coordination Group (CCG)** in response to the emergency needs of the operational area(s). It manages and coordinates mutual aid between PREOCs at the provincial central level, and serves as the coordination and communications link with the federal disaster support structure. Integral to the **PECC** is the **Emergency Coordination Centre (ECC),** a 24/7 emergency operations unit within the Provincial Emergency Program. The **ECC** provides operational communications and tasking. **PECC** will also activate the **Public Media Information Room**.

## 3.1 ORGANIZATIONAL RESPONSE MATRIX

**Figure 6: Response Matrix**



# 4. KEY PERSONNEL AND DESCRIPTION OF ERP SPECIFIC ROLES AND REPONSIBILITIES

## 4.1 FIRST RESPONDER

The First Responder is the person(s) first to the scene of the potential emergency. They should observe and note as many details as possible regarding the nature of the potential emergency. This individual(s) is tasked to initiate an emergency response by calling the area foreman. They are also tasked with securing the area until the foreman arrives. The First Responder should then communicate all observations and the timeline of events to the responding Foreman. The list of duties that this individual has is summarized in ERP Sec 4 Table 2: First Responder / First Supervisor Checklist.

## 4.2 FIRST SUPERVISOR

Management of the Lagoon D tailings facility is primarily the responsibility of the Plant and Operations – Road Crew, with technical support and monitoring provided by the Geotechnical Group within the Engineering Department.

When the Foreman arrives on scene they should observe the current conditions and receive the initial report from the First Responder. The foreman will then decide based on conditions and potential concerns to contact key on-site personnel in the following order:

1. Plant Operations General Foreman (D/S) or Senior Foreman Operations (N/S)
2. Engineering Geotechnical Group and/or Environmental Group.
3. General Manager or On-call Manager

Alternate Key On-site Personnel to Contact:

4. Plant Superintendent
5. Engineering Superintendent

Operations Superintendent
All emergency contact details are listed in the Emergency Preparedness Manual.

### 4.3 EMERGENCY COORDINATOR

The Emergency Coordinator position will be held by either the:

- Primary Option
    - Road Crew Foreman
    - Operations Foreman as designated by the Senior Operations Foreman
    - Operations General Foreman

- Secondary Option
    - Plant Foreman
    - Plant General Foreman
    - Senior Operations Foreman

This individual will be positioned at the hazard site organizing and monitoring the progress of any mitigation work and/or progress of the hazard. The list is divided into Primary and Secondary based on which roles would have access to the most appropriate resources.

The Emergency Coordinator will designate mine personnel, as needed, to act in operations, planning, and logistical roles. The list of duties that this individual has varies depending on the degree of the hazard rating. Refer to ERP Sec 4 Table 3: Emergency Coordinator Checklist– Imminent Flood Emergency.

A summary of the Emergency Coordinator's responsibilities include but are not limited to:

- Confirming the hazard rating with the General Manager and Engineering/ Plant Superintendents
- Receiving written information from the First Responder/ First Supervisor on how the hazard has progressed
- Supervising ground operations personnel
- Approving action items and requesting resources
- Liaising with the Site Commander, the Lead Communication Specialist, and Senior Management
- Maximization of available resources

## 4.4 SITE COMMANDER

The Site Commander will be selected by Senior Staff and will be situated in Room 301 at the Harmer office. During night shifts or weekend, the Senior Operation Foreman will act as the Site Commander until relieved by the first Superintendent to arrive at the Site Command Post. This individual will communicate with the Emergency Coordinator and the Lead Communications specialist to give updates on how the hazard is progressing and to help mobilize resources (Refer to Table 4: Site Commander Check).

A summary of the Site Commander's responsibilities include but are not limited to:

- Setup the Site Command Post (SCP) in Harmer 301.
- Ensuring that occupational health and safety procedures are in place to protect site personnel
- Appointing Duty Officers
- Ensuring that adequate communications equipment is ready and available
- Securing Resources and/or Personnel for the Emergency Coordinator
- Helping coordinate the mitigative and remedial operations at the site and maintain communication with Safety Department

For a more detailed description of the Site Commander Roles and responsibilities, please refer to the ERP Sec 4 Table 4: Site Commander Checklist.

## 4.5 LEAD COMMUNICATION SPECIALIST

The Lead Communication Specialist (LCS) will communicate with the Site Commander and will activate the REOC in Sparwood. This position is responsible for talking to the media, relevant government institutions, local authority, and emergency services. Refer to ERP Sec 4 Table 5: Lead Communications Specialist checklist. The only roles that can communicate to the media are: Manager of Community and Aboriginal Affairs, General Manager EVO, and a spokesperson as designated by External Affairs, Teck Resources Ltd., Vancouver. If these personnel are not available locally, the remaining duties of the LCS, will be delegated according to the Site Commander.

# 5. FLOOD EMERGENCY

## 5.1 DEFINITIONS

Any change to the current condition of the Lagoon D main dike should be classified as a hazardous or non-hazardous condition.

A ***Non-Hazardous Condition*** (standard degradation) requires routine maintenance by the Road Crew. Under such conditions there is no requirement to activate the ERP.
For example; minor erosion events, minor seepage events/wet spots appearing with clear/clean water, tailings line breach, small sinkhole forming in the beach with no corresponding seepage at toe etc.

