

Exceptional service in the national interest



TTD Outdoor Test Facility Demonstration Scenario

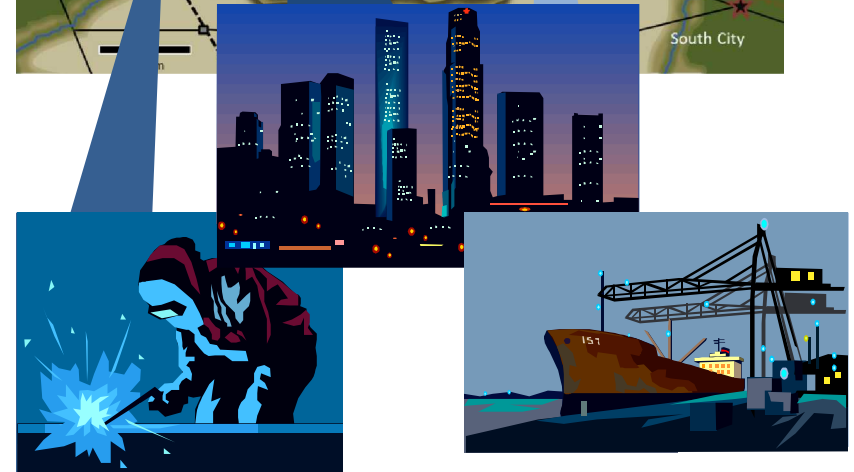
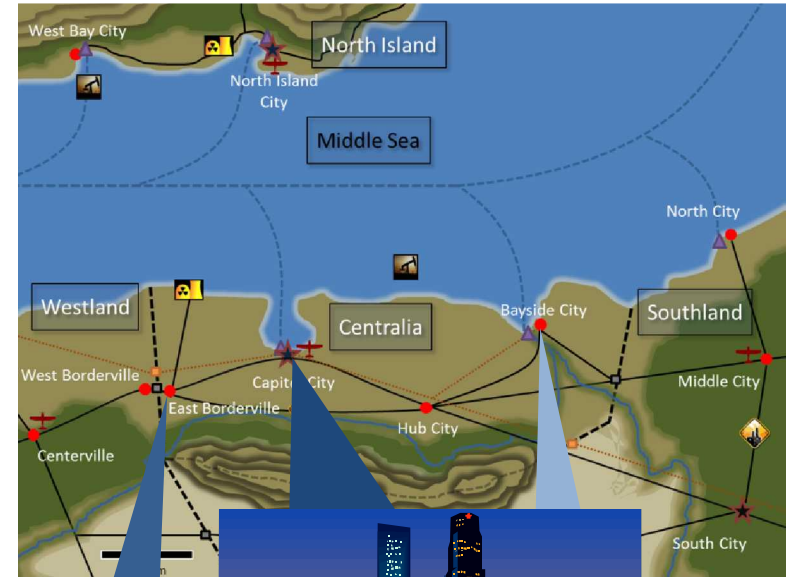
Cooperative Monitoring Center
Sandia National Laboratories

