

SESSION 9: Recovery Plans

Panel Members:	Ernest Brockman Robert Fulton Wing Lee David Lyngholm John Moyle	Duke Power (No slides) USACE PG&E USBR NJ DEP
Moderator:	Patrick Regan	FERC

- “Don’t dwell on ‘how’ someone might exploit a vulnerability... focus on ‘if’ they do, what are the consequences, and what can you do to prevent or mitigate the impact”
 - Tom Flowers – CenterPoint Energy

Unifying Dam Safety and Security – Fort Worth Workshop – February 2005



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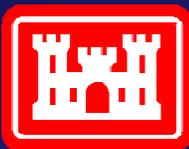


Robert H. Fulton

Dam Safety Engineer, South Atlantic Division

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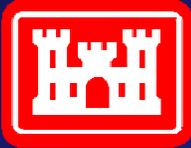
robert.h.fulton@usace.army.mil



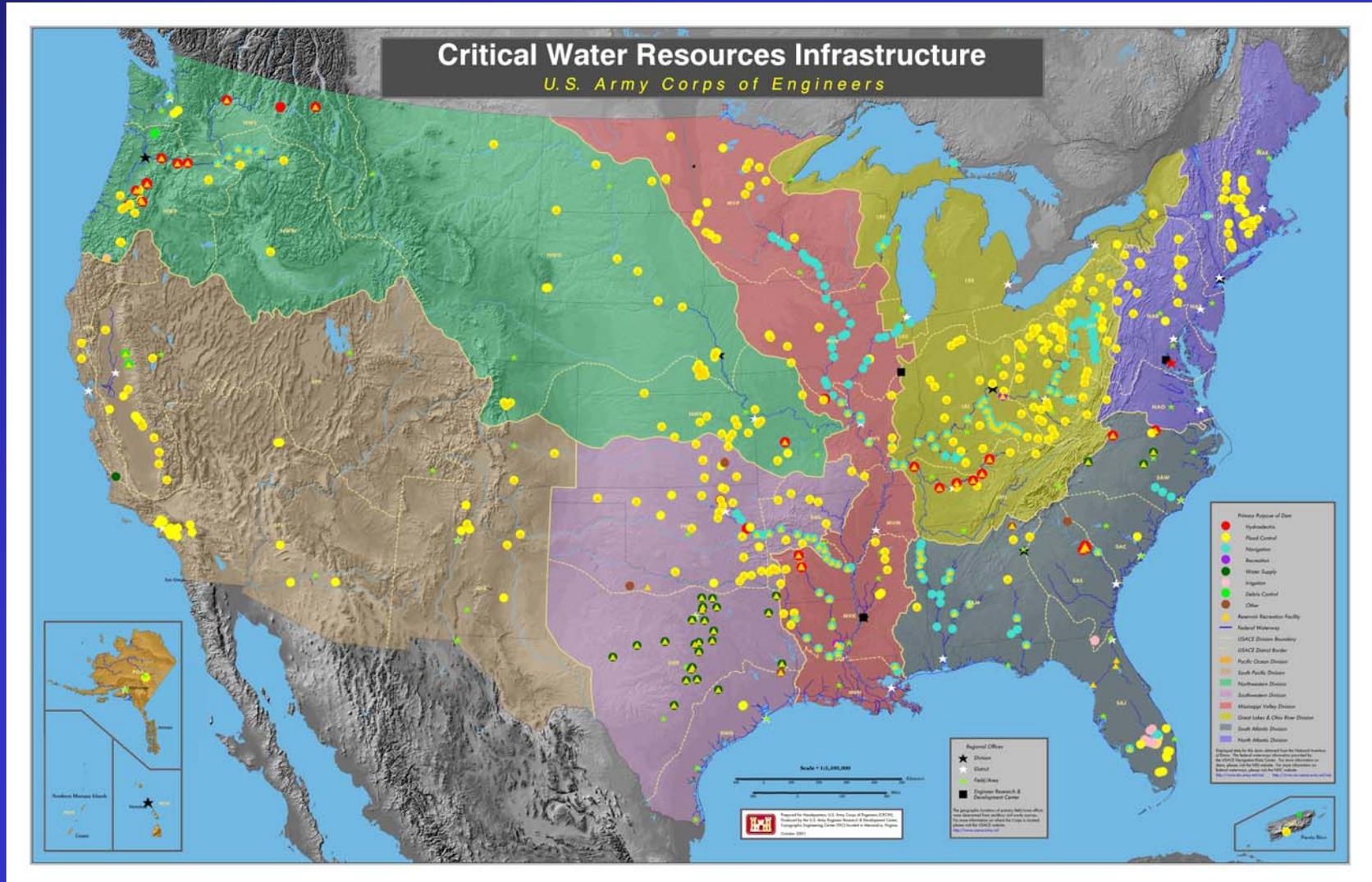
**US Army Corps
of Engineers.**

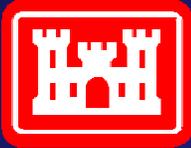
USACE Divisions & Districts





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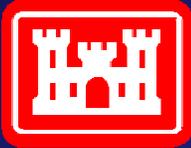


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People

- 36,000 civilians (USACE)
- 300 military (USACE)
-
- 4,000 civilians (SAD)
- 35 military (SAD)

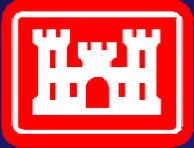




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South Atlantic Division Civil Works Area of Responsibility

