

From: "Hamer, Mike" <mhamer@entergy.com>
To: "Jonathan Rowley" <JGR@nrc.gov>
Date: Thu, Sep 7, 2006 12:00 PM
Subject: Vernon Hydro Station Safety Reports

Please see attached.

Date: Fri, Sep 10, 2004 1:10 PM

2002 FERC Inspection...

-----Original Message-----

From: LOYD, LELAND [mailto:LLOYD90@entergy.com]
Sent: Friday, September 10, 2004 11:02 AM
To: Ragonese, John L.
Cc: RUCKER, ROGER B
Subject: Vernon Station Safety Reports

John

Per our phone conversation, I am requesting the two reports (Vernon Station) you were speaking of, the one in 1992 by the outside consultant and the latest one by the FERC Staff. This is for the project I am working on for Vermont Yankee.

If you cannot send it electronically then send a CD to

ENTERGY CORPORATION

1448 SR 333

Russellville, AR 72802

C/o Leland Loyd

N-GSB-45

Thanks

Leland Loyd

Entergy Nuclear Inc.

lloyd90@entergy.com

479/858/4696

Mail Envelope Properties (4500420F.7A8 : 7 : 1960)

Subject: Vernon Hydro Station Safety Reports
Creation Date Thu, Sep 7, 2006 11:59 AM
From: "Hamer, Mike" <mhamer@entergy.com>

Created By: mhamer@entergy.com

Recipients

nrc.gov
 TWGWPO03.HQGWDO01
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Files	Size	Date & Time
MESSAGE	23	Thursday, September 7, 2006 11:59 AM
TEXT.htm	1184	
Mail		
HYDCT-REG-007.7.03.pdf	1426138	
Mime.822	1	

Options

Expiration Date: None
Priority: Standard
ReplyRequested: No
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Concealed Subject: No
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**OPERATION REPORT
FEDERAL ENERGY REGULATORY COMMISSION
New York Regional Office**

For the period October 28, 1998 to June 24, 2002

Licensee: USGen New England, Inc. (USGen) Project No.: 1904-VT/NH
 NATDAM No.: NH00097

Project Name: Vernon

Location: Connecticut River Windham/Cheshire VT/NH
 (Waterway or reservation) (County) (State)

License issued: June 25, 1979 Expires: April 30, 2018 Type: MON

Date of last amendment: May 8, 2002 (Order Granting Extension of Time Under Article 301)

Inspected by: Liza Vélez and Michael Monahan Date: June 24, 2002

Parts of project inspected: Powerhouse, dam and fishway

Weather: Sunny; high 80's

Accompanied by: Bruce Davin, Director of Hydro operation; Justin Donaghy, Hydro engineer; Earl Brissette, Maintenance Planner; John Ragonese, FERC License Manager.

Summary

The Vernon Project is located on the Connecticut River between Vernon, Vermont and Hinsdale, New Hampshire. By Order issued February 27, 1998, the Commission approved transfer of the license from New England Power Company to USGen New England, Inc.

The project consists of a concrete gravity dam and spillway section with an intake structure/powerhouse at the right end that is contiguous with the dam. All project structures were inspected and found to be well operated and generally maintained. A crack was found at the top of the downstream end of the pier between Tainter Gates Nos. 4 and 5. The licensee's representative stated that they will investigate this condition. The surface of the spillway did exhibit some concrete deterioration, but not to the extent that immediate repairs are warranted.

Based on field observations, review of office data, and discussions with the Licensee's representatives, it appears that the Licensee is in compliance with the terms of the License as it pertains to the operation and maintenance of the project.

Submitted August 30, 2002

Liza M. Vélez, COOP Student - Civil Engineer

PERTINENT DATASHEET

----- FERC.... D2SI.... New York Regional Office -----

General Data

Dam Number: 01904-01-01	River: Connecticut River
Project Name: Vernon	River Mile: 212.4
Licensee: USGen New England, Inc.	Drainage Area (sq/mi): 6,266
Exemptee: -----	Seismic Zone: 2
Applicant/Other: -----	D/S Hazard: Low
Development: Vernon	DS City: Vernon, Vt.
Lake Name: Vernon	DS City Distance (mi): 0
Dam Name: Vernon	Dam Completion Date: 1909
State, County: NH Cheshire	
USGS Quad	
Latitude: 42.7717	
Longitude: 72.5133	