A ***Hazardous Condition*** constitutes a significant change, potentially influencing the stability of the dike and requires a specific response within a defined time period. Assuming such response conditions can be reasonably met, there is no requirement to activate the ERP. If the condition cannot be addressed, within a defined time period or is likely to degrade, the risk should be re-evaluated. If necessary, the condition will need to be elevated to a ***Potential Flood Emergency*** or an ***Imminent Flood Emergency***, both requiring the implementation of the ERP.

A ***Potential Flood Emergency*** is any condition that could cause a significant and/or sudden increase in water levels downstream of the Lagoon Facility. A Potential Flood Emergency is a condition that has been identified but not yet confirmed as to severity. For the purpose of this plan:

- "Condition" is defined as an impending flood event or structural/operational situation that threatens, or may threaten, the dam's integrity.
- "Significant increase in water levels" is defined as those flows likely to exceed bank full capacity at critical downstream locations.
- "Sudden increase" is defined as an operator directed increase due to a dam emergency or due to a dam breach.

An ***Imminent Flood Emergency*** is defined as any condition that will, or likely will, produce significant and/or sudden increases in flow downstream of the Tailings Lagoon. It is a condition that has been confirmed as serious with a defined time scale whereby all precautionary measures for protection will be implemented.

## 5.2 LAGOON D TAILINGS FACILITY SITE OPERATING PERSONNEL ACTIONS

Upon initial indication of a Flood Emergency of the Lagoon D tailings facility, site staff shall immediately activate the on-site **Emergency Response Plan** that will direct them to:

1. Activate the **Site Command Post (SCP).**

2. Activate the **Regional Emergency Operations Centre (REOC)** to be established at The District of Sparwood (Main office buildings) 136 Spruce Avenue, Sparwood.
3. Immediately attempt to lower the pond water level through decanting to Westfork and/or if necessary siphoning into Otto Creek (North side of Lagoon D)
4. Stop any Plant feed into Lagoon D.

If a decision is made to issue an *Imminent Flood Emergency* notification (see ERP Section 10 Table 3: Emergency Coordinator Checklist), Lagoon D tailings facility **SCP** staff will then activate the next response level in the **Emergency Response Plan** that will direct them to:

1. Notify District and Regional Authorities as per the Organization Response Matrix (Section 3.1)
2. If requested, assist out Authorities to notify residents below the facility, as per the EMP Downstream Water and Stakeholder Contact List.

### 5.3 MUNICIPAL AFFAIRS – EMERGENCY MANAGEMENT BRITISH COLUMBIA ACTIONS

Upon initial notification of an *Imminent Flood Emergency* at the Lagoon D Tailings Facility, the REOC and PREOC staff will contact Elkview Operations Lead Communications Specialist to confirm the notification of Imminent Flood Emergency. Upon verification of the *"Imminent Flood Emergency"* declaration, Government Emergency Operations staff will begin the evacuation process of the inundation area.

### 5.4 LOCAL AUTHORITIES ACTIONS

Local Authorities notified of an "Imminent Flood Emergency" will:

1. Activate the **Emergency Response and Recovery Plan: Elk Valley Sub Region** for the *Imminent Flood Emergency*, outlined as the Sparwood District Emergency Response Plan.
2. If necessary, send a representative to the **Regional Emergency Operations Centre (REOC)** at The District of Sparwood (Main office) 136 Spruce Avenue, Sparwood.

### 5.5 R.C.M.P. ACTIONS

Upon notification of an *"Imminent Flood Emergency"* the RCMP may be requested to send a representative to the **Regional Emergency Operations Centre (REOC)**. The RCMP will respond in co-ordination with the local authorities and their Municipal Emergency Plans.

**PART 2**

# EMERGENCY RESPONSE PLAN (ERP)
# FOR FLOOD EMERGENCIES AT THE LAGOON D TAILINGS FACILITY

# 1. INTRODUCTION

The **Emergency Response Plan (ERP)** for Flood Emergencies was developed from previous work carried out by the Dam Safety Group for Water Stewardship in the BC Ministry of the Environment. It is intended as a guideline to assist facility operators in the development, implementation, assessment, and revision of their *Emergency Response Plan for Flood Emergencies.*

The Canadian Dam Association, administered with the assistance of The Dam Safety Group for the BC Ministry of the Environment requires all owners of any tailings facility to have in place an **Emergency Preparedness Plan (EPP)** that defines the emergency response measures to be implemented in the event of a dam breach. The operator's **Emergency Response Plan (ERP)** for flood emergencies outlines, in order of priority, the key emergency response roles and responsibilities to implement the **Emergency Preparedness Plan (EPP)**. Staff and contractors who may have a response role should receive emergency preparedness training and be involved in exercising the emergency plans.

The **Emergency Response Plan (ERP)** is divided into three sections as follows:

1. **General Plan**: outlines the purpose of the **Emergency Response Plan (ERP)**, the roles and responsibilities for the various components of the **ERP**, the general policies that apply and the procedures that will activate the **ERP**.

2. **Check-sheets**: define the actions to be taken by the individuals assigned to key roles when the **ERP** has been activated. They are placed in order of priority by which key personnel may be assigned.

3. **Appendices**: forms and assignment lists.

GENERAL PLAN

## 1.1 PURPOSE

Teck Coal has an obligation to protect lives and prevent property damage in the event of a dam breach. Therefore, it is necessary to have a dam breach **Emergency Response Plan (ERP)** in a state of preparedness that extends beyond normal procedures.