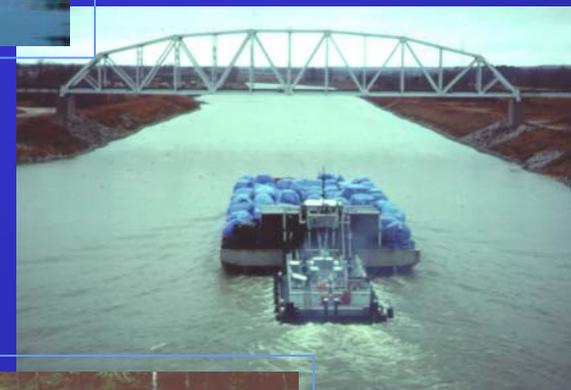


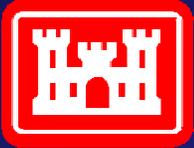


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Civil Works Missions

- Navigation
- Flood Control
- Hydropower
- Environmental Restoration
- Regulatory
- Emergency Response
- Water Supply
- Wildlife Management



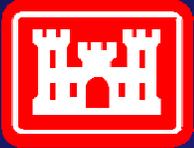


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Multiple Purpose Projects

- 33 projects in division
- Hydropower
- Flood Control
- Navigation
- Water Supply/Quality
- Fish & Wildlife
- Recreation
 - 500 million visitor hours annually
 - 20% of national visitation
 - Three of top ten most visited projects in nation



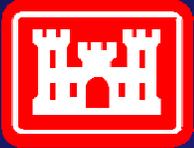


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Protection of USACE Critical Infrastructures



- Integrate fences, gates, sensors, cameras, barriers
- Secure control room and monitor access
- Evaluate visitor access
- Duress alarm for personnel
- Obscuration systems for critical assets in yard
- Switch control procedure and contingency plans
- Redundancy in control and communication
- Identify safe haven in tunnel areas
- Personnel identification (badges) and security training
- Vehicle entry control and barrier systems
- Screening of deliveries and inspection of shipments
- Protection from flying glass and debris
- Patrols and force response enhancements



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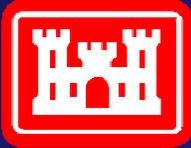
S.O.S.

Safely Operating Securely

SURETY (Defined)

- Safety
- Security
- Sanity





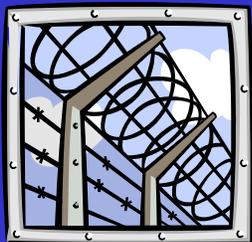
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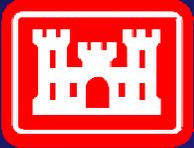
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Safely Operating Securely

SURETY (Activities)

- Repel
- Respond
- Recover



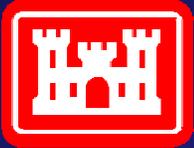


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PREPARATION

- Plan
- Pre-Position
- Proactive Interaction (Alliances)
- Energize
- Educate
- Exercise
- Review
- Remediate
- Re-Evaluate



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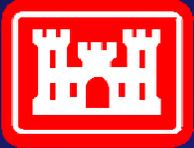
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PREPARATION

REVIEW (Evaluate)

- Emergency Action/Evacuation Plans
- RAM-D
- Inundation Mapping





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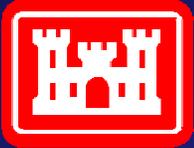
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PREPARATION

REMEDiate (Reduce Risk)



- Preventive Maintenance
- PICES Recommendations
- CPSP and BSP Implementation
- Prioritize O&M Backlog



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PREPARATION

RE-EVALUATE (Changes)

- **Conditions**
- **Characteristics**
- **Catastrophe**





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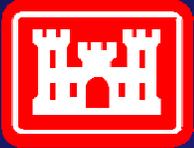
PREPARATION

RE-EVALUATE (Changes)

Conditions

- Threat
- Operational Restrictions





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PREPARATION

RE-EVALUATE (Changes)



Characteristics

- Real Estate
- Hydrologic



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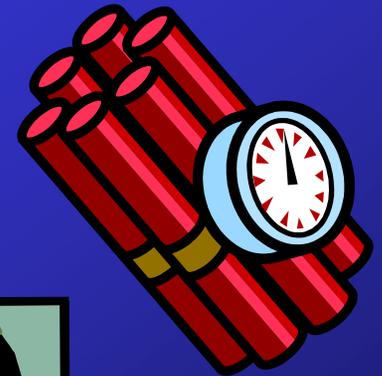
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PREPARATION

RE-EVALUATE (Changes)

Catastrophe

- Seismic
- Extreme Weather
- Terrorism





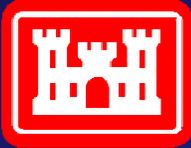
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SUMMARY

- *Consequences of Dam Failure are same, regardless of Initiating Event*
- *Preparation is Key and should be proactive, inclusive and continuous*
- *Sane understanding of inability to prevent ALL events necessitates emphasis on effective response and rapid recovery*

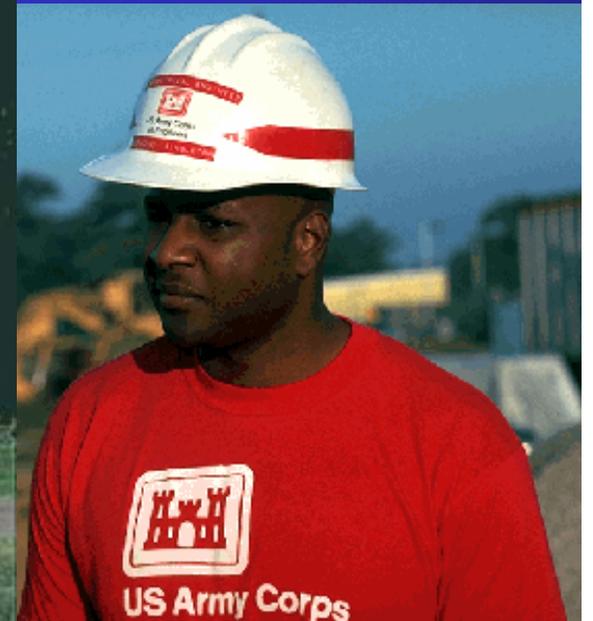


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South Atlantic Division Corps of Engineers



Questions ?





