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a) Questions Asked and Responses from UPPCo Personnel Interviewed on Wednesday June 4, 2003 about the fuse plug at Silver Lake P-10855.

Following a site visit on June 3, 2003, Members of the FERC Team (Jerry Gotzmer; Tak Yamashita; John Hawk; Steve Collins; Michael Davis; T.J. Lovullo; James Evans; Teresa Schwalbach, Marquette County Emergency Management Coordinator; Jim Pawloski, Michigan Dam Safety; and Jessica Mistak, Michigan DNR) met with members of UPPCo and WPS to discuss the Silver Lake fuse plug activation incident on May 14, 2003. Participants in the discussions and site visit on June 3 and 4, 2003 are listed on the attached rosters.

The questions the Team asked are listed below with the summarized responses received?

1. Initially, explain how you found out there was a problem at Silver Lake, what your actions were, and what was observed at the site.

(Most of the information in these responses are from Mr. Bob Meyers or the UPPCo operators. Some supplemental information is included from the Marquette County EOC log of the event.)

Response

Mike Morissette of the Marquette Count Road Commission (MCRC) was notified at 16:20 hours on May 14, 2003 by a MCRC employee that there was a problem with high water at the bridge on County Road AAO. This bridge is approximately 2 miles downstream of the Silver Lake project. At 16:25 hours, another MCRC employee called Mr. Morissette from home to report that he had observed high discolored water at the County Road AAO bridge at approximately 15:00 hours. Mr. Morissette then called UPPCo but got an answering machine. At 16:46 hours, he was able to contact Mr. Bob Meyers of UPPCo to advise him of the situation. Mr. Meyers then called all operators back in.

At 17:00 hours, a citizen called Central Dispatch at 911 to report water over the Mulligan Bridge with 7 or 8 people stranded on the north side. Mr. Meyers of UPPCo activated the EAP at 17:13 hours by notifying Central Dispatch. An UPPCo operator was enroute to Silver Lake at 17:34 hours. The operator arrived at Silver Lake between 18:30 to 18:40 hours. No water was coming over the concrete spillway ogee. The staff gage indicated that the water level at 18:40 hours was 1483.26 feet.

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The operator could hear roar of water coming from the fuse plug spillway area. When he got there, he noted that the entire fuse plug was gone and that water had cut well down into the foundation. He notified Mr. Meyers of the situation by telephone, who asked if he had a camera with him. He did not, so he was instructed to return to get a camera and come back to the site to monitor the fuse plug area and provide updates.

At around 19:30 hours, Gerrald Laurile, UPPCo operator, returned to Silver Lake with a camera. He met Mr. Odevaro, a construction company owner, who had been called to come to evaluate what might be done to close the fuse plug breach. It was decided that nothing could be done at that time about the breach. The UPPCo operator took some photographs of the washed out fuse plug area, which showed that the reservoir had cut 15 to 20 feet into the foundation at the fuse plug area by around 19:40 hours.

Mr. Meyers met with Teresa Schwalbach, Marquette County Emergency Management Coordinator and Sheriff Michael Lovelace at 19:33 hours at his office to discuss the situation. Mr. Meyers indicated that the fuse plug at Silver Lake had failed. He indicated that it would take about an hour to determine the water spill estimates. At 2310 hours, the EOC was opened at the State Police HQ.

The UPPCo operator remained at Silver Lake through the night providing updates on the water level every 30 minutes, which were then provided to the EOC. At 2:20 hours on May 15th, the EOC was given word that the spill over Hoist Dam was at 3 feet. By 6:00 hours on May 15th, the water level at Silver Lake had dropped below the intake sill of the concrete ogee spillway. The operator was recalled from Silver Lake at this time.

At 6:30 hours, the City of Marquette issued an evacuation advisory for all residents north of Wright Street. At 8:10 hours the Forestville Dam water level (the next dam below McClure Dam on the Dead River) was up by 26 inches after having been drawdown by 5 feet earlier. The City of Marquette made the evacuation order mandatory at 8:45 hours, May 15th.

Hoist reservoir reached its peak elevation of 1344.50 feet at 9:00 hours May 15th. Water continued to rise at McClure until it reached a peak elevation of 1201.53 feet. around 13:00 hours

2. How much precipitation occurred in the area in the days prior to the breach of the Silver Lake fuse plug? Was this an unusual amount of precipitation?

Response

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Prior to the rains that occurred on Mother's Day weekend, May 10th and 11th, 2003, the Silver Lake and Marquette area had not had any precipitation for several weeks. On May 10th and 11th between 4 and 5 inches of rain occurred over parts of the area. While this amount of rain is significant, it was not considered to be abnormal for this time of year.

3. Are headwater and tailwater elevations from Silver Lake sent in electronically like the Hoist and McClure readings?

Response

No. There is no power within 13 miles of the site. Automatic headwater and tailwater recording units had not been considered necessary for this site.

4. How often is the Silver Lake project checked? What were the ground conditions like prior to the rains that occurred on May 11th? Was it dry? Was the ground frozen? Was there snow was on the ground?