Hydrologic Data

PMF (cfs): 567,100
 IDF (cfs): 567,100
 100-YR Flood (cfs):
 Flood of Record (cfs): 185,000
 Date Flood of Record: 3/21/1936
 Average Flow (cfs): 10,170
 Minimum Flow Required (Y/N): Y
 Minimum flow (cfs): 1250

Reservoir Data

Surface Area (acres):
 Maximum:
 Normal: 2,550
 Minimum:
Pool Elevation (msl)
 Maximum: 222.10
 Normal: 220.10
 Minimum:
Storage (acre-ft)
 Maximum: 54,000
 Normal: 18,300
 Minimum:

Project Works

Type of Dam
 Type 1: Concrete
 Type 2: Gravity
 Type 3:
 Dam Height (ft): 58
 Dam Crest Elevation (msl): 212.1
 Length of Dam (ft): 956
 Flashboards Installed (Y/N): Y
 Flashboard Elevation (msl): 220.1
 Overflow Spillway Length (ft):
 Overflow Spillway Crest Elev. (msl):
 Number of Gates: 14
 Number of Powerhouses: 1
 Authorized Gen. Capacity (kW): 20,400
 Number of Generating Units: 8
 Number of Penstocks: 0
 Number of Canals: 0
 Number of Tunnels: 0
 Number of Locks: 0

Safety Requirements

Consultants Safety Inspection Report
 Report Required (Y/N) N
 Latest Report Submitted
Emergency Action Plan (EAP)
 EAP Status: Exempted
 Latest EAP/ EAP Modification:
Boat Restraining Barrier: Mo. Day
 Required (Y/N): Y Date In: 05 20
 Date Out: 10 01

Gate Count by Type

Tainter	Vert Lift	Slide	Drum	Bascule
6	0	8	0	0
Needle	Roller	Valve	Flap	Other
0	0	0	0	0

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A. DOWNSTREAM HAZARD POTENTIAL

The Vernon project had been classified as a low hazard structure based on the dam break analysis (see following paragraphs) and field observation. According to the analysis, the maximum rise in stage cause by a breach will not exceed 1.7 feet under either the 50 year or 100 year flood conditions. The analysis concluded that if a dam failure occurs it would not cause a significant incremental impact to downstream structures.

A preliminary Dam Break Analysis indicated that a hypothetical failure of the dam during a sunny day condition and 100 year flood would have insignificant impact on downstream areas. By the NYRO's letter dated April 24, 1984, the Vernon Project was exempted from filing an EAP.

The NYRO reviewed the adequacy of the EAP exemption status for the Licensee's low hazard dams on the Connecticut and Deerfield Rivers in 1992. By NYRO letter dated December 30, 1992, the Licensee was directed to satisfactorily demonstrate the consequences of a failure by submitting reports that fully document all reconnaissance and studies performed to determine that failure of the dams will not present a hazard to human life or cause significant property damage under all flow conditions up to the Probable Maximum Flood (PMF).

On December 29, 1993, the Licensee filed a report entitled Dam Failure Analysis of Emergency Action Plan Exemption Status. The report was found by NYRO staff to be deficient in the letter of April 23, 1996. In that letter, the Licensee was requested to fine tune the Dam Break Analysis including documenting the "n" values used in the Dam Break Analysis for the Vernon Project. On June 21, 1996, the Licensee submitted a revised dam break analysis with the Manning "n" values used in all dam break analysis.

After review of the final revised Dam Break Analysis, the NYRO agreed with the consultant's assessment that no reasonably foreseeable project emergencies at the Vernon Dam would endanger downstream life, health or property.

Field observations indicated that the downstream river channel is wide open and no structures would be immediately impacted by the project's dam breach which confirmed the project's low hazard classification.

B. PROJECTS SAFETY AND MAINTENANCE

1. Dams, Dikes and Appurtenant Structures

The Vernon Project is located on the Connecticut River between Vernon, Vermont and Hinsdale, New Hampshire (Figure 1). The project consists of a concrete gravity dam and a spillway section with an intake structure/powerhouse at the right end that is contiguous with the dam (Figure 2). The dam has a maximum height of 58 ft, and a spillway facility of 956 ft-long that includes six tainter gates and eight sluice gates, hinged flashboards and stanchions.

