NorthMet Project

Contingency Action Plan for the Flotation Tailings Basin

Version 5

Issue Date: May 15, 2017

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1.0 Contingency Action Plan Summary

1.1 Purpose

The purpose of the Flotation Tailings Basin (FTB) Contingency Action Plan (CAP) is to:

- identify potential basin failure modes that could occur during construction events and during routine operations; conditions that if left undetected and unresolved could instigate instability of basin dams
- proactively identify contingency plans (i.e., operation change, design change if needed) for each potential failure mode, if observed
- identify instrumentation and monitoring that confirms acceptability of construction and operating activities, and proactively alerts construction, operations, and management personnel to basin conditions that if left unresolved could initiate a potential failure mode
- define responsibilities and provide procedures for responding to unexpected and potentially hazardous conditions threatening the integrity and performance of the FTB

This document will evolve throughout the permitting, operating, reclamation, and postclosure maintenance phases of the NorthMet Project (Project). It will be reviewed and updated as necessary in conjunction with changes that occur in facility operating and maintenance methods or requirements. Each revision will be provided to the Department of Natural Resources (DNR) dam safety permitting personnel for informational purposes such that they remain fully informed as plan updates are incorporated. Any plan updates that may affect permit conditions will be discussed with dam safety permitting personnel. A Revision History is included at the end of the document.

This CAP is intended to be a stand-alone guide to initial response to emergency conditions that could potentially develop at the FTB. As with any emergency condition, ongoing real-time decision-making will be required once the situation is assessed. Poly Met Mining, Inc. (PolyMet) will establish and maintain a project-wide emergency action plan (EAP) that should be referenced in the event of other potential conditions such as severe weather (i.e., tornado) or fire that are not a part of this plan and which do not constitute a significant or ongoing threat to the FTB.

1.2 Notification Flowchart

The Notification Flowchart (Large Figure 1) summarizes the sequence of actions required during a situation involving threat of dam failure. Contact lists are provided in Section 3.0. Notification procedures for other hazardous situations are described in Section 0.

1.3 Site Description

The FTB is a tailings basin located on the PolyMet Plant Site. The Plant Site is located south of the Embarrass River in St. Louis County. The area between the FTB and the Embarrass River is sparsely populated forest.

Personnel responsible for FTB management are:

- *Operations Contact* - Beneficiation Division Manager or designee – Responsible for overall FTB design, planning, operations, maintenance, and monitoring. The plant site will be staffed full-time during operations and alternate contacts shall be designated to support the Beneficiation Division Manager in CAP implementation.

- *Design Engineer* (an independent consultant retained specially for dam safety expertise and a registered engineer) – Responsible for performance monitoring data analysis and interpretation, dam safety inspection and reporting assistance, tailings dam planning and design assistance, and permitting assistance.

1.4 Observational Method

The Observational Method as stated by Peck (1969) in his Rankine Lecture is the method by which the integrity of the Tailings Basin dams will be monitored and basin operations and/or design adjusted as needed in response to observations. The steps in the Observational Method and their status as of the writing of this version of the Contingency Action Plan are summarized in Table 1-1.

Table 1-1 Observational Method

Activity	Summary	Status	Related Reference Documents
1. Geotechnical Exploration	Geotechnical exploration sufficient to establish at least the general nature, pattern and properties of the deposits, but not necessarily in detail.	Complete	Geotechnical Data Package – Volume 1 (Appendix B of the Dam Safety Permit Application-FTB)
2. Initial Design	Establishment of the design based on a working hypothesis of behavior anticipated under the most probable conditions.	Complete	See Geotechnical Data Package – Volume 1 (Appendix B of the Dam Safety Permit Application-FTB)