Response

The Silver Lake project is checked on a weekly basis as long as the site can be accessed. Snow cover in the Silver Lake area precluded getting in to check on Silver Lake the week of April 28th due to sloppy melting snow conditions. The Silver Lake site was checked on May 1st and May 7th. The snow was gone from the site by May 7th. By Mothers' Day weekend, the ground surface was starting to dry out some in that there had not been any precipitation for several weeks. The ground had frozen to a depth of as much as 9 feet in some places during the winter. However, the frost had gone out of at least the upper several feet of ground by May 11th. (We requested information about the presence of frost, which we received later. It indicated some areas with no frost encountered on May 9th and 15th, while some areas checked still encountered frost at depths of 2 to 3 feet on these dates).

5. What was the reservoir elevation when it was checked on May 7th? Did you look at the fuse plug? How did the fuse plug appear compared to the previous week when it was looked at? Did the ground downstream of the fuse plug appear wet or were there any signs of seepage? How high did the water appear to be on the upstream side of the fuse plug?

Response

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The reservoir elevation on May 7th was 1483.35 feet. The operator looked at the fuse plug and found it to be in good condition. The operator who checked Silver Lake on May 7th was different than the person who checked it on May 1st. The person who checked it on May 1st found the fuse plug to be in good condition. The reservoir water appeared to him to be at the upstream toe of the fuse plug, but he stated that this was the first time he had seen the fuse plug since it was installed, so the water could have been up on the upstream slope a little. There was no seepage observed on the downstream side of the fuse plug on May 1st or 7th. The foundation did appear moist.

6. According to the Fuse Plug Design Report, with the fuse plug in place, the normal maximum water level of the reservoir is to be 1481.5 feet. The Design Report also requires that the stop logs in the fourth bay of the concrete ogee spillway be removed to elevation 1482.5 feet. When the site was checked on May 16, 2003, we found that the stop logs in the fourth spillway bay, which appeared to be new, were approximately the same height as the concrete ogee crest. High water marks were observed on the tar paper on the upstream side that indicated that the reservoir level had reached an elevation of 1485.58 feet which exceeds the fuse plug pilot channel elevation of 1485.5 feet. The license for the project indicates that the target elevation for May 1st is 1479.0 feet. Do you know why the stop logs were not removed to elevation 1482.5 feet and the reservoir was not operating at 1481.5 feet?

Response

The Operating Plan had not been drafted yet since it was not due to FERC until October 30, 2003. The licensee and MWH were coordinating on the development of this plan. UPPCo management and operators indicate that they were never made aware of the lower operating regime with the fuse plug in place. The stop logs have always been there. They were not aware of the lower stop log level requirement.

7. How did the soft area on the downstream of Hoist's right embankment get discovered?

Response

Operators and additional personnel were sent to Hoist and McClure to monitor developing conditions and to keep the spillways clear debris at these sites. It was during the time of inspecting the embankment that the soft condition was recognized. A decision was made to place a filter berm on the downstream slope to prevent possible piping and to provide added weight for stability. The Regional Office was notified of this situation.

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8. How well do you feel that the Emergency Action Plan (EAP) worked during this event? Were there any problems that you noted or changes that need to be made?

Response

The EAP worked very well. The Licensee provided personnel in the EOC full time during the crisis. Input was sent in from the field on Silver Lake, Hoist, and McClure every 30 minutes to update the decision making process. The EOC manager, Teresa Schwalbach, who is a part of the FERC Team, provided a copy of the EOC log which dates from May 14, 2003 to May 30, 2003. This log is also attached. The Licensee personnel, the EOC manager, and the Michigan Dam Safety representative all acknowledge that the Functional Exercise for Hoist development in 1998 provided excellent training and preparation for the Silver Lake event. No problems were noted during the operation. The NWS gave regular weather updates during this time. The NWS used their emergency broadcast system to provide appropriate warning information.

The Licensee indicated that as they tracked the water level rise in Hoist and compared it to the expected Silver Lake dam break calculations. It appears that the fuse plug activation probably occurred about 6 hours prior to the 1500 hour observation of water at the County Road AAO bridge.

b) Questions Asked and Responses from Marquette Board of Light and Power Personnel on Wednesday June 4, 2003 regarding their actions following the fuse plug activation at Silver Lake P-10855.

The FERC Team talked with Mr. Bill Pyle and Mr. Kirby Juntila. Our questions were general in nature and the response summary is primarily extracted from the log that Mr. Juntila provided us.

1. When did MBLP find out about the Silver Lake fuse plug? What actions did MBLP take following this notification?

Response

At 20:15 hours on May 14th, word was received that the Silver Lake fuse plug had blown out. At 23:00 hours, UPPCo notified MBLP that they estimated that Hoist would pass around 5000 cfs sometime on May 15th. Mr. Kirby Juntila was called out at 01:00 hours May 15th to report to Central Dispatch. The waste

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gates on Dam #3 (Tourist Park Dam) were opened more through the early morning hours to further draw the reservoir down. Water was up on the gatehouse door of Dam #2 (Forestville Dam) by 6 inches at 10:50 hours. By 12:07 hours, water was going over the Tourist Park Dam at the Tourist Park Road. At 12:42 hours, the entire top of Tourist Park Dam was overtopped. The east end of Tourist Park Dam washed out by 14:00 hours, May 15th. The water level at Forestville Dam was holding at 12 inches up on the gate house door at 15:24 hours.