During the inspection, it was observed that the concrete spillway did exhibit some concrete erosion deterioration (Photo No. 1). Since the concrete appears to be structurally sound and the erosion was insignificant with regard to the stability of the spillway, the structure does not need immediate repair. A sloped crack was found on top of a downstream pier between Tainter Gates Nos. 4 and No.5. The crack

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does not appear to be threatening any gate structural support members and the Licensee's representative stated that they will investigate this condition (Photo No. 2). Some concrete surface erosion deterioration was observed in the stanchion flashboard section (Photo No 3), but nothing that needs immediate repair. The left upstream abutment retaining wall was also in good condition, no sign of cracking or lateral displacement (Photo No. 4). Some spalling at the base of the left downstream training wall of the trash sluice was observed. However, the spalling is insignificant with regard to the integrity of the structure (Photo No. 5).

The Vernon Neck, a natural ridge at the left abutment, was inspected by walking along the crest, the downstream and upstream slopes. The crest and the slopes of the Vernon Neck were found to be in good condition, with no sign of lateral displacement, settlement or cracking (Photo No. 6 and 7). Brush control on the Vernon Neck is performed by the maintenance crews on a periodic basis of 3 to 5 years. Erosion along the left bank just downstream of the Vernon Dam spillway is monitored biannually (Photo No 8). The last survey report was review by NYRO on March 4, 2002. The licensee indicates that the erosion was minor and relatively uniform along the base of the bank. Their next report is scheduled to be submitted by December 31, 2003.

Minor water leakage was noted through a crack in the wall of the spillway gallery where the sluice gate operators are located. The Licensee has successfully grouted other leaks in the past and will do the same with this leak when the conditions warrant repair. The valve packing on Unit 5 that was leaking into the gallery during the 1999 inspection was replaced (Photo No. 9).

The powerhouse and intake structure appeared to be in good condition and well maintained. (Photo Nos. 10 thru 11). The fish ladder on the downstream side of the powerhouse was also in good condition (Photo No. 13).

2. Spillway Gates, Operation and Standby Power

By letter dated December 27, 2001, the Licensee confirmed successful operation of the 20 foot and 10 foot high by 50 foot wide Spillway Gates at the Vernon dam. The following information was reported in the Licensee's letter:

Tainter Gate No.	Date of last full opening (30 ft)	Date of last Operation – gate opening (ft)	
1	3/28/2000	4/14/2001	20'
2	3/28/2000	4/14/2001	20'
3	3/8/2000	4/13/2001	10'
4	3/9/2000	4/11/2001	10'
5	3/10/2000	4/10/2001	10'
6	3/10/2000	4/10/2001	10'

The gate load test is performed annually and non-load test at least bi-weekly. The letter was submitted on May 31, 2001. They tested Tainter Gates Nos. 1 and 2 using both normal and standby power. The other gates including the eight 9 foot high by 7 foot wide slide gates were only tested with normal power.

During the inspection, Tainter Gate No. 2 was operated by the emergency generator (Photo No. 12).

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No problems occurred during the gate operation. An automatic Emergency Generator test is performed once per month. At the time of the inspection, all gates were reported to be operational. They appeared to be structurally sound. Rust spots were observed on the tainter gate that will be painted during the 2003 maintenance season.

3. Power Plants

Automation of the station was completed by the end of 1998. The Vernon Station is remotely controlled and monitored from the Wilder Station.

The upgraded generator automation equipment was observed during June 24, 2002 inspection. Also a powerhouse ventilation system and a transformer room automatic fire protector door were installed during the reporting period (Photo No. 14 and No. 15).

Due to alignment problems, Unit No. 10 experienced an unscheduled shutdown during December 10, 2001 thru February 8, 2002. The powerhouse appeared to be in good condition and well maintained.

4. Reservoir Condition

There were no major problems at the reservoir. The reservoir shores were in sound condition. There were no signs of erosion, slides at or around the rims of the reservoirs. At the time of the inspection the reservoir elevation was at 220.1 ft MSL.

5. Instrumentation and Monitoring

Cracks in the powerhouse are monitored by gages and trammel points. The Sixth Independent Consultant's Safety Inspection Report recommended termination of the crack monitoring program since no detrimental trends have been detected. The licensee maintains these devices, but they are only read after felt earthquakes and major floods.

The Licensee also performs biannually cross-section surveys and soundings of the erosion along the left bank just downstream of the Vernon Dam spillway (Photo No 8). The last survey report was reviewed by NYRO on March 4, 2002. The licensee indicates that the erosion was minor and relatively uniform along the base of the dam. Their next report is scheduled to be submitted by December 31, 2003.

The Licensee has monitored the seepage conditions at the sluice gate operator gallery and the spillway inspection gallery since 1984. The amount of leakage has been greatly reduced as a result of past grouting.