Activity	Summary	Status	Related Reference Documents
3. Select Instrument Values to Observe	Selection of instrument values to observe as construction and operations proceed and calculation of the anticipated values on the basis of the working hypothesis. Values to observe will be quantified after installation and baseline monitoring of the new instrumentation listed in the Instrumentation and Monitoring Plan.(1)(Attachment D of this management plan)	Partially Complete; framework for values to be observed are reported herein and in the Instrumentation and Monitoring Plan.(Attachment D of this management plan)	Instrumentation and Monitoring Plan (Attachment D of this management plan)
4. Calculate Instrument Values to Observe	Calculation of instrument values to observe under the most unfavorable conditions.	To be quantified after installation and baseline monitoring of the new instrumentation listed in the Instrumentation and Monitoring Plan.1(Attachment D of this management plan)	Instrumentation and Monitoring Plan (Attachment D of this management plan)
5. Pre-Selection of Course of Action in Response to Observed Instrumentation Values	Selection in advance of a course of action or modification of design for every foreseeable significant deviation of the observational findings from those predicted on the basis of the working hypothesis.	Complete – see subsequent sections of this Contingency Action Plan.	NA
6. Measurement of Values to be Monitored and Evaluation of Actual Conditions	Measurement of values to be monitored and evaluation of actual conditions.	To be initiated following baseline monitoring and initiation of operations.	NA
7. Modification of Design to Suit Actual Conditions	Modification of design to suit actual conditions.	To be implemented as needed during operations.	NA

1) Instrument installation to occur after permitting, prior to initiation of operations.

1.5 Supporting Documentation

Geotechnical Data Package – Volume 1 (Appendix B of the Dam Safety Permit Application-FTB) presents the findings from site geotechnical explorations and the associated in-field

and in-laboratory test data, and the seepage and slope stability model outcomes for the most probable geotechnical slope stability conditions and the unfavorable slope conditions evaluated to date.

Design of the FTB as guided by findings presented in the Geotechnical Data Package is presented in this Flotation Tailings Management Plan which provides a full description of the FTB.

The Flotation Tailings Basin Instrumentation and Monitoring Plan (Attachment D of this management plan) presents the plan for instrumentation installation to be completed after permitting but prior to initiation of basin operations. Following instrumentation installation, baseline instrument monitoring data will be gathered and, in conjunction with the additional geotechnical data gathered during instrument installation; seepage and slope stability models will be updated and typical instrument values at each instrument location will be established for normal and high pond conditions. Threshold values will be documented and the initial actions to be taken in response to data trends toward threshold values will be reviewed and updated as needed (Figure 1-1).

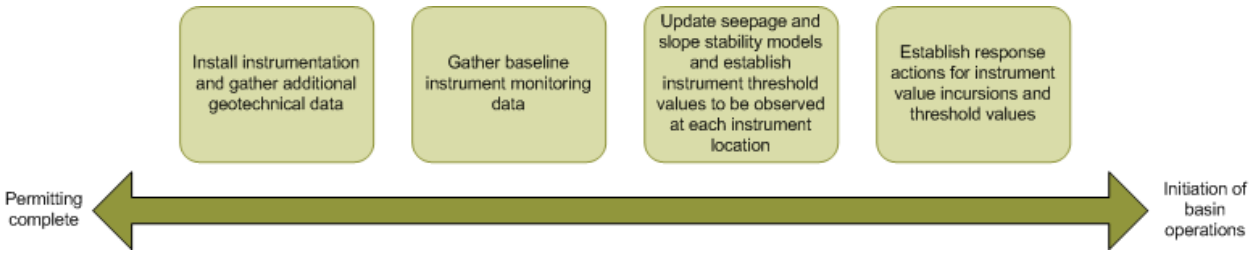

Figure 1-1 Instrumentation Timeline

The details of the instrumentation and monitoring (instrument types, locations, threshold values) will be retained within the Instrumentation and Monitoring Plan, with periodic updates to that plan as needed as instrumentation is installed and/or replaced, and as construction and operations of the FTB proceeds.

1.6 Outline

The outline of this document is:

Section 1.0 Contingency Action Plan Summary.

Section 2.0 Warning signs of unusual, hazardous, or emergency conditions associated with construction and operation of the FTB, and response actions.

Section 3.0 Internal and external emergency notification procedures.

Section 5.0 Emergency Mobilization Procedures.

Section 6.0 Emergency Evacuation Procedures.

