

OPERATION REPORT
FEDERAL ENERGY REGULATORY COMMISSION
OFFICE OF ENERGY PROJECTS
DIVISION OF DAM SAFETY AND INSPECTIONS
CHICAGO REGIONAL OFFICE

For the period October 23, 2003 to September 30, 2004

Licensee Ameren UE Project No. 2277

Project Name Taum Sauk NATDAM Nos. MO30040 and MO30041

Location East Fork, Black River Reynolds Missouri
(Water or reservation) (County) (State)

License issued August 26, 1965 Expires June 30, 2010 Type Major
Effective July 1, 1960

Date of last amendment March 3, 1977, Amended License Articles Nos. 7 and 35

Inspected by Teodor Strat & Michael Davis Date September 30, 2004

Parts of Project Inspected All visible portions of water-retaining structures

Weather 70 degrees F., clear and dry.

Accompanied by Mr. Rick Cooper, Steve Burnett, Steve Bluemner, Charles Fronick, and Jeff Scott, representing the licensee

Summary

The impoundment and control structures appear to be in satisfactory condition with no deficiencies affecting dam or public safety. The licensee continues an effective program of inspection and maintenance. Security measures were discussed and appropriate actions taken. The licensee is in compliance with the license requirements.

Submitted: December 23, 2004

By: Teodor Strat,
Teodor Strat, P.E

PERTINENT DATASHEET

----- FERC.... D2SI.... Chicago Regional Office-----

General Data

Dam Number:	02277-01-01	River:	E FK BLACK
Project Name:	TAUM SAUK P/S	Drainage Area (sq/mi):	0
Development:	TAUM SAUK	D/S Hazard:	H
Lake Name:	UPPER RESERVOIR	DS City :	LESTERVILLE
Dam Name:	TAUM SAUK PS UPPER	Distance (mi):	6
State,County:	MO REYNOLDS	Completion Date:	1963
USGS Quad:	JOHNSON SHUT-INS 7.5'		
Latitude:	37.5333	Last Inspection Date:	9/30/2004
Longitude:	-90.8167		

Hydrologic Data

PMF (cfs):
 IDF (cfs):
 100-YR Flood (cfs):
 Flood of Record (cfs): No Data
 Minimum Flow Required (Y/N):
 Lowest Minimum Flow (cfs):

Reservoir Data

Surface Area (acres):
 Normal: 54.5
 Pool Elevation (msl)
 Max: 1,597.00
 Normal: 1,589.00
 Minimum: 1,505.00
 Reservoir Storage (acre-ft)
 Maximum: 4,360
 Normal: 2,560

Project Works

Type of Dam:
 Type 1: ROCKFILL
 Type 2:
 Type 3:

Dam Height (ft): 84
 Dam Crest Elevation (msl): 1597
 Length of Dam (ft): 6562
 Flashboards installed (Y/N): N
 Flashboard Elevation (msl): Not Applicable
 Uncontrolled Spillway Length (ft): N/A
 Uncontrolled Spillway Crest (msl): N/A
 Number of Powerhouses: 1
 Authorized Gen. Capacity (kW): 408,000
 Number of Generating Units: 2
 Number of Penstocks: 1
 Number of Canals: 0
 Number of Tunnels: 3
 Number of Locks: 0

Safety Requirements

Consultants Safety Inspection Report
 Required (Y/N) Y
 Latest Report Submitted 8/26/2003

Emergency Action Plan(EAP) Status: SAT
 Latest EAP/EAP Mod: 1/6/2004

Boat Restraining Barrier Req. (Y/N): N
 Mo. Day

Date In :
 Date Out:

Gate Count by Type

Category 1 Gates (Y/N): No

Tainter	Vert Lift	Slide	Drum	Bascule
0	0	0	0	0
Needle	Roller	Valve	Flap	Other
0	0	0	0	0

PERTINENT DATASHEET

----- FERC.... D2SI.... Chicago Regional Office-----

General Data

Dam Number: 02277-02-01	River: E FK BLACK
Project Name: TAUM SAUK P/S	Drainage Area (sq/mi): 88
Development: Taum Sauk - Lower Reservoir	D/S Hazard: H
Lake Name: Lower Reservoir	DS City : LESTERVILLE
Dam Name: TAUM SAUK PS LOWER	Distance (mi): 3
State,County: MO REYNOLDS	Completion Date: 1963
USGS Quad:	
Latitude: 37.4833	Last Inspection Date: 9/30/2004
Longitude: -90.8333	

Hydrologic Data

PMF (cfs): 120,464
 IDF (cfs): 120,464
 100-YR Flood (cfs):
 Flood of Record (cfs): 27,500 cfs 11/19/85 & 31,000 cfs 11/14/93
 Minimum Flow Required (Y/N): N
 Lowest Minimum Flow (cfs):

Reservoir Data

Surface Area (acres):
 Normal: 370
 Pool Elevation (msl)
 Max:
 Normal: 750
 Minimum:
 Reservoir Storage (acre-ft)
 Maximum: 4360
 Normal:

Project Works

Type of Dam:
 Type 1: GRAVITY
 Type 2:
 Type 3:

Dam Height (ft): 60
 Dam Crest Elevation (msl): N/A
 Length of Dam (ft): 390
 Flashboards installed (Y/N): N
 Flashboard Elevation (msl): Not Applicable
 Uncontrolled Spillway Length (ft):
 Uncontrolled Spillway Crest (msl):
 Number of Powerhouses: 0
 Authorized Gen. Capacity (kW):
 Number of Generating Units: 0
 Number of Penstocks: 0
 Number of Canals: 0
 Number of Tunnels: 0
 Number of Locks: 0

Safety Requirements

Consultants Safety Inspection Report
 Required (Y/N) Y
 Latest Report Submitted 8/26/2003

Emergency Action Plan(EAP) Status: SAT
 Latest EAP/EAP Mod: 1/6/2004

Boat Restraining Barrier Req. (Y/N): Y

	Mo.	Day
Date In :	04	01
Date Out:	11	15

Gate Count by Type

Category 1 Gates (Y/N): No

Tainter	Vert Lift	Slide	Drum	Bascule
0	0	0	0	0
Needle	Roller	Valve	Flap	Other
0	0	0	0	1

PERTINENT DATASHEET

----- FERC.... D2SI.... Chicago Regional Office -----

General Data

Dam Number: 02277-03-01	River: E FK BLACK
Project Name: TAUM SAUK P/S	Drainage Area (sq/mi): 65
Development: Gravel Trap	D/S Hazard: L
Lake Name:	DS City : LESTERVILLE
Dam Name: GRAVEL TRAP DAM	Distance (mi): 7
State,County: MO REYNOLDS	Completion Date: 1963
USGS Quad: JOHNSON SHUT-INS	
Latitude: 37.4833	Last Inspection Date: 9/30/2004
Longitude: -90.8333	

Hydrologic Data

PMF (cfs): 85000
 IDF (cfs): N/A
 100-YR Flood (cfs): No Data
 Flood of Record (cfs): No Data
 Minimum Flow Required (Y/N):
 Lowest Minimum Flow (cfs):

Reservoir Data

Surface Area (acres):
 Normal: 4
 Pool Elevation (msl)
 Max: 748.00
 Normal: 748.00
 Minimum: 748.00
 Reservoir Storage (acre-ft)
 Maximum: 20
 Normal: 20

Project Works

Type of Dam:
 Type 1: OTHER
 Type 2:
 Type 3:

Dam Height (ft): 8
 Dam Crest Elevation (msl): 746
 Length of Dam (ft): 400
 Flashboards installed (Y/N): N
 Flashboard Elevation (msl): Not Applicable
 Uncontrolled Spillway Length (ft):
 Uncontrolled Spillway Crest (msl):
 Number of Powerhouses: 0
 Authorized Gen. Capacity (kW):
 Number of Generating Units: 0
 Number of Penstocks: 0
 Number of Canals: 0
 Number of Tunnels: 0
 Number of Locks: 0

Safety Requirements

Consultants Safety Inspection Report
 Required (Y/N) N
 Latest Report Submitted

Emergency Action Plan(EAP) Status: N
 Latest EAP/EAP Mod:

Boat Restraining Barrier Req. (Y/N): N
 Mo. Day

Date In :
 Date Out:

Gate Count by Type

Category 1 Gates (Y/N): No

Tainter	Vert Lift	Slide	Drum	Bascule
0	0	0	0	0
Needle	Roller	Valve	Flap	Other
0	0	0	0	0

A. DOWNSTREAM HAZARD POTENTIAL

The hazard rating for the Upper Dam was established following the 1989 operation inspection and review of the 1988 revisions to the EAP. A dam failure analysis was performed for the EAP, which qualitatively assessed the impacts of a breach in both the Upper and Lower Dams. The analysis did not determine the incremental rise in the downstream water surface elevation or the quantitative impacts on structures. The EAP only discusses a normal condition failure event since the Upper Dam is a pumped-storage reservoir. The Johnson Shut-Ins State Park and campgrounds are at risk from a failure of the west side of the Upper Dam. There are no developments in the projected floodway from a failure of the north or east sides. The flood wave from a failure of the Upper Dam would eventually flow into the lower reservoir via the Black River and place the recreational users of the lower reservoir at risk.

The present hazard rating for the Lower Dam was established following the 1999 operation inspection. After reviewing available data on the most recent (1986) significant flooding compared to the qualitative analysis for the EAP, we concluded that about 25 structures would be flooded due to the failure of the dam, with the first structure being flooded within 15 minutes from the time of failure.

A failure of the Lower Dam during normal flow conditions might create a high risk for loss of life and significant property damage due to the proximity of the village of Lesterville and county highways.

Both the upper and lower dams are classified as having a high hazard potential. The licensee maintains emergency action plans for both dams. No change in development in the vicinity of the project was reported or observed during this inspection. The current **High** hazard potential rating for both dams is appropriate.

B. PROJECT SAFETY AND MAINTENANCE

This report includes 32 photographs and an exhibit annotated to show the position and orientation of the camera for each photograph. Exhibit 1 is a plan view of the project.