FERC Inspection/Tour/Visit - June 3/4, 5

Name	Organization	Email	Phone Number
ROBERT MEYERS	UPPER PENINSULA POWER CO	RMEYERS	906 485-2419
Gil Snyder	Wisc. Public Serv. Corp	GSnyder@WPSR.com	920 433 1411
Teresa Schwalbach	Mgt. Co. Emer. Mgmt	tschwalbach@mgtdty.org	906 475-1134
James Evans	FERC D2SI-WI	james.evans@ferc.gov	202-502-8716
JERRY GOTZMER	FERC D2SI-AR	jerrygotzmer@ferc.gov	770-452-3777
Steve Collins	FERC D2SI-AR	steve.collins@ferc.gov	770 -452 - 3768
TJ LoVallo	FERC - DHAC - Wash.	tlovallo@ferc.gov	202.502.8900
Tak Yamashita	FERC - D2SI - SFR	takeshi.yamashita@ferc.gov	415 369-3390
John Hawk	FERC-D2SI - CRO	john.hawk@ferc.gov	312-596-4437
Shawn Puzen	Wisconsin Public Service	spuzen@wpsr.com	920.433.1094
Chris Freiburger	Michigan DNR	Freiburg@Michigan.gov	517-373-6644
Michael DAVIS	FERC - D2SI - CRO	michael.davis@ferc.gov	312-596-4434
JIM PANLOSKI	MICHIGAN DEQ	panloski@michigan.gov	989-705-3443

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Name	Organization	Email	Phone Number
Bob Meyers	UPPCO	BMEYERS@WPSR.COM	906 985-2419
TJ Lovullo	FERC - DHAC - Wash.	Thomas.Lovullo@ferc.gov	202-502-8900
Veresa Schwalbach	Mgt. Co. Emerg. Mgmt	tschwalbach@mtcity.org	906-475-1134
James H. Evans	FERC - D25I - MO	James.Evans@ferc.gov	202-502-8716
JERRY GOTZMER	FERC - D25I - ARD	jeremy.gotzmer@ferc.gov	770-452-3777
MICHAEL DAVIS	FERC - D25I - CHICAGO	MICHAEL.DAVIS@FERC.GOV	312-576-4434
Tak Yamashita	FERC - OPERATIONAL-SERVICES	Tak.Yamashita@ferc.gov	(615) 369-3370
John Hawk	FERC - D25I - Chicago	John.hawk@ferc.gov	312-596-4437
Jessica Mistak	MDNR Fisheries	mistakj@michigan.gov	906-249-1611 x308
JIM PAWLOSKI	MDEQ Dan Safety	pawlosk.j@michigan.gov	989-705-3443
Shawn Puzen	WPSC	spuzen@wpsr.com	920.433.1094
GEORGE BAROSKO	WPS UPPCO ERSTEN HYDRO	MAINT. @ OPER. HYDRO	486-4901 906
Robert Sarnon	WPS/UPPCO Eastern Lakes	Robert.Sarnon@wpsr.com	486-4901
Harold Tawach	UPPCO	harold.tawach@wpsr.com	486-4901
Steve Collins	FERC - D25I - ARO	steve.collins@ferc.gov	770-452-3768
ANDREW KACHUMBSKY	UPPCO	akachuma@wpsr.com	906-485-2404
GERALD ROSKI	UPPCO	G.Roski@wpsr.com	906 485-2415
JEROME LEPAGE	UPPCO	J.Lepage@wpsr.com	906.485-2405
ALLEN CLISHE	UPPCO	acclis40@wpsr.com	906 524 4851
LOUIS ROY	UPPCO	Ass Station Eng.	906 - 524 4851
JAMES R. MELCHIONI	UPPCO	JMELCH1@WPSR.COM	906-786-2321
BOB EDWARDS	WPS	YEDWARD@WPSR.COM	906-483-4519
BORNA WOLF	WPS	bwolf@wpsr.com	920-433-1727
GILL SNYDER	WPSC	G.SNYDER@WPSR.COM	920-433-1411
GARY JOHNSON	Mt Co EMD	GJOHNSON@mtcity.org	906-475-1196
JOSEPH W. VAN DOSTERHEAT	MOT CO CO	JVAND@MOTCO.ORG	906.475-1118

