

**BEFORE THE PUBLIC SERVICE
COMMISSION OF THE STATE OF MISSOURI**

SUMMARY OF MEETING

COMES NOW Union Electric Company d/b/a Ameren Missouri (Ameren Missouri or Company) and for its Summary of Meeting states as follows:

On October 14, 2014, at 11:00 a.m., a tour of the Taum Sauk Energy Center was held.

Participants from Ameren Missouri included Director Hydro Operations Warren Witt, Manager Plant Operations Bart Mabry, Manager Regulatory Accounting Laura Moore, Manager Regulatory Affairs Gaye Suggett, and State Regulatory Liaison Cathy Hart.

Participants from the Missouri Public Service Commission included: Commissioner Scott Rupp; MPSC Staff Debbie Bernsen, Derick Miles, Gary Bangert, Kay Niemeier, Brian Wells, Jason Kunst, Tammy Huber, Jerry Scheible, and Clair Eubanks. Dustin Allison from the Office of the Public Counsel was invited.

Respectfully Submitted,

/s/ Wendy K. Tatro

Wendy K. Tatro, #60261

Director & Assistant General Counsel

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**ATTORNEYS FOR UNION ELECTRIC
COMPANY d/b/a AMEREN MISSOURI**

CERTIFICATE OF SERVICE

The undersigned certifies that a true and correct copy of the foregoing document was sent by electronic transmission, facsimile, U.S. Mail or e-mail to all parties of record in all of its contested cases pending before the Missouri Public Service Commission on this 17th day of October, 2014.

/s/ Wendy K. Tatro

Wendy K. Tatro

Taum Sauk Pumped Storage Energy Center

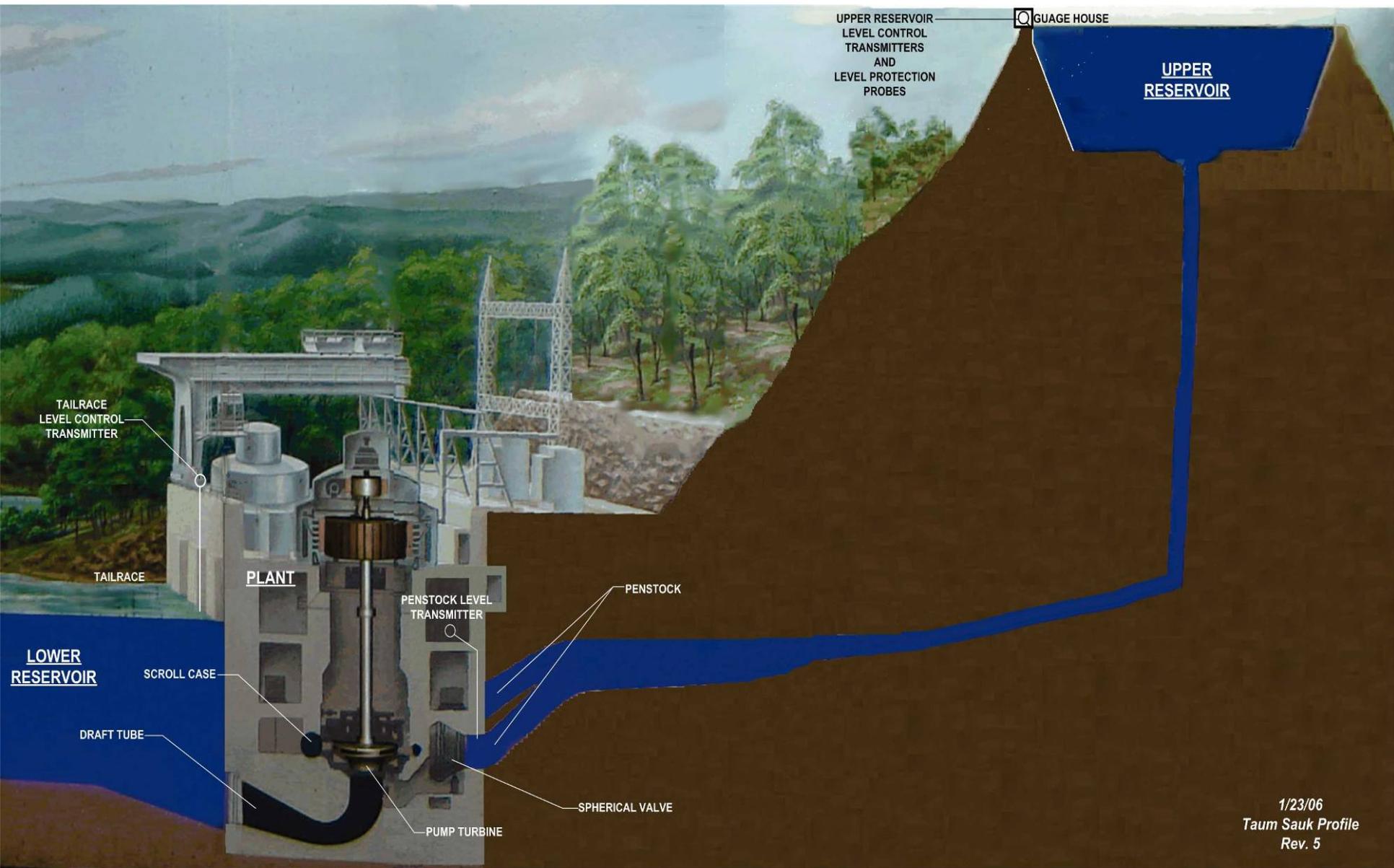
Warren A. Witt
Director of Hydro Operations
Ameren Missouri