6. Licensee's Inspection Program

Maintenance personnel conduct a daily visual inspection of all the project facilities. The plant is attended by several operations crew daily. Engineering staff performs an annual inspection of all the project structures. Divers make a thorough inspection once every five years on both the upstream and downstream side.

The inspection program appears to be effective and adequate.

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7. Emergency Action Plan

By letter dated August 6, 1996, the NYRO concluded that the project's exemption status from filing an EAP for this low hazard dam.

Although the Vernon Project has been granted an exemption from filing an emergency action plan, notification procedures are required as part of the comprehensive emergency action plan for the Licensee's four hydro projects on the Connecticut River. A current Emergency Action plan was posted in the powerhouse control room. During the inspection, the operator on duty was asked to display his knowledge of the EAP. The operator was familiar with the emergency notification procedures.

The reprinted Emergency Action Plan (EAP) was submitted to the NYRO on December 7, 2001. On a letter dated January 23, 2002, NYRO staff approved the 2001 Emergency Action Plan and determined to be in compliance with current Commission Guidelines.

The proximity of the Vernon Yankee Nuclear Plant makes the Vernon Project subject to Radiological Response procedures. Drills are therefore conducted in cooperation with personnel of the Vernon Nuclear Plant to test the response procedures. These drills are conducted in conjunction with the testing of the conventional EAP. The latest drill exercise conducted was on June 12, 2002.

8. Status of Part 12-D Report

The Sixth Independent Consultant's Safety Inspection was submitted to the NYRO October 29, 1992 and was approved by the NYRO on August 9, 1994.

As recommended by the Consultant in the Sixth Report, superficial concrete erosion repairs on the spillway at tainter gate Nos. 3 to 6, and the spillway floodgates were scheduled to be completed by the end of 1999. At that time, the Licensee's Chief Engineer, Steve Doret informed the NYRO that there is no current schedule for making specific repairs; however, money will be budgeted for annual concrete repairs. No concrete repairs have been made to date.

By letter dated August 6, 1997, the project was issued an exemption from performing future Part-12 Inspections based on its low hazard classification.

9. Status of Previous Operation Inspection

As it was noted during the October 28, 1999 inspection, the spillway surface exhibits some concrete deterioration. These conditions are not threatening to the integrity of the structure. There is still no current schedule for making these repairs.

10. Records

The licensee keeps copies of drawings that cover all civil works, and other project related documents at the powerhouse office.

C. ENVIRONMENTAL REQUIREMENTS

The Licensee maintains recreation areas along the Connecticut River which are used by the general

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public. As a result of the Environmental and Public Use inspection conducted on July 19, 1999, the project facilities were found to be in compliance with the approved plans, including minimum flow requirements.

The next EPUI has not been scheduled.

D. Public Safety Plan

The Public Safety plan was last submitted on December 8, 1999 and was accepted as satisfying the filing requirements of Section 12.4 of the Commission's regulations on December 30, 1999. The facility provides five recreational sites that include picnic, fishing, and swimming areas, boats ramps and canoe portages. The Licensee has installed buoys or boater safety devices, warning signs, and fences at the project. Field observations confirmed that the public safety devices are consistent with the layout in the Public Safety Plan.

Based on field observations, the installation of public safety devices conformed to the public safety plan. The project is fenced off and signs are posted to warn the public of the dam. There are no additional devices or signs needed at the present time.

The project security was discussed during the current Operation Inspection and any follow-up was provided as needed.

E. PROJECT COMPLIANCE

1. Unauthorized Project Maintenance or Uses

According to the Licensee's representatives and field observation, there were no unauthorized project maintenance or uses during this report period.

2. License Compliance

By Order Amending License, dated June 12, 1992, the Commission authorized the Licensee to replace four existing 2-MW units (Unit Nos. 5 through 8) with two new 14-MW units (Unit Nos. 11 and 12) and to upgrade the powerhouse. The proposed change would increase the Project's total installed capacity from 24.4 MW to 44.4 MW and increase the total hydraulic capacity from 15,530 cfs to 20,930 cfs. The deadlines for the start and completion of the construction were June 11, 1994 and June 11, 1996, respectively. The Commission Order issued on May 08, 2002 a fifth extension of time for commencing and completing the construction to June 11, 2004 and June 11, 2006, respectively.

By letter dated on January 28, 2002, the licensee certified compliance with the project Article 34 Minimum flow requirement of 1250 cfs. There are water level sensors installed by a computer that reads transducers elevation data to calculate inflows and outflows at the project every hour.