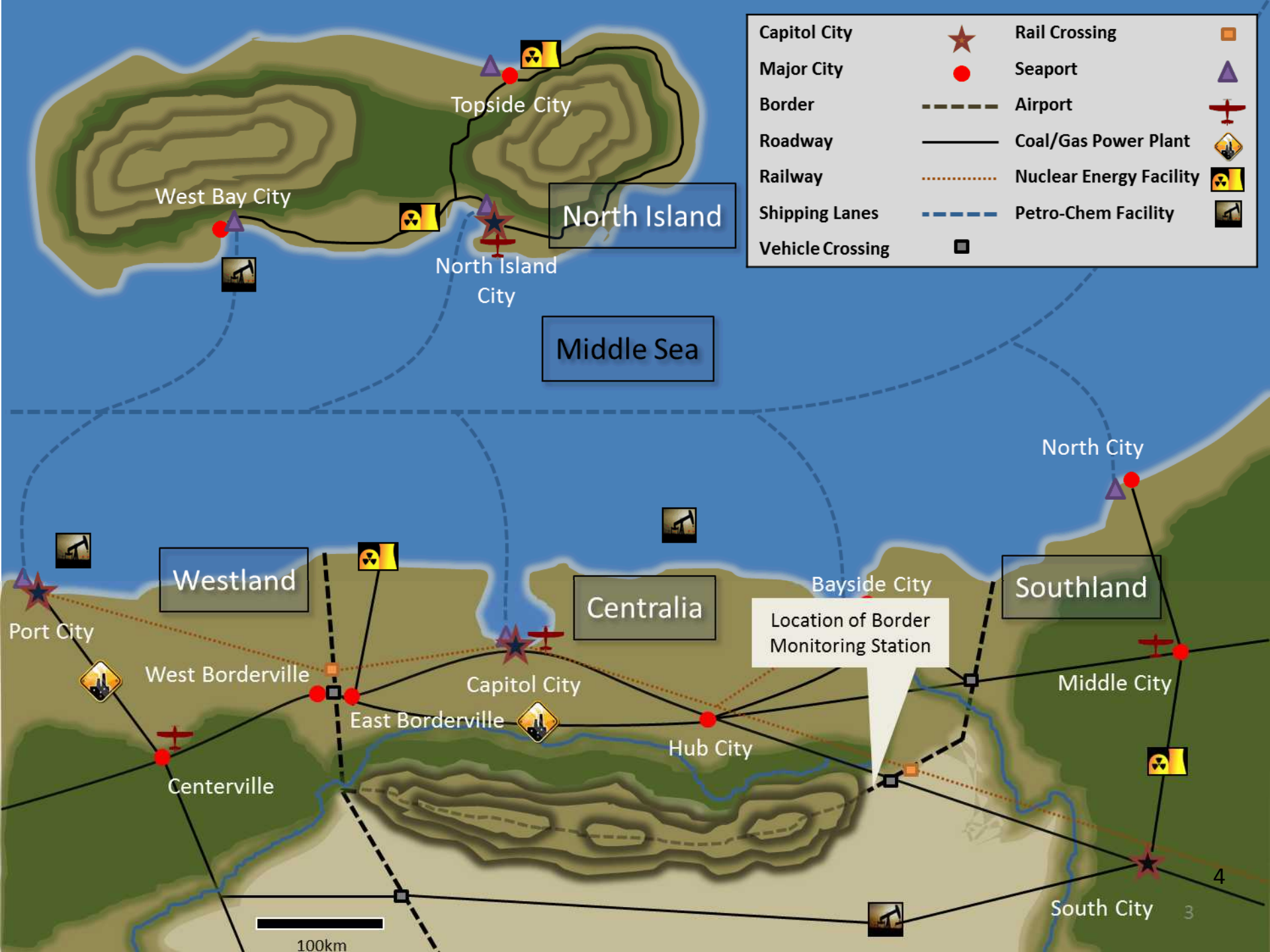
TTD Outdoor Test Facility Demonstration

INTRODUCTION TO CENTRALIA

Centralia

- Centralia is an internally stable country that enjoys friendly relations with three regional neighbors
- The country has a growing economy with industries that include:
 - Manufacturing
 - High technology
 - Agriculture
 - Offshore natural gas
- Centralia is also a regional trade hub
 - Two deepwater seaports
 - One major regional airport
 - Highway and railway transit routes





Capitol City	★	Rail Crossing	⊠
Major City	●	Seaport	▲
Border	- - - -	Airport	✈
Roadway	—	Coal/Gas Power Plant	⚡
Railway	⋯	Nuclear Energy Facility	☢
Shipping Lanes	- - - -	Petro-Chem Facility	🏭
Vehicle Crossing	◻		

Location of Border Monitoring Station

100km

4
3

Border Management

- Centralia has a long border with Southland (more than 600 km)
- Diverse terrain features include:
 - Mountains
 - Plains
 - Desert
- Authorized points of entry and exit (POEs) include:
 - 2 road crossings
 - 1 rail crossing
- The border between POEs is monitored by foot patrols and unattended ground sensors