This **ERP** is integrated within the Lagoon D **Emergency Preparedness Plan (EPP),** the Elkview Operations Emergency Preparedness Manual, and the District of Sparwood's Disaster Response Plan(s).

## 1.2 AUTHORITY

The **EPP** that forms the basis for these procedures and check-lists has been developed in accordance with the Dam Safety Guidelines of the Canadian Dam Association and the guidelines prepared by Dam Safety of British Columbia.
The local authority (The District of Sparwood) shall be responsible for the control and direction of the emergency response to a disaster or emergency event within their municipality. Teck will assist the Municipality's efforts when Teck is asked to and where Teck can provide reasonable support. The Municipal Government Act, Part 1, Section 3, requires a municipality to develop and maintain safe and viable communities.

## 1.3 SITE ACCESS

Lagoon D has various access but not all areas are equally accessible. The primary access is from the east side along the Main Plant Rd. At the primary access it is possible to drive the entire circumference of the top two levels of the lagoon. An access road from Cossarini Creek Culvert above Lagoon A provides pickup access to the mid northeastern face, then to the trestle, and the northern Lagoon D toe and Otto Ponds. The northwestern toe is not accessible to vehicles; it is blocked by Otto Ponds and the rail loop. The northeastern toe is partially accessible from the Lagoon A crest dike but access has not been maintained and would require dozer work. The southern and western Lagoon D toe is accessible from the Plant Gate; the road is drivable but not maintained and only goes part of the way around. Alternative western toe access could be via Hwy 43, though no direct access currently exists.

## 1.4 EMERGENCY RESPONSE ROLES AND RESPONSIBILITIES

The decision to activate the ERP is the responsibility of the General Manager or General Manager's designate. The ERP will be activated for the following two conditions:

- Potential Flood Emergency: Defined as any condition that could cause a significant and/or sudden increase in water levels downstream of the Lagoon Facility. A Potential Flood Emergency is a condition that has been identified but not yet confirmed as to severity.

- Imminent Flood Emergency: Defined as any condition that will, or likely will, produce significant and/or sudden increases in flow downstream of the Lagoon Facility. An Imminent Flood Emergency is a condition that has been confirmed as serious with some indication of potential timescale.

Once the ERP is activated the following group's general responsibilities are listed below:

**Elkview Operations, Teck Coal Limited (Lagoon D Owner and Operator)**

1. Assessment and determination of the level of emergency at the dam site.
2. Mitigation and repair work at site of emergency.
3. Technical Support to the municipality(s).
4. Activation of, and technical support to, the Site Command Post (SCP), and Regional Emergency Operations Centre (REOC).
5. Emergency public information communications.
6. Assistance in notifying potential affected parties downstream if requested by the municipality.
7. Notify MEM of Geotechnical Incident as per HSRC sec. 1.7.1 & 1.7.3 within 4 or 16 hours.

**Municipal Government**

1. Notification of persons in the flood inundation area.
2. Evacuation of inundation area.
3. Search and rescue at local level.
4. Road closures.
5. Public safety.
6. Emergency lodging and provisions.
7. Emergency medical services.
8. Emergency Public Communication.

**Provincial Emergency Program –British Columbia**

1. Co-ordinate provincial government assistance to the municipality(s) as required.
2. Co-ordinate provision of federal government assistance, as required.

3. In mutually agreed circumstances, conduct emergency operations in National Parks, First Nation Reserves, or on other properties under federal jurisdiction.

## 2. POTENTIAL FAILURE METHODS DEFINITIONS AND DESCRIPTIONS

There are multiple failure methods and often those methods will be combined together. Below are examples of several of the most common failures and how to identify them. Mitigation suggestions are located in Section 3 Checklist – Emergency Coordinator.

1. **Piping-** Piping describes the event where water moves through the ground (in this case tailings) picking up particles; those particles are then deposited away from the structure. Piping always has a definitive start and an end point. The damage is most visible at the end point where the particles are being removed from. The most common form of piping is a seep; and so long as the water in the seep runs clear there is minimal risk. Once a seep starts moving particles, and the water turns dirty, it can continue to erode an open "pipe" that will allow water to flow freely. Free flowing water moves faster and faster, eroding more and more until the overall structure fails. At the toe and on the face of a structure look for flowing water, mud flows that come out of the bank, or circular divots in the slope. On the top of the structure look for sink holes or whirlpools; although by the time these features appear on top the "pipe" is almost fully complete.

2. **Overtopping-** Overtopping occurs when water in the lagoon pond flows over the top of a dike crest. This water surge could be the result of increased water inflow from rain, snow melt, or Plant discharge; or a decrease in pond volume due to the slumping of solids into the pond. During overtopping, water will flow quickly from the high to low side and erode the upper crests of the dike. This flow could lead to further erosion as more water is released via the ever increasing new channel.

3. **Foundation Spreading-** Spreading (or slumping see below) occurs when material in the slope face loses strength and flows away from the slope. This is most often associated with an increase of water, or pore pressure, within the slope. The material may fail on its own or it may be driven from above by unaffected material. The material flow will spread outward until it reaches a new equilibrium. Visually the spreading may initially look like a bulge in the slope; it could then turn into a flow where the material may be rolling and mixing as it fans out to the sides.