3:00	SEIMCO notified of situation that could affect their gas lines		
	NWS issues a Flash Flood Warning		
5:00	Central Dispatch notifies DEQ, Negaunee Schools notified of road closure, WalMart and Gander Mountain contacted for supplies		
6:00	Police, Fire and EMS units placed on north side of river at various locations in the event of wash-out		
	NWS advised of situation		
6:30	City of Marquette issues an evacuation advisory for all residents north of Wright Street		
7:20	City of Marquette contacting people in evacuation area		
7:30	UPPCO completed fly-over - water 3.6' below low steel on 510 bridge		
	Baraga Gym open for evacuees. Pets can be taken to Lakeview Arena		
8:10	Forestville water level up 26" after being drained 5' earlier		
8:20	Water 1' below girders at Forestville Bridge - decision made to close bridge		
8:45	City of Marquette evacuation order made mandatory		
9:00	Highest water level at Hoist 1348.94 (crest figure is 1344.50)		
9:30	Co Rd 510 and Forestville Bridge are closed.		
9:40	Water decreased at Hoist .24", increased at McClure .36"		
9:50	Wright Street closed from Commerce to Ontario (sight seers)		
9:55	Civil Air Patrol airborne over the scene		
10:10	WE non-critical personnel evacuated - O'Dovero assisting with sand bagging		
11:55	Senator Prusi and Rep. Adamini called regarding the Forestville Bridge and LS&I trestle		
	16 people in the Baraga Gym for shelter staffed by Red Cross		
	Associated Press called		
12:17	Marquette Area Public Schools issue news release regarding students in Big Bay and evacuated areas		
13:30	National news release issued.		
14:00	Chief Toma of Powell Twp FD reports the loss of all electrical power there. 200+ students at Bay Cliff		
	Alger-Delta Electric Co-Op notified		
	Highest water level at McClure 1201.53 (crest figure is 1196.40)		
14:45	BLP advised that main line to Big Bay is down. Power out until further notice		
15:25	WE supervisor unable to contact 100+ employees inside the plant. 4' of water in the plant.		
	Coast Guard has helicopter on stand-by.		
15:49	Powell Twp has lost all phone service, including 9-1-1. SBC working on it.		
16:16	Powell Twp FD is staffing the Big Bay fire hall. NWS instructing people to go to the hall if they have emergency.		
16:26	8 people in Powell Twp need shelter. Red Cross unable to get to them. Powell EMS to make arrangements.		
17:20	Commissioner Corkin requests a State declaration of emergency		
18:30	Governor declares state of emergency for Marquette County		
21:30	BLP advises they will broadcast power conservation advisories. Should be U.P.-wide.		
	Their main power unit is down for annual maintenance, hopefully back on line by weekend.		

22:53	Power restored to Powell Twp							
	Friday, 5/16/03							
8:30	Phone service restored to Powell Twp (fiber optic cable)							
9:45	Co Rd 550 open for <20 Tons							
	Coast Guard flying DEQ Remediation Division to look for oil slicks, floating tanks, etc.							
11:50	Paul Arsenault meets with State, County, and Local Officials. Decision made to lift evacuation order.							
13:00	Press Conference at Marquette City Hall							
	Evacuation lifted, Lakeshore Blvd closed, Forestville Bridge open <40 Tons							
	Co Rd 510 open <40 Tons, Damage report Line 475-1194 established.							
16:00	Health Department issues Public Service Announcement regarding water, septic, etc.							
17:15	Capt. Bacon of DNR approves closing of boat launch at the Hoist							
19:23	Governor issues order prohibiting use of Dead River from Silver Lake to Lake Superior							
	Saturday, 5/17/03							
12:30	Approach to Boisey Creek Bridge on Red Road collapsed. MCRC notified.							
13:45	Jim Marshall from LS&I advised that the railroad bridge shows no sign of movement. One footing has a void but is usable (will have contractor work on it). South slip at the upper harbor is not plugged and the shipping lane is clear							
17:00	Briefing for Congressman Stupak, State Senator Prusi, Rep. Adamini, local officials							
	Sunday, 5/18/03							
8:00	Prison crews assembled to assist with beach clean up in Marquette.							
9:00	Governor Granholm and staff tour the damaged areas.							
13:11	Lt. Ranta of State Police Motor Carrier Division gives permission to UPPCO to move an overweight vehicle to travel from Ishpeming to L'Anse (generator)							

	Damage assessment - Kippola working with locals, NMU (Bus. Research Inst), and FEMA
	Public meeting - Bob Meyers from UPPCO to check on hosting meeting next Wed.
	Dead River will remain closed due to loss of rails to protect boats from going over dams.
	NRCS will be contacted regarding tree debris in river area.
10:30	Drain Commissioner reports that the outlet on Badger Creek is forming a gully - requesting information on temporary erosion control measures - Corps of Engineers to contact ECI to provide assistance and NRCS may be able to help as well
16:00	Army Corps of Engineers provided information to ECI as requested.
	Thursday, 5/22/03
8:30	Press release from Powers regarding damage assistance programs
10:00	Daily coordination meeting held.
	Electric power issue - Brett advised 11 locations adding a total of 160mW to the grid. "Stability limit" being monitored closely. DEQ issue involving diesel burning permit resolved. Power issue affecting all of U.P. and parts of Wisconsin. NWS advised good weather predicted next 7 days, no rain, temps in 60's. UPPCO advises water currently 4" over crest at Hoist, 1' over at McClure
	FEMA update - Still need estimate from DNR regarding fisheries and boat landing damage.
	MCRC has a number of issues regarding estimates at Co Rd AAO. Flood has changed the river system at that area from one stream to three which would affect the new bridge design. Also that bridge was THE access to that area of the county for all commercial traffic, etc. DNR has approved relocating the bridge in light of the new stream formation. DEQ permits still an issue and will be facilitated by EMD in Lansing.
	NRCS advised 10-11 possible sites to provide stabilization and temporary protection only for emergent and compelling issues only. MAY be able to take care of sediment removal at power plant.
	Sandy Glazier of EMD asked "Who is responsible for inland waterway clean up?" No one is sure.
	FERC still needs to give permission to UPPCO to cut the high banks. EMD and FEMA will facilitate the process with DOE. Corps of Engineers believes they can only work on navigable waterways and there MAY be a possible program (Section 14) for erosion related to utilities.
	Coast Guard will continue warnings to boaters because of debris in Lake Superior.
	Drain Commission will work with FEMA regarding issues they are experiencing.
	Security issues - patrols will continue over Memorial Day weekend to keep people off the Dead River and away from access points. Main issue is the fact that the booms (that keep boats from going over the dam) are gone at all the dam sites. UPPCO will be providing private security at Silver Lake.
12:30	Don Ryan from CCI met privately with Dan Brown of FEMA reference economic impact.
15:00	Dan Brown from FEMA was advised that FERC has given to OK to knock down the dangerous banks once photographs of the area are completed. Aero Metric will be flying over the area tomorrow to take

