

Emergency Response Protocol for Turtle Mountain

2017



Government of Alberta ■
Alberta Emergency Management Agency

Turtle Mountain Response Plan

Acknowledgements

The Emergency Response Protocol for Turtle Mountain has been drafted by the Alberta Emergency Management Agency (AEMA) as per the 2015 Alberta Emergency Plan (AEP) with the support of the Alberta Energy Regulator (AER)/ Alberta Geological Survey (AGS) and the Municipality of Crowsnest Pass.

If you have questions about this document, please contact:

Plans Manager

Alberta Emergency Management Agency
14515 122 Ave NW
Edmonton, Alberta T5L 2W4

Phone: 780-422-9000

Website: <http://www.aema.alberta.ca>

Copyright © 2017 the Crown in the Right of Alberta, as represented by the Minister of Municipal Affairs, Alberta Emergency Management Agency, Edmonton, Alberta, Canada.

All Rights reserved. Commercial use strictly prohibited. Modification or reproduction prohibited unless authorized in writing by the copyright owner.

Turtle Mountain Response Plan

Table of Contents

Acknowledgements.....	2
Record of Amendments	3
Table of Contents.....	4
Background.....	5
1.1 General.....	5
1.2 Key References	5
1.3 Acronyms.....	5
1.4 Key Terms	6
Concept of Operations	7
2.1 Objective.....	7
2.2 General Concept.....	7
2.2 Lead / Supporting / Coordinating Organizations.....	8
Support.....	9
3.1 General.....	9
3.2 Transport	9
Control, Coordination, and Communications	10
4.1 Control.....	10
4.2 Coordination	10
4.3 Communications	10
4.4 Messaging	10
Annex A – Turtle Mountain Slide Emergency Protocol Decision Tree	11
Annex B – Ground-Based Interferometry Image.....	12

Turtle Mountain Response Plan

Background

1.1 General

In 1903 a catastrophic rock slide at the North Peak of Turtle Mountain buried parts of the town of Frank, killing between 70 and 90 people. Since that time extensive geological studies have been conducted to determine the likelihood of another slide, and have reached the conclusion that the potential exists for another devastating slide from the North, South, or Third Peak of Turtle Mountain.

While such a slide cannot be prevented, its potential damage may be mitigated. To that end, the Government of Alberta (GOA) commissioned a project in 2003 to monitor the mountain's stability in real time in order to provide early warning before a potential slide. This project consisted of installing a network of sensors which measure deformation of the rock face in near-real time, and transmit the data to geoscience experts in the Alberta Energy Regulator (AER) / Alberta Geological Survey (AGS) for evaluation and if necessary, informing AEMA of potential hazard.. Sensor emplacement was completed in 2005, and since 2014 the North, South, and Third Peak has been continuously monitored.

In 2013, AER/AGS commissioned a panel of distinguished geologists to assess the status of monitoring at Turtle Mountain, and recommend possible changes to the Turtle Mountain Monitoring Program (TMMP) if required. Given the current status of Turtle Mountain's hazard potential, the panel recommended that AER/AGS discontinue the early warning systems and the 24/7 continual on-call status for monitoring, in favour of a near-real-time remote monitoring system. This real-time monitoring system was installed and tested in 2015-16 and is the current functioning system.

1.2 Key References

Geotechnical Hazard Assessment of the South Flank of Frank Slide Hillcrest Alberta. BGC Engineering Inc. (February 2000).

A Framework for Monitoring the South Peak of Turtle Mountain – Final Report. RSRead Consulting Inc. (March 2002).

Turtle Mountain Monitoring Project Summary Report. RSRead Consulting Inc. (December 2004).

Turtle Mountain Monitoring Project Warning System Development Report. AMEC Earth and Environmental (March 2005).

Expert Panel Review of Turtle Mountain Monitoring Program. Lara Harald Blikra, Giovanni Crosta, Jacques Locat (October 2014).