FERC Workshop on "Responding to Emergencies at Dams"

"Recovery Plans"

Wing Lee
Pacific Gas and Electric Company
San Francisco, CA

Recovery Plan ??



雄偉的石岡水壩同樣經不起斷層錯動的研
壩面南側拱起約9.8公，北側約2公

Shih-Kang Dam, Taiwan





Recovery Phases

- “Initial” Recovery
- “Long-Term” Recovery



Initial Recovery Actions

- Restore Critical Systems to Full Operations.
- Evaluate Need to Continue EMO; Return to Normal Roles/Responsibilities when Feasible.
- Perform Assessments of Damaged Facilities, Equipments, and Operations.
- Conduct After-event Debriefings and Provide Reports.
- Appoint Team to Oversee Recovery Process.
- Establish Priorities for Permanent Repair, Reconstruction, Replacement.



Initial Recovery Actions Con't

- Perform Assessment of Losses and Cost Analysis for Repairs vs. Replacements.
- Determine Approx. Insurance Reimbursements and Sources for Financial Assistance.
- Review Temporary Staffing Needs, Recruit and Train if Necessary.
- Revise Emergency Plans as Appropriate.
- Identify any Enhancements to Technology and/or Operations.



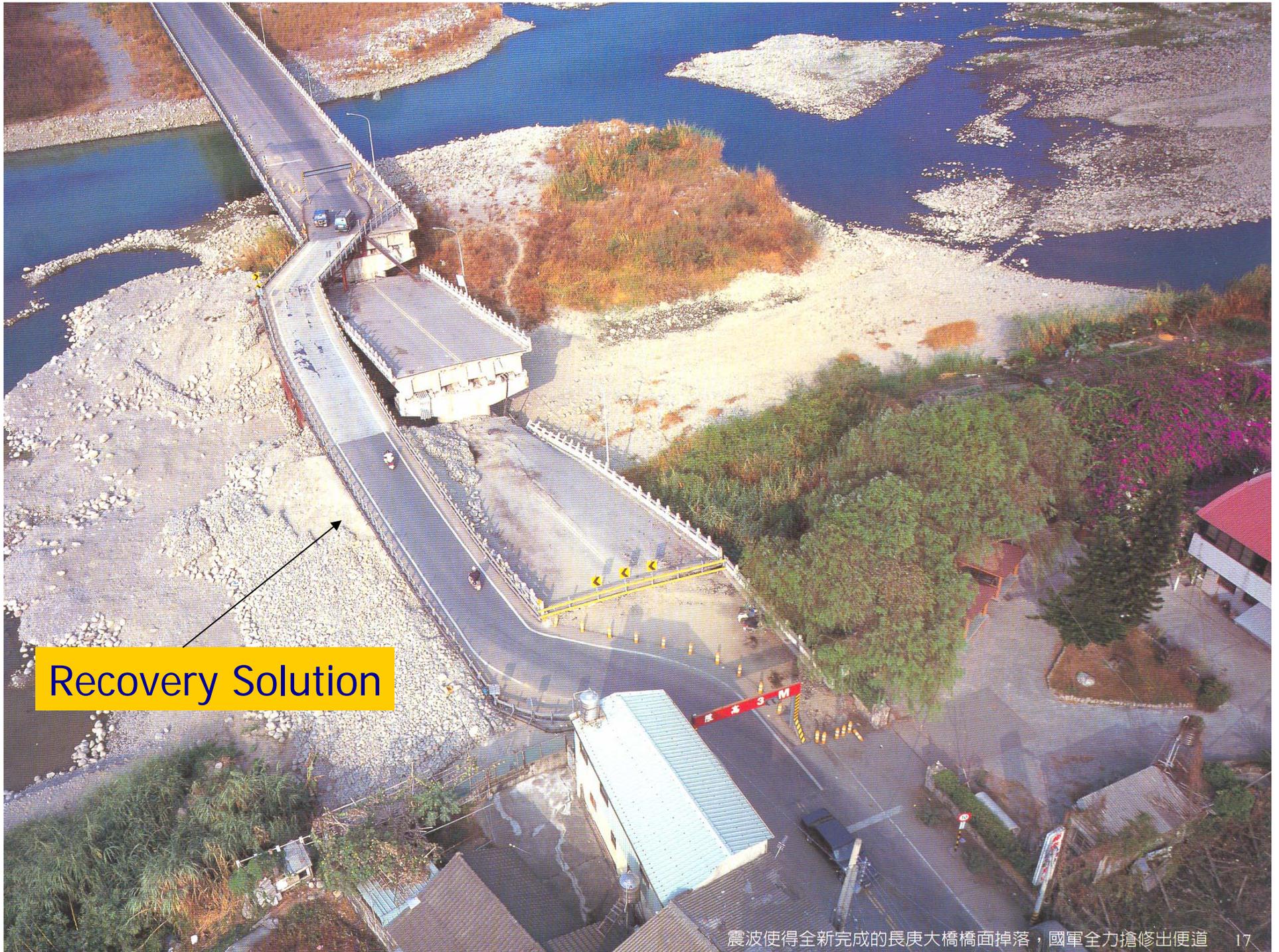
Long-Term Recovery Actions

- Maintain Liaison with External Government Agencies for Inspections, Permits, and Reconstruction.
- Initiate Permanent Reconstruction of Damaged Facilities and Replacement of Damaged Equipments.