F. FINDINGS AND FOLLOW-UP ACTIONS

As the result of the June 24, 2002 inspection, a crack was observed at the top of a downstream pier between Tainter Gate Nos. 4 and 5. The Licensee's representative stated that they will monitor this crack and investigate this condition. Future inspections should monitor the need for concrete repairs to the spillway. There were no other items identified as a result of this inspection that require immediate action by

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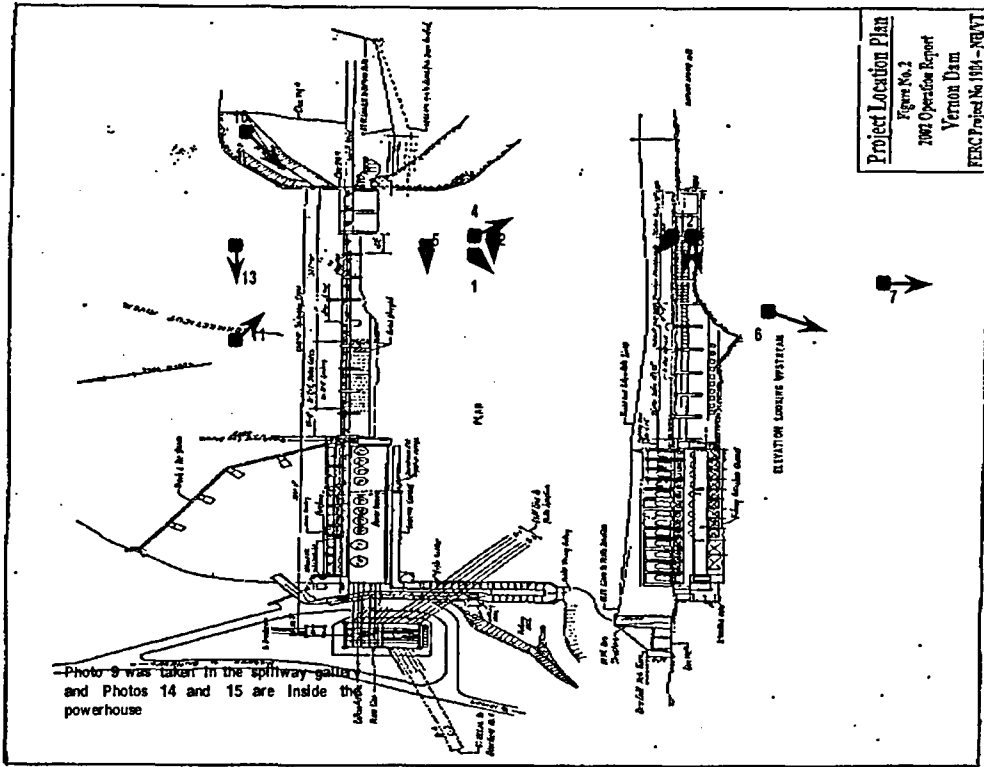
- 8 -

the Licensee.

Based on files review and field inspection, the project is well maintained and appears to be operated in accordance with the terms of the License.

Attachments: Descriptive Sheet
Site Location Map (Fig. 1)
Photo Location Plan (Fig. 2)
Photographs (15)

CC: FERC-NYRO
Liza M. Vélez



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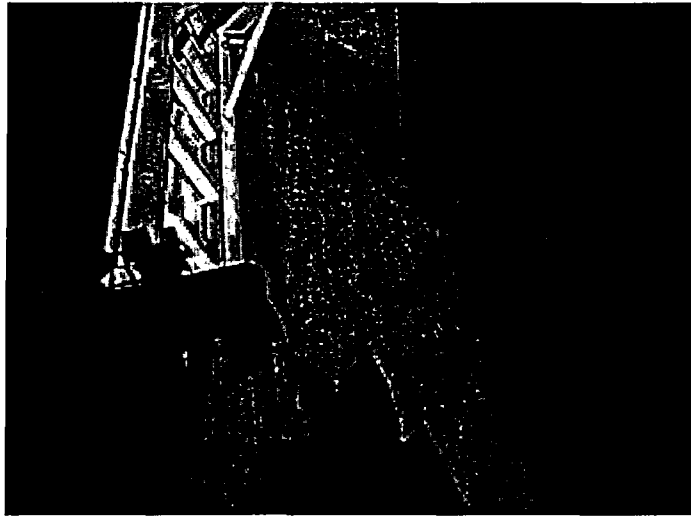


Photo No. 1 - Weep hole on the spillway surface (Tainter Gate No. 4). Note the concrete deterioration.