	photographs and do contour mapping.						
	There is a log jam to be cleared at the old RR bridge. DEQ advised no permit would be needed.						
	FERC will be here on June 3-4 to meet with engineers and members of the EOC.						
	Thursday, 5/29/03						
19:00	Public meeting held at Negaunee Twp Hall						
	Friday, 5/30/03						
18:00	Captain Ort of Emergency Management Division along with G. Corkin and DEQ approve an amendment to the Governor's order regarding access to the Dead River Basin effective 5/31/03 at 7 a.m.						

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B. Appendix B

IBOR and FERC Team Telephone Interview with Mr. Ben Trotter on June 12, 2003

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The IBOR and FERC Team Telephone Interview with Mr. Ben Trotter on June 12, 2003

On June 12, 2003, the Independent Board of Review (IBOR) and the FERC Team interviewed Mr. Ben Trotter of Wisconsin Public Service Resources. Mr. Barth Wolf an attorney of Wisconsin Public Service Resources was also on the telephone with Mr. Trotter. The IBOR and FERC Team discussed Mr. Trotter's observations and recollections as the licensee's Quality Control person on site during the construction of the Silver Lake fuse plug and other on going work at Silver Lake during 2002.

The following are a series of questions we asked Mr. Trotter and the summarized responses he gave:

1. During the time the Silver Lake fuse plug was being built, what percentage of time do you estimate you were on site to observe construction? Do you have frequent photographs and logs of the construction you observed at the fuse plug?

Response

Construction work at Silver Lake started August 1, 2002 and was completed at the end of October 2002. The fuse plug construction started September 9, 2002 and took approximately one week. Mr. Trotter was on site 2 to 3 days each week for the period of August 1, 2002 to the end of October 2002 to observe the construction.

Photographs were taken and logs were kept during the Silver Lake construction. Last week we requested that these be available to us by June 12th. Mr. Trotter indicated that they had been put on a CD and would be sent to us by June 13th.

- 1a. How often were representatives of the designer and the quality control testing firm on site, and were you there at the same time?

Response

The representative on site for Montgomery Watson Harza (MWH) the designer was Ms. Manoshree Sundaram. Mr. Trotter recalls that she was there frequently. During the time of the fuse plug foundation preparation, Ms. Sundaram was on site for 3 days.

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Coleman Engineering performed testing on the fuse plug materials for specifications. Two people from Coleman were involved. Mr. Bill Rice was one representative. Mr. Trotter didn't remember the other person's name. Someone from Coleman was on site each day during construction of the fuse plug.

1b. Between yourself, the designer, and the QC testing firm, were any construction related problems noted, and if so, how were they resolved?

Response

There were no problems that were recalled.

2. How was the fuse plug foundation area prepared prior to the construction of the fuse plug (for example: area was cleared and grubbed, dike #2 was removed, etc.)?

Response

The area was cleared and grubbed. The dike was removed to the elevation of the base of the fuse plug, which is 1481.0 feet. The foundation was scarified and leveled prior to compaction. Mr. Trotter indicated that the fuse plug foundation was a sand-rock or sand-gravel mix.

3. All four dikes are known to have pits on the lake side which were a result of material being excavated to build the dike. Design drawings for the fuse plug indicate that the fuse plug was built over the pit area for dike 2. What type of materials and procedures were used in preparing and filling the pit area?

Response

The reservoir level had been drawn down by 10 feet prior to the start of construction. The pit in front of dike number 2 was dry and had a shallow layer of dried fine grained material that had checked some from drying out. All of these materials were removed from the pit before the area was worked, filled, and compacted with materials being excavated from the dike.

4. During the construction of the fuse plug, what measures, if any, were taken by the contractor to ensure that the core material and filters were properly placed and compacted without contamination (ie core and filter materials were not allowed to overlap into adjacent zones and traffic on the fuse plug was not allowed to cross the core and filters except at a designated crossing?).

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Response

The contractor laid out the locations of the fuse plug zones on the foundation and spray painted the zones with dashed lines to control placement of the materials. No special forms or form sleds were used to control placement of the materials in the narrow zones of the filters and core. Materials for the fuse plug were placed by a back hoe operator. The materials were then worked with rakes and shovels to keep the alignment of the zones.

