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Colorado Springs


CS4950/5950  
*Homeland Security & Cybersecurity*

**Disaster Response**

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**Lesson 39  
Disaster Response**

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Springs



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**Disaster Response**

This module examines what happens in the worst-case scenario precipitated by cyber-attack.



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### Disaster Response

Recall that all disasters advance through four general stages:


1. **Prevent**
2. **Protect**
3. **Respond**
4. **Recover**



**Four Phases of Disaster**

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### Disaster Response

- Before a disaster, **Prevention Actions** are taken to reduce the chances of encountering an incident, or mitigating the consequences of future encounters.
- **Protective Actions** are taken to reduce or eliminate a particular threat or hazard.
- After a disaster, **Response Actions** are taken to save lives and protect property.
- **Recovery Actions** seek to alleviate social disruptions caused by the disaster as quickly as possible following the incident.



**"Boom"**

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### Disaster Response

In this lesson, we examine how the US would likely **Respond** to disaster precipitated by cyber-attack.



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### Disaster Response

#### US Nuclear Power

- Generates 19.5% of US electricity, 797.2B KWH
- 99 nuclear power plants operate in 30 States
  - 34 Boiling Water Reactors (BWRs)
  - 65 Pressurized Water Reactors (PWRs)



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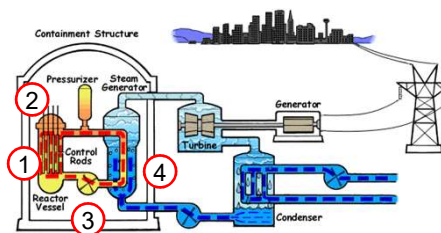
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### Disaster Response

#### PWR Basic Operation

1. Uranium pellets stacked inside fuel rods are packed together to form the reactor core.
2. Cadmium/boron control rods absorb free neutrons.
3. When control rods removed, free neutrons split uranium atoms releasing heat and more neutrons in a fission reaction
4. Core heats surrounding water which is piped to a heat exchanger to create steam and drive electricity generators.



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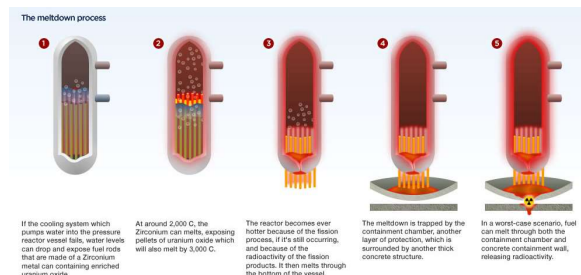
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### Disaster Response

1. If the control rods cannot be replaced, then the core will overheat.
2. First danger is a steam explosion releasing radioactive gas & debris.
3. Second danger is core superheats and melts through containment vessel eventually flash steaming groundwater, further spreading radiation.



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### Disaster Response

- In 2010, a tsunami knocked out power to Fukushima nuclear power plant in Japan.
- Though the plant scrambled, without power to circulate water, the core overheated.
- Three reactors melted down.
- 470,000 people were evacuated within a 18-mile radius.
- The site will remain too hot to begin cleanup for next 40 years.
- Japan shut down all nuclear reactors, cutting 30% of its power.



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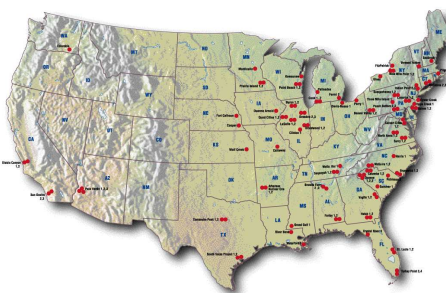
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### Disaster Response


- US Nuclear power plants are not connected to the Internet.
- US Nuclear power plants have many built-in safety and redundancy measures.
- **Still, it is not inconceivable that a supply-chain attack could inhibit a key component or set of components that could result in a meltdown.**



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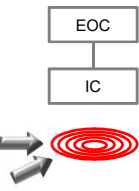
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### Disaster Response

- All disasters are local.
- If a nuclear reactor goes critical, **City and County fire and police would be first on scene** to effect evacuation within the immediate vicinity and downwind from the plant.
- Neighboring jurisdictions would lend support under **Mutual Aid Agreements**
- Evacuation efforts would be directed from an **Incident Command Post**, supported by an **Emergency Operations Center**.



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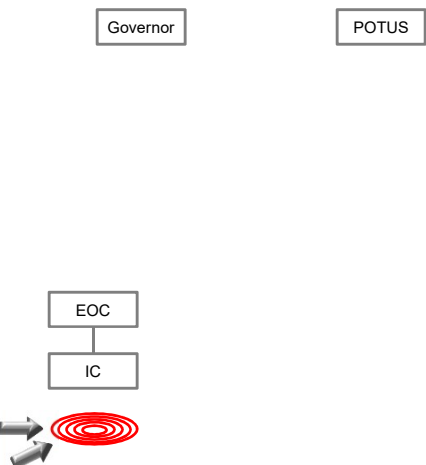
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### Disaster Response

- Local responders would setup a perimeter and try and rescue plant personnel.
- Both the **President** and **Governor** would be immediately notified of the incident.