Recovery Plans

- Should the EAPs Include such Plans ??
- If so, What Format Should in Take??
- Level of Details?
 - Include:
 - Generation Assets?
 - Water Diversion and Conveyance Assets?
 - Communication & Instrumentation Assets?



Recovery Solution

RECLAMATION

Managing Water in the West

**Responding to Emergencies
at Dams – Recovery Plans**

FERC Workshop – Ft. Worth

February 17, 2005



U.S. Department of the Interior
Bureau of Reclamation

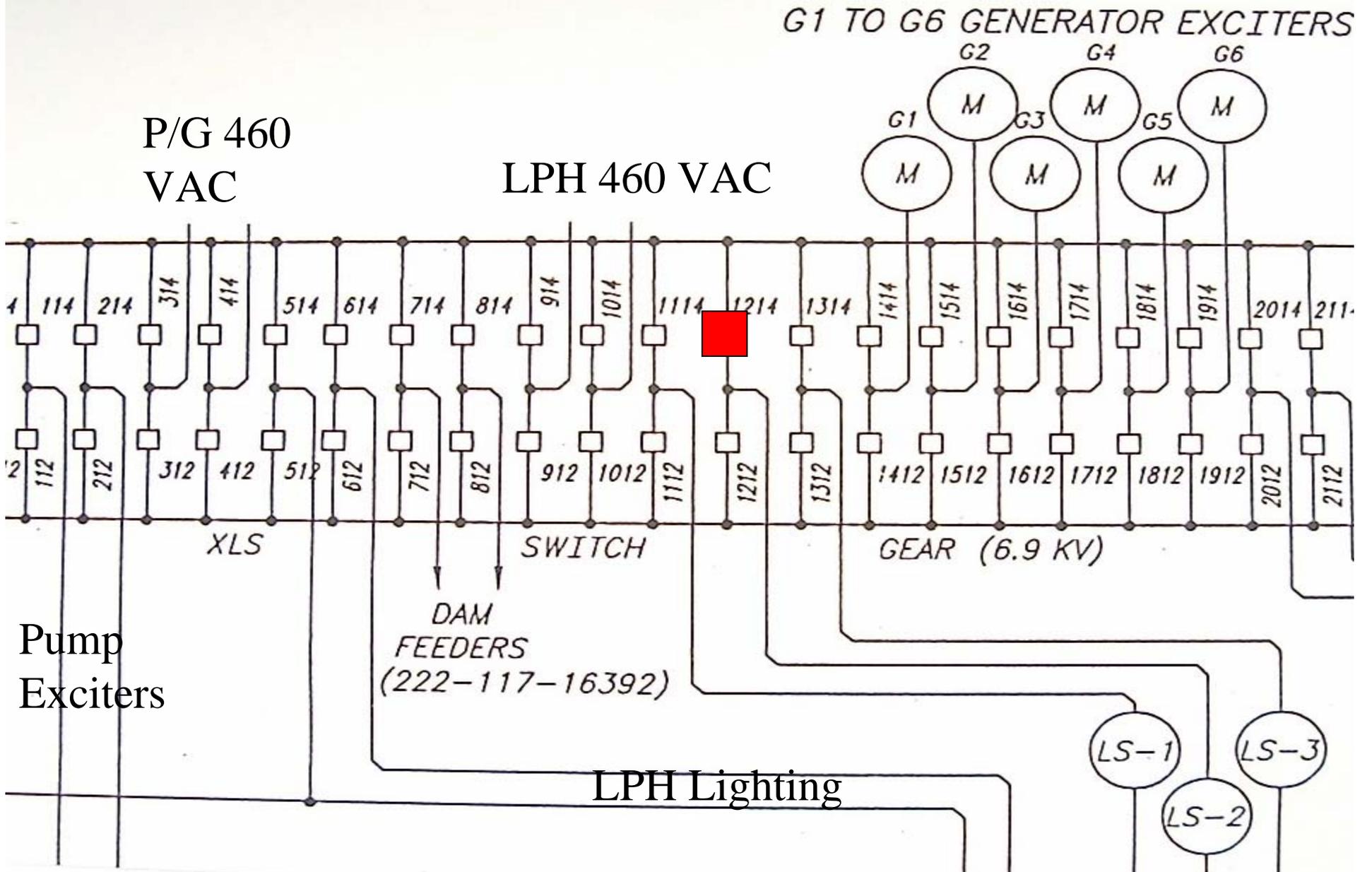
Grand Coulee Power Office

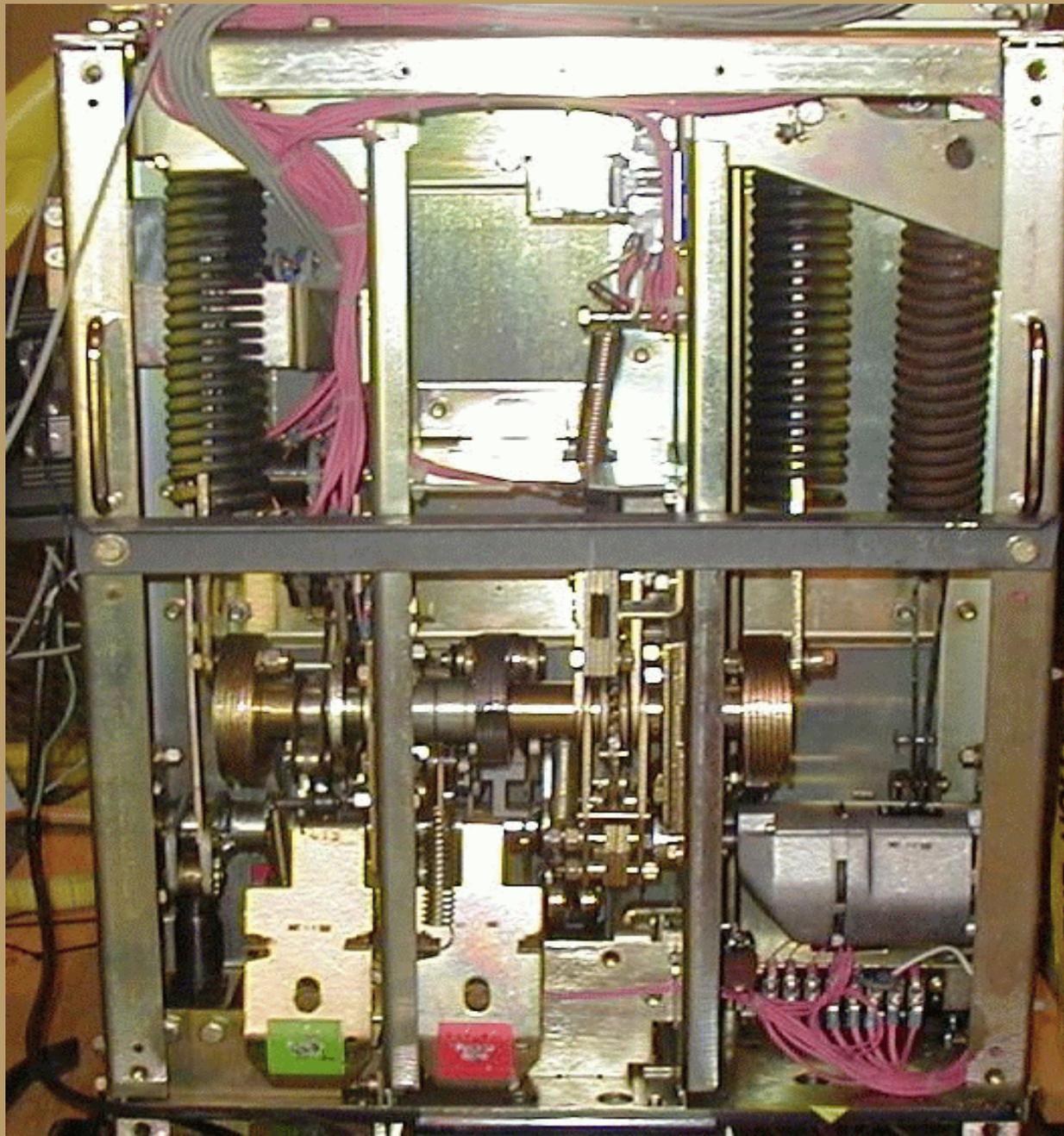