AMEREN HYDRO GENERATION

- Keokuk Energy Center
 - 15 units, 140 MW, 100 years old
- Osage Energy Center
 - 8 units, 240 MW, 82 years old
- Taum Sauk Pumped Storage Energy Center
 - 2 units, 440 MW, 50 years old
- ~2% of Ameren generation

PUMPED STORAGE OPERATION OVERVIEW

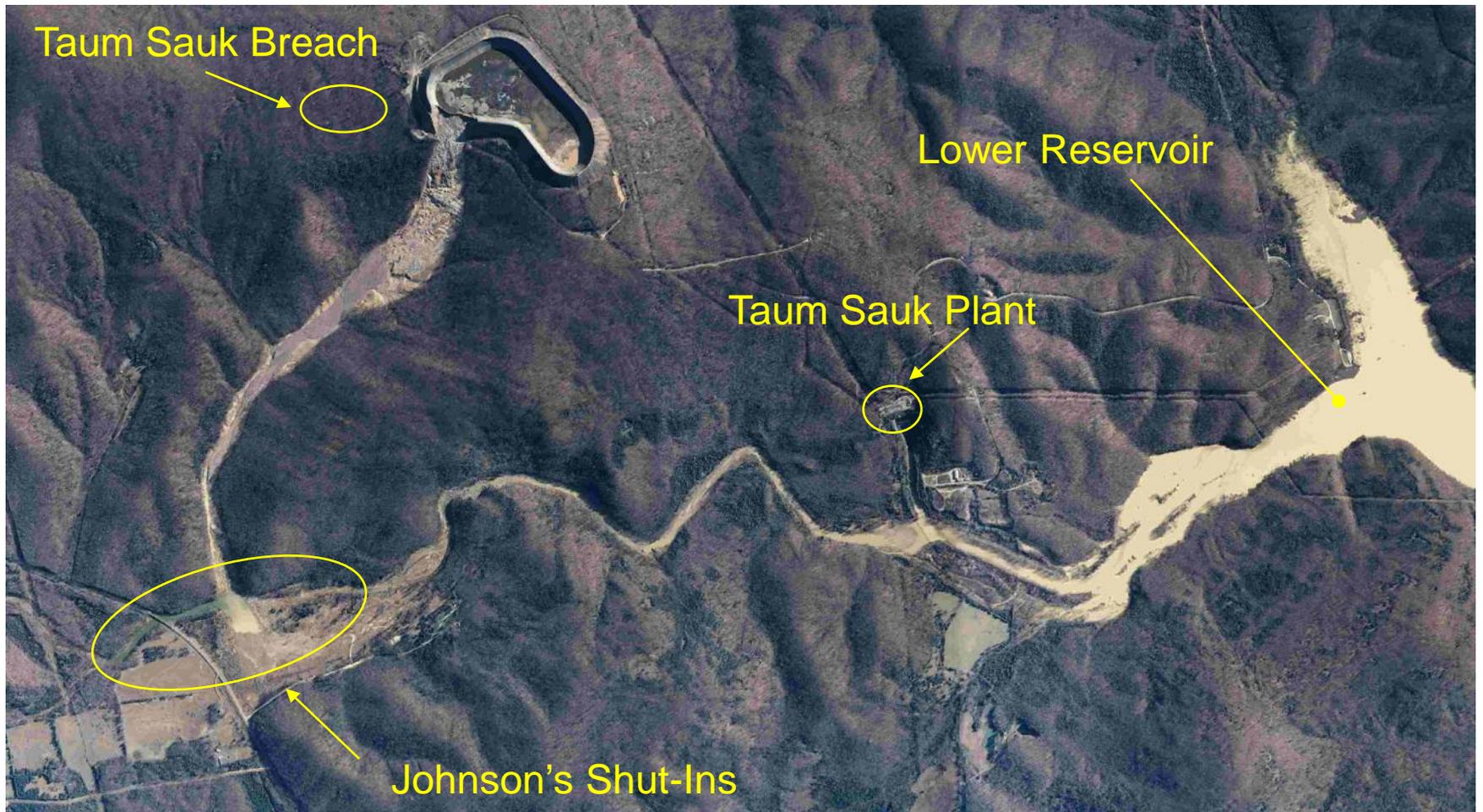


TAUM SAUK BASICS

- ❑ Location: Reynolds County, Missouri
- ❑ Production Capacity: 440 MW
- ❑ Maximum Operating Head: 860 ft
- ❑ Number of Units: 2 pump turbines
- ❑ Began Operation: 1963
- ❑ Reservoir Size:
 - Upper: 51 acres
 - Lower: 370 acres
- ❑ Type:
 - Upper: Concrete Gravity—Sym. RCC
 - Lower: Concrete Gravity
- ❑ Height:
 - Upper: Approx. 125 ft above bedrock
 - Lower: 55 ft
- ❑ Length:
 - Upper: 6800 ft
 - Lower: 390 ft



INCIDENT SITE



WATER LEVEL CONTROL SYSTEMS

- **Level Control – Normal Operations**
 - **Low & High Probes**
 - Differential Pressure & Radar
 - Run-time Checks
- **Level Protection**
 - **High Level & High-High Level Probes**
 - Conductivity
 - Mechanical Float Switch
- **Continuous Video Camera & Staff Gage**
 - Including adequate lighting
- **Overflow Release Structure (ORS)**
 - Ultrasonic Gap Switch
- **Redundant Power Systems, Including a UPS**