Monitoring Station Capabilities

- Border monitoring stations like this one receive data from unattended ground sensors
- Sensor capabilities include:
 - Video
 - Magnetic sensing
 - Seismic sensing
 - Gross gamma radiation detection
- The monitoring stations provide a crucial link between these sensors and personnel in the field



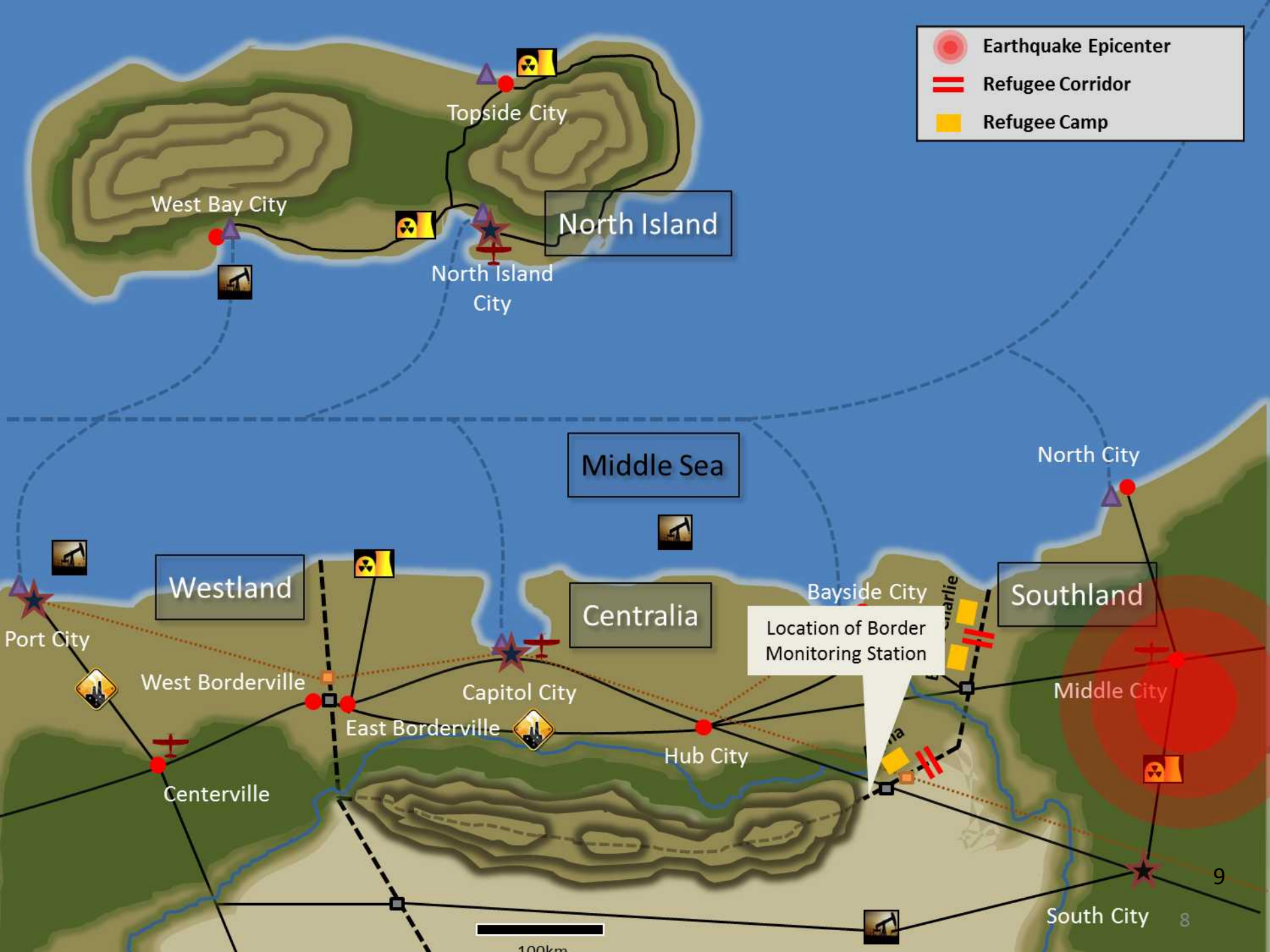
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RADIOLOGICAL MONITORING SCENARIO INTRODUCTION