4. **Crest or Face Slumping-** Slumping is very similar to Spreading described above. The main difference is instead of a large portion of material losing strength, only a smaller/thinner layer fails. This thin layer acts like ball bearings and the solid material above it slides over the thin layer. All of the material will flow until the thin layer is used up or reaches a new equilibrium. The advantage to a slump is that it may be possible to identify the weak layer and somehow isolate it. Upon visual

inspection with a slump, usually, there would be lots of chunky material at the bottom of the failure and a clear clean failure surface above.

5. **Liquefaction-** Liquefaction occurs when fine particles become suspended in water. When tailings fines settle out of water but do not form strong bonds with other fines; settled fines are very weak with no cohesion. Two things need to happen to liquefy the weak material: 1.) the area needs to become slowly saturated, and 2.) a strong jolt such as a large slump or earthquake stirs up the material. A jolt could also be from heavy truck traffic or a local explosive blast. An example of a liquefied material could look like quicksand or slurry. Once this liquefied material starts flowing it will act like water and flow to the lowest ground depression.

## 3. EMERGENCY RESPONSE STRUCTURE

The response structure with regard to site coordination can be broken down into two phases:

1. The Initial Response Procedure (see Figure 7 )
2. The ERP Activation Procedure (see Figure 8 )

**Figure 7: Initial Response Procedure**

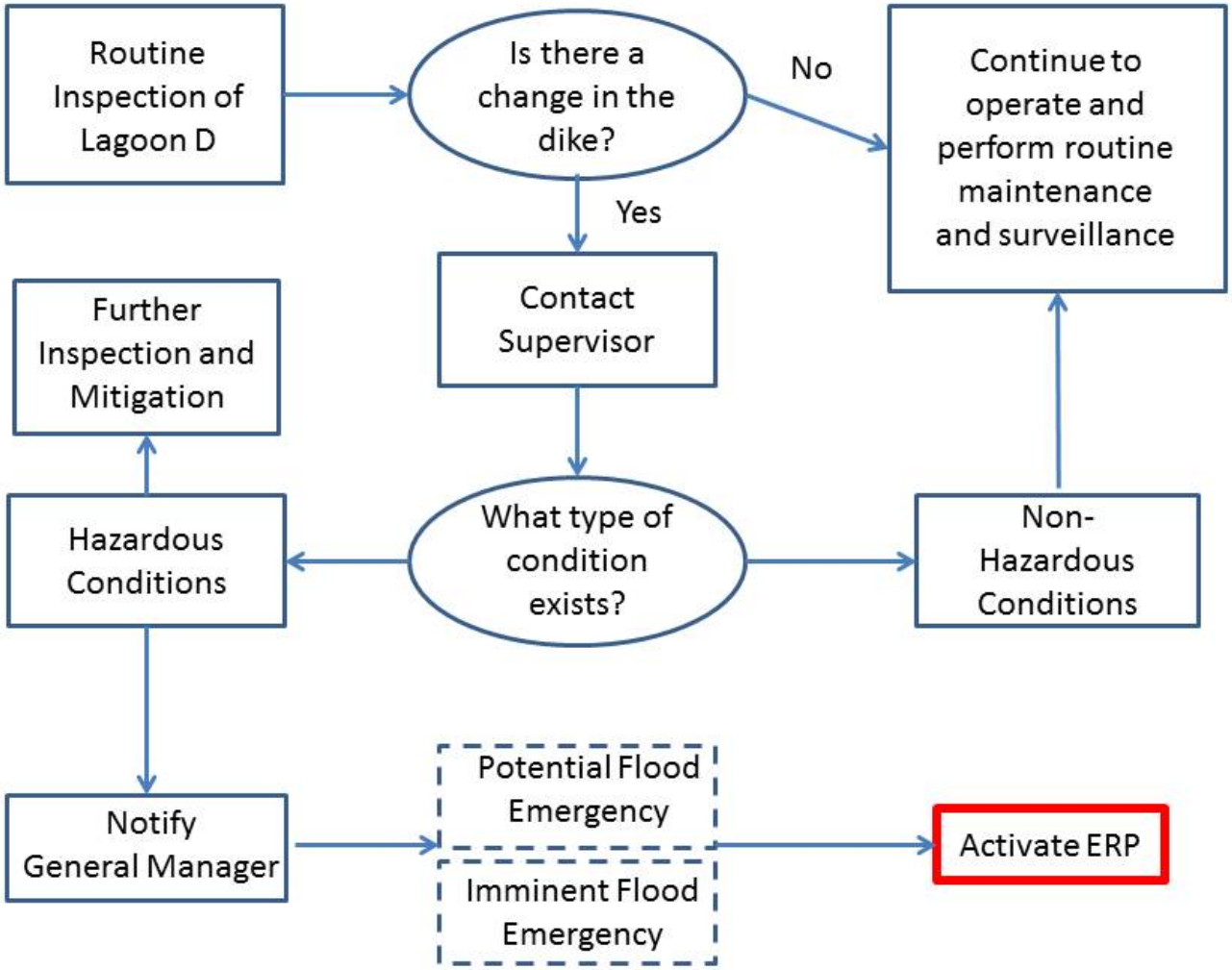
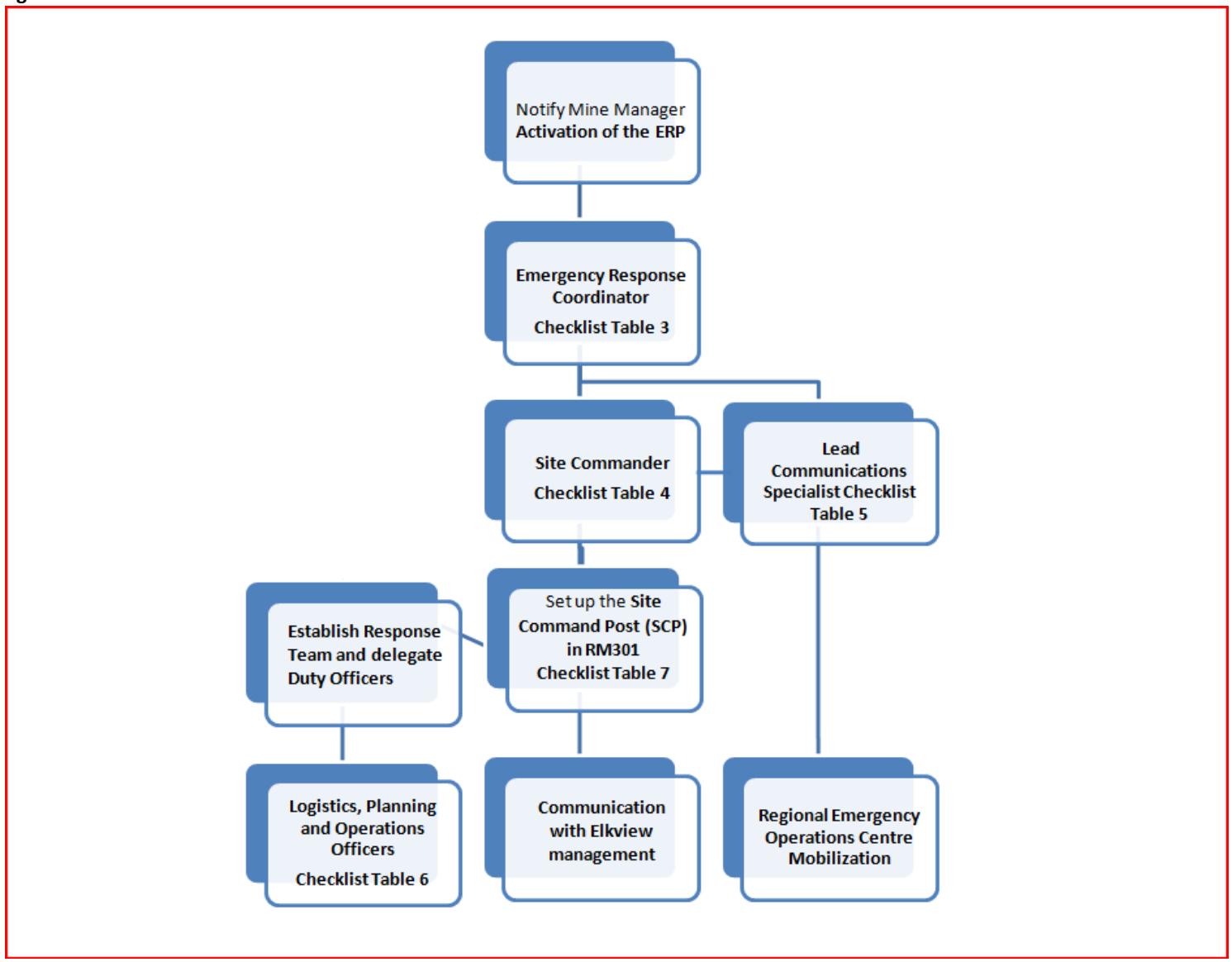