Construction traffic did not cross the fuse plug. The fuse plug was 265 feet long and could be accessed from either side. Work was performed from one side of the fuse plug and then equipment was moved around to the end to the other side. There was no set sequence of placement of materials that Mr. Trotter recalled.

5. What types of equipment were used to place and compact the fuse plug materials? Was there any problems in obtaining the specified densities, using the equipment the contractor had on site?

Response

The filter zones and core materials were compacted by a walk behind flat plate vibratory compactor. Mr. Trotter did not recall there being any problems in obtaining the required densities.

6. When density tests of the fuse plug materials were conducted, what were the procedures, for correcting the density of the materials that did not meet density requirements?

Response

Coleman Engineering would check the densities. If the densities did not meet specifications, Ms. Sundaram would require the contractor to rework the materials or rework and re-compact them again.

7. Dike #2 is listed as having a length of 369 feet, but the fuse plug had a length of 265 feet. Was the area beyond the ends of the fuse plug, where dike #2 had been, treated in any way to limit the erosion process to the length of the fuse plug?

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Response

Mr. Trotter did not recall how this was handled.

8. Were as-built surveys performed? Were vertical control points for the fuse plug and main spillway on the same datum?

Response

Yes.

9. Were as-built drawings prepared?

Response

Yes. These were submitted in the Final Construction Report dated December 2002.

C. Appendix C

Discussions with Mr. Norm Bishop of MWH and UPPCo Management and Operators on June 19, 2003.

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June 26, 2003

a) Questions Asked and Responses from Mr. Norm Bishop from Montgomery Watson Harza on Thursday June 19, 2003 about the fuse plug at Silver Lake P-10855.

Members of the FERC Team (Jerry Gotzmer, John Hawk, Steve Collins, Michael Davis, T.J. Lovullo, and James Evans) met with Mr. Norm Bishop of Montgomery Watson Harza (MWH) in the Chicago Regional Office to discuss the design and construction of the fuse plug at Silver Lake Dam project.

The questions we asked of Mr. Norm Bishop and the summarized responses he gave us are given below:

1. Please describe the process that MWH went through to determine that a fuse plug spillway was needed at Silver Lake versus a permanent spillway. Why was a fuse plug spillway decided upon as the choice of spillways?

Response

Stone & Webster began working with UPPCo on the PMF in 1993. Additional work continued in 1995. FERC wrote the licensee in 1995 to start looking at short comings of the project. In a 1995 report, alternatives were reached regarding target water elevations and release water requirements. The DEQ target water levels were lower than previous operating levels.

The existing concrete ogee spillway at Silver Lake could only handle slightly over 3,000 cfs flows. The updated PMF was approximately 21,000 cfs. This resulted in the need for additional spillway capacity of around 18,000 cfs. A fuse plug spillway was decided upon to provide this capacity. In 2001, it was established that a normal maximum operating pool level of 1481.5 feet was needed if a fuse plug spillway was used.

2. Was the licensee brought into the decision process for deciding upon the fuse plug spillway? If so, what was the licensee's role in deciding on the fuse plug spillway?

Response

We coordinated with the licensee on a day to day basis and through periodic meetings as necessary. MWH met with UPPCo on several occasions. Our points of contact at UPPCo for these meetings and for day to day contact were

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Mr. Robert Meyers and Mr. Robert Edwards. The licensee sent forward the 2002 Fuse Plug Design Report to FERC which contained the revised pool operating level and stop log elevation.

3. The fuse plug spillway was designed to pass what percent of the PMF? At what design flood (percent PMF) was the fuse plug designed to be activated? How frequent of an event would this be?

Response

Mr. Bishop indicated that the drainage basin is an ungaged basin and that he did not know at what percent of the PMF the fuse plug was intended to be activated. He indicated that the outlet gate structure (full open) and open bay of the concrete spillway (with the stop logs removed to elevation 1482.5 feet) could pass 634 cfs before the fuse plug would be activated. Mr. Bishop said it should take a greater than a 1 in 500 years event to activate the fuse plug.

4. What percent of the PMF was the concrete spillway to pass prior to the activation of the fuse plug spillway? Why was the fuse plug pilot channel and crest designed at a lower elevation than the concrete ogee crest?

Response

Mr. Bishop stated that by design there was no plan to use the concrete ogee spillway once the fuse plug was in place. The intended primary capacity for passing smaller floods would be the outlet gate structure, the open stop log slot in the concrete spillway, and the storage volume of the reservoir between elevation 1481.5 feet (normal maximum pool) and elevation 1485.5 feet (the fuse plug pilot channel elevation).

5. Did the use of a fuse plug spillway require a change in the operating procedures and lake level for Silver Lake? If so describe them.

Response

Mr. Bishop stated that the March 2002 Fuse Plug Spillway Design Report, shows the normal maximum reservoir water level with the fuse plug in place is elevation 1481.5 feet. Section 9 of the Design Report states that, "Stop logs in the fourth bay of existing concrete spillway from the left will be removed to elevation, El. 1482.5 feet." Paragraph 4.7 of the Design Report states that, "The wooden stoplogs at the fourth bay in the spillway from the left are removed during periods of high water or when large flows are expected."