Disaster in Southland

- Neighboring Southland has recently experienced multiple crises:
 - Political turmoil resulting from disputed elections
 - A massive earthquake centered near Middle City
- Thousands of refugees have fled to Centralia seeking shelter, aid, and the rule of law
- Refugee crossing corridors and camps have been established





Earthquake Epicenter
Refugee Corridor
Refugee Camp

North Island

Middle Sea

Westland

Centralia

Southland

Location of Border Monitoring Station

100km

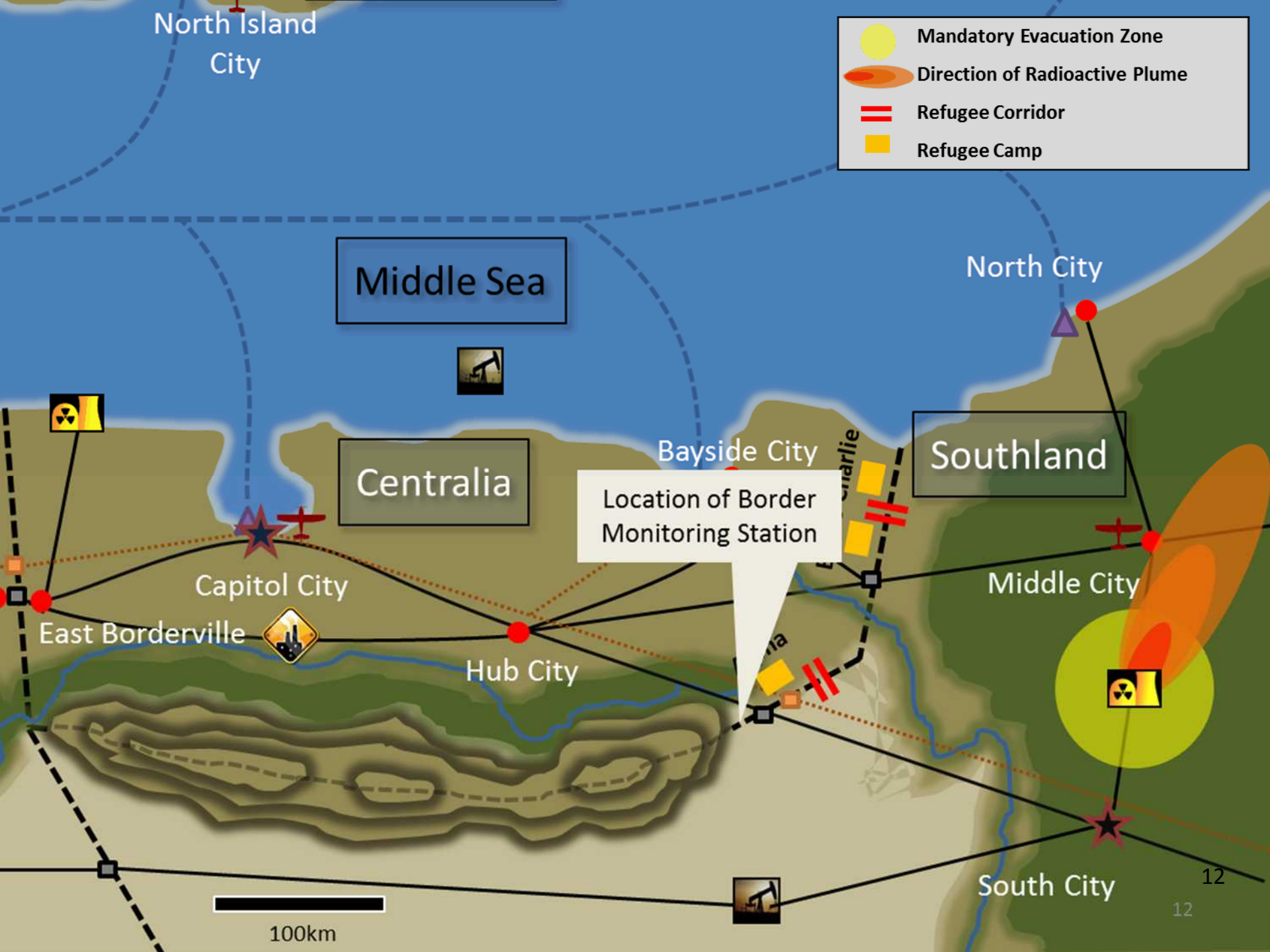
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RADIOLOGICAL MONITORING SCENARIO PART 1