**Figure 8: ERP Activation Procedure**



## 4. CHECKLISTS

Table 2: First Responder / First Supervisor Checklist

| FLOOD EMERGENCY - FIRST RESPONDER / FIRST SUPERVISOR CHECKLIST | | |
|---|---|---|
| **First Responder** | | |
| 1. | Determine the nature of the emergency. Observe and note as many details as possible. Write them down. | |
| 2. | Immediately contact the area foreman to assess the situation. | |
| **First Supervisor** | | |
| 3. | Assess the site condition. Talk with the First Responder. Is the situation hazardous or not? | If yes, proceed to Step 4. |
| 4. | Contact the following Job Roles, in order: | See EPM Contact List for Phone #'s |
| | 1. Plant Ops. General Foreman | Or on N/S Snr. Ops. Foreman |
| | 2. Engineering – Geotechnical Group | And/or Environment Group |
| | 3. General Manager | Or On-call Manager |
| | If contact cannot be made with any of the above roles, or as time permits, then contact: | |
| | 4. Plant Superintendent | |
| | 5. Engineering Superintendent | |
| | 6. Operations Superintendent | |
| | In discussion with the General Manager, and/or above parties, a determination to ***activate the ERP*** will be made; if there is risk of one of the following:<br>• Potential Flood Emergency<br>• Imminent Flood Emergency<br>The decision to activate the ERP must be made by the General Manager or Designate. At this stage only the ERP has been initiated; an Emergency may not yet be declared. | |
| 5. | Secure the area and ensure the safety of all site personnel. Begin mitigation efforts. | |
| 6. | Continue to monitor the area until directed otherwise by Emergency Coordinator. | |