1. Dams, Dikes and Appurtenant Structures

This is a pumped-storage project, with an upper and a lower reservoir. The lower reservoir, operated as a run-of-river reservoir with outflow maintained approximately equal to natural inflow, provides storage for water to be pumped to the upper reservoir at night or during periods of low power demand. The water volume used to generate electricity is cycled between the lower and upper reservoir, so the water elevations of the lower and upper reservoirs fluctuate depending on the pumping/generating modes of operation and time of day. The project structures include a concrete faced rockfill dam

(dike), that encircles and forms the upper reservoir; a concrete gravity dam impounding the lower reservoir; a reversible turbine powerhouse; a gravel trap dam located upstream of outlet canal in the lower reservoir, and a small dike that impounds the seepage collection pond at the toe of the upper reservoir. The turbine/generator sets are designed to operate in reverse to pump water to the upper reservoir at night. During the daylight peak-demand hours, the turbine/generator sets operate in normal gravity-feed mode to generate electricity.

Upper Reservoir (Photographs 1 through 13):

Upper Dam- The upper reservoir is created by a kidney shaped ring dike (Upper Dam) at the top of a planed-off mountaintop. The rockfill Upper Dam has a maximum section approximately 94 feet high and is topped by a concrete parapet wall approximately 10 feet high (Photographs 1, 2 and 3).

At the time of the inspection, the upper dam was undergoing maintenance work (Photographs 1 through 4. Note the morning glory intake shown in photographs 5 and 6). Specifically, the upstream face of the upper dam was being lined with geomembrane. The purpose of this work is to minimize the leakage through the rockfill dam. To conduct this work the licensee emptied the reservoir. Therefore, no leakage was noted at the time of this inspection. The underlying riprap appears stable and in good condition. No unusual settlement or displacements were noted in the crest or parapet wall (Photographs 7 through 10). Pattern cracking is present in the parapet wall, as noted in our previous inspections. The cracking has not changed appreciably since our previous inspection (Photograph 9).

Leakage previously noted is being adequately monitored and is reported to the FERC biannually. Over the past several years the leakage rate has gradually increased approximately 2-fold; however, it stabilized somewhat since 2002. Geomembrane was purchased in 2002 and was stockpiled on-site for installation in fall 2004. The work was originally scheduled to be completed in 2002 but was halted due to contractor delay in finishing the work. The work was to resume in the fall of 2003 but was again delayed to fall of 2004. The licensee had budgeted \$2 million to complete the work this fall. Following the inspection we spoke with Mr. Cooper and learned that the work had been completed in November 2004.

A concrete lined access tunnel is located on the northeast side of the Upper Dam, which allows access to the floor of the reservoir when it is dewatered. The access tunnel was inspected and found to be in good condition (Photographs 11 and 12). Except for the crack in the crown of the tunnel, no significant cracks or leakage were noted in the lining.

Collection Pond Dike- Drainage ditches surrounding the toe of the dike direct all leakage into a collection pond (Photograph 13). A small dike retains water in the collection pond, where it is pumped back into the upper reservoir. When the leakage rate

exceeds the pump back capacity, water spills from the collection pond and eventually flows into the lower reservoir.

Lower Reservoir (Photographs 14 through 20):

Concrete Dam- The lower reservoir gravity dam is about 60 feet high and 390 feet long founded on rock with rock abutments at each end (Photographs 14 - 17). Both abutments were in good condition at the time of our inspection with no signs of instability or excessive seepage (Photographs 16, 17, and 19). The concrete appeared to be in good condition with no evidence of significant cracking, spalling, deterioration, or displacements. Minor leakage was noted along horizontal joints in the monoliths but the discharge was very small (Photographs 16 and 17).

The minimum flow gate was open 3% at the time of our inspection with a flow of approximately 0.75 cfs. No other flow was occurring over the dam. The plunge pool below the toe of the dam appeared to be in good condition (Photograph 18).

Minor modifications were made to the dam recently. A steel deck, stoplog rack, and lifting beam were added for storage and placement of stoplogs at the sluice gate bay (Photograph 20). This work was completed during the summer of 2003 and was not coordinated with the FERC. Upon review following our 2003 inspection, we found that the new deck would have no significant impact to the spillway capacity or stability of the dam, and therefore no further coordination with the FERC is recommended. In addition to these modifications, the licensee replaced the cables on the boat barrier with stainless steel cables.

Gravel Trap Dam: The gravel trap dam is a low head low hazard potential steel sheet-pile and rock crib structure designed to trap gravel in the East Fork of the Black River before it washes into the lower reservoir. This structure, which is also referred to as a bin wall, is located just upstream of the confluence of the powerhouse tailrace and the lower reservoir. It consists of two rows of sheetpile driven into the bedrock with rockfill in between. The previous operation inspection report indicated that the steel sheet piling was plumb with no separation of interlocks or leakage of fill. The crest of the dam is at elevation 746 feet, which is below the crest elevation of the overflow spillway at the lower dam. The bin wall is designed to leak when the lower reservoir drops below 746 feet. About 30,000 cubic yards of material are excavated from upstream side of the bin wall every three to five years.