Nuclear Safety Consequences

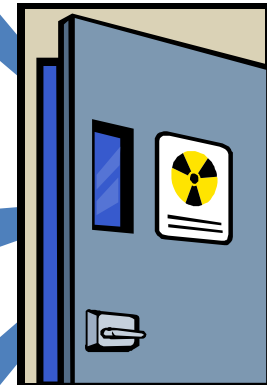
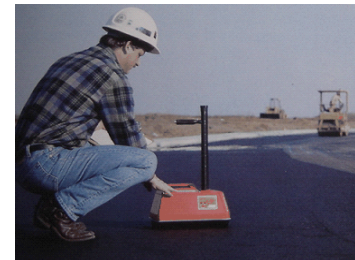
- The earthquake epicenter was located near Southland's nuclear power station, which suffered extensive damage to cooling systems
- A partial core meltdown of the reactor has resulted in a fire and the release of radioactive products into the atmosphere
- Emergency responders are attempting to contain the crisis:
 - A mandatory evacuation zone has been created around the reactor
 - International assistance has been requested to aid with containing the meltdown and subsequent cleanup

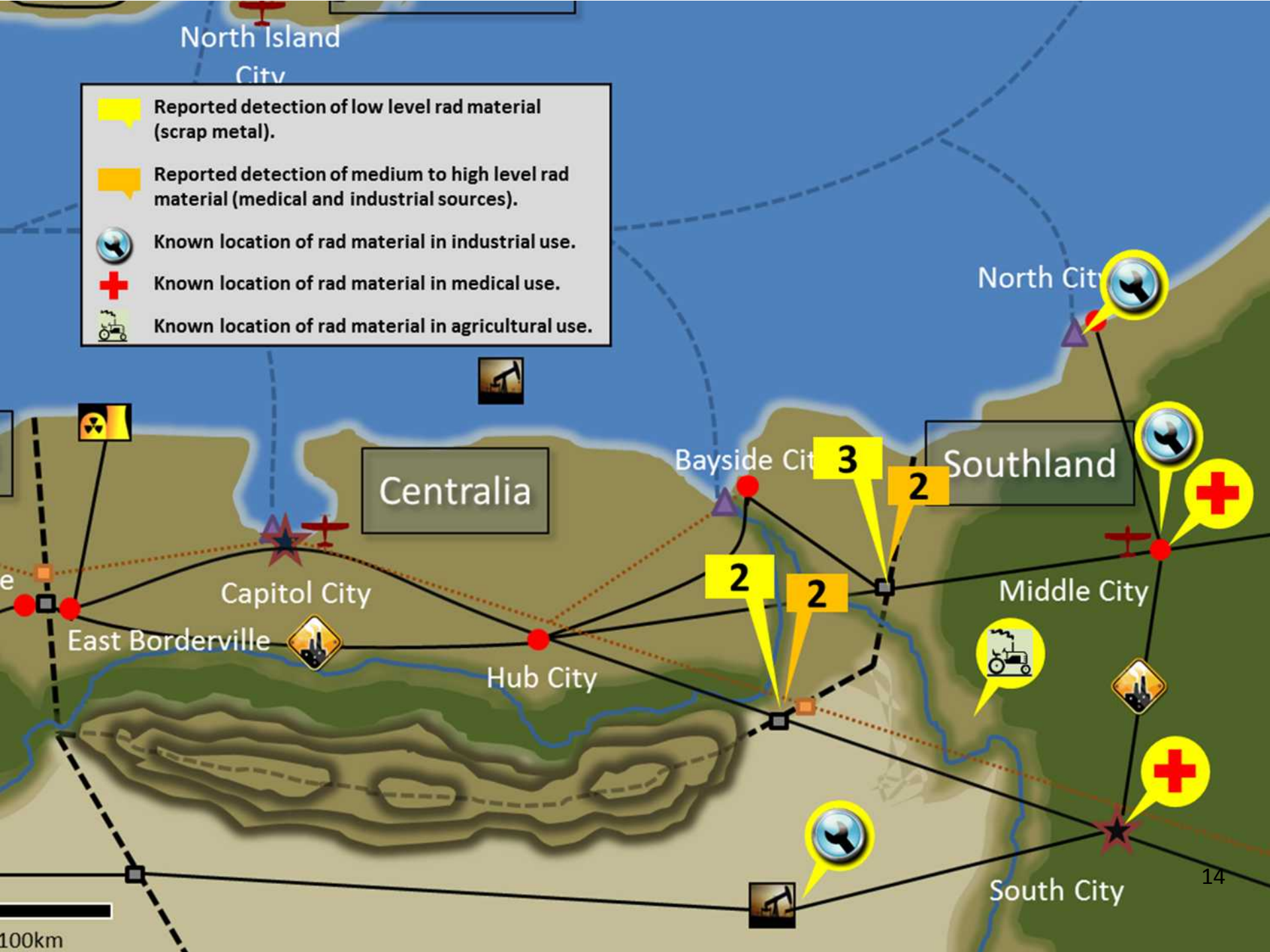




Radiological Consequences

- Additional concerns exist regarding the security of radioactive materials in Southland. The uses of these materials include:
 - Medicine
 - Industry
 - Agriculture
- Materials are usually regulated by the Ministry of Environment, which currently lacks leadership following the election crisis
- Centralia's border guards have already intercepted multiple radioactive material smuggling attempts at POEs





Border Guard Advisory

- Border guards have been advised to remain on alert for signs of radioactive material
- Material might be trafficked across the border through multiple pathways:
 - Smugglers attempting to traffic material for black market sale
 - Terrorists attempting to conduct a radiological attack
 - Contaminated shipments of metal scrap and other commodities
 - Refugees contaminated by, or in possession of, radioactive material



Questions

Consider the following questions from the perspective of personnel manning the border monitoring station:

- What are the potential detectable signatures of radioactive material out of regulatory control?
- What border monitoring capabilities can support detection of radioactive material?
- Given the present situation, are there additional measures that might be undertaken to protect Centralia's borders (between POEs) from illicit trafficking of radioactive material?

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RADIOLOGICAL MONITORING SCENARIO PART 2

Detection Incident