XLS Switchgear Failure

July 28, 2000

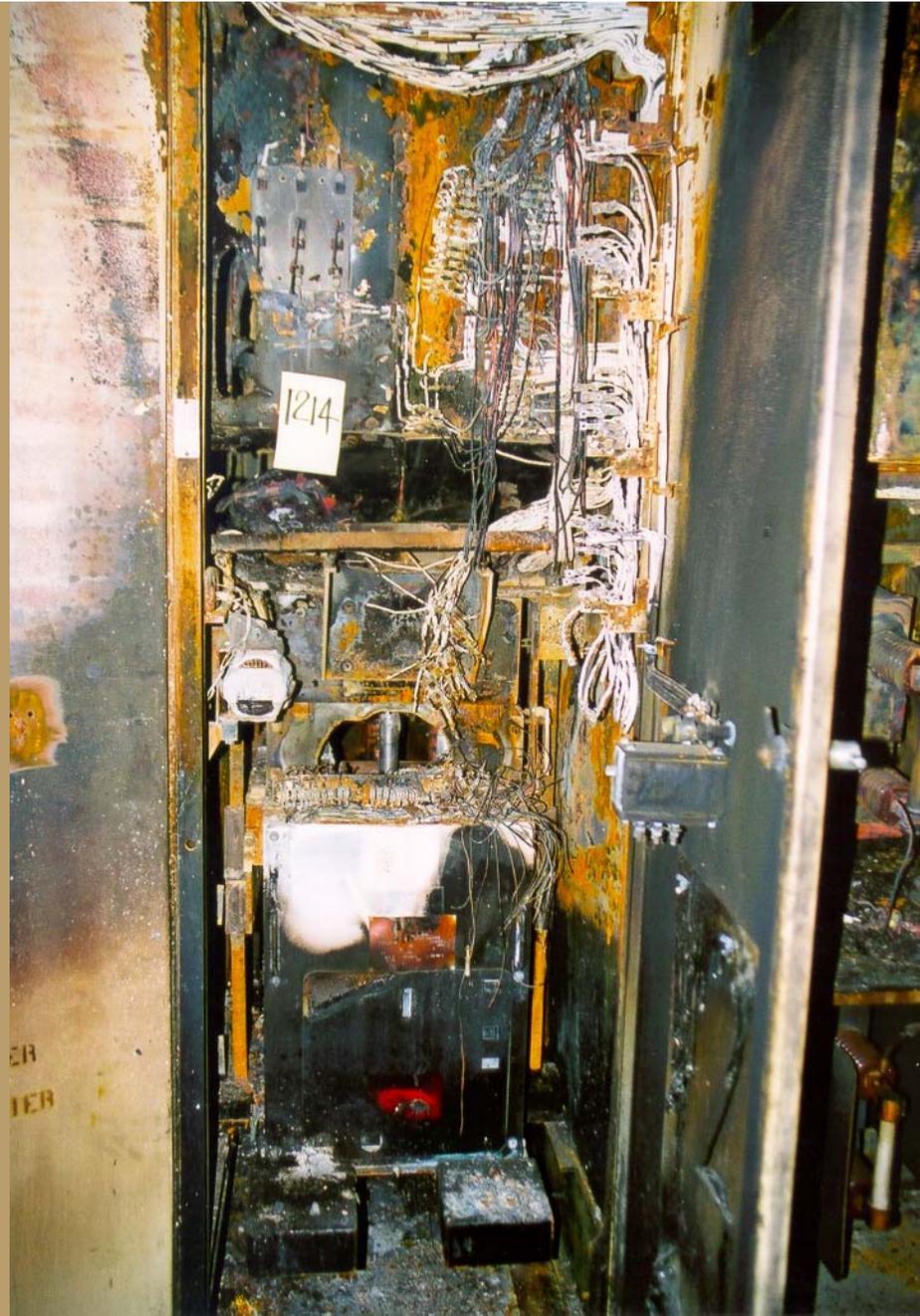
RECLAMATION



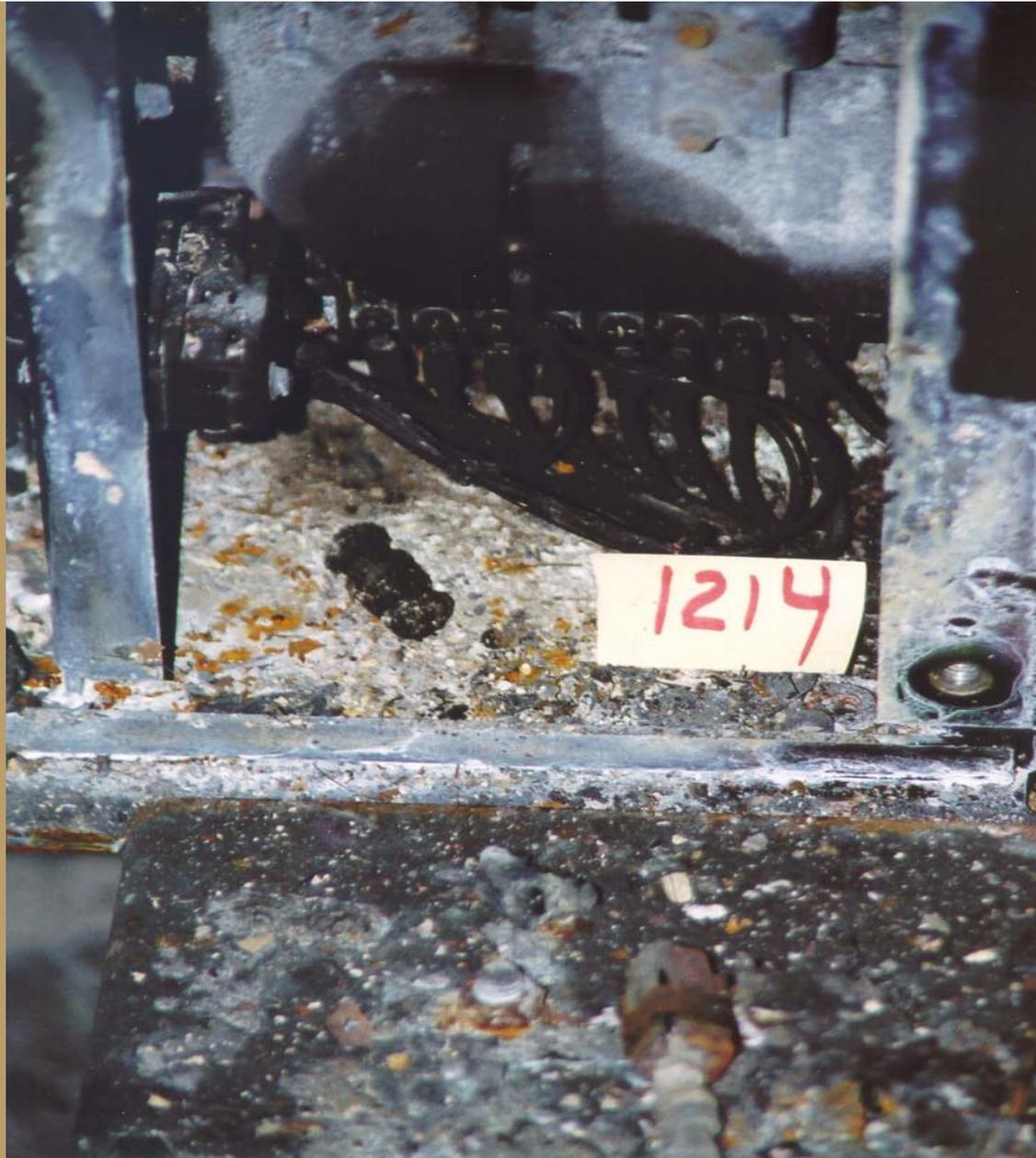




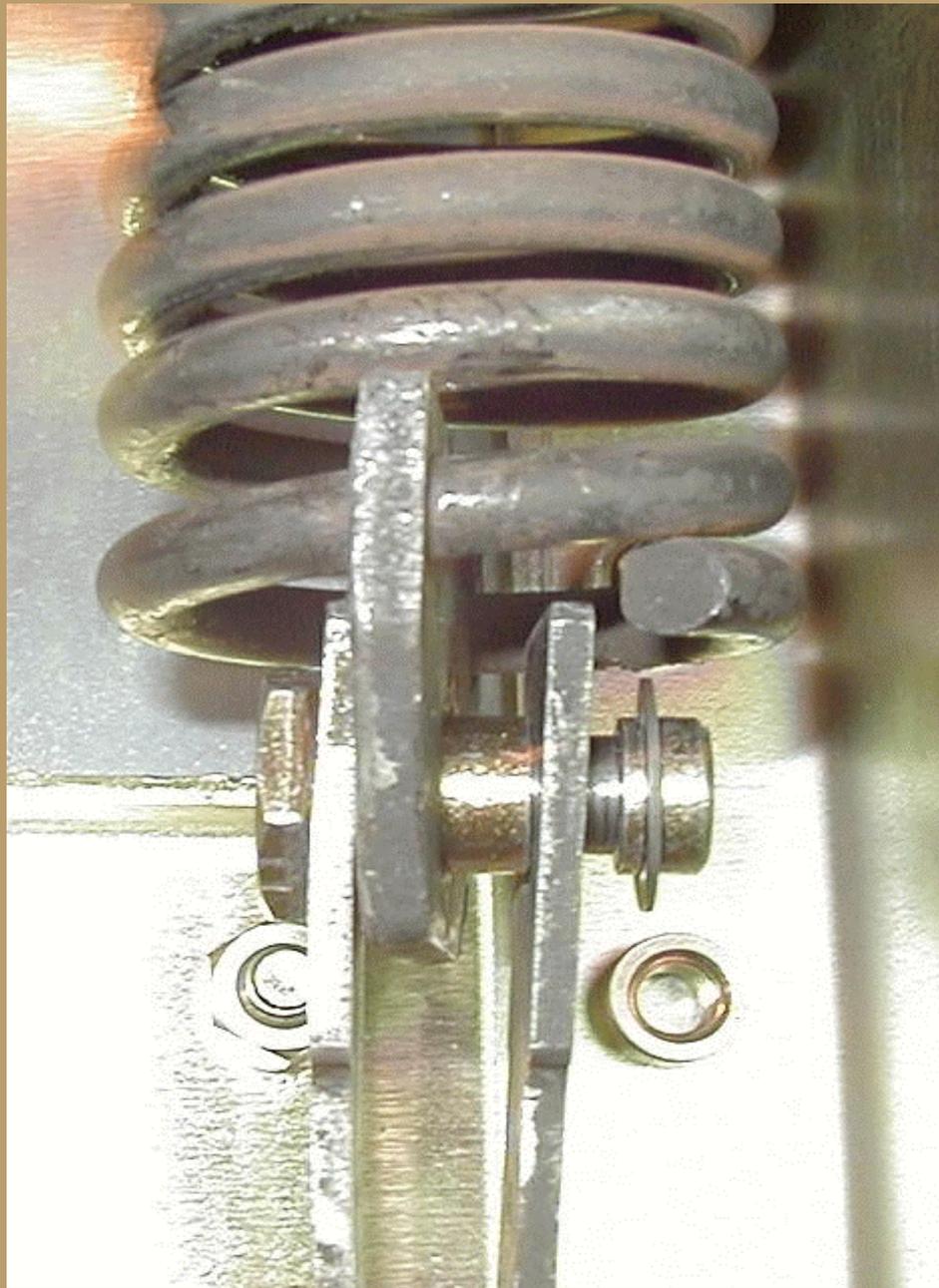
RECLAMATION



RECLAMATION



RECLAMATION



RECLAMATION

In Place at Time of Incident

- Emergency Action Plan (Addresses Notification of Outside Agencies, etc.)
- Standing Operating Procedures (SOP's)—
Covers Operation of Specific Equipment
- Fire Detection and Alarm Systems
- Building had recently been brought up to meet current Life Safety Requirements

In Place at Time of Incident

- Alternate sources of electrical power to station service system (XLS)
- Alternate sources of electrical power to electrical loads throughout the project
- Critical control systems operated from battery system(s).
- Uninterruptible Power Supply (UPS) for main computer control system (SCADA)

Lessons Learned

- Procedure(s) should be developed for system restoration, if possible, in addition to specific equipment operation.
- Station Service Systems should be reviewed from a 'worst case' scenario.
- Newly installed equipment subject to design deficiencies.

Learned Lessons

- Critical electrical loads should be identified and a means to provide temporary power addressed.
- An updated list of resources/assistance should be readily available.
- You are pretty much on your own to determine contamination and deal with cleanup.

RECLAMATION

Learned Lessons

- Procurement processes take time--even in an 'emergency'.
- Safety expertise may be required in specialized fields such as industrial hygiene, including ability to perform tests/analysis.

Questions?