Photo No. 2 - Crack found in downstream pier between Tainter Gate Nos. 4 and 5.

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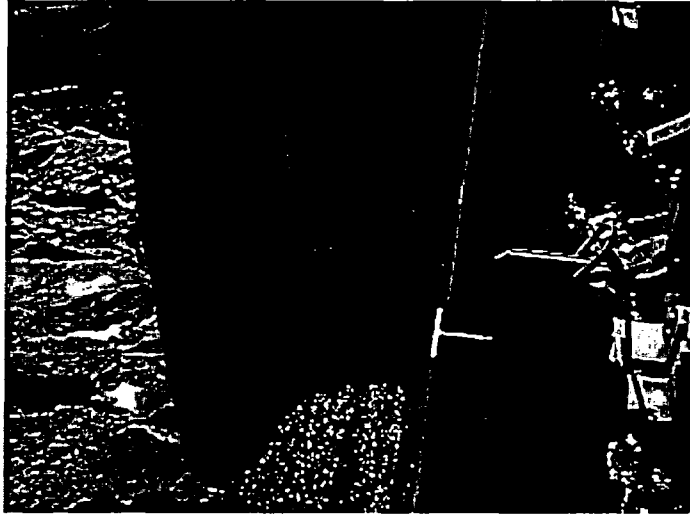


Photo No. 3 - The stanchion flashboard section. The downstream surface exhibits minor concrete deterioration.

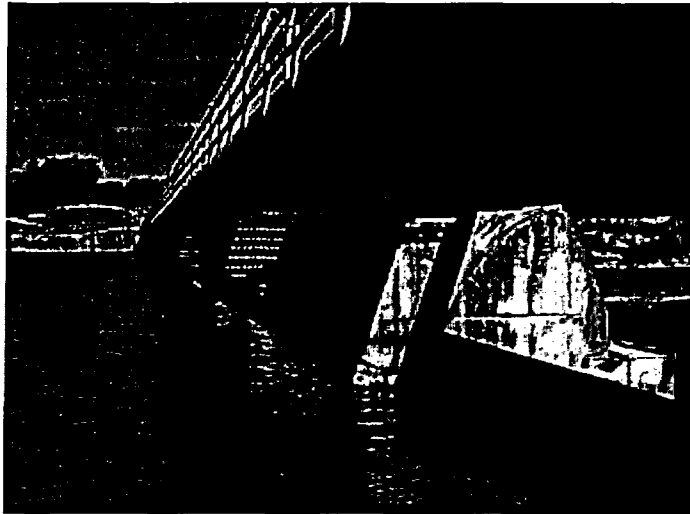


Photo No. 4 - Looking across the upstream side of the spillway towards the left abutment.

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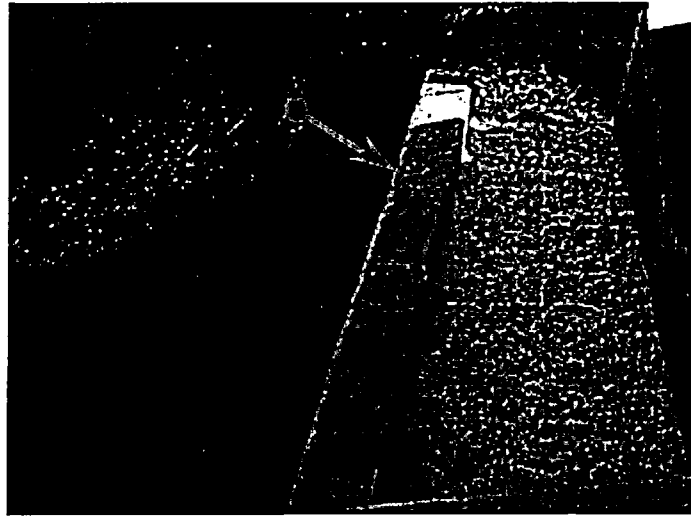


Photo No. 5 - Minor concrete spalling along the left downstream training wall of the trash sluice.