2.0 Unusual, Hazardous and/or Emergency Conditions Warning Signs and Response Actions

Unusual, hazardous, and/or emergency conditions warning signs may be visually evident during routine or special tailings basin inspections, and/or may be evidenced by changed monitoring values in piezometers, inclinometers, and/or survey monuments. Some unusual conditions may not warrant an emergency response, but require prompt investigation and resolution. Events which may cause unusual, hazardous, and/or emergency conditions may include (but are not limited to):

- Natural weather events, which could impact pond levels or cause erosion, including:
    - high precipitation event
    - significant snowmelt in combination with high precipitation event
- Operational disruptions, which could cause erosion or impact the phreatic surface within the dam, including:
    - an unrepaired pipe break or
    - prolonged pump stoppage
- Construction changes, which could impact the phreatic surface of the dam or create excess pore water pressures within the dam, including:
    - increase in the rate of construction
    - over steepening of dam slopes

Unusual conditions will typically involve an investigation, intensified monitoring, inspecting and/or testing, and defining and implementing possible corrective measures. Some conditions represent a potential emergency if sustained or allowed to progress. In such cases it will be necessary to discuss and define a response plan, at the site, under the direction of the *Operations Contact*, and then to implement the plan. The first actions in the event of any emergency condition are:

- initiate the appropriate chain of communications
- check that all persons who could possibly be affected are safe
- immediately undertake the appropriate response actions

Sections 3, 4 and 5 describe actions to be initiated if an emergency situation occurs. The following sections list potential visual and monitoring instrument warning signs.

2.1 Visual Warning Signs

Large Table 1 provides a listing of visual warning signs and initial response actions for unusual, hazardous, and/or emergency conditions that could develop at the Tailings Basin. It is important to note that each condition is unique and that seemingly harmless conditions could quickly progress into something more serious if timely and appropriate action is not taken. To detect visual warning signs, daily and weekly inspections, semi-annual inspections, and inspections after unusual events/observations will be carried out as specified in this Flotation Tailings Management Plan.

2.2 Monitoring Instrument Warning Signs

Large Table 2 provides a listing of monitoring instrument warning signs and initial response actions for unusual, hazardous, and/or emergency conditions that could develop at the Tailings Basin. As with visual warning signs, it is important to note that each monitoring instrument warning sign condition is unique and that seemingly harmless conditions could quickly progress into something more serious if timely and appropriate action is not taken. Instrumentation data collection will in many cases be automated, allowing for real-time notification of data that is approaching pre-defined threshold values. Instruments that are not automated (e.g., alignment hubs, some inclinometers and some piezometers) will be read at the specified frequency. Further detail is provided in the Instrumentation and Monitoring Plan (Attachment D of this management plan).

3.0 Contacts

Emergency contacts are summarized in Tables 3-1 through 3-3. These tables will be updated prior to initiation of basin operations and on a routine basis as company personnel and responsibilities change.

Table 3-1 NorthMet Tailings Basin Structural Integrity Emergency Contact List

Emergency Contact	Name	Mobile	Office
Mining Manager (as alternate to General Manager)	Jim Tieberg	218-248-0952	218-471-2165
Operations Contact (Manager of Operations and Development)	Dave Hughes	TBD	218-471-2158
PolyMet Mining Environmental Compliance Manager	Kevin Pylka	218-750-2054	218-471-2162
Environmental Site Director	Christie Kearney	218-461-7746	218-471-2163
Director of Environmental Permitting and Compliance	Jennifer Saran	651-600-5457	651-389-4108
Design Engineer	Tom Radue	952-240-4051	952-832-2600
Emergency Health and Safety			
Fire/Ambulance/Police – Dependent on Incident Severity	N/A	911	911
Hospital – Grand Itasca Clinic and Hospital	General Number	N/A	218-326-3401
Government Agencies			
Minnesota Duty Officer			800-422-0798
National Response Center			800-424-8802
US EPA Region V			312-353-2318
Minnesota Pollution Control Agency (24 hrs)			612-296-8100 or 612-296-6300
Minnesota Emergency Response Commission			612-643-3000

