Guideline for Emergency Preparedness

STAY LIVE
Electrical Industry Health & Safety Group

StayLive Electrical Industry Health and Safety Group

Controlled Document

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Contents

1 Introduction

The purpose of this guide is to assist generators and Transpower with their preparations to deal with significant major events which may threaten the continuity of power supply and compromise the safety of the public.

The Civil Defence Emergency Management Act 2002 (CDEM Act 2002) requires all lifeline utilities such as electricity suppliers, telecommunication network providers, and water authorities, to work through a process to determine their emergency preparedness status.

This guide was prepared by the StayLive Emergency Preparedness Working Group in consultation with personnel from the Waikato Civil Defence Office and the Waikato Lifeline Utilities Group.

The distribution sector of the industry (ie, line companies) is not covered in this guide but their role in managing customer load control and communication during a major event is acknowledged along with their interaction with the Transpower – System Operator function when grid emergencies are called.

2 Scope

The information in this guideline is generic and applies to all generation and transmission assets.

This document follows the principles and processes described as the “Four Rs” of emergency preparedness as defined in the CDEM Act 2002. Risks should be identified and then managed in line with the Four Rs.

The following sections outline the activities which should be carried out by generators and Transpower to meet the requirements of the CDEM Act 2002 and thereby improve the overall emergency preparedness of this sector of the Electricity Supply Industry.

3 The 4Rs

The New Zealand integrated approach to hazard management consists of four areas of activity: reduction, readiness, response and recovery.

Reduction means identifying and analysing long-term risks to human life and property from hazards; taking steps to eliminate these risks if practicable, and, if not, reducing the magnitude of their impact and the likelihood of their occurring.

Readiness means developing operational systems and capabilities before a major loss event or emergency happens; including self-help and response programmes for the general public, and specific programmes for emergency services, lifeline utilities and other agencies.

Response means taking actions immediately before, during or directly after a major loss event to save lives and protect property, and to help communities recover.

Recovery means co-ordinating efforts and processes to bring about the immediate, medium-term and long-term holistic regeneration of a community following a major loss event.

Each of the four activities is described later in this document (sections 5 to 8).

4 Risk Identification and Analysis

4.1 Identification of Vulnerabilities

The hazards that are most likely to impact the generation and transmission sectors have been identified as:

- major earthquake
- major weather event, which may include any of the following:
  - extreme winds
  - heavy sustained rain
  - heavy or sustained snow fall or driving snow
- volcanic eruption mainly in the North Island
- any other incident that causes major disruption to the power grid and may result in a regional or island wide blackout.

Events may include any one or a combination of the above events.

Each organization must produce their own specific response plans that are developed taking into account the type of plant on their sites, their geographic location and site-specific hazard(s).

Bowtie analysis is one method of systematically preparing and reviewing arrangements for event management – section 4.2.

4.2 Bowtie Risk Analysis

Bowtie analysis provides a graphical way of representing risk or threats (see Figure 1):

- The central “Hazardous Event” is the risk or event to be managed.
- “Prevention” includes the things that can be done (ie, barriers that can be put in place) to prevent or mitigate the risk or event.
- “Recovery” includes the processes that are available to manage and recover from the risk or event.

Bowtie workshops are typically attended by a multi-disciplinary group who develop the components and identify barriers to improve the likelihood of recovery.

While not the only technique, Bowtie analysis does provide a methodical process for documenting and managing risks and events.

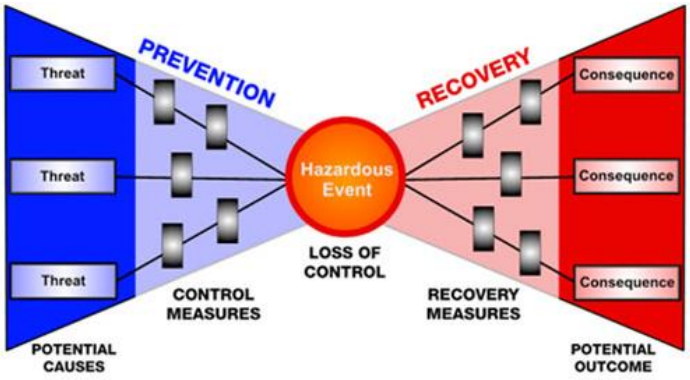

Figure 1 – Example of Bowtie analysis

5 Reduction

Each identified vulnerability requires consideration of the nature of the risk involved followed by evaluation of the economics of risk mitigation.

Analysis of major natural catastrophes is the subject of the Lifeline Utility Groups around New Zealand who provide a forum for so-called lifeline utilities to research the vulnerabilities of utilities such as power, communications, and water.

These collaboration committees have gathered comprehensive data on matters such as the probability of occurrence of major events above and the inter-dependences these utilities have with each other.

