



Understanding Dependence on Electricity and Contingency Planning for Outages

Lessons from Exercise Pandora 2009

Presentation for National Lifelines Forum

Christchurch

7 October 2009



Exercise Overview

- Background
- Exercise Aim
- Exercise Planning and Management
- Exercise Scenario
- Exercise Objectives and Reflections
- Concluding Observations



Background

- Annual Canterbury EOC Exercise
- To practice & Evaluate operational procedures
- Three year cycle



Exercise Aim

For EOCs, the Group ECC, partner agencies and infrastructure providers/ suppliers to develop and practice an initial response to an electricity power disruption across the Canterbury CDEM Group area

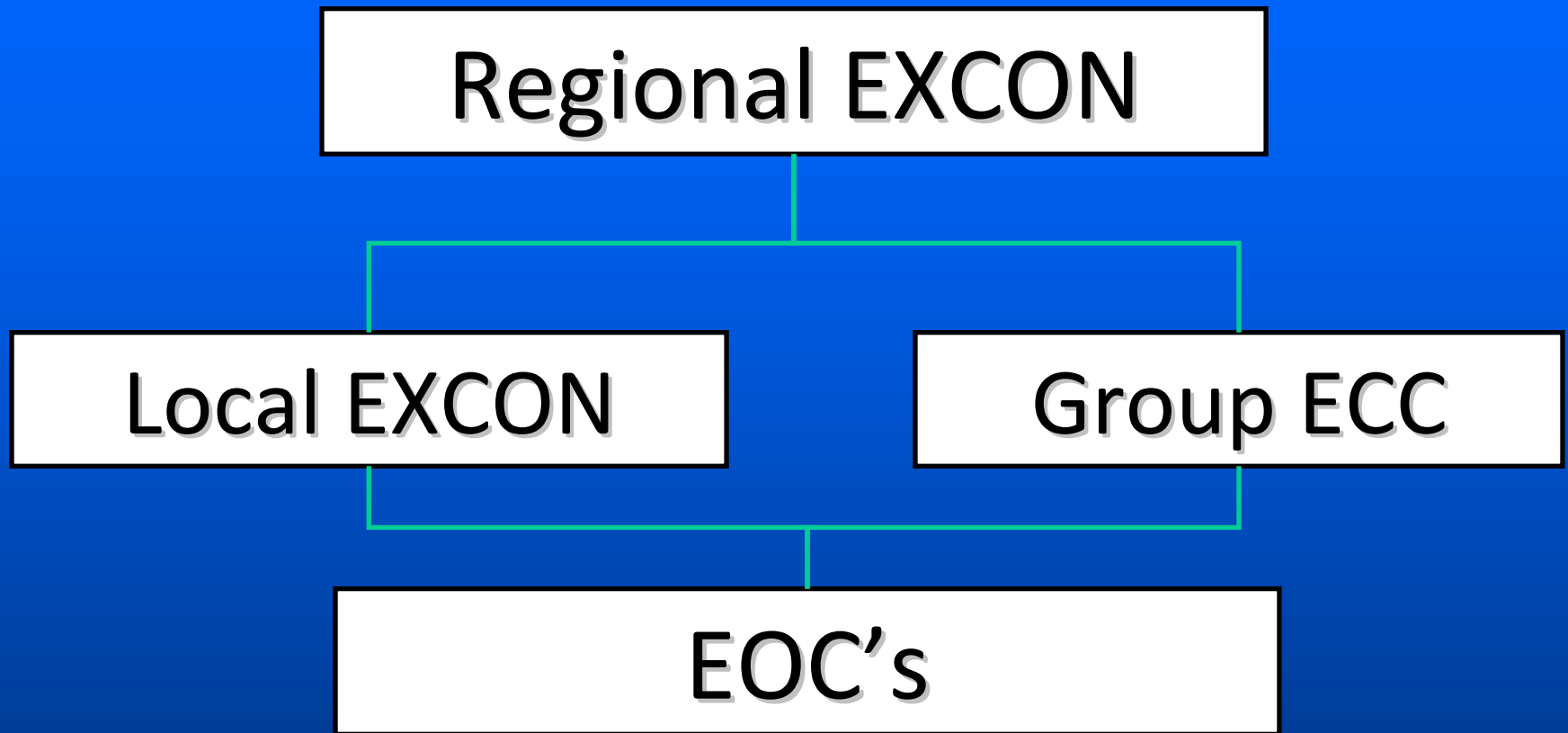


Exercise Planning

- Exercise Working Group
- Exercise writing team



Exercise Management



Exercise Scenario

- Originally intended to have a complete outage for some time
- Decided to have a partial outage
 - Distribution Lines Companies have to make strategic decisions downstream of Grid
 - Rolling *black outs*
 - Have to prioritise customers
 - Limited communication with Transpower
 - Many unknowns especially initially