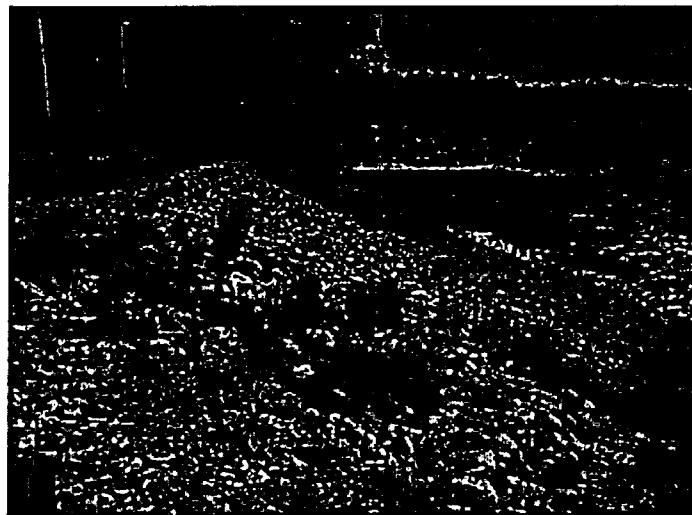


Photo No. 6 - Looking along downstream slope of Vernon Neck. Vegetation control is performed on both the upstream and downstream sides.

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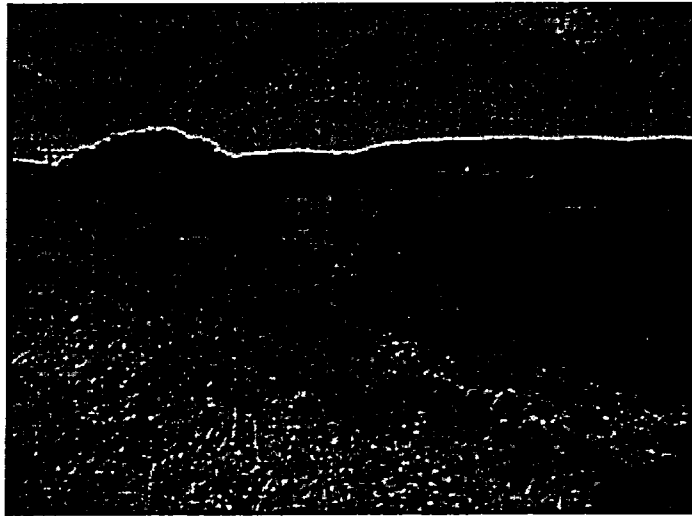


Photo No. 7 - Looking east along Vernon Neck. There are no signs of lateral displacement or settlement.

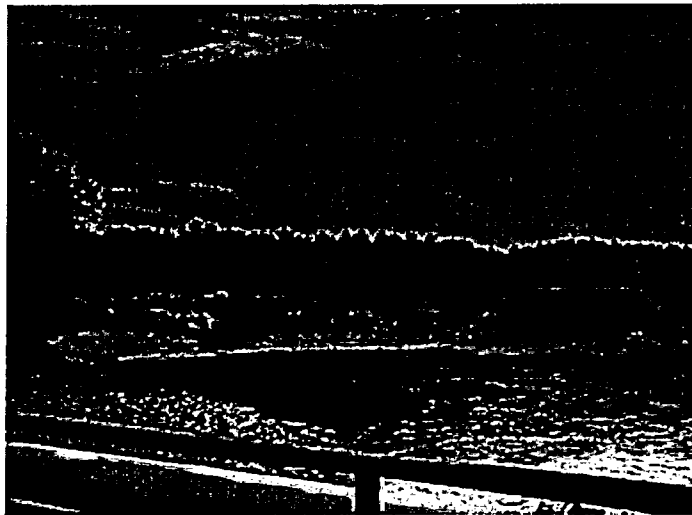


Photo No. 8 - View of the eroded area located on the downstream left bank. Erosion is monitored by biannual surveys.

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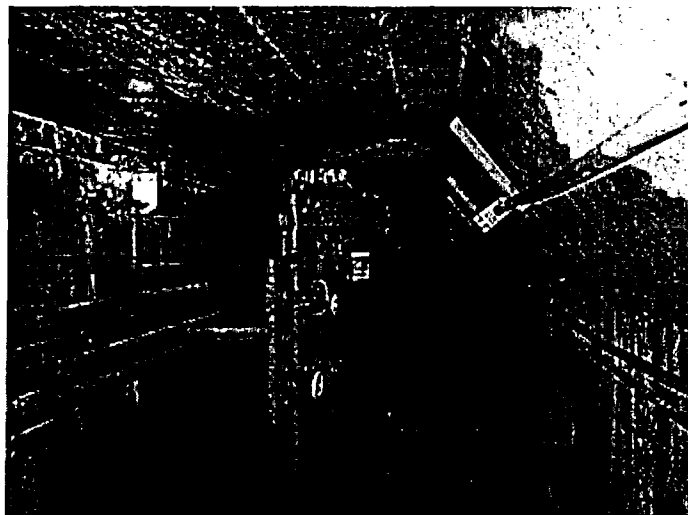


Photo No. 9 - The valve packing of Unit No. 5 operator was replaced. There were no visible leakage coming from the operator.