UR WARRICK
CABINET 1

UR WARRICK
CABINET 2

UR WARRICK
CABINET 3

WARNING

WARNING
DANGER OF ELECTRIC SHOCK
DO NOT OPEN THIS CABINET
UNLESS YOU ARE QUALIFIED

WARNING

WARNING

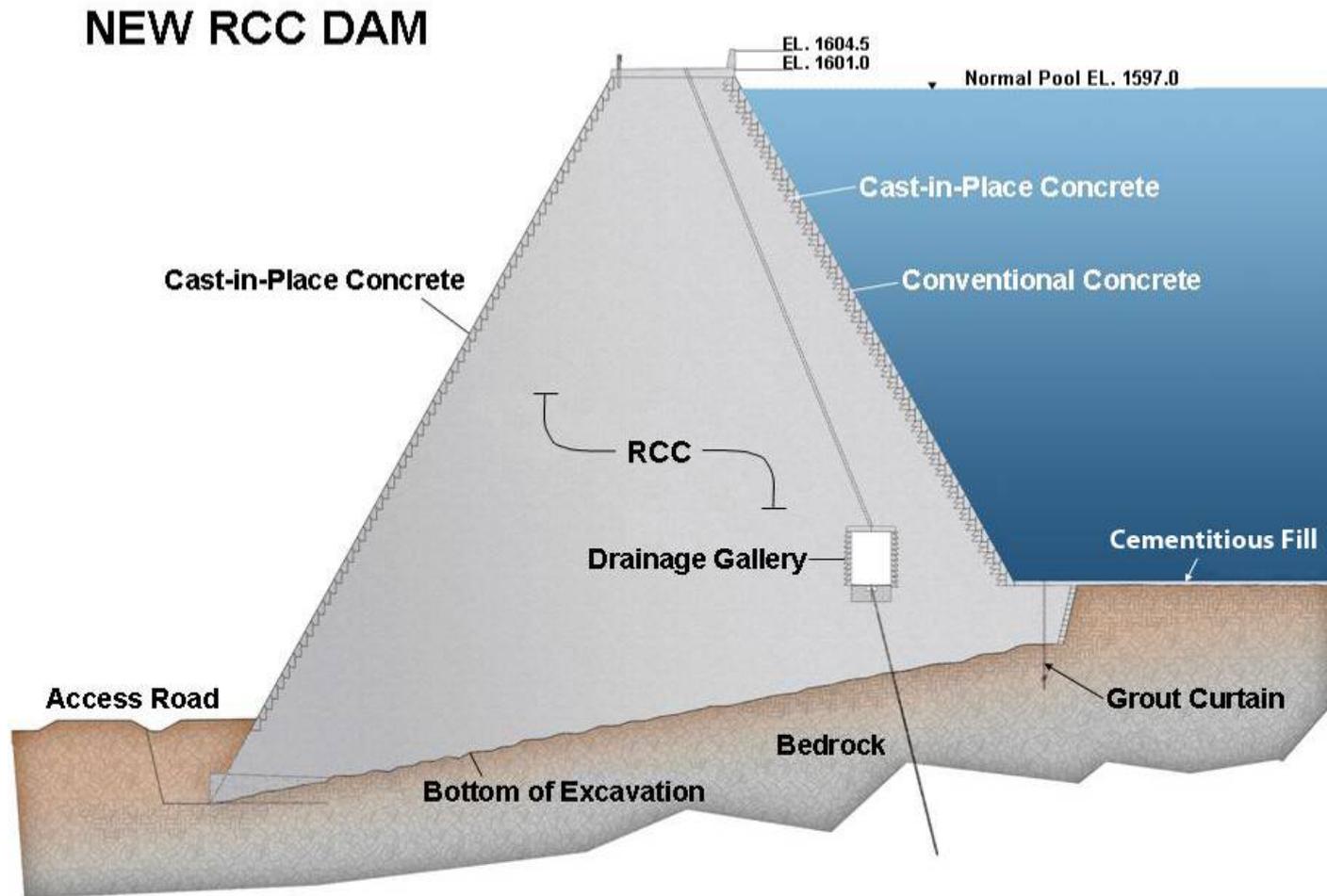




02/06/2010 11:33

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DESIGN CROSS SECTION



FOUNDATION EXCAVATION



AGGREGATE PRODUCTION



04/11/2008 07:34

Ozark crushed and stockpiled coarse and fine aggregate in the upper reservoir bowl area.