Pump/Powerhouse (Photographs 21 through 32):

We inspected each level of the pump house/powerhouse and observed no significant cracking, concrete deterioration or other structural distress (Photographs 21 - 27). No leakage in the abutment (in the exterior of the powerhouse), where the steel penstocks exit the tunnel portal, was noted.

We noted that there was runoff exiting the slope above the penstock portal. Since the quantity of seepage is small, and the licensee is monitoring the seepage, we recommend continued monitoring.

The headwall, where the steel penstocks enter the powerhouse, appeared in good condition with no significant cracking, and with efflorescence and very minor leakage from the joint around the opening (Photograph 26).

Since power generation was down to conduct the maintenance work at the upper dam, the licensee was conducting minor maintenance work on the units, sump pumps and the computer system.

2. Spillway Gates and Standby Power

Certification of gate operation is not required for the Taum Sauk Project. The lower dam contains a sluice gate and pipe gate used to regulate run-of-river and minimum flows, respectively. Both gates can be operated remotely from the plant via microwave station, or manually. The large sluice gate can pass up to 2,500 cfs. The gate motor, rising stem, gear box and manual crank appeared in good condition. Backup power for the main sluice gate is a manual hand crank. The 20-inch diameter pipe is equipped with an electronic cutoff that stays 5% open to pass minimum flows. Debris is cleaned from the gates, on an as-needed basis, by an outside contractor. Neither gate is needed to pass the flood flows, as the dam is designed as an overflow structure. Gate valves in the powerhouse are used to isolate the pumps/generators from the penstock tunnel and upper reservoir. Steel bulkheads for the draft tubes, now stored on the upstream rack, were in good condition.

3. Power Plants

There have been no modifications to the generating equipment. The turbine nameplate ratings are 295,000 HP with a flow of 2,650 cfs under a 790 feet head. The generators are each rated at 204,000 KW, but we learned that power generation can be as much as 220,000 KW with an 80% gate opening. The optimum RPM of the units is 200. During an emergency the gates can be closed in less than 2 minutes to avoid water hammer.

The power plant equipment is well-maintained and clean (Photographs 25 - 32). At the time of our inspection the headwater was about 1505.0 feet (empty) and tailwater was at 750.0 feet MSL with no discharge. Both units were off and generating no power.

As stated above, the licensee was conducting maintenance work on the units, the steel penstock, the sump pumps, the cooling pumps, seals, inlet valves, transformers and

updating the digital control equipment. A report concerning the repairs/updates is to be filed by the end of the year.

4. Reservoirs

A maximum volume of 2,672 acre-feet is pumped from the lower reservoir to the upper reservoir at night. Hence, the reservoir level of the lower reservoir fluctuates significantly depending on the time of day and power demands. The licensee began a program to stem leakage from the upper reservoir in 2002. The remaining work, installation of the geomembrane liner, was completed in fall 2004.

Although the lower reservoir level fluctuates, the flow being passed to the downstream areas is being maintained at run-of-river by use of the minimum flow pipe and sluice gate at the lower dam. The lower dam was free of significant debris and no water was passing over the spillway (Photographs 15 - 18). The slopes of the lower reservoir appeared stable.

The licensee stated that it takes about 14 hours to fill (elevation 1597.0 feet MSL) the upper reservoir using one pump and about 8 hours using two pumps. In generation mode, the units can generate for 6 hours at full capacity before the upper reservoir is depleted down to elevation 1525.0 feet MSL, elevation at which the generation is stopped.