Photo No. 10 - Looking across the upstream side of the powerhouse/intake structure.

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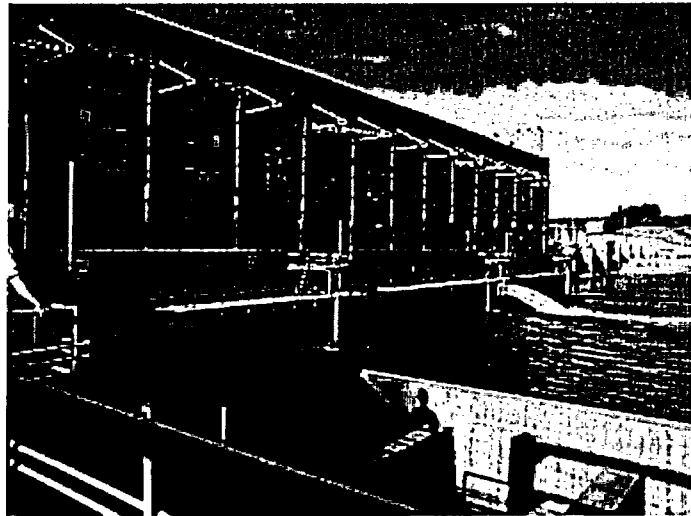


Photo No. 11 - Looking from the fish ladder towards the downstream side of the powerhouse.



Photo No. 12 - A typical Tainter Gate. This is Gate No. 2 being operated using power from Emergency Generator. Some rust spots were noted. The Licensee's representative stated the rust spots will be painted during the 2003 maintenance season.

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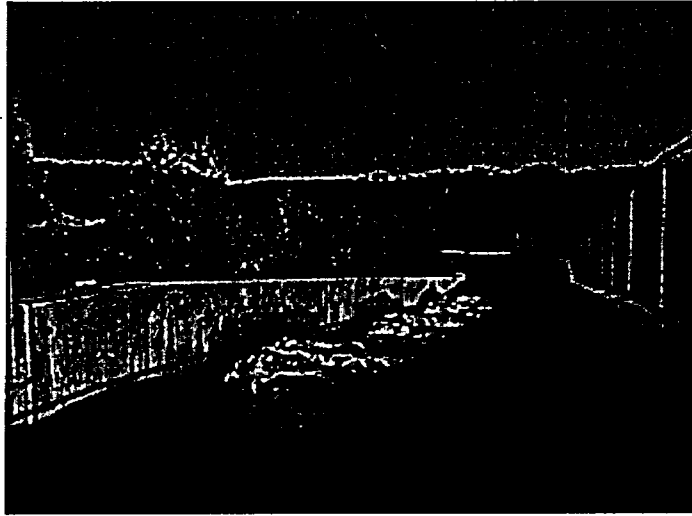


Photo No. 13 - Looking downstream along the fish ladder.



Photo No. 14 - The emergency generator.

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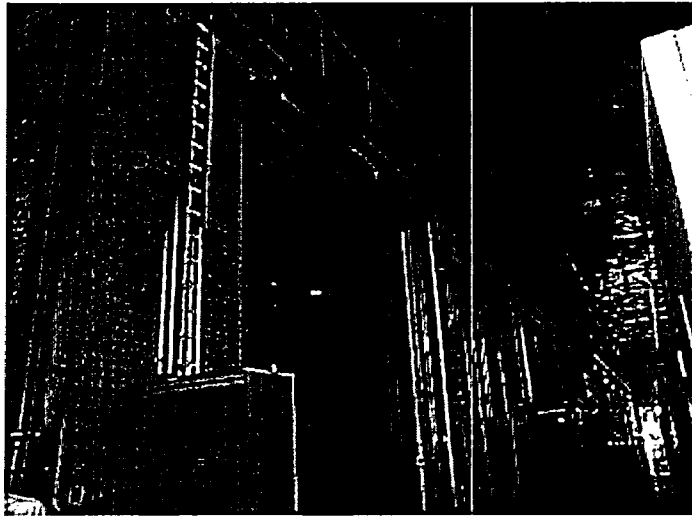


Photo No. 15 - The new transformer room automatic fire protection door.