Table 3-2 City of Hoyt Lakes Emergency Contact List

Title	Name	Phone	Email
Police Chief	Tim Soular	218-225-2000	police@eastrangepd.com
Sergeant	Heather Krueger	218-225-2000	police@eastrangepd.com
911 Emergency Communications	Emergency Non-Emergency	911 218-742-9825	N/A
Residents and/or businesses in affected inundation area will be added to this list			

Table 3-3 St Louis County Emergency Contact List

Title	**Name**	**Phone**	**Email**
Sheriff	Ross Litman	218-726-2340	County_Sheriff@stlouiscountymn.gov
Undersheriff	Dave Philips	218-726-2340	County_Sheriff@stlouiscountymn.gov
911 Emergency Communications	Emergency Non-Emergency	911 218-727-8770	County_Sheriff@stlouiscountymn.gov
Mine Inspector	Steve Manninen	218-742-9840	manninen@stlouiscountymn.gov

PolyMet will work with local emergency agency personnel to establish and confirm the list of residences who may need to be contacted in case of some emergencies at the FTB, the means to be used for contact, and the assignment of responsibility for maintenance of the contact list.

4.0 Notification Procedures

The top priority in case of imminent or actual dam failure is to warn and evacuate people in downstream areas. Large Figure 1 presents the notification procedures for an emergency involving threat of dam failure. Attachment A describes responsible persons and their responsibilities for notification, emergency operations and repairs, and post-emergency action. Section 6.0 describes emergency evacuation procedures.

Emergency notification procedures vary depending on the condition/s existent that prompt the notification and can be divided into three levels:

Level 1 – Condition that does not warrant emergency response but requires prompt investigation and resolution.

Level 2 – Potential emergency if condition is sustained or allowed to progress; requires response plan.

Level 3 – Imminent or actual failure requiring partial or complete evacuation, emergency communications and response actions.

Level 1, Level 2, and Level 3 conditions that could occur at the Tailings Basin are listed in Large Table 1 and Large Table 2.

4.1 Internal Notification Procedures

The notification procedures for Level 1 and Level 2 conditions are:

- the person first noticing a Level 1 or Level 2 condition will notify the *Operations Contact* and initiate responses and intensified monitoring
- the *Operations Contact* will notify the *Design Engineer* as appropriate

The notification procedure for Level 3 conditions are:

- the person first noticing a Level 3 condition will notify the General Manager, the *Operations Contact* and initiate responses immediately, and
- The *Operations Contact* will notify the *Design Engineer*.

4.2 External Notification Procedures

No external notification is required for Level 1 or 2 conditions. The notification procedure for a Level 3 condition is as follows:

- If the condition presents the threat of dam failure, the notification procedures shown in Large Figure 1 and the evacuation procedures presented in Section 6.0 will be implemented

- Once Level 3 actions are implemented, but in no case longer than 4 hours after the occurrence, the *Operations Contact* will notify the responsible regulatory personnel at the DNR and/or Minnesota Pollution Control Agency (as appropriate to permit coverage and compliance requirements)

- Notification will occur first via telephone, with follow-up E-mail or other written correspondence to document initial and any follow-up telephone conversations

In the event of an emergency situation resulting from actual or potentially imminent dam failure, the *Operations Contact* will also initiate evacuation procedures as described in Section 6.0.

Copies of this FTB Contingency Action Plan and the plant-wide Emergency Action Plan shall be kept in the office of the *Operations Contact*.

5.0 Emergency Mobilization Procedures

All those involved in response, after first having communicated with the appropriate parties, should consider two types of actions as first steps in the response, with respect to the protection of human life and health, environment and property:

- What can be done to prevent the situation from worsening?
- What can be done to reduce the consequences of the impending or actual failure?

Any such action must be presented to the *Operations Contact* who will decide on its implementation in consultation with the *Design Engineer*. Most obvious mobilization requirements associated with Level 2 and Level 3 conditions are detailed in Table 5-1.