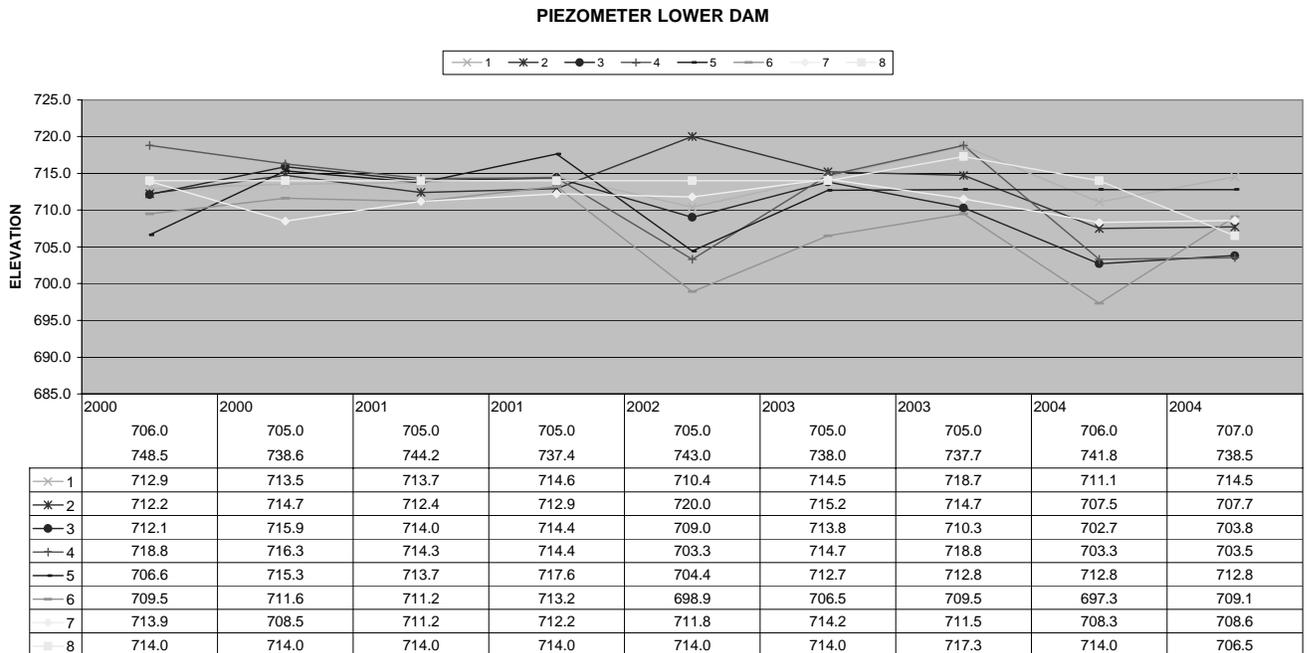
5. Instrumentation

In accordance with Article 34 of the license, the licensee monitors the leakage from the upper reservoir and sends us a report on weekly observations every six months. The latest report was filed July 27, 2004. Leakage has decreased somewhat since repairs were performed in 2002 and appears to be relatively stable now at around 60 cfs +/- 10 cfs. The current amount of leakage (before the drawdown) is relatively independent of the reservoir elevation.

Settlement monuments are surveyed every five years in conjunction with the consultant's safety inspection. There were no significant settlements reported in the recent consultant's safety inspection; however, the survey for 2003 was not yet available at the time the Part 12D report was written and was not included in his analysis. We requested the 2003 survey data from the licensee in our letter of October 24, 2003. The survey was filed December 26, 2003 (see section B – 8, below).

Elongation was monitored in earlier Part 12D reports by measuring and summing joint gaps in the parapet wall between each of the 111 panels. The movements were found to fall within normal tolerances due to temperature variation by the 1988 Part 12D report. Elongation readings are no longer taken.

The licensee also maintains eight piezometers in the gallery of the lower dam and monitors them twice a year. We reviewed piezometer readings for the past several years during this inspection, and found uplift pressures to fall within normal ranges (see graph below).



The licensee recently took soundings in the tailrace area near the gravel trap dam. This area is periodically dredged to prevent a sediment dam from forming at the outlet of the tailrace channel. No significant problems were noted. The area below the Lower Dam was sounded this fall. The results will be included in the next P12. The 2003 Part 12D inspection reported that the downstream toe of the dam was underwater and could not be inspected for scour, similar to the observations made during this inspection. One of the recommendations was to perform soundings, which the licensee completed in fall 2004.

An instrumentation inspection was conducted in 1998. The instrumentation program was satisfactory; however, we requested that some modifications be made pertaining to the recording and data reduction methods. This has been implemented by the licensee.

No unusual instrumentation readings were reported. The licensee is continuing to monitor flow from the tunnel's annular space. We requested that they also monitor flow exiting the slope above the tunnel. Other than those items discussed above, the licensee's instrumentation program was acceptable.

6. Licensee's Inspection Program

There have been no changes to the licensee's inspection program during this reporting period. The project is not manned 24 hours a day, but is monitored remotely 24/365 by

operators at Bagnell Dam (Osage Project No. 459), which is continuously manned. The Plant Superintendent visits the structures at least once a week. On-site personnel drive the area at least twice a day. An independent consultant performs an inspection every 5-years. The licensee's inspection program is satisfactory.

7. Emergency Action Plan

An update to the Emergency Action Plan was filed on August 4, 2004. The latest notification list was available in the plant superintendent's office. A copy is also kept in the control room of the licensee's Osage Project (FERC No. 459) which is manned 24 hours a day. The most recent annual test of the EAP was conducted on December 15, 2003 and was filed on January 6, 2004. Operators are trained in EAP procedures once a year, and a training log is kept in the Osage control room. The plant superintendent lives on site and checks for new development downstream each year. During our interview, the licensee demonstrated knowledge of actions required by the EAP, and his responsibilities in carrying out the plan. The flood inundation maps appeared adequate, with flood wave arrival times and structures that could potentially be impacted identified. The licensee reported no new downstream developments and none were observed during our inspection.

Following the inspection, the state of Missouri emergency management agency (EMA – 573.526.9144) had been contacted to review the coordination/cooperation between the licensee and the EMA. We spoke with Mr. Steve Sloan, Deputy Chief of Operations. Mr. Sloan reported no communication flaws and had no suggestions for improvement at this project. Mr. Sloan stated the licensee is doing a good job of maintaining, updating, and coordinating the Emergency Action Plan.