ON-SITE RCC BATCH PLANTS



12/29/2007

UPPER RESERVOIR OCTOBER 29, 2008



COMPLETED REBUILD NOVEMBER, 2009



UPPER RESERVOIR MILESTONES

- **Breach occurred December 14, 2005**
- **FERC authorization to reconstruct the Upper Reservoir Dam on August 15, 2007**
- **Initial RCC placement October 10, 2007**
- **Final RCC placement November 2009 (2,838,216 C.Y. RCC)**
- **Total concrete required was 3,200,640 C.Y.**
- **Over 800 personnel on-site at height of construction**
- **First filling of the Upper Reservoir on February 27, 2010**
- **Plant returned to commercial operation on April 15, 2010**



TAUM SAUK DAM VS. HOOVER DAM

Taum Sauk Dam

- **Total Concrete – 3.2 Million Cubic Yards**
- Total Cement Used – 1.1 Million Barrels
- Total Excavation – 4.6 Million Cubic Yards
- Personnel at Height – 800
- Construction Duration – 2 Years
- Total Height – Approx. 100 Feet



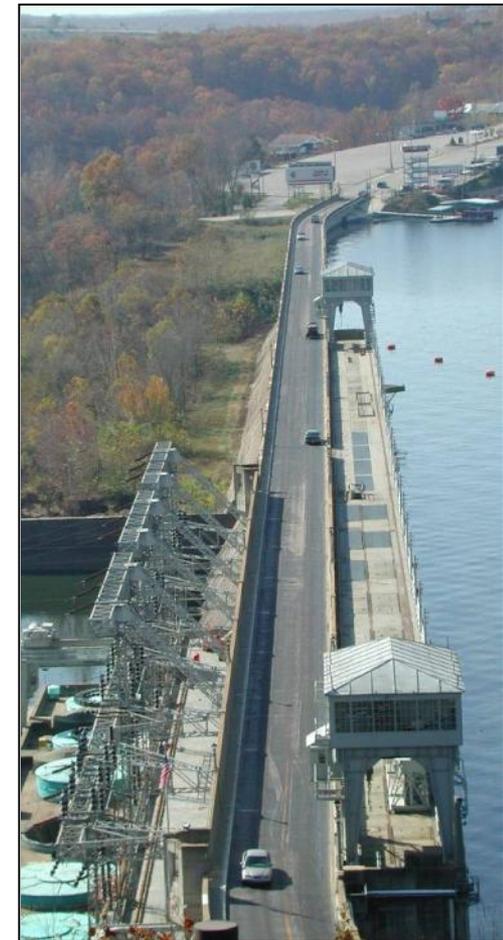
Hoover Dam

- **Total Concrete – 3.25 Million Cubic Yards**
- Total Cement Used – 5 Million Barrels
- Total Excavation – 1.76 Million Cubic Yards
- Personnel at Height – 5,200
- Construction Duration – 2 Years
- Total Height – 726.4 Feet



CHANGES IN AMEREN AFTER INCIDENT

- Settlement agreement between Ameren and FERC required Ameren to implement a Dam Safety Program
- Increased awareness of potential dam hazards
- Developed computerized commitment tracking system
- Renewed dedication to dam safety at all facilities
- QMS Implementation



TAUM SAUK RECENT ACTIVITIES

- Complete electrical systems upgrade (ICE) during rebuild outage
- Unit 1 generator failure in June, 2011
 - Returned to service in April, 2012 (10 months)
- Fall 2013 Outage
 - Rewound Unit 2 generator, completed Feb. 2014
 - Larger servomotors to address wicket gate (turbine ctrl valve) operation
 - Penstock inspection, first drain of upper reservoir
 - Replaced inlet valve seals on both units
 - Scroll case weld repairs

NEW TAUM SAUK LICENSE – JULY 2014

- Original license 1960 – 2010
- New license is for 30 years, 2014-2044
- New plans required, coordinate with MDC, MDNR, USFWS
 - Water Management Plan
 - Bat Management
 - Fish Recovery
 - Historic Property Management
 - Recreation Management
 - Rock and Sediment Management

NEW TAUM SAUK LICENSE

- Annual requirements
 - Water Management report
 - Two USGS gauge payments
 - Fish stocking and fish habitat report
 - Upper and Lower Reservoir re-vegetation report
 - Annual FERC administration fee
 - Rock and Sedimentation report
- Modifications required
 - Revise upper reservoir lighting
 - Add fish habitat
 - Remove construction parking lot structures