Table 5-1 FTB Mobilization Plan for Level 2 or 3 Situations

Component Failure	Level 2 Condition	Level 3 Condition
Failure of a dam (during construction and/or routine operations).	Planning for mobilization of earthmoving equipment, pumps and pipelines, as well as lowering of the pond level may be necessary, after all communications are carried out.	Immediate mobilization of earthmoving equipment, pumps, pipelines, power generator(s) available at site locations, and lights, will most likely be necessary. Immediate lowering of the pond level will typically be necessary.
Failure of a pump station.	After the repair work is initiated, plan for mobilization of pumping equipment if the timing for repairs would affect the pumping needs.	Immediate mobilization of pumping equipment and, if required, the availability of a power generator may be necessary.
Failure of a pipeline.	Initiate pipe or pipe section replacement.	Initiate chain of communications after initiating pipe or pipe section replacement.
Localized power failure.	Identify systems affected. Prepare for cessation of tailings deposition if power outage exceeds 24 hours.	Identify systems affected. Cease tailings deposition if power outage exceeds 24 hours.
Regional power failure.	No action required. FTB operations cease in absence of power.	No action required. FTB operations cease in absence of power.

In conjunction with Level 2 and Level 3 Conditions it will be the responsibility of the *Operations Contact* to compile a list of the specific equipment needs, size/type, source (company, name, contact information), and availability to respond to component failure. The list shall be populated prior to the initiation of basin operations and be reviewed and updated on an annual basis thereafter. This is so that a timely response can be made in the event that emergency mobilization is required. For emergency response equipment that does not have local 24-hour 7-day-per-week availability, provisions shall be made for permanent on-site stationing of the equipment. Primary emergency response equipment will typically consist of

on-site earthwork equipment, mobile pumping systems and supplementary piping and power supply, and mobile/emergency lighting carts with power supply.

6.0 Emergency Evacuation Procedures

During operations, personnel will be on-site 24 hours a day, 7 days per week. Personnel will therefore be able to review conditions and monitor for changing conditions. Additionally, monitoring instrumentation is planned to be automated by a remote monitoring system, which includes thresholds and automated alarms data trends toward or falls outside of pre-established thresholds.

In the event of a failure of the FTB dam, residences located between the FTB and the Partridge River could be flooded. The Dam Break Analysis (Attachment H of this Management Plan) presents an inundation map and describes approximate floodwave travel times. The Dam Break Analysis indicates that there would be adequate time to provide emergency warning. There is some chance that a problem may not be identified, recognized, or responded to in a timely manner. Therefore, any early warning signs will be treated with the highest level of priority. If evacuation notices are given, it will be understood that the notice is at minimum due to a prudent level of caution and those potentially affected will be instructed to evacuate without delay.

A list of residences and businesses having the potential to be impacted by a dam break will be assembles and attached to this CAP prior to the start of FTB operations. As noted previously, PolyMet will work with local emergency agency personnel to establish and confirm the list of residences who may need to be contacted, and the means to be used for contact.

Revision History

Date	Version	Description
10/31/2011	1	Initial release
12/07/2012	2	Dam Break Analysis results incorporated by reference. FTB Dam Failure Notification Flowchart placeholder added. Outline expanded for development during DNR Dam Safety permitting.
04/12/2013	3	Revisions made to address DNR comments that not all situations are Emergencies. Hence, renamed document Contingency Action Plan and expanded on contingency actions to be implemented in response to various potential on-site conditions.
07/11/2016	4	Revisions made to submit for permitting and to include Notification Flowchart (Large Figure 1).
05/15/2017	5	Revisions made to add detail to Observational Method and Construction Phase warning signs and response actions.