8. Status of Part 12D Reports

The licensee filed the eighth Consultant Safety Inspection Report (CSIR), dated August 2003, with the Regional Engineer on August 26, 2003. His plan and schedule to address each of the actions recommended by the consultant was filed with the report. We reviewed the report and the licensee's plan and schedule to address the consultant's recommendations and found that the report met the requirements of our regulations. By letter dated November 19, 2004, we informed the licensee of our findings, and made several recommendations of our own to be addressed either immediately or in the next Consultant Safety Inspection Report, due November 1, 2008. Some of our recommendations were: addressing the crest survey for the upper reservoir, inclusion in the next report of the soundings downstream of the lower dam, inclusion of an explanation of the cause of the buckling in the penstock liner, inclusion of a post seismic deformation and stability for the upper dam, and addressing other minor items.

9. Status of Previous Operation Inspection

We found that the licensee continued an effective program of inspection and maintenance of the dam. The structures appeared to be in satisfactory condition with no deficiencies affecting dam safety. Several follow-up action items were required in our letter of January 20, 2004. At the time of the inspection the licensee either addressed or was in the process of addressing our recommendations. This is satisfactory.

10. Records

Operating data, copies of instrumentation data and plans of the project structures are kept in the superintendent's office in the powerhouse. Both hardcopy printouts and electronic backup files are maintained. Copies of electronic records are maintained at the licensee's Osage Plant and at the Taum Sauk Plant. Completed maintenance is recorded on work orders and the licensee is in the process of creating an electronic database tracking system. The licensee's maintenance of records meets the requirements of Section 12.12 of the Commission's regulations.

C. ENVIRONMENTAL REQUIREMENTS

The last Environmental and Public Use Inspection was completed on June 17, 2003. In our follow-up letter we found that the licensee was in compliance and that public safety items were in conformance with the public safety plan. We requested no remedial action as a result of the inspection. The report summarizes all of the environmental requirements of the license articles.

The licensee appeared to be in compliance with minimum flow requirements and Run-of-River operation for the lower reservoir, based on their frequent adjustments to the minimum flow gates and minimum gate opening settings.

D. PUBLIC SAFETY

The lower reservoir boat barrier was in-place at the time of our inspection and appeared to be in good condition. The licensee maintains fences to restrict public access the project and has posted large warning signs on the lower reservoir dam facing upstream and downstream. The signs are illuminated at night. The licensee has posted many signs in the recreation area on the lower reservoir warning of possible rising waters and swift currents due to plant operations. Other signage and lighting was functional as shown on the Public Safety Plan that was filed on June 21, 1993.

No accidents or deaths occurred during this reporting period.

E. PROJECT COMPLIANCE

1. Unauthorized Project Modification or Uses. None during the reporting period.
2. License Compliance. Based on review of all available information and our field inspection, the licensee is in compliance with license requirements during this reporting period.

F. FINDINGS AND FOLLOW-UP ACTIONS

At the time of our inspection we found no dam safety deficiencies that would require immediate remediation.

Project security was discussed during the current Operation Inspection and any follow-up was provided as needed. The vulnerability assessment for this project, as well as the plan and schedule for any recommendations, was also reviewed during this inspection and appears to be adequate.

32 photographs and 1 Exhibit, follow

**Taum Sauk Hydroelectric Project, No. 2277
September 30, 2004 Operation Inspection**



Photograph 1 - The upper reservoir - empty at the time of the inspection.



Photograph 2 - Same as the above, different location.

**Taum Sauk Hydroelectric Project, No. 2277
September 30, 2004 Operation Inspection**



Photograph 3 - New lining being placed.



Photograph 4 - Same as the above.

**Taum Sauk Hydroelectric Project, No. 2277
September 30, 2004 Operation Inspection**



Photograph 5 - The powerhouse intake.



Photograph 6 - Same as the above, different location.

**Taum Sauk Hydroelectric Project, No. 2277
September 30, 2004 Operation Inspection**



Photograph 7 - The rockfill upper dam.



Photograph 8 - The 10-foot parapet wall that crowns the embankment.

**Taum Sauk Hydroelectric Project, No. 2277
September 30, 2004 Operation Inspection**



Photograph 9 - Same as the above. Note the cracks.



Photograph 10 - No significant unreported defects were noted in the parapet wall.

**Taum Sauk Hydroelectric Project, No. 2277
September 30, 2004 Operation Inspection**



Photograph 11 - The concrete lined access tunnel to the floor of the upper reservoir open to traffic due to construction.



Photograph 12 - Crack along the apex of the tunnel. No change from previous inspections.

**Taum Sauk Hydroelectric Project, No. 2277
September 30, 2004 Operation Inspection**



Photograph 13 - Seepage collection pond.



Photograph 14 - The lower concrete dam.

**Taum Sauk Hydroelectric Project, No. 2277
September 30, 2004 Operation Inspection**



Photograph 15 - The crest of the ogee crest.



Photograph 16 - The downstream face of the concrete dam.

**Taum Sauk Hydroelectric Project, No. 2277
September 30, 2004 Operation Inspection**



Photograph 17 - Same as the above.