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| **NOTES** | Time: |

Table 3: Emergency Coordinator Checklist– Imminent Flood Emergency

<table>
<tr><th colspan="2">FLOOD EMERGENCY – EMERGENCY COORDINATOR</th></tr>
<tr><td>1.</td><td>Go to the hazard site.</td></tr>
<tr><td>2.</td><td>If the Site Commander is not at Harmer 301 and is not in good communications, contact the Plant Foreman. The Foreman is to function as the Site Commander until the Site Command Post (SCP) has been manned in RM301 at the Harmer Office. The Foreman’s duties are listed in ERP Section 4 and Table 4.</td></tr>
<tr><td>3.</td><td>Observe the situation.</td></tr>
<tr><td>4.</td><td>Receive reports from First Responder and/or First Supervisor.</td></tr>
<tr><td>5.</td><td>A.) Contact senior management and advise them of the situation.
<table>
<tr><td>Job Roles (attempt to contact In Order): See EPM Contact List for Phone #’s</td></tr>
<tr><td>General Manager or On-call Manager</td></tr>
<tr><td>Plant Superintendent</td></tr>
<tr><td>Operations Superintendent</td></tr>
<tr><td>EH&S Superintendent</td></tr>
<tr><td>Engineering Superintendent</td></tr>
<tr><td>BRE Superintendent</td></tr>
<tr><td>Maintenance Superintendent</td></tr>
<tr><td>Employee Relations Superintendent</td></tr>
<tr><td>Controller</td></tr>
</table>
B.) Decide to declare an <u>Emergency</u>.<br>This decision will be made by the General Manager or On-call Manager. If un-available the decision will be made by a Superintendent. The flood emergency may be considered:<br>Potential- (uncertain time scale, full scale evacuation not yet required ) or<br>Imminent- (definite time scale, full scale evacuation required).<br><br>C.) Inform the Site Commander that a Potential or Imminent Flood Emergency has been declared.</td></tr>
<tr><td>6.</td><td>Request a written report from the First Responder and First Supervisor</td></tr>
<tr><td>7.</td><td>Assume Command of Hazard Site (see Step 8 for specific site task list).</td></tr>
</table>

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| Notes | Time: |

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| 8. | Ensure that the below items are performed:<br>• Turn off any current inflow in Lagoon D<br>• Start-up decant pump to lower the pond level. Direct water to Westfork and/or if necessary use additional pumps to siphon into Otto Creek.<br>• Continue to monitor the condition, assign a trained observer. A trained observer will be shown by technical staff or a supervisor on what to look for and who to contact.<br><br>Specific instructions pertain to the mode of failure as described below.<br><br>**For Piping Failures**<br>• Fill in any holes on the surface beach with sand and coarse material hauled in.<br>• Mobilize equipment required to provide coarse reject for backfilling the depression on the beach area (scrapers, small haul trucks and loader, 992 loader and haul truck, lighting plants, etc.).<br>• Dozer on beach can push adjacent excess beach sand into the depression.<br>• Dozer to push access ramp off dike for closer access for scrapers or small haul trucks.<br>• Dump short and push material into the depression.<br>• If the depression continues to enlarge, the dike stability has been reduced. Personnel and equipment should evacuate to a safe location.<br>• If the depression is able to retain material, continue to backfill as necessary and proceed to seepage location.<br>• Keep Plant Control Room Operator/SCP informed of proceedings.<br>• Organize personnel and material to the location of the seepage.<br>• Place membrane filter cloth over seep (this is to allow drainage but retain the dike material).<br>o Membrane filter cloth required is stored in or by the Plant Supply Tent.<br>• Bury filter cloth with coarse rejects or other suitable drainage material.<br>• Continue to observe dike near seepage for new seeps, remediate as required.<br>• If seepage is uncontrollable, evacuate personnel to a safe location.<br>**For Overtopping Failures**<br>• Use additional pumps to rapidly draw down the water level. Water can be directed to Westfork or in emergency conditions Otto Creek.<br>• If water level has been successfully reduced follow procedure for Piping Failures to backfill the breached section<br>**For Foundation/ Spreading Failures**<br>• Identify the source of instability<br>• Use appropriate earthworks (buttress construction) to minimize further deformation and collapse of the dike.<br>• If seepage has developed follow procedure outlined for Piping Failure |

| | |
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| | **For Liquefaction Failures**<br>• Initiate immediate evacuation. |
| Notes | Time: |

Table 4: Site Commander Checklist

| FLOOD EMERGENCY – SITE COMMANDER | |
|---|---|
| 1. | A.) Designate an Emergency Coordinator if not already done.<br>B.) Relocate to Harmer Rm 301.<br>C.) Assign regular duties to alternate. |
| 2. | Obtain a full report on activities to date from the Emergency Coordinator and First Responder/First Supervisor. Confirm the level of emergency with the Emergency Coordinator. |
| 3. | Phone Lead Communication Specialist (LCS) and inform the LCS of the Level of Hazard. Tell the LCS that their list of duties is in the ERP sec 4 table 5. Tell the LCS to proceed to the REOC. |
| 4. | Ensure that Lagoon equipment is operational (gates, generator, etc). |
| 5. | Evacuate the Hazard Area - Contact Mine Operations dispatch, available maintenance/plant staff and/or Duty Officers are to evacuate Mine employees and contractors working within the hazard area and lock and/or control all gates. |
| 6.) | Contact LCS at REOC or contact REOC directly. |
| 6. | Report communications with REOC to the Emergency Coordinator. |
| 7. | Establish Duty Officers:<br>Duty Officer 1: Event Scribe and Data Recorder of all events<br>Duty Officer 2: Logistics<br>Duty Officer 3: Planning<br>Duty Officer 4: Operations |
| 8. | Ensure occupational health and safety procedures are in place to protect site personnel. |
| 9. | Ensure that adequate communications equipment is available and operational. |
| 10. | Co-ordinate the mitigative and remedial operations at the site and maintain communication with the Site Safety and Emergency Coordinator. |