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6. Why were the stop logs to be removed to only elevation 1482.5 feet if the normal maximum water level is a foot lower at elevation 1481.5 feet?

Response

Many fishermen use the lake. The extra foot of stop logs provides protection from going over the structure by accident.

7. Was the licensee made aware of the changes in operating procedures requiring a lower lake level of 1481.5 feet? Was the licensee in agreement with this process, in that it meant the loss of up to 4.75 feet of storage below the concrete ogee crest elevation of 1486.25 feet for hydro generation?

Response

We coordinated with the licensee on a day to day basis and through periodic meetings as necessary. MWH met with UPPCo representatives on several occasions. The licensee sent forward the 2002 Fuse Plug Design Report to FERC which contained the revised pool operating level and stop log elevation data.

8. Was a subsurface investigation conducted to evaluate the foundation materials in the fuse plug area?

Response

No.

9. What is the source of materials identified as “reuse existing soil” in the Coleman Engineering Company Aggregate Testing Summary? The construction report identifies 38, 000 CY being excavated from the emergency spillway channel and Dike 2 area. Were fill materials used in the toe drain berm from the 38, 000 CY excavated from the fuse plug area?

Response

Mr. Bishop didn't know.

10. There is a lack of gradation information from the emergency spillway channel fuse plug area. Are the foundation deposits in the area of the Main Dam similar to the deposits at the location of the fuse plug and emergency spillway channel? Is the range of gradations shown on Figure 9, Toe Drain Backfill and Foundation Material Gradation Curves, of the March 2002 Fuse Plug Spillway and Dam

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Modification Design Report representative of the gradations of the materials in the fuse plug and emergency spillway channel area?

Response

Mr. Bishop didn't know

11. Given the 1.0 – foot horizontal thickness of the core, the lack of any core extension into the foundation, the pervious nature of the remainder of the fuse plug materials and the incompatibility of the filter and DS rip-rap, was an analysis conducted to evaluate the effects of seepage on the piping stability of the fuse plug?

Response

Mr. Bishop indicated that a modification was made on the base of the core, but he didn't know the details.

12. Was a design reevaluation made given the as-constructed pilot channel elevations of 1,485.37 and 1,485.28 feet?

Response

MWH did not receive any as built information.

13. Your design report states that “In the event of a breach, it is anticipated that the high velocity of the flow will completely or nearly completely erode established vegetation within the grassed channel and damage the spillway channel.” Knowing that the fuse plug/emergency spillway control section foundation materials are susceptible to erosion, why wasn't a hardened emergency spillway control sill/section to prevent erosion of the control elevation included in the design?

Response

A rock trench was designed for this function.

14. Given the estimated breach velocities in the emergency spillway and erodibility of the emergency spillway channel invert materials, what was the rationale in the removal of the rock trench? Were velocities in reaches 5, 6, and 7 evaluated with the existing vegetation left in place? Were the effects of vortices on erosion around the in-place vegetation evaluated?

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Response

The licensee requested that the rock trench be removed. Mr. Bishop was not aware if velocities were evaluated with the existing vegetation left in place.

15. The Fuse Plug Spillway and Dam Modification Report, dated March 2002, states that the “Silver Lake Reservoir has fluctuated annually from an average low at El. 1,462 to an average high of El. 1,480.” The Last Part 12 report (1999) indicates the reservoir routinely reaches elev. 1487 in the spring or early summer (Fig. 5-2 to 5-5). The standard operating procedure creating these high reservoir levels was to have all stoplogs in place. Your fuse plug design report identifies the removal of the stop logs to EL. 1,482.5 feet. What efforts were made to identify this to UPPCO as a key change to be made in the operation of the project after the construction of the fuse plug? Were studies with the reservoir at El. 1,482.5 feet at the start of the storm conducted to determine the smallest flood event that would raise the reservoir to El. 1,485.5 feet and fail the fuse plug?

Response

There were to be changes in operations as indicated in the design report.

16. What type of grass was specified and used for hydro seeding the emergency channel spillway?

Response

The contractor was to establish the grass. The initial grass was to be rye.

17. During the time the Silver Lake fuse plug was being built, what percentage of time do you estimate that a MWH representative was on site to observe construction? Were frequent photographs and logs of the construction taken and recorded by MWH? How often were representatives of the licensee and the quality control testing firm on site, and was MWH there at the same time?

Response

MWH representative, Ms. Manoshree Sundaram, made three site visits during the period of construction. The licensee provided its own Quality Control. Ms. Sundaran visited the site September 11 and 12, 2002, the week that the fuse plug was constructed.

18. Between MWH, the licensee, and the QC testing firm, were any construction related problems noted, and if so, how were they resolved?

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Response

No problems were noted.

19. All four dikes are known to have pits on the lake side which were a result of material being excavated to build the dike. Design drawings for the fuse plug indicate that the fuse plug was built over the pit area for dike 2. How was the fuse plug foundation area prepared prior to the construction of the fuse plug? What type of materials and procedures were used in preparing and filling the pit area?

Response

The foundation area was cleared and grubbed. Unacceptable materials were removed. The foundation was scarified, leveled, and compacted (proof rolled). A vibratory compactor was used for this compaction.