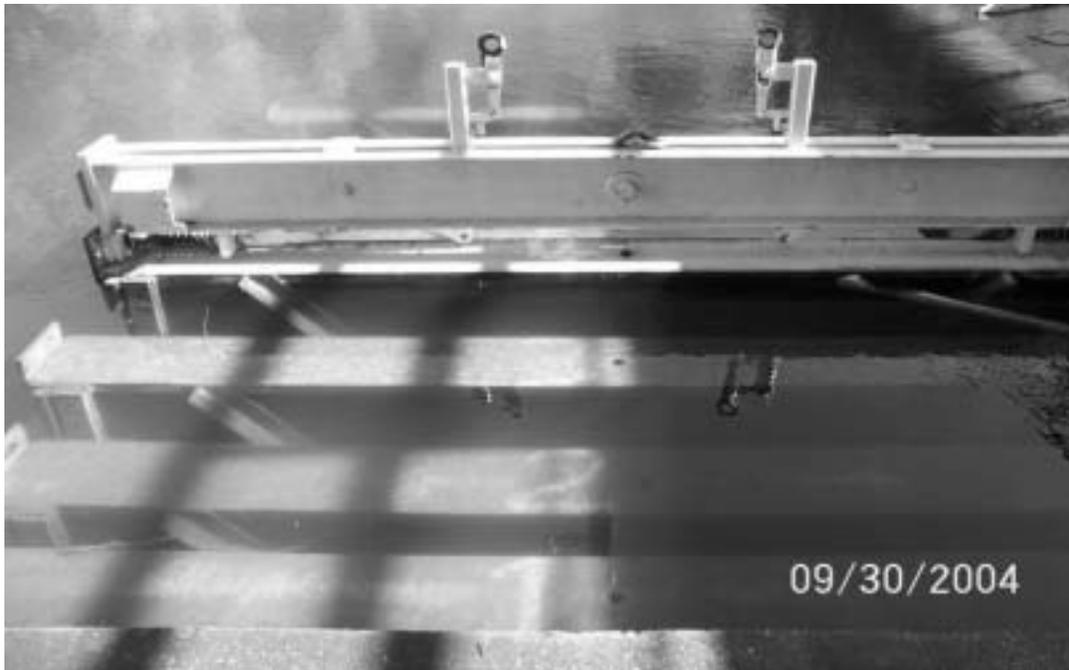


Photograph 18 - Sluiceway outlet at the left side of the dam.

**Taum Sauk Hydroelectric Project, No. 2277
September 30, 2004 Operation Inspection**



Photograph 19 - The left abutment of the concrete dam.



Photograph 20 - Gates for the lower sluiceway.

**Taum Sauk Hydroelectric Project, No. 2277
September 30, 2004 Operation Inspection**



Photograph 21 - The powerhouse area.



Photograph 22 - Same as the above.

**Taum Sauk Hydroelectric Project, No. 2277
September 30, 2004 Operation Inspection**



Photograph 23 - The penstock portal area.



Photograph 24 - The powerhouse interior.

**Taum Sauk Hydroelectric Project, No. 2277
September 30, 2004 Operation Inspection**



Photograph 25 - Same as the above.



Photograph 26 - The area around the penstock and head wall.

**Taum Sauk Hydroelectric Project, No. 2277
September 30, 2004 Operation Inspection**

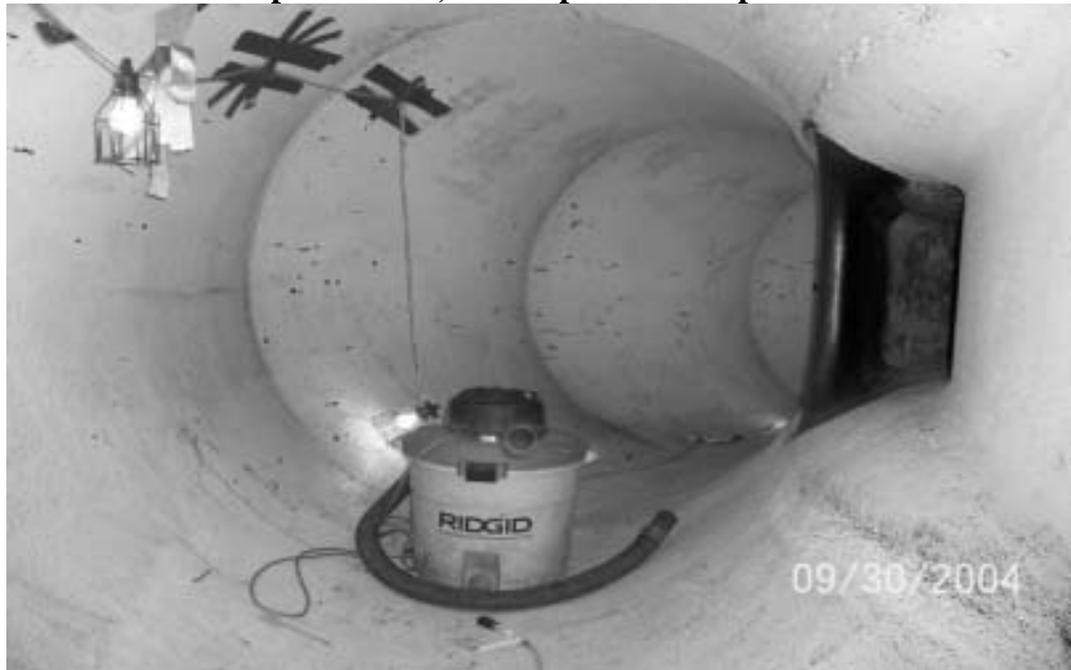


Photograph 27 - Crack around unit housing.