Figure 2 – Aim: to reduce risk

Some examples of good industry practice in risk reduction are:

- strengthening plant and buildings for earthquakes, (eg, TPNZ standard)
- seismic strapping or restraint of key equipment and components, including storage facilities
- volcanic ash fallout cleaning kits in buildings and vehicles
- ensuring adequate line corridors for power lines (tree fall distances)
- establishing alternative disaster recovery centres, including back-up control facilities
- robust roads and bridges – strengthening
- access to recovery plant and equipment
- redundancy of cable services – route diversity and third-party providers
- alternative communications (eg, Skype, video comms, radio, sat phones, etc)
- identifying and investing an inventory of strategic spares
- provision of redundancy, segregation and diversity in key safety systems, such as dam spillway systems, control and communication paths, etc
- fire mitigation and control
- event review feedback of good (and bad) learnings.

6 Readiness

Generators and Transpower should prepare contingency plans to deal with the expected and the unexpected. These plans should include but not be limited to the following:

- spillway flood management plans
- dam overtopping and structural failure plans
- plans to respond to volcanic activity leading to ash fallout on catchments and plant
- major electrical plant failure plans (including local service supplies)
- switching contingency plans
- regional and Island wide black out contingencies
- mutual aid arrangements with service providers (eg, common contractors)
- plans in place to deal with most probable scenario(s)
- structures in place, identified executives, incident controllers
- stakeholder relationships (eg, landowners, local council, local authorities, iwi, etc)
- Civil Defence and Lifeline Utility Group liaison links in place
- PMs or routines for critical emergency equipment and facilities (eg, fuel, test runs, stocks of emergency supplies etc) including plant testing
- critical spares inventory management and secure storage
- equipment availability (eg, generator sets, pumps, diggers)
- access to sites and plant – liaison with roading authorities (eg, NZTA, etc)
- alternative comms equipment (eg, Fleetlink radio system, sat phones)
- refuelling arrangements (eg, standby generator, pumps, etc)
- exercises of disaster scenarios and response, familiarisation, training and use of emergency equipment
- access to aviation services to get to sites – particularly remote or key sites
- back-up accommodation, blankets, food, drink
- spare vehicles at remote sites
- grab packs
- staff welfare.

7 Response

Once an event occurs or is developing, act early to get ready and ahead. Situational awareness is key to successful management of any incident. Consider the following:

- incident response structure within the organization with defined roles and reporting structure
- a CIMS approach to managing an emergency response
- safety assessments first, along with damage assessments
- recording actions and decisions taken, sequence of events, etc
- public and stakeholder communications plans
- regular and upfront communication

- staff wellbeing
- mutual aid plans actioned
- safety priorities: public and staff, then environment, and finally plant
- a response team assembled from across the business
- internal communications: keep CEO, senior management, and the board informed
- civil defence: liaison links in place
- stakeholder relationships (eg, landowners, etc)
- event management and response
- detailed event log to record decisions – what, why, when, who – this is vital and may be required later on, possibly in legal proceedings
- records or minutes of conversations with various authorities – reconfirm verbal instructions with written confirmation
- eyes on the ground (or in the air) to confirm situation – where practicable
- learnings: find out what's good and working, what's not working
- safety first: ensure people on the ground think about their own safety (eg, is that building safe to enter?)
- forward planning: take time to think what next – what are the possibilities and probabilities?

Keep going back and checking: people welfare, plant condition, equipment working, environmental conditions. Has the situation improved or worsened?

8 Recovery

Recovery plans have to be formulated in detail after a major event to restore the service to the pre-event level. Does the utility have the capability to provide services to a level similar to before the major event, in the short, medium and long term?

Some examples of items to consider are:

- assessment of insurable losses and following through on insurance claims
- consenting issues for removal, clearing or dumping debris from event
- restoration of service – does plant need to be inspected, retested, recertified in some way before normal service is restored?
- review of replacement asset architecture or functionality with an intention to improve future performance
- sharing of learnings from event with interested parties
- state of plant – establish
- suitable approved dump sites and associated consents
- removal of debris (eg, logs from waterways or other waterborne debris)
- removal of ash or dust from buildings, roadways and other equipment

- buildings – fit for long-term inhabitation, building systems functioning (eg, UPS, security, fire systems, etc)?
- plant inspections – check spillways after high flows for damage, check debris and log booms, ensure operating mechanisms are all in a good state to return to service, etc
- steam pipework and remote steam field equipment
- essential systems – are they all good to go?
- control and comms gear – all in a good state, remote sensors working before plant is started up, batteries or UPS in good condition?
- strategic supplies replenished (eg, fuel, oil, coolant, etc)
- air conditioning systems and air filters in general – inspect, clean, replace
- return of plant – ensure this is carried out in a systemic manner as if starting for the first time.

If it doesn't go, it's not going for a reason.

9 General Information

9.1 Communication Flows

Figure 3 on the following page depicts the communication flows in the event of a volcanic eruption that results in a large fallout of ash across the North Island and causes major disruption to generating or transmission capacity. This same communications flow is applicable for other type of event.

The communication flows describe the interactions between CDEM, industry participants, local regional lifelines co-ordinators. The flows are equally applicable to other event scenarios.