1.3 Acronyms

Acronym	Full Spelling
AEMA	Alberta Emergency Management Agency
AEA	Alberta Emergency Alert
AER	Alberta Energy Regulator
AGS	Alberta Geological Survey
COPR	Common Operating Picture Report
BPT	Be Prepared To

Turtle Mountain Response Plan

DEM	Director of Emergency Management
ECC	Emergency Coordination Centre
GOA	Government of Alberta
MoTI	(British Columbia) Ministry of Transportation and Infrastructure
POC	Provincial Operations Centre
TMMP	Turtle Mountain Monitoring Program

1.4 Key Terms

Condition GREEN (Normal Operations) – In the context of Turtle Mountain, Condition GREEN is the normal condition of the mountain where sensors either detect no deformation of the rock face, or provides a warning that is likely caused by instrument error, climatic conditions, or vandalism. No further action is required.

Condition YELLOW (Watch) – In the context of Turtle Mountain, Condition YELLOW is the condition where a trend of deformation of the rock face is detected by the sensor network. To meet the criteria of Condition YELLOW, these must be a uniform trend of movement over a large portion of the mountain face, signifying a change in the stability of the rock face. In the event of Condition YELLOW, AER/AGS will increase the frequency of data review from the monitoring network, prepare for potential on-site reconnaissance and warn the Municipality of Crowsnest Pass and AEMA of the change.

Condition ORANGE (Warning) – In the context of Turtle Mountain, Condition ORANGE is declared when deformations of the rock face are accelerating and a slide is imminent. In the event of Condition ORANGE, AGS/AER will conduct a detailed remote assessment at the ECC, warn the Municipality of Crowsnest Pass and AEMA, and provide geotechnical expertise and/or context with respect to evacuations of the predicted runout zone.

Condition RED (Failure) – In the context of Turtle Mountain, Condition RED is declared when sensor data and visual reconnaissance shows accelerating deformation of the rock face and where there is visual verification that a catastrophic failure is underway. In the event of Condition RED, AER/AGS will warn the Municipality of Crowsnest Pass and AEMA. In addition, evacuation of the potential runout zone will be ordered, highway and rail traffic in the danger zone will be restricted, and emergency response personnel and materials will be pre-positioned to deal with the collapse.

Runout Zone – Runout zone is defined as the area in which an avalanche decelerates, slide materials are deposited, and the avalanche stops.

Turtle Mountain Response Plan

Concept of Operations

2.1 Objective

The objective of this plan is to describe the procedures by which a potential catastrophic landslide at Turtle Mountain will be identified, communicated to the residents of the Municipality of Crowsnest Pass and the GOA, and mitigation measures be implemented.

2.2 General Concept

Since there is no way to **prevent** a catastrophic slide, the GOA's efforts in this area are focused on **preparation and mitigation**. Preparation is centred on obtaining early notification of a slide, while mitigation is centred on damage reduction in the predicted runout zone.

AER/AGS received real-time deformation measurements on a 24/7 basis from the completion of the TMMP in 2005 until 2016, when AER/AGS transitioned to a near-real-time remote monitoring system. These measurements continue to enable AER/AGS to evaluate the likelihood of a catastrophic collapse of the mountain, and warn the Municipality of Crowsnest Pass and affected GOA departments.

Once AER/AGS detects significant deformation of the rock face, an alert is passed to the Director of Emergency Management (DEM) of the Municipality of Crowsnest Pass, AEMA, Alberta Transportation, and the warning level is raised to Condition YELLOW. At this time AEMA will ensure that the Field Officer with responsibility for Crowsnest Pass is warned of the potential of a catastrophic collapse. Additionally, AEMA will ensure Alberta Transportation, the Canadian Pacific Railway, and the Government Operations Centre (to facilitate federal and CP Railway coordination and communication) are aware of the potential for catastrophic collapse, and that lines of communication are open between the DEM of Crowsnest Pass and the AEMA. At this time AEMA may elevate the operational level of the Provincial Operations Centre (POC). AEMA will also notify Culture and Tourism Staff at the Frank Slide Interpretive Centre and the Leitch Collieries Provincial Historic Site in addition to all relevant departmental Business Continuity and Consequence Management Officers.

As the situation develops, the deformation may subside, remain elevated, or worsen. If the deformation subsides, AER/AGS may recommend a return to Condition GREEN and regular monitoring will recommence. If the deformation remains elevated but does not pose an imminent threat, AER/AGS will make a recommendation as to whether the new deformation conditions become Condition GREEN and recommence regular monitoring. If the deformation worsens, AER/AGS may recommend elevation to Condition ORANGE.