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Large Table 1 Visual Warning Signs

Visual Warning Sign and Typical Location	Corresponding Change in Instrumentation Values (depending on location of movement relative to instrumentation)	Potential/Actual Consequences and Notification Procedures	Required Action
Signs of slowly forming erosion at toe and/or exterior face of slope.	No change in instrumentation values expected.	Potential dam instability and/or eventual dam failure if erosion continues. **Level 1 and Level 2 (see Table Notes)**	1) Discuss findings with the Design Engineer. 2) Be prepared to carry out one or more responses such as: a. Resolve source of erosion. b. Repair erosion area. c. Re-establish vegetation (modify design if recommended by Design Engineer). d. Re-inspect area on weekly basis until area is fully restored.
Soft toe condition or increased seepage at downstream slope or dam toe.	Potential increase in piezometric levels.	Internal erosion or slope slumping and eventual dam failure. **Level 1 and Level 2**	1) Discuss the findings with the Design Engineer. 2) Commission a field investigation program if so recommended. 3) Be prepared to carry out one or more responses including: a. Modification of basin pond operating procedures. b. Placement of graded overburden/buttress. c. Installation of drain system. d. Other design modifications if recommended by Design Engineer.
Cracks developing at dam crest or in slope.	Potential increase in piezometric levels. Potential slope deformation at inclinometers. Potential deflection in alignment monuments.	Deformation of dam structure that may lead to eventual dam failure. **Level 2; potential Level 3**	1) Increase frequency of dam walk-overs to daily until the problem is understood and addressed. 2) Seek advice from the Design Engineer. 3) Monitor crack development for increase in size, spacing, etc. 4) Commission a field investigation if so recommended. 5) Be prepared to carry out one or more responses including: a. Modification of pond and/or basin operating procedures. b. Placement of graded overburden/buttress. c. Temporary cessation of operations. d. Reduction in pond elevation (planned or emergency).
High turbidity in dam seepage flow.	Potential increase in piezometric levels.	Internal erosion and eventual dam failure. **Level 2; potential Level 3**	1) Increase frequency of dam walk-overs to daily until the problem is understood and addressed. 2) Seek advice from the Design Engineer. 3) Take water samples for suspended solids determination if recommended by Design Engineer. 4) Commission a field investigation if so recommended. 5) Be prepared to carry out one or more responses including: a. Modification of pond operating procedures. b. Placement of graded overburden/buttress. c. Installation of drain system. d. Reduction in pond elevation (pumping and/or cessation of tailing discharge).
Pond level close to or approaching overflow level; loss of freeboard.	Potential increase in piezometric levels.	Pond water discharge to environment via emergency overflow. **Level 1**	1) Confirm functionality of emergency overflow channel. 2) Immediately undertake actions to reduce the pond level (increased pumping to WWTP as necessary). 3) Temporarily discontinue seepage recovery. 4) Temporarily terminate tailings discharge to pond. 5) Consult with Design Engineer to identify other actions as needed.

Visual Warning Sign and Typical Location	Corresponding Change in Instrumentation Values (depending on location of movement relative to instrumentation)	Potential/Actual Consequences and Notification Procedures	Required Action
Any other change in seepage conditions.	Potential increase in piezometric levels.	Dam stability safety margin affected. **Level 2; potential Level 3**	1) Seek advice from the Design Engineer. 2) Initiate other responses as may be required (temporarily discontinue seepage recovery). 3) Reduction in pond elevation (pumping and/or cessation of tailing discharge).
Slumping, sliding or bulging of a dam slope or adjacent ground.	Potential increase in piezometric levels. Potential slope deformation at inclinometers. Potential deflection in alignment monuments.	Catastrophic dam breach resulting in release of water or water and liquefied tailings. **Level 2; potential Level 3**	As above (blue shaded box) and: 1) Construct stabilizing berm per direction of the Design Engineer. 2) Initiate geotechnical evaluation per direction of the Design Engineer.
Boils observed downstream of dam.	Potential increase in piezometric levels.	An internal erosion failure possible, with potential breach of the dam. **Level 2; potential Level 3**	As above (blue shaded box) and: 1) Place granular filter buttress over the boils, if approved by the Design Engineer. 2) Initiate geotechnical evaluation per direction of the Design Engineer.
Water vortex within the pool and/or sinkhole on the tailings beach.	No change in instrumentation values expected.	An internal erosion failure in progress, with potential breach of the dam. **Level 2; potential Level 3**	As above (blue shaded box) and: 1) Check downstream of the dam area for increased and/or turbid seepage discharge. 2) Place granular filter buttress against any such areas, if approved by the Design Engineer. 3) Initiate geotechnical evaluation per direction of the design engineer.
Severe flood/intense rainstorm or rapid snowmelt resulting in extreme pond level.	Potential increase in piezometric levels.	Overtopping of dam and resulting erosion and over-steepening of the downstream slope, leading to dam failure. **Level 3**	1) Initiate chain of communications and ensure safety of people. 2) Confirm functionality of emergency overflow channel. 3) Stop discharge into the pond. 4) Lower pond by any practical means approved by the Design Engineer.