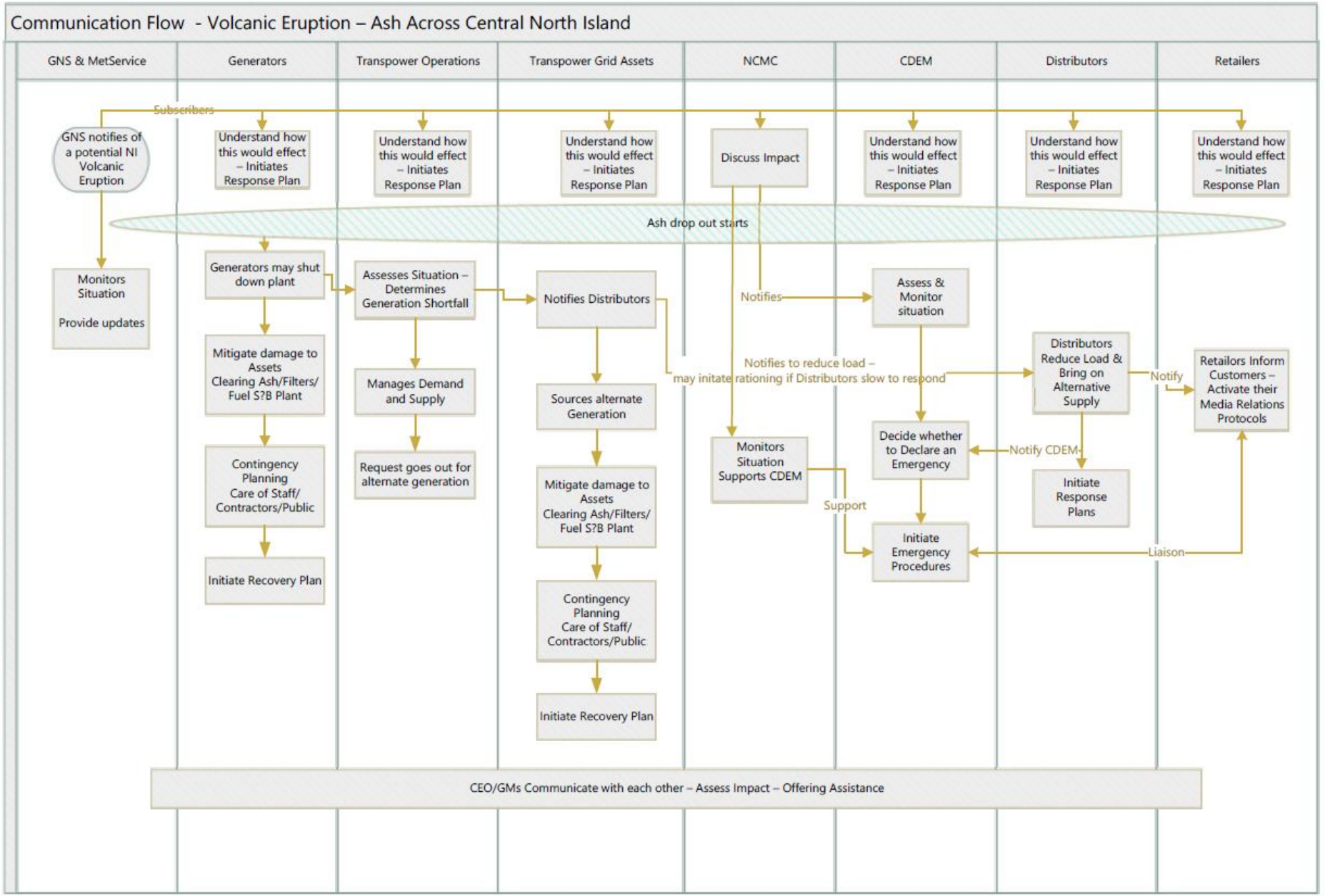

Figure 3 – Typical communications and co-ordination for a volcanic eruption scenario

For communications between industry participants, use Electrical Industry Emergency Contact List (EIECL) and/or Transpower's customer contact list. (Definition: NCMC – National Crisis Management Centre)

9.2 Hints and Tips in Emergency Centres

Below are some hints and tips that can be referenced in the case of an event:

- Use white boards to record key aims and objectives.
- Manage staff fatigue.
- Look after staff and their families.
- Keep detailed records of actions and decisions taken, SOEs, etc (type up notes as you go).
- Ensure there are regular briefs by Incident Controller using command and control techniques.
- Monitor social media for information (true, false, misleading).
- Keep the CEO briefed, charge the CEO with briefing the Board, Shareholders, etc.

9.3 Useful Links to Websites

- EIECL Contact List – available at each company
- GNS website https://www.gns.cri.nz
- CDEM website https://civildefence.govt.nz
- MetVuw website http://metvuw.com
- Metservice website https://metservice.com
- Volcanic Ashfall Impacts Working Group website https://volcanoes.usgs.gov/volcanic_ash

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