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Bull Shoals Unit 1 161kV Switchyard Feeder Repair

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Background



- Original Equipment – 52 years old.
- Unit 1 Oil filled cable pothead failed and exploded on Sept 6 2006.
- Resulting fire and fire suppression damaged oil insulated cable system
- Minor damage to power plant.

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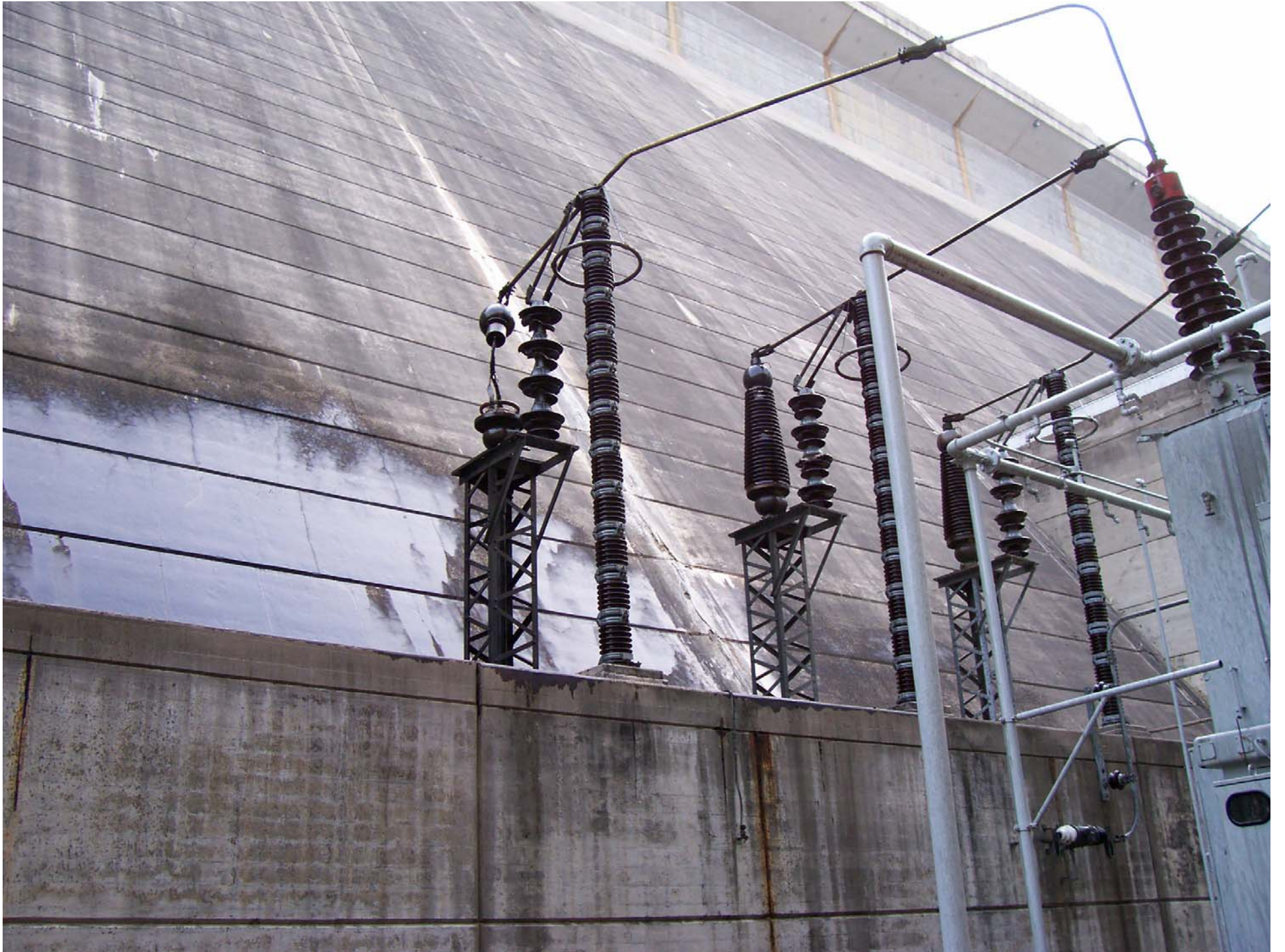
Background



- Transformer Unit 2 damaged and removed from service.
- Cause of fire – Failure of Pothead stress cone assembly and build up of combustible gas
- Power Plant lost all power and went in the Black. Power Plant Personnel restored service to plant in about 4 hours

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Post Event Activities



- **Restored Plant Operations**
- **Repair of Unit 2 Transformer (Corps and SWPA). Restored to Service Sept 21st.**
- **Analysis of Event**
- **Commanders Inquiry**
- **Independent Engineering Team**
- **Specialized Contractor**
- **Analyze Other Systems at Bull Shoals and Table Rock**

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Repair Options

- **Replace in Kind** **\$2.2 Million**
- **Advantages**
????
- **Disadvantages**
 - Long Lead Time**
 - Limited Number of Contractors**
 - Mean Time to Repair – Significant**
 - Abnormal System for similar plants in the region**
 - High Cost of Replacement**