- Acknowledged that no scenario can be “All things to all men”
- Priority to provide users eg Emergency Services and Lines Companies practice with intermittent electricity supply
- Elected to use a predetermined programme of outages effecting all of Canterbury’s substations (and those further north)



Scenario

- Leading up: low lake levels due to very dry summer /autumn / winter eg 2008
- Maximum amount of use of Haywards Benmore DC Link transmission of power south
- Grid close to becoming unstable at peak power usage eg early evenings due to unusually cold weather



- There has been a number of Grid Alerts but not widespread outages
- Magnitude 7.8 earthquake in upper Waitaki Valley
- Most power stations tripped (oil surges tripping bearing low level alarms) at unmanned stations
- Damage to DC link at Benmore results in total outage

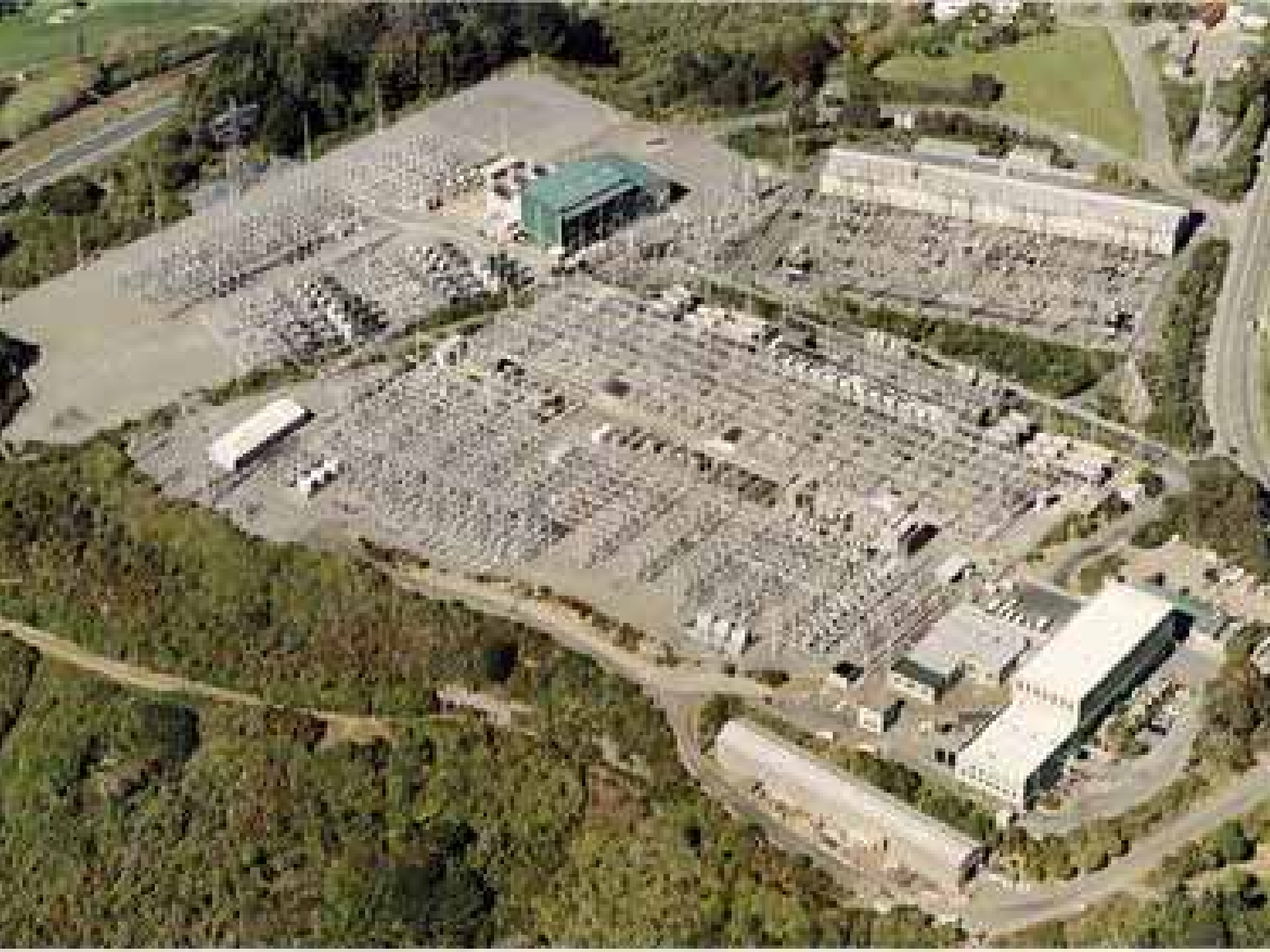


















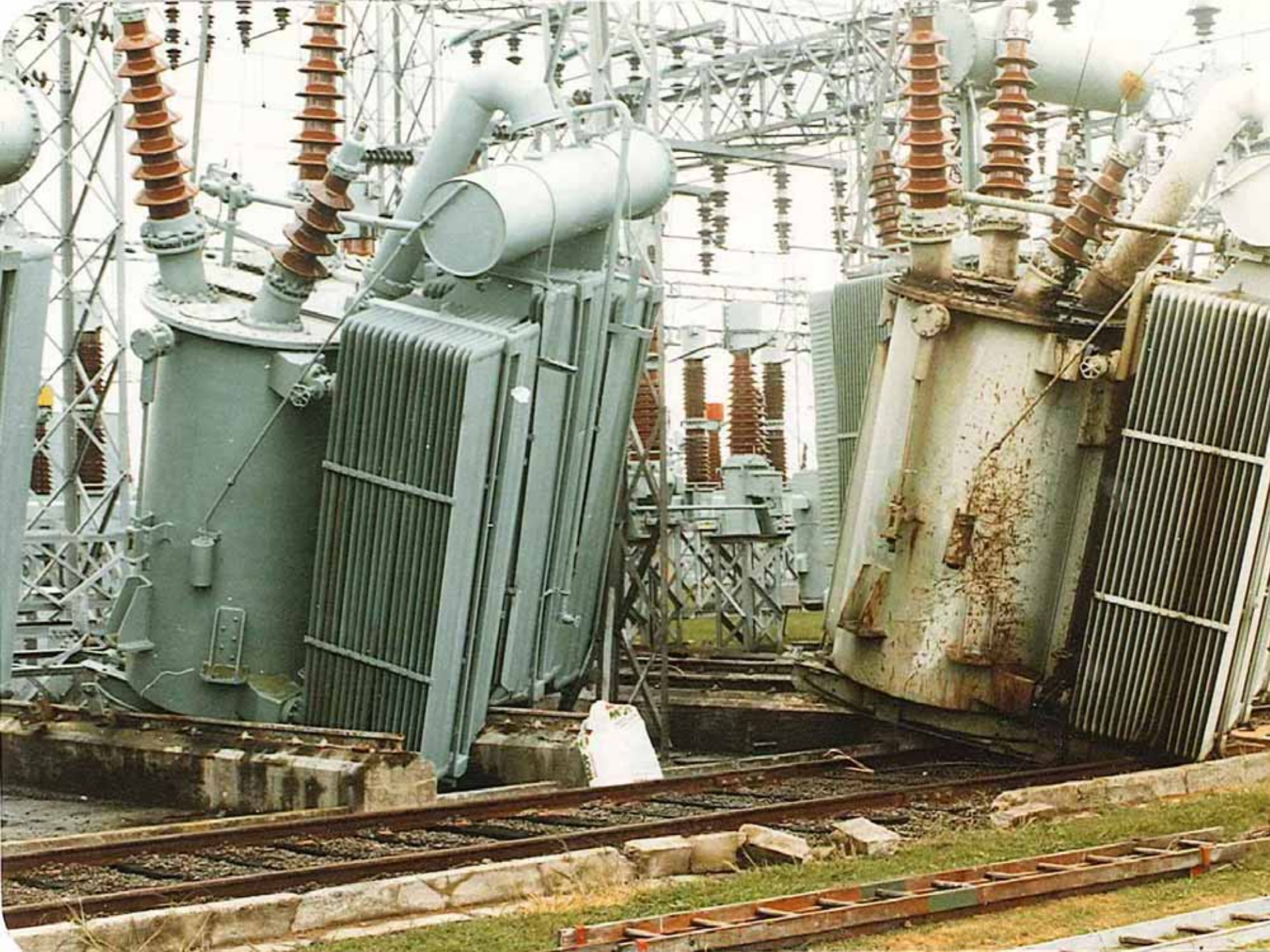


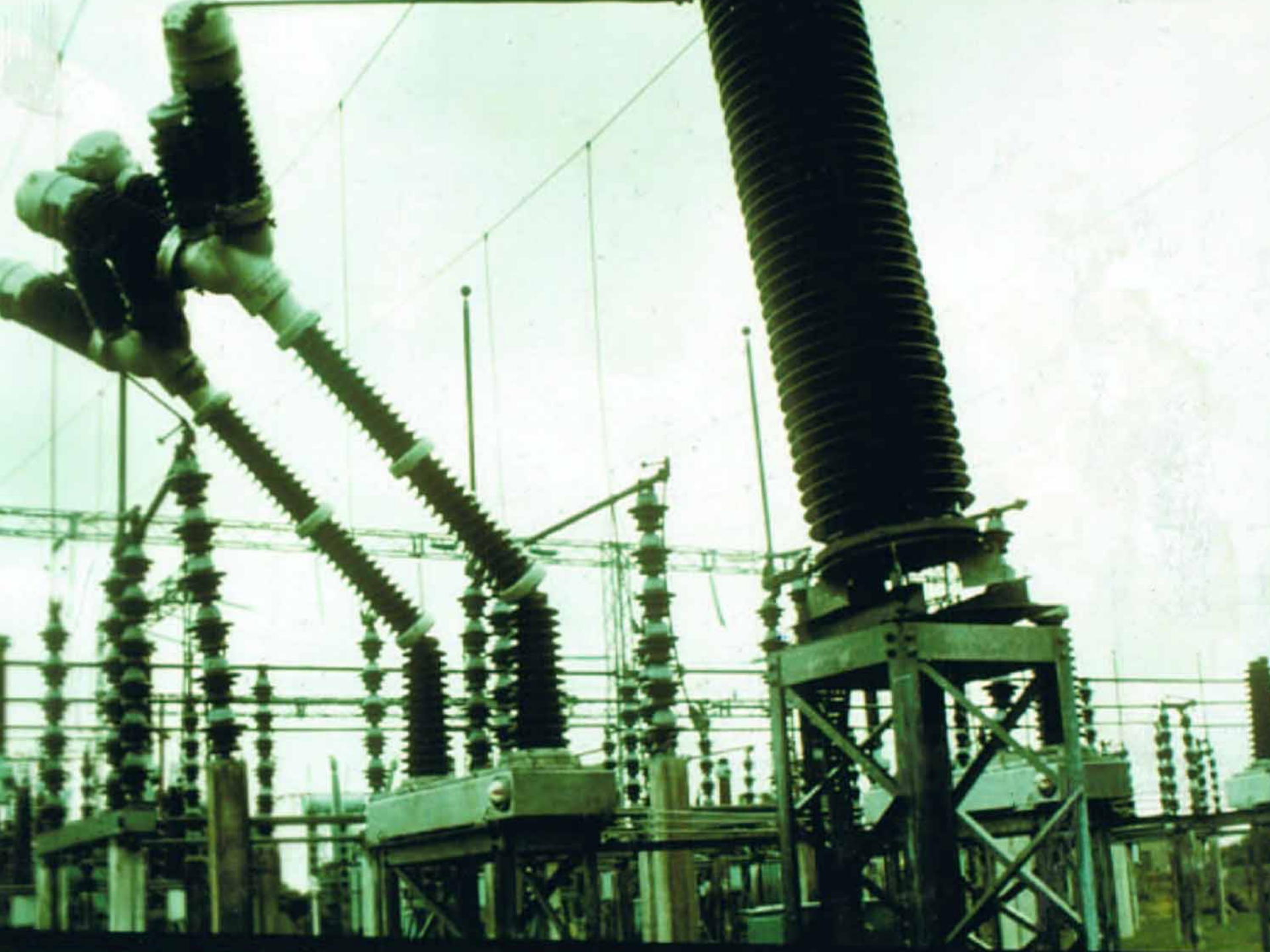


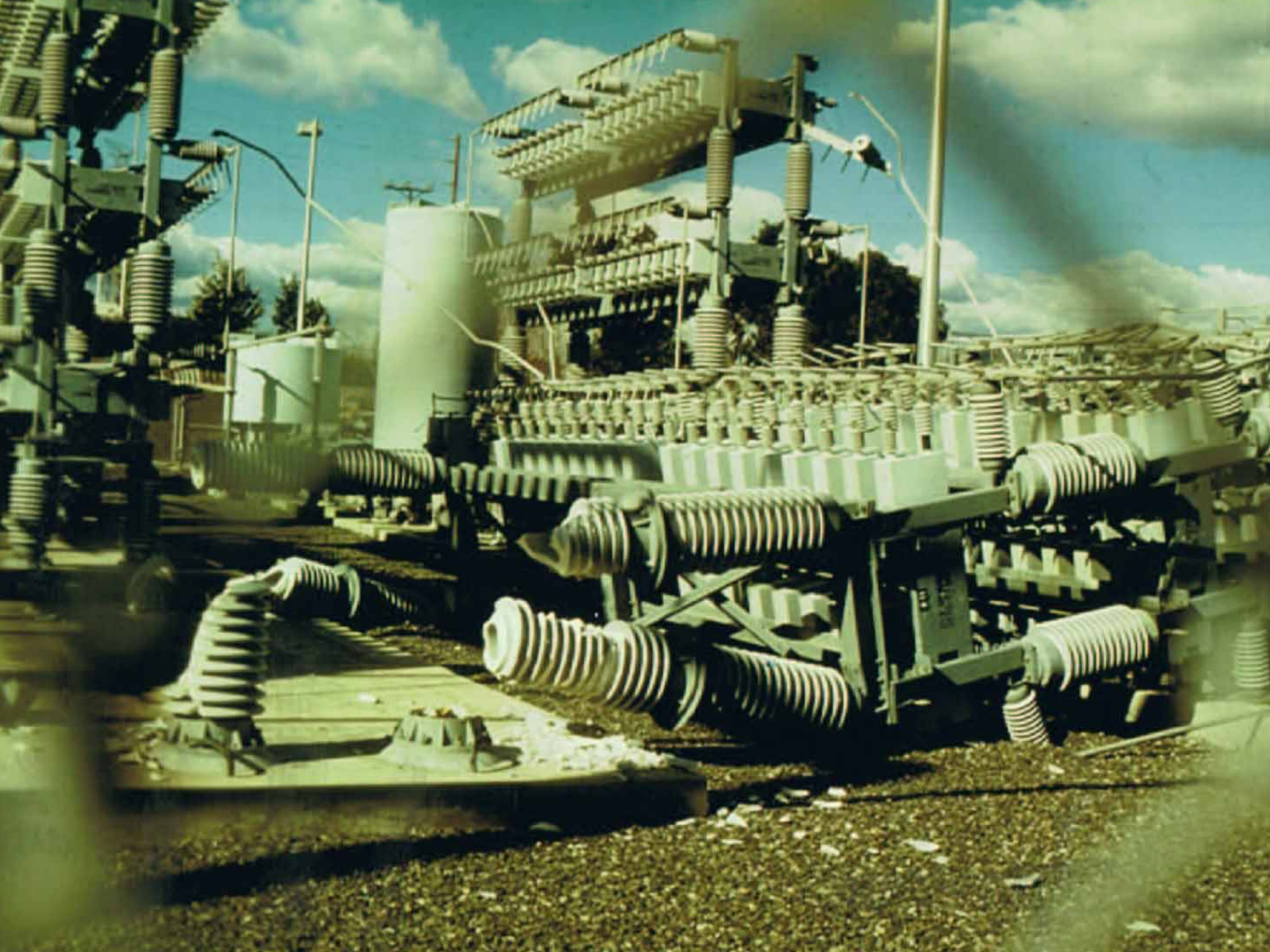
What sort of damage could be expected?











- In addition to damage to DC link:
- Buckholz relays tripped on most transformers and have to be physically checked prior to resetting
- Damage to some bus and disconnector supporting insulators
- Substantially reduced capacity
- Time delays due to travel time required for staff to check out various parts of network



- Substantial part of South Island grid becomes unstable and trips out
- Complete outage of middle and upper South Island
- Some power station will have to be *black started*
- Attempt make to gradually rebuild grid, matching available supply with demand



- Some substations (Grid Exit Points or GPX's) have to be either run at 0% or 100% eg Kaiapoi and Waipara
- Other GPX's can have more variable supply in and out
- Schedule of GXP available supply percentages against time provided as injects for exercise senario



Exercise Objectives/Reflections

1. To identify strategic 'lifeline' related community issues caused by a power outage and plan for the management of those issues
2. To identify roles and responsibilities of CDEM Group members, partner agencies and 'lifeline' agencies when jointly responding to power outages or potential outages

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3. For CDEM Group members, partner agencies and lifeline agencies to coordinate planning for a long term power outage
 4. To practice CDEM Group member and partner agency 'Business Continuity Plans' (BCPs)





5. For the electricity distribution industry and Local Authorities to practice joint coordination of the effective use of a limited power supply.



Concluding Observations

- The +4R's : Relationships
- Response expectations need to be transparent
- Pre-identify sources of information
- Communication
- it is very obvious that those that participated in the exercise planning process contributed the most to the Group objectives.