Upon the adoption of Condition ORANGE, the Municipality of Crowsnest Pass will activate their municipal ECC, and issue a voluntary evacuation notice for the potential runout zone. Alberta Transportation may restrict road traffic on Highway 3 and CP Railway may reduce or re-direct rail traffic on the impacted rail line. Alberta Transportation will also notify the British Columbia Ministry of Transportation and Infrastructure (MoTI) in order to synchronize highway restrictions on both sides of the provincial border. AEMA will elevate the readiness status of the POC (if not already done), and ensure that all potentially affected GOA departments are aware of the situation. Depending upon the analysis of AER/AGS, AEMA may pre-position a Field Officer in the Crowsnest Pass Municipal ECC. It is likely that the Crowsnest Pass ECC will be operating on a 24 / 7 basis at this condition.

If the conditions continue to worsen, AER/AGS may recommend adoption of Condition RED (a slide is imminent and where there is visual verification that a catastrophic failure is underway).

Turtle Mountain Response Plan

Under Condition RED the Municipality of Crowsnest Pass will fully activate their municipal ECC for 24 / 7 operations, issue mandatory evacuation orders for the potential runoff zone. Alberta Transportation will close Highway 3 in conjunction with BC MoTI. CP Railway may stop all rail traffic on the impacted railway. AEMA will elevate the operational level of the POC in order to coordinate emergency aid and manage information flow for the GOA, pre-position a Field Officer in the Crowsnest Pass ECC (if not already done), and will coordinate pre-positioning of emergency aid and personnel at the request of the Municipality of Crowsnest Pass.

Once all measures of Condition RED have been adopted, all GOA departments will stand by to render assistance to the municipality of Crowsnest Pass as required to include recovery operations.

A graphical decision tree outlining this plan is attached as Annex A.

2.2 Lead / Supporting / Coordinating Organizations

While the Municipality of Crowsnest Pass, as the local authority, retains tactical control of a catastrophic slide of Turtle Mountain, the GOA will provide support assistance through the following:

- a. Lead Organization – Alberta Geological Survey
- b. Coordinating Organization – Alberta Emergency Management Agency
- c. Supporting Organizations: Community and Social Services, Culture and Tourism, Alberta Environment and Parks, Alberta Health, Justice and Solicitor General, Alberta Transportation

Turtle Mountain Response Plan

Support

3.1 General

In the event of a catastrophic collapse of the Turtle Mountain, the GOA will provide support to the Municipality of Crowsnest Pass when requested or required. In that access routes to the Municipality of Crowsnest Pass are limited, pre-positioning of emergency aid and personnel may be required once Condition ORANGE is declared.

3.2 Transport

Both Highway 3 and the Canadian Pacific Railway fall within the 'worst-case' prediction of the runout zone. In the event of a catastrophic collapse of the Mountain, both routes will be assumed de facto closed until such time that experts can certify their safety.

Turtle Mountain Response Plan

Control, Coordination, and Communications

4.1 Control

Control at the incident level in the event of a catastrophic slide at Turtle Mountain will be retained by the on-site Incident Commander.

The DEM of the Municipality of Crowsnest Pass, or that individual's delegate will continue to exercise their roles and responsibilities.

4.2 Coordination

Coordination at all except the local level will be conducted by AEMA through the coordinating mechanism of the POC.

4.3 Communications

Communications throughout the response to a catastrophic slide at Turtle Mountain will be as follows (in the order of preference):