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| Notes | Time: |

Table 5: Lead Communication Specialist Checklist

| FLOOD EMERGENCY – LEAD COMMUNICATION SPECIALIST (LCS) | |
|---|---|
| 1. | Proceed to the Regional Emergency Operations Centre<br>• Activate the PR/REOC mobilization plan<br>• Ensure the telephone lines and other communications equipment is operational. |
| 2. | Assign duties to Communication Support Staff and provide assistance with REOC in regard to contacting key agencies, people in the evacuation area if failure is imminent (otherwise RCMP role), transportation, utilities, and First Nations representatives if requested to do so by the Municipality. |
| 3. | Liaise with the Public Media & Information Room at the District of Sparwood Main Office and the Provincial Regional Emergency Operations Centre at the BC Ministry Branch, Nelson, for Southeast BC. |
| 4. | Liaise with the media. Prepare media releases in conjunction with the Emergency Coordinator and management containing the following information:<br>• Expected magnitude of the flood wave<br>• Likely impact on downstream users<br>• The amount of time available for evacuation<br>• The location of the evacuee staging area and/or Reception Centre<br>• Which areas are likely to flood<br>• Which areas likely will not be flooded<br>• How those in the flood path should protect themselves<br>• Any other pertinent information |
| 5. | A staging area for the media will be set up in The District of Sparwood (Main Office), 136 Spruce Avenue, Sparwood if required. The Lead Communication Specialist will provide regular situation updates to the media. Access to the dam site is restricted. |
| 6. | Media kits with background material containing the following information will be available for the public and media with the approval of the Emergency Coordinator:<br>• What caused the emergency?<br>• Who owns the dam?<br>• What type of dam is it?<br>• What kind of emergency (piping, overtopping, etc) is it?<br>• When were people first warned?<br>• Are people being evacuated and where are the reception centres?<br>• How can we contact evacuees?<br>• Which roads and bridges are closed/being closed? |

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| Notes | Time: |

Table 6: Duty Officers Checklist

| FLOOD EMERGENCY – OFFICERS | |
|---|---|
| 1. | Act on instructions, directions and requests from the Emergency Coordinator and the Emergency Co-ordinator staff. Recording all actions using Tables 10 and 11 in Section 8. |
| 2. | **Duty Officer:** Open an Event Log<br>• maintain operations logs, maps and situation boards<br>• Contact required evacuees in affected areas |
| 3. | **Operations Officer**: Coordinate activity of site machinery and their support through communications with maintenance |
| 4. | **Planning Officer:** Work alongside the Emergency Coordinator and help facilitate action plans to minimize the impact of the inundation. |
| 5. | **Logistic Officer:** Put into action directives from the Operations and Planning Group<br>• Contact contractors and auxiliary support equipment coming on-site as well resources in support of the evacuation response |

| | |
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| Notes | |

Table 7: Site Command Post Checklist

| FLOOD EMERGENCY – SITE COMMAND POST (SCP) | |
|---|---|
| 1. | Site Command Post – RM301 Harmer Office requirements:<br>• Inundation Maps<br>• Event Logs<br>• Two meridian telephones and two standard telephones (clearly marked).<br>• Situation status board with flip chart (located in supply room).<br>• Situation status board with dry erase board (located in supply room).<br>• Stationery; adequate pens, paper etc.<br>• Two copies of the ***Lagoon D Tailings Facility*** Emergency Preparedness Plan.<br>• Media kits with pre-worded background material.<br>• Large wall map.<br>• Battery operated radios.<br>• Extra phone cable extensions.<br>• Video Conferencing |
| 2. | Set up the status board so that all responders can clearly see it. Key events should be written on this board (time, event, actions, and response). |
| 3. | Hang up the large wall map to track real time progress of the response efforts and any flooding |
| 4. | The Lead Communication Specialist will assign the communication priority functions to responders as they arrive:<br>Establish contact with the Public Media and Inquiry Room at The District of Sparwood (Main Office), 136 Spruce Avenue, Sparwood, B.C.<br>Establish contact with the Government Emergency Operations Centre.<br>Establish contact with the BC Environment (Flow Forecasting Program).<br>Handle all public inquiries.<br>Handle all media inquiries. |
| 5. | Answers to questions relating to the emergency will be supplied by the Site Command Post on a regular basis and may include:<br>How is the situation progressing?<br>What actions are being taken?<br>What resources are being used for mitigation?<br>Who/which communities have been evacuated? |
| 6. | The Lead Communication Specialist will lend support to the Site Command Post if directed to do so by the Emergency Coordinator. |

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| Notes | Time: |

# 5. MAINTAINING A STATE OF READINESS

## 5.1 UPDATING THE EMERGENCY PREPAREDNESS PLAN AND RESPONSE PLAN

Lagoon D tailings facility, operations and engineering staff will be responsible for updating the **Emergency Preparedness Plan (EPP)** and on-site **Emergency Response Plan (ERP).** Updates may include but are not limited to: procedures, phone list, and roles and responsibilities. Revisions will be circulated to all affected agencies identified in the record of manual holders (Refer to Section 6.3).