20. During the construction of the fuse plug, what measures, if any, were taken by the contractor to ensure that the core material and filters were properly placed and compacted without contamination (i.e. core and filter materials were not allowed to overlap into adjacent zones and traffic on the fuse plug was not allowed to cross the core and filters except at a designated crossing?)

Response

Two zones were placed together (filters and core) to keep them separate.

21. What types of equipment were used to place and compact the fuse plug materials? Were there any problems in obtaining the specified densities, using the equipment the contractor had on site? When density tests of the fuse plug materials were conducted, what were the procedures, for correcting the density of the materials that did not meet density requirements?

Response

A backhoe was used to place the materials. Compaction of the filters and core were by hand compactor. If density specifications were not met, the materials were to be removed and replaced.

22. Dike #2 is listed as having a length of 369 feet, but the fuse plug had a length of 265 feet. Was the area beyond the ends of the fuse plug, where dike #2 had been, treated in any way to limit the erosion process to the length of the fuse plug?

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Response

Beyond the ends of the fuse plug, the ground was to be sloped on a 2H: 1V slope and grassed.

23. Were as-built surveys performed? Were vertical control points for the fuse plug and main spillway on the same datum? Were as-built drawings prepared?

Response

Coleman did the surveying for the job. MWH did not receive any as built surveys or as built drawings.

24. Was the emergency action plan considered to have a role in the design of the fuse plug? That is, if the fuse plug is activated, the EAP should be activated to provide notification of the activation of the fuse plug.

Response

EAP drawings may have been used for establishing the limits of flooding due to fuse plug activation.

b) Questions asked and Responses from Mr. Dave Harpole of WPSR on Thursday June 19, 2003 about the fuse plug at Silver Lake P-10855.

1. With the selection of the fuse plug design, did MWH discuss with WPS/UPPCo the required change in operating procedures at a lower reservoir level of 1481.5 feet?

Response

Mr. Harpole didn't recall any discussion with Harza or FERC that would change the reservoir operation regime. He recalled a stop log limit of 1482.5 feet.

2. MWH indicates that they were requested by the licensee to remove the rock trench downstream of the fuse plug. Did the licensee make this request?

Response

Mr. Harpole indicated that he was not a part of any discussion about removing the rock trench. However, the engineering group of WPSR (Ben Trotter) may have been involved.

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c) **Questions asked and Responses from Mr. Robert Meyers of UPPCo on Thursday June 19, 2003 about the fuse plug at Silver Lake P-10855.**

The FERC Team talked with Mr. Robert Meyers of UPPCo to ask a few additional questions.

1. Why was a fuse plug spillway selected over a permanent spillway, such as a concrete ogee with or without flashboards? What role did WPS/UPPCo having in selecting the fuse plug design versus a permanent spillway?

Response

The design firm developed the type of spillway for the project.

2. MWH indicates that they were given the coordination information between UPPCo and Michigan DEQ about the lower operating level. Was this the case?

Response

Mr. Meyers did not recall getting anything from DEQ or the DNR about a lower operating level. The DEQ target elevations were considered minimum elevations not maximum elevations. UPPCo was not aware of any change in operating level of the reservoir. The stop logs were not designed to be removed during flows over them. The specifications did not include removal of stop logs as part of the work to be done.

3. With the selection of the fuse plug design, did MWH discuss with WPSR/UPPCo the required change in operating procedures at a lower reservoir level of 1481.5 feet?

Response

The Operating Plan had not been developed yet.

4. The contour lines on MWH drawing, "Fuse Plug and Spillway Channel Plan and Profile" indicate that Dike #2 may have had a low area across it that is low enough for water to have passed through it during previous high reservoir levels. The latest photographs do not show a swale or low area across Dike #2. Do you recall there being a low area across this dike?

Response

Mr. Meyers did not recall there being a low area or swale across dike #2.

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5. Did MWH receive copies of the as-built drawings of the fuse plug?

Response

Yes MWH was given a copy of the as build drawings. They were sent copies of the bi-weekly construction reports also.

d) Questions asked and Responses from Two UPPCo Operators on Thursday June 19, 2003 about the fuse plug at Silver Lake P-10855.

The two UPPCo operators that we talked with during this discussion were Mr. Gerald Laurila and Mr. Louis Roy. The FERC Team had previously spoken to these two operators on June 4, 2003 at Ishpeming, MI.

1. While you are here to talk with the IBOR, has anything else come to mind about what you saw or did on May 14th and 15th with regards to the activation of the Silver Lake fuse plug?

Response

No.

2. The contour lines on MWH drawing, "Fuse Plug and Spillway Channel Plan and Profile" indicate that Dike #2 may have had a low area across it that is low enough for water to have passed through it during previous high reservoir levels. The latest photographs do not show a swale or low area across Dike #2. Do you recall there being a low area across this dike?

Response

Neither operator recalled there being a low area across Dike #2.

3. When you arrived at the fuse plug site and took a picture, do you recall how much of the fuse plug if any was still in place?

Response

The picture was taken around 7:45 PM. There was back cutting in the channel quite a ways upstream of the fuse plug at that time.

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- e) **Questions to ask on Thursday in the Discussion with Coleman about Silver Lake.**

No representative from Coleman was available.