Notes for Notification Procedures:

Level 1 – Condition that does not warrant emergency response but requires prompt investigation and resolution.

Level 2 – Potential emergency if condition is sustained or allowed to progress; requires response plan.

Level 3 – Imminent or actual failure requiring partial or complete evacuation, emergency communications and response actions.

Large Table 2 Instrumentation Warning Signs

Instrument Type and Typical Location	Instrumentation Warning Sign	Corresponding Visual Changes (dependent on magnitude of movement)	Potential/Actual Consequences and Notification Procedures	Required Action
Piezometer (single or nested) – Located on Perimeter Dams/Slopes and on Cell Splitter Dams/Slope (ref. Instrumentation and Monitoring Plan for Piezometer Names and Locations)	Gradual or Sudden Increase in Water Level in One or More Piezometers, Above Threshold Action Levels (ref. Instrumentation and Monitoring Plan for Piezometer Reading Values – Predicted and Threshold)	1) Soft toe condition or increased seepage at downstream slope or dam toe. 2) Elevated pond level in basin. 3) Increased turbidity in seepage flows. 4) Boils observed downstream of dam.	1) Excessive seepage through dam and potential for dam breach. 2) An internal erosion failure possible, with potential breach of the dam. 3) Catastrophic dam breach resulting in release of water or water and liquefied tailings. **Level 1, 2 or 3 (situation dependent)**	1) Check the reading again; confirm instrumentation functionality. 2) Intensify reading frequency to daily. 3) Seek advice from the Design Engineer. 4) Commission a field investigation if so recommended. 5) Be prepared to carry out one or more responses including: a. Check downstream of the dam area for increased and/or turbid seepage discharge. b. Place granular filter buttress against any such areas, if approved by the Design Engineer. c. Initiate geotechnical evaluation per direction of the design engineer. d. Modify pond and/or basin operating procedures. e. Temporary cease operations/stop discharge into the pond. f. Lower pond by any practical means approved by the Design Engineer.
Inclinometer – Located on Perimeter Dams/Slopes and on Cell Splitter Dams/Slopes (ref. Instrumentation and Monitoring Plan for Inclinometer Names and Locations)	Gradual or Sudden Movement in Horizontal Direction in One or More Inclinometers (ref. Instrumentation and Monitoring Plan for Inclinometer Reading Values – Predicted and Threshold)	1) Cracks developing at dam crest or in slope. 2) Slumping, sliding or bulging of a dam slope or adjacent ground.	1) Deformation of dam structure that may lead to eventual dam failure. 2) Catastrophic dam breach resulting in release of water or water and liquefied tailings. **Level 1, 2 or 3 (situation dependent)**	As above (blue shaded box).
Survey Monument – Located on Crest of Perimeter Dams and on Crest of Cell Splitter Dams	Gradual or Sudden Movement in Horizontal and/or Vertical Direction in One or More Survey Monuments	1) Cracks developing at dam crest or in slope. 2) Slumping, sliding or bulging of a dam slope or adjacent ground.	1) Deformation of dam structure that may lead to eventual dam failure. 2) Catastrophic dam breach resulting in release of water or water and liquefied tailings. **Level 1, 2 or 3 (situation dependent)**	As above (blue shaded box).