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### Disaster Response

- The EOC would call in additional support requested by the **Incident Commander**.
- The **State EOC** would collect all requests for support and determine how to source them.
- The Governor would be in communication with the President.

```

graph TD
    Governor --- POTUS
    Governor --- SEOC
    SEOC --- EOC
    EOC --- IC
    IC --> Target
  
```

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### Disaster Response

- Governor's command considerable response assets in the form of the **State National Guard**.
- The Governor would likely command the Adjutant General to support evacuation efforts.
- Additionally, the Guard would deploy their **WMD Civil Support Team** to help map the fallout.
- More Guard units could be requested from other States under the **Emergency Management Assistance Compact**.

```

graph TD
    Governor --- POTUS
    Governor --- SEOC
    Governor --- NG
    SEOC --- EOC
    EOC --- IC
    NG --- JFHQ
    JFHQ --- CP
    IC --> Target
  
```

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### Disaster Response

- The FEMA regional manager would quickly be in contact with the **State Coordinating Officer** to draft a **Presidential Declaration of Emergency** authorizing **Disaster Assistance Funds** under the **1988 Stafford Act**.
- FEMA would setup a **Joint Field Office** and the President appoint a **Federal Coordinating Officer** to obtain Federal assets from executive agencies tasked in the **National Response Framework**.

```

graph TD
    Governor --- SEOC
    Governor --- NG
    POTUS --- DHS
    POTUS --- FEMA
    SEOC -.-> JFHQ
    NG --- JFHQ
    DHS --- FEMA
    FEMA --- JFO
    JFHQ --- JFO
    JFO --- EOC
    EOC --- IC
    JFHQ --- CP
    IC --> Site
    CP --> Site
    JFO --> Site
    
```

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### Disaster Response

- Military commanders in the vicinity have **Immediate Response Authority** to provide local assistance.
- If additional military assets are needed, FEMA will request **Defense Support of Civil Authorities**.
- USNORTHCOM** will coordinate the deployment of military units to the disaster.
- Deploying units will work under the direction of a National Guard **Dual-Status Commander**.

```

graph TD
    Governor --- SEOC
    Governor --- NG
    POTUS --- DHS
    POTUS --- DoD
    SEOC -.-> JFHQ
    NG --- JFHQ
    DHS --- FEMA
    DoD --- USNORTHCOM
    FEMA --- JFO
    JFHQ --- JFO
    JFO --- EOC
    EOC --- IC
    JFHQ --- DSC
    USNORTHCOM --- DSC
    IC --> Site
    DSC --> Site
    JFO --> Site
    
```

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### Disaster Response

- All on-scene actions remain under the control of the Incident Commander.
- The Incident Commander prioritizes and directs actions from an **Incident Action Plan**.
- All supporting agencies work together with the Incident Commander according to the **National Incident Management System**.

```

graph TD
    Governor --- SEOC
    Governor --- NG
    POTUS --- DHS
    POTUS --- DoD
    SEOC --- JFHQ
    JFHQ --- JFO
    DHS --- FEMA
    DoD --- USNORTH_COM[USNORTH COM]
    JFO --- IC
    JFO --- DSC
    IC --- EOC
    EOC --- IC
    DSC --- IC
    IC --- OnScene[On-Scene Actions]
    DSC --- OnScene
    
```

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### Disaster Response

- The Incident Commander can request Federal assets organized into **15 Emergency Support Functions** under the National Response Framework.
- Among others, **ESF #6, Mass Care**, would be requested from the **Red Cross** to assist with sheltering and caring for the large displaced population.

**National Response Framework**  
Second Edition  
May 2013  
Homeland Security

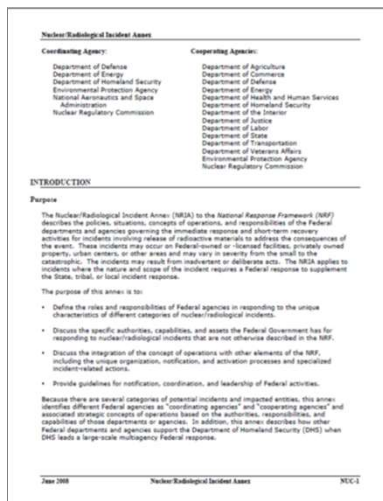
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### Disaster Response

- **Under the Nuclear / Radiological Annex to the NRF, the Nuclear Regulatory Commission would be the Lead Federal Agency** for advising response to a nuclear meltdown.
- Once the immediate crisis is resolved, The **Environmental Protection Agency** would become the LFA for advising on recovery.



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### Disaster Response


- **Recovery would never be complete.**
- Like Fukushima and Chernobyl before it, hundreds if not thousands of square miles would have to be declared "uninhabitable".
- Thousands of citizens would have to be resettled.
- **The nation will survive, but the effects will be inestimable.**



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**Conclusion**

Questions?



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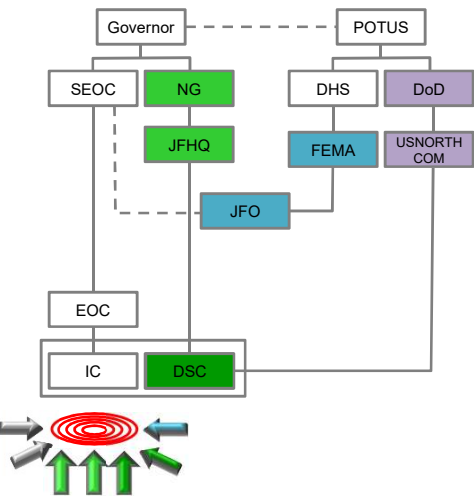
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**Disaster Response**

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