Photograph 28 - The scroll case manhole cover of Unit 1.

**Taum Sauk Hydroelectric Project, No. 2277
September 30, 2004 Operation Inspection**



Photograph 29 - The scroll case of Unit 1.



Photograph 30 - Same as the above.

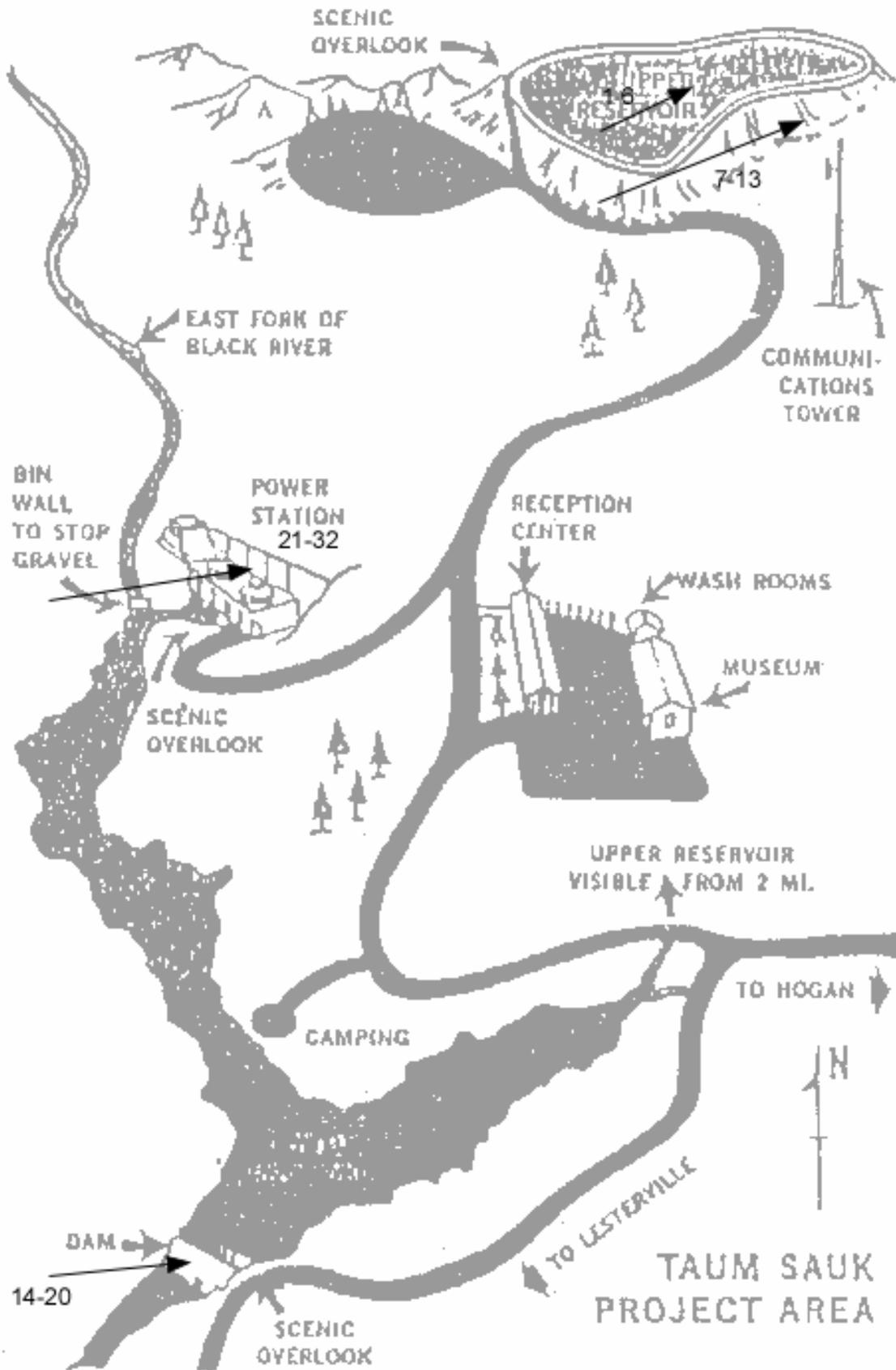
**Taum Sauk Hydroelectric Project, No. 2277
September 30, 2004 Operation Inspection**



Photograph 31 – Inside bottom view of the runner.



Photograph 32 - The auxiliary unit.



DATE: 093004	TITLE: Taum Sauk - Project Area Operation Inspection	EXHIBIT 1 PROJECT No. 2277 CRO-D2SI-FERC
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