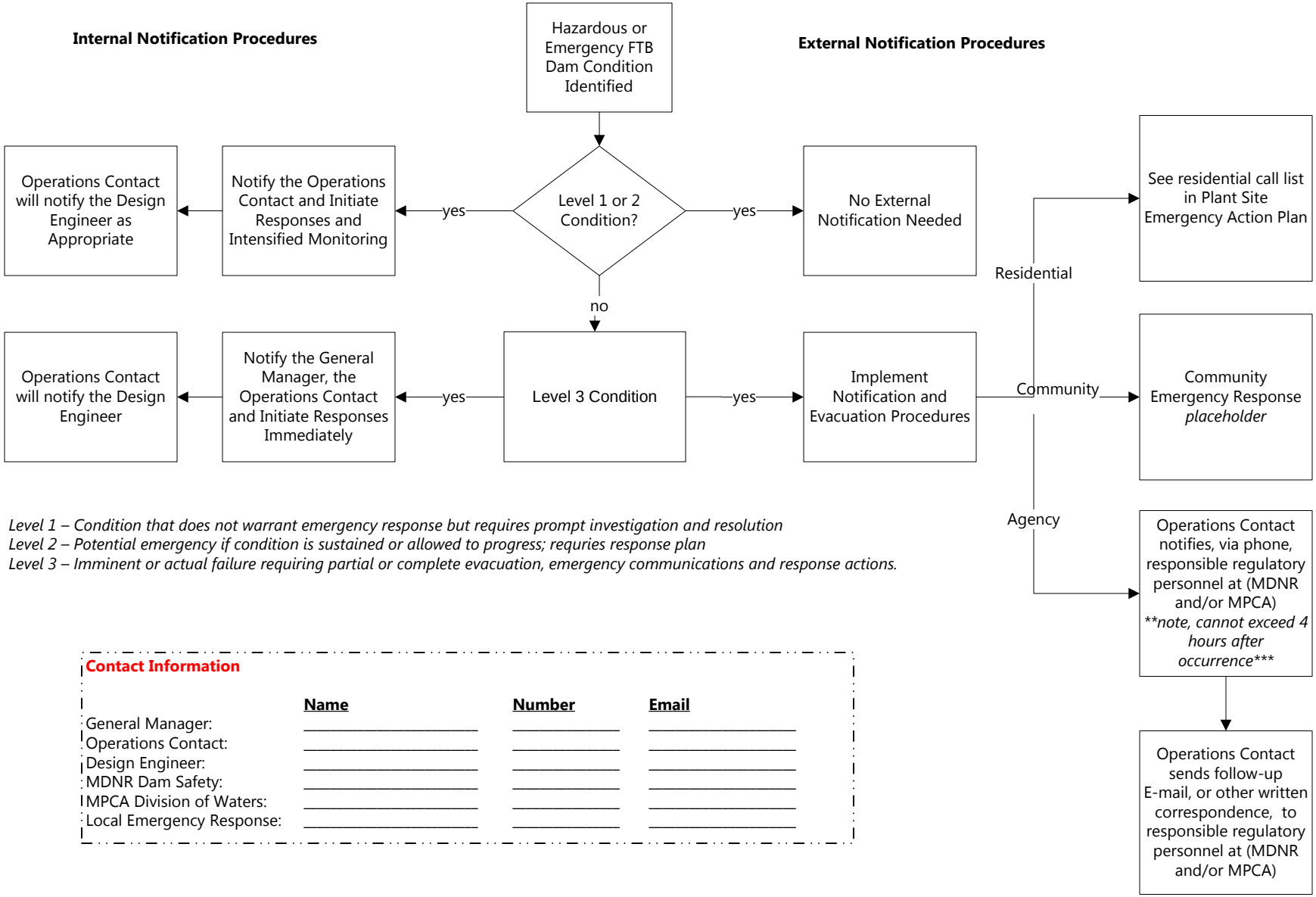
Notes for Notification Procedures:

Level 1 – Condition that does not warrant emergency response but requires prompt investigation and resolution.

Level 2 – Potential emergency if condition is sustained or allowed to progress; requires response plan.

Level 3 – Imminent or actual failure requiring partial or complete evacuation, emergency communications and response actions.

Large Figures



Large Figure 1 Notification Procedures for an Emergency Involving Threat of FTB Dam Failure