RECLAMATION

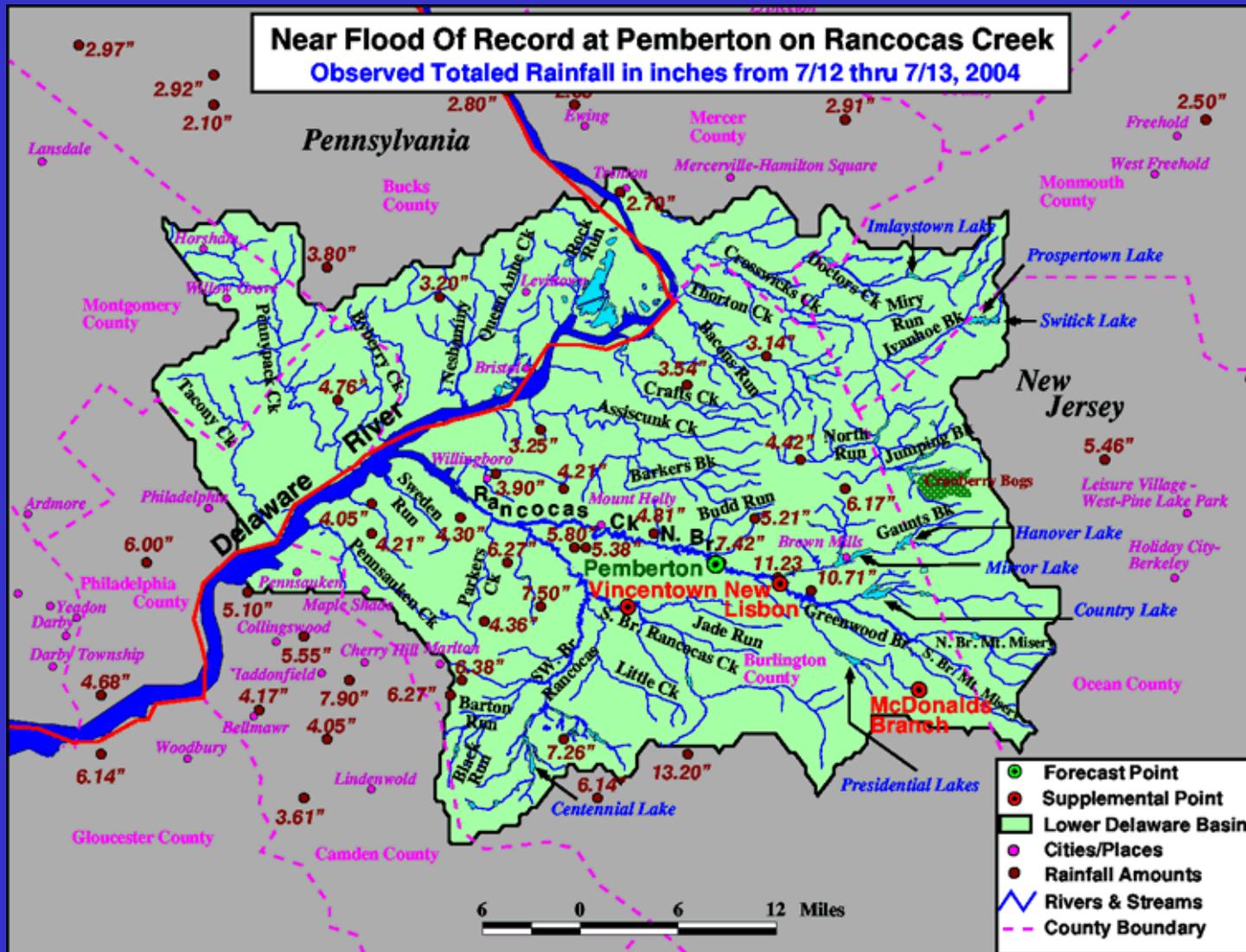
Burlington County, NJ

Dam Failures

July 12, 2004



The Rainfall Event



Failed Dams

High Hazard

None

Significant Hazard

Lower Aetna Dam
Upper Aetna Dam
Kenilworth #2 Dam
Papoose Lake Dam
Stokes Lower Dam
Lake Stockwell Dam
Birchwood Lake Dam
Camp Inawendiwin Lower Dam

Low Hazard

Blue Lake Dam
Crane Lake Dam
Camp Inawendiwin Upper Dam

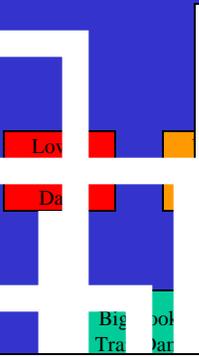
Unclassified Dams

Third Street Dam
Hinchman Dam
Lower Reeves Dam
Reeves Dam B
Lost Lake Dam
Elmwood WW Dam
Squaw Lake Dam

Squaw Lake Dam

Lake Stockwell Dam

Papoose Lake Dam



Dam Safety Impact

18 Failed Dams

27 Damaged Dams

**Numerous other water control structures failed
or damaged**

Post Disaster



Interagency Waterway Infrastructure Improvement Task Force



FEMA 1530 DR NJ

Findings of the Task Force:

1. The storm of July 12-15, 2004, was, beyond a reasonable doubt, **a 1000-year storm.**
2. Several of the dams along the Rancocas waterway **did not meet current construction standards.**
3. There were **no Emergency Action Plans** for many of the impacted dams.
4. The Dam Safety Bureau (NJDEP) has **inadequate enforcement powers** to insure compliance with its rules and regulations.
5. There was **no working alarm system** to alert the residents along waterways of potential flooding.
6. Local, county, and state emergency workers, both professional and volunteer, did an outstanding job to protect life and property.

Post Disaster

Recommendations of the Task Force:

1. Legislative action be taken to **provide greater enforcement and penalties** for lack of compliance to the rules and regulations relating to Dam Safety.
2. **Greater emphasis be placed on dam inspection** to insure compliance by owner.
3. Consideration be given to **installing a state of the art alarm system to warn residents** of potential flooding.
4. The Dam Safety Bureau and State and County Offices of Emergency Management **provide training in preparing Emergency Action Plans**, and exercise development for local Emergency Management personnel.
5. Flood exercises be conducted on periodic basis.
6. Encourage Boy Scouts, Canoe Clubs, and similar groups to keep streams clear of Debris.
7. Continue this Task Force to assure continued interest by all concerned parties.
8. Have Task Force look into the possibility of having **insurance made available to dam owners** covering liability and property damage.
9. Have Task Force look into the possibility of having **dams bonded to guarantee funding is available for continued maintenance.**

Post Disaster

Lawsuits

Increased Dam Safety Awareness

Increased Enforcement Abilities (S1895)

Funding for Dam Safety