- A gamma radiation detector in the field sounds an alarm indicating the nearby presence of radioactive material
- Secondary scanning with remotely operated cameras reveals the presence of an individual crossing the open border



Incident Response

Consider the following questions from the perspective of personnel manning the border monitoring station:

- What is the appropriate response, given the information collected by the remote sensors?
- If personnel in the field are called to respond, what procedures should they follow, particularly in regards to the possible presence of radioactive material?
- What additional information needs to be collected in order to appropriately adjudicate this detection incident?

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RADIOLOGICAL MONITORING SCENARIO PART 3

Situation Update

- Border guard personnel intercept the individual detected by the remote sensors
- The individual identifies himself as a refugee seeking aid and does not claim knowledge of radioactive material in his possession
- Personal radiation detectors (PRDs) worn by the border guards indicate the presence of radioactive material, and they maintain their distance from the individual



Incident Response

Consider the following questions from the perspective of personnel manning the border monitoring station:

- What further instructions should be given to the personnel in the field?
- What should be done to ensure the safety of the border guards, but also to maintain custody of the radiation source?
- The PRDs used by the border guards cannot identify the radiation source; what additional capabilities are needed for identification?

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RADIOLOGICAL MONITORING SCENARIO CONCLUSION

Situation Update

- The individual is escorted to a field outpost by the border guards, who continue to maintain safe distance
- Radiation safety specialists are flown in to assist with the investigation
- The individual, who lived near Southland's nuclear power station, is found to have Caesium-137 contamination in his belongings
- Following personal decontamination, the individual is flown to a hospital for further treatment