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Repair Options

- **Overhead Extension**
- **Corps and SWPA Analyzed multiple Options**
- **New Structure on Roof - \$10 Million - Replaces All feeders**
- **Intermediate Towers - \$7 Million – Replaces All feeders**
- **Solid Bus to Switchyard – \$15 Million – Replaces All Feeders**
- **Overhead Cable Bus – All Feeders**
- **Installation of Overhead Cables (from the dam to the switchyard) for Unit 1 – work to be done by SWPA and Corps**
- **Replacement of existing Potheads, transformer bushings and lightning arrestors for Units 2 through 8 – \$900 Thousand**

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Recommended Repair Option



**Installation of Overhead Cables (from the dam to the switchyard) for Unit 1
By SWPA and Corps**

**Replacement of existing Potheads, transformer bushings and lightning
arrestors for Units 2 through 8 – \$900 Thousand**

Advantages

Shorter Time to Repair

Least Cost to Repair

Decrease Mean Time To Repair

SWPA has many components on hand

SWPA and COE to do Engineering Design In House

Maintains the reliability of the existing cable system

Disadvantages

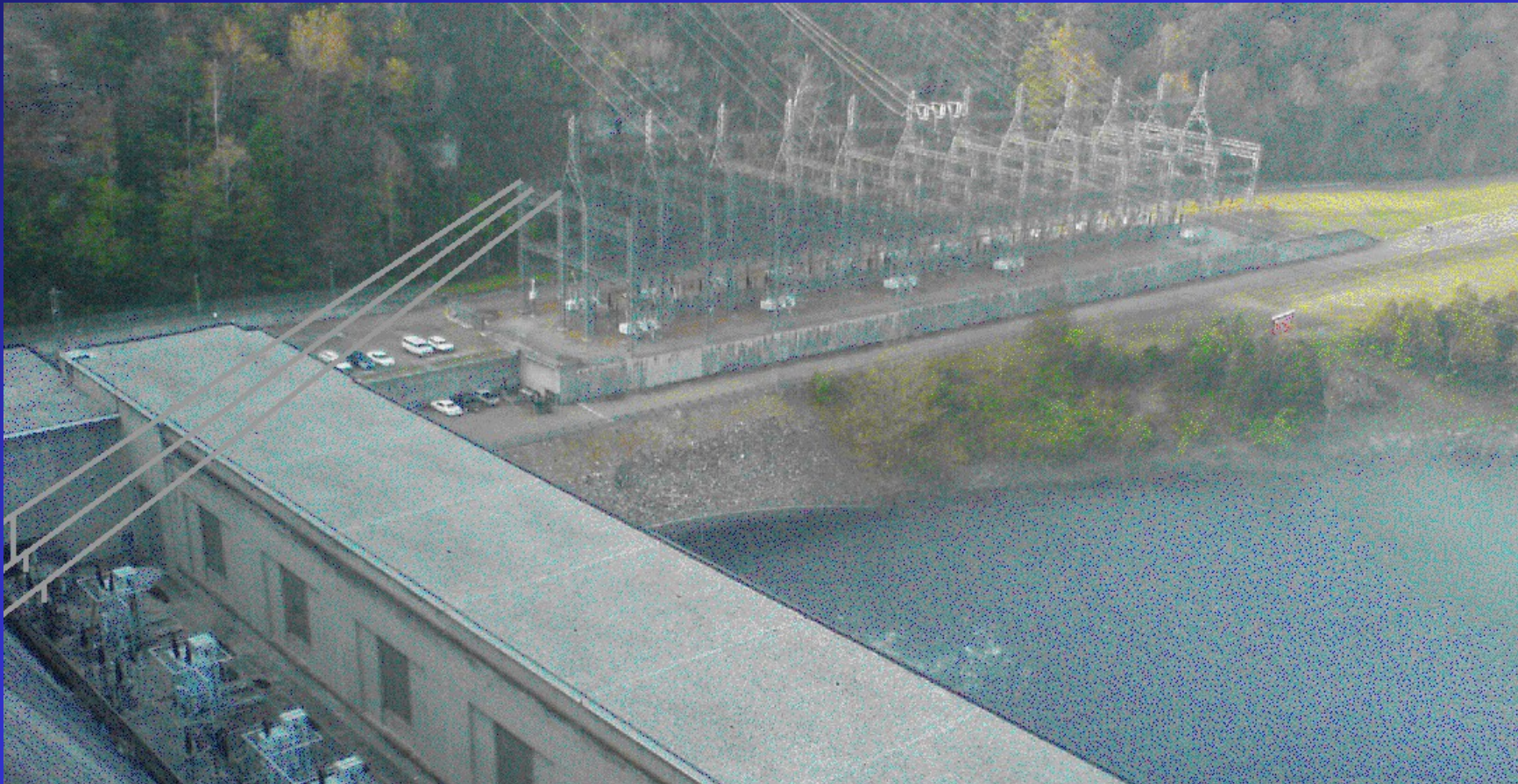
None

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Overhead Line Option



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Future Work



Complete Design Work and Issue Contracts as necessary.

SWPA Install Line for Unit 1

Repair and Restore Unit to Service - ASAP

Corps to Continue to analysis and test other systems

Replace remaining Potheads, Transformer bushings, and lightning arrestors.

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Conclusion



**Bull Shoals Power Plant Employees and
Hydropower Test Crew - Did a Great Job to
restore plant after the explosion, fire, and plant
black out.**

**Immediate response by SWPA for the restoration
of Unit #2 Transformer**

Excellent Team Work Between Corps and SWPA

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QUESTIONS ??

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