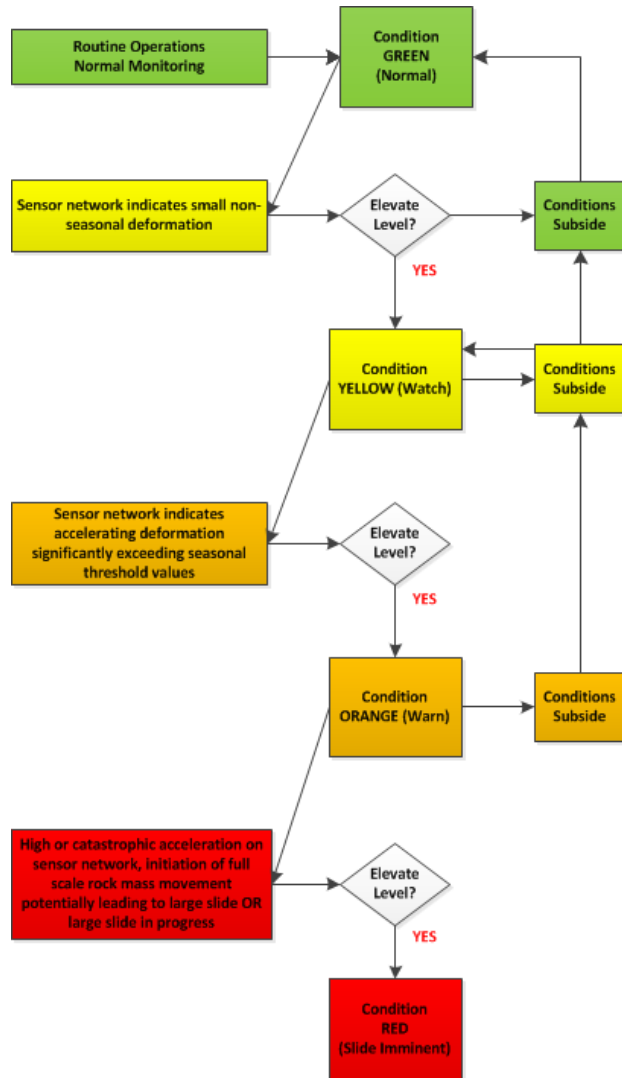
- a. Land lines;
- b. Cell phones;
- c. E-mail;
- d. Satellite phone; and
- e. Amateur radio.

4.4 Messaging

In that a catastrophic slide at Turtle Mountain will generate substantial media interest, even if there is little damage, all internal (GOA) and external (public) messaging will be coordinated by the GOA Public Affairs Bureau.

Turtle Mountain Response Plan

Annex A – Turtle Mountain Slide Emergency Protocol Decision Tree



AER/AGS	AEMA	Crowsnest Pass	Other Organizations (Through POC)
Normal monitoring	Normal monitoring	Normal monitoring	N/A
Field check sensors as required			
AER/AGS	AEMA	Crowsnest Pass	Other Organizations (Through POC)
Increase frequency of monitoring	Warn Field Officer	Confirm comms with AEMA	Monitor situation
Warn AEMA, AB Transportation Coordination Information Centre, DEM of Crowsnest Pass	Confirm comms with DEM of Crowsnest Pass	to stand up ECC	
Contact AB Transportation Lethbridge District/Southern Region	Issue POC Alert		
AER/AGS	AEMA	Crowsnest Pass	Other Organizations (Through POC)
Increase frequency of monitoring	Elevate POC as required	Activate municipal ECC	Pre-position Emergency Social Services
Update AEMA, AB Transportation, DEM of Crowsnest Pass	Confirm comms with Crowsnest Pass DEM, AB Transportation	Issue voluntary evacuation notice for runout zone	Pre-position heavy equipment
Send geotechnical experts to Crowsnest Pass ECC	Issue POC Alert Updates, COPR	Issue AEA Alert	Pre-position emergency personnel
			Close Highway 3 and railway if required
AER/AGS	AEMA	Crowsnest Pass	Other Organizations (Through POC)
Continue monitoring	Elevate POC as required	Maintain municipal ECC at 24/7	Pre-position Emergency Social Services
Warn AEMA, AB Transportation, DEM of Crowsnest Pass	Issue POC Alert Updates, COPR	Issue mandatory evacuation notice for runout zone	Pre-position heavy equipment
Send geotechnical experts to Crowsnest Pass ECC	Coordinate GOA response	Issue AEA Alert	Pre-position emergency personnel
			Close Highway 3 and railway

Protocol Decision Tree Table Legend:

X Axis – Responsible Organization
 Y Axis – Corresponding colour and assigned decision / task

Turtle Mountain Response Plan

Annex B – Ground-Based Interferometry Image



Source: AER/AGS - Ground-Based Interferometry (GBInSAR) used at Turtle Mountain