Any revisions and/or comments to the Lagoon D tailings facility **Emergency Preparedness Plan (EPP)** or **Emergency Response Plan (ERP)** should be forwarded to the Emergency Co-ordinator listed in the communications directory of this plan. All revisions will be recorded on the Record of Revisions sheet(s) included in this plan.

## 5.2 TRAINING GENERAL STATEMENT

Elkview Operations staff managing the Lagoon D tailings facility, identified as emergency responders, will be familiar with all aspects of the **Emergency Preparedness (EPP)** and **Response Plans (ERP)**. Teck Coal Limited is responsible for ensuring the **Site Command Post (SCP)** is functional and that staff are adequately trained. Municipalities and other responders are responsible for their Emergency Measures.

## 5.3 TRAINING SPECIFICS

All Teck EVO personnel employed in roles mentioned in this document, and those involved in the operation, maintenance and surveillance of the Lagoon D Tailings facility will have a working knowledge of their potential roles and responsibilities as outlined in this document. All such employees are to know where updated copies of this document are kept for reference. A review of this document is to be carried out by these employees annually and tracked through their training requirements in SiteLine.

## 5.4 TESTING PLANS AND PROCEDURES

Elkview Operations personnel managing the Lagoon D Tailings Facility will coordinate and participate in periodically testing the EPP and dam breach emergency response procedures jointly with downstream agencies and stakeholders. It is incumbent upon each responding agency to have adequate plans and trained staff in place to deal with any emergency within their jurisdiction. Testing will comprise of periodic tabletop scenarios, review of ERP and EPP working documents, as well as the OMS.

# 6. KEY CONTACT NUMBERS

**MINE LOCAL NUMBERS**

| | |
|---|---|
| Mine Gate Security | 58899 |
| **ANY EMERGENCY** | **58888** |
| Emergency First Aid | 58888 |
| Harmer First Aid | 58779 |
| Plant First Aid | 58935 |

**REPORTING STATIONS**

| | |
|---|---|
| Mine | 58199 |
| Plant | Channel 10 |
| Plant Alternate | 58913 |
| Mine Rescue Team | 58199/58779/58899/58888 |

**ECC RADIO FREQUENCIES**

Used to relay information to outside services, additional information can be found in section 1 page 10.

| CHANNEL # | RX FREQ.& SQUELCH | TX FREQ.& SQUELCH |
|---|---|---|
| 3 – for Harmer | 168.93 – "TPL 91.5" | 168.06 – "TPL 91.5" |
| 10 – for Plant | 169.99 – "TPL 103.5" | 167.925 – "TPL 103.5" |

**Channel 3 is an emergency channel at Harmer (Mine Site)**
**Channel 10 is an emergency channel at Plan (Coal Plant)**
**Major Disaster Conference Room #301 425-8937**

## Media

**Only the Lead Communication Specialist, General Manager, or Manager of Public Affairs will contact the Media if necessary**

# 7. EPP AND ERP DISTRIBUTION AND REVISIONS

## 7.1 EPP RECORD OF REVISIONS

Table 8: EPP Record of Revisions

| Revision # | Date | **Section(s) Revised/Added/Deleted and Reason** |
|---|---|---|
| Original | | |
| 1 | January 2010 | Contact information updated. Incorporates changes resulting from meeting with Sparwood Emergency Response Community. |
| 2 | January, 2012 | Updated contact information |
| 3 | October, 2014 | All sections reviewed and updated to meet current procedures and standards. The majority of Contact Information has been moved to the Emergency Preparedness Manual (EPM). |
| | | |
| | | |

## 7.2 ERP RECORD OF REVISIONS

Table 9: ERP Record of Revisions

| REVISION # | DATE | **SECTION(S) REVISED/ADDED/DELETED AND REASON** |
|---|---|---|
| Original | | |
| 1 | January 2010 | Contact information updated. Incorporates changes resulting from meeting with Sparwood Emergency Response Community. |
| 2 | January, 2012 | Updated contact information |
| 3 | October, 2014 | All sections reviewed and updated to meet current procedures and standards. The majority of Contact Information has been moved to the EPM document. |
| | | |
| | | |

## 7.3 ERP DISTRIBUTION LIST FOR REVISIONS

This document now forms its own chapter in the Emergency Preparedness Manual (EPM) for Teck Coal Elkview Operations. Please refer to the distribution list in the EPM. The EPP/ERP is also available online as part of SiteLine and SharePoint Standard Practice and Procedures; in the Engineering Section.

## 8. EVENT LOG AND RECORD OF ASSIGNMENT

Table 10: Event Log

| Event: | | | | | |
|---|---|---|---|---|---|
| Responder's Name: | | Assigned Position: | | | |
| Date: | | Time Log Opened: | | | |
| Instructions | Begin this log immediately on being assigned to an emergency response function. Document all events and responses as they occur. Care and control of this log is your responsibility. Continue to keep this log until advised to stand down. Submit this log only to the Emergency Coordinator or to the Site Control Post | | | | |
| TIME | TO | FROM | ACTION | FOLLOW-UP | CLOSED |
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Table 11: Record of Assignment

| RECORD OF ASSIGNMENTS<br>Page __ of __<br>Event: | | |
|---|---|---|
| Date: _____ Time Record Opened: _____ | | |
| DATE & TIME | NAME | ACTION and FOLLOW-UP |
| | | |
| | | |
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