



Wisconsin Public Service Corporation

700 North Adams Street
P.O. Box 19001
Green Bay, WI 54307-9001

www.wisconsinpublicservice.com

March 20, 2012

FERC Project: 2525

Ms. Kimberly D. Bose, Secretary
The Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

Dear Secretary Bose:

Re: Proposed Amendment to the Order Amending Water Quality Monitoring Plans issued April 30, 2002.

Reference: 1) Letter to Mr. T. Jensky from Mr. T LoVullo dated January 9, 2012.

During the 2011 water quality monitoring season at the Caldron Falls Hydroelectric Project, there were periods during the monitoring season where the water quality monitor was not continuously in the water to monitor water quality parameters. Pursuant to reference 1, The FERC requested that Wisconsin Public Service Corporation (WPSC) amend the water quality monitoring plan to either permanently affix the water quality monitor or provide details on how the equipment will be maintained so that it functions properly throughout the monitoring period. Accordingly, WPSC is submitting a proposal to amend the water quality monitoring plan for the Caldron Falls Hydroelectric Project for review and approval.

WPSC is proposing the following changes to the monitoring plan:

- At the upstream monitoring location, modify the frequency of monitoring from continuously during the monitoring season at a location approximately 1 meter from the bottom of the reservoir to conducting monthly dissolved oxygen, pH, and temperature profiles near the powerhouse intake;
- Move the downstream monitoring location to a deeper water location that is unaffected by changes in release flow so that the monitor can be kept in the water at all times;
- Remove the reference to use four agitating devices in front of the trash racks to provide mixing between the epilimnion and hypolimnion of the reservoir for the correction of potential problems, and;

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- Modify the frequency that the instrumentation shall be cleaned, downloaded, and calibrated according to manufacturer specification to at least once every 14 calendar days during the monitoring period from the current specification of every 7 – 10 days.

WPSC has consulted with the Wisconsin Department of Natural Resources (WDNR) and the U.S. Fish and Wildlife Service (FWS) regarding the proposed changes to the monitoring plan. Documentation of Agency Consultation is attached. No comments were received from the FWS on the proposed changes to the water quality monitoring plan. WDNR did provide comments on the proposed changes, and a response to the comments is included with the Documentation of Agency Consultation.

Should you have any questions or concerns with this submittal, please do not hesitate to call Mr. Mark Metcalf at (920) 433-1833.

Sincerely,



Terry P. Jensky

Vice President - Energy Supply Operations

Enc: Caldron Falls Proposed Water Quality Monitoring Plan

cc: Mr. Gil Snyder, WPSC - D2
Mr. Shawn Puzen, IBS - D2
Ms. Joan Johaneck, WPSC - D2
Mr. Bruce Crocker, WPSC - D2
Mr. John Myers, IBS - D2
Mr. Dave Giesler, IBS - D2
Mr. Ed Brandt, WPSC - CRI
Mr. Bill Bosacki, WPSC - CRI
Mr. Howard Giesler, WPSC - PUL
Mr. Bill Błoczynski, WPSC - MERH
Ms. Peggy Harding, FERC - CRO

Caldron Falls Hydroelectric Project (FERC No. 2525)

Proposed Amendments to the Approved Water Quality Monitoring Plan

March 20, 2012

Original Issue Date: April 30, 2002

Revision No. 2

Caldron Falls Hydroelectric Project - FERC License No. 2525

Article 409: The licensee shall file with the Commission, for approval, a plan to monitor dissolved oxygen (DO) and water temperature, and pH of the Peshtigo River upstream and downstream of the Caldron Falls dam.

Water Quality Monitoring Plan Requirement:

Ensure flow releases from the project, as measured immediately downstream from the dam, maintain the following standards, except when natural conditions prohibit attainment of the standards:

- (1) DO concentrations shall not be less than 5.0 milligrams per liter (mg/L) (minus the precision of the monitoring instrument of 0.2 mg/L for Hydrolab Brand Equipment) for more than 24 hours per year;
- (2) Water temperature shall not exceed 89 degrees Fahrenheit, and;
- (3) The pH shall be within the range of 6.0 to 9.0 standard units, with no change greater than 0.5 units outside the natural seasonal maximum and minimum.

Natural conditions include inflows to the project less than the 95 percent exceedances flow.

I. Location and Frequency of Monitoring

Monitoring upstream and downstream of the facility occurs on a five-year basis. The next scheduled monitoring period is in 2016, and every five years thereafter for the term of the License. Upstream monitoring shall consist of monthly dissolved oxygen, temperature, and pH profiles of the Caldron Falls Reservoir. Readings will be taken at one (1) meter intervals just above the dam near the powerhouse intake. Monitoring downstream of the Project shall occur approximately 700' to 1,150' downstream of the powerhouse in a location that is unaffected by changes in water elevation due to fluctuations in release flow volumes (NE ¼ of NE ¼, T33N, R18E, Section 10).

II. Methods

The monitoring parameters include pH, dissolved oxygen, and temperature. At the downstream monitoring location, the data is collected at one-hour intervals continuously for the months of June, July, August, and September using a Hydrolab Datasonde Equipment or equivalent. Instrumentation shall be cleaned, downloaded, and calibrated according to manufacturer specification at least every 14 calendar days during the monitoring period. Calibration and maintenance information is recorded in a log for each piece of equipment. A post deployment calibration of the monitor will be conducted to determine the calibration drift. Raw dissolved oxygen data will be corrected for calibration drift assuming a linear degradation of calibration

based upon a post calibration of the equipment. At the upstream monitoring location, dissolved oxygen, pH and temperature data shall be collected using handheld monitoring equipment. The handheld equipment shall be calibrated and maintained in accordance with the manufacturer's specifications. Calibration and maintenance records shall be maintained for the monitoring equipment.

III. Data Submittal and Review

A. When data is downloaded from the equipment, it will be screened for periods of non-compliance with the standards. If periods of non-compliance are identified, the WDNR will be notified within five working days. The results of the monitoring will be supplied to the Wisconsin Department of Natural Resources (WDNR) and the U.S. Fish and Wildlife Service (USFWS) in a tabular format in an excel spreadsheet or equivalent.

B. The resource agencies will be given 30 days for review of the results of the study. The monitoring results, agency comments and responses to agency comments will be provided to the Federal Energy Commission (FERC) by February 28th of the year following the year in which monitoring occurred.

IV. Correction of Potential Problems

A. Through monitoring conducted in 1999, 2000, and 2001, it was determined that it is necessary to increase the flow through the sluice gate during periods of the summer. Past accurate data from 2000 and 2001 indicate all periods of low dissolved oxygen levels occur between July 15 and September 1. Therefore, annually during the period July 15 and September 1, Wisconsin Public Service Corporation (WPSC) will release a minimum flow of 56 CFS out of a sluice gate to mitigate low dissolved oxygen concentrations downstream of the facility.

Documentation of Agency Consultation

Proposed Amendment to the Water Quality Monitoring Plan

Caldron Falls Hydroelectric Project (FERC No. 2525)



Wisconsin Public Service Corporation

700 North Adams Street
P.O. Box 19001
Green Bay, WI 54307-9001

www.wisconsinpublicservice.com

January 31, 2010

FERC Project No. 2525

Ms. Cheryl Laatsch
Water Management Specialist
WDNR, Office of Energy
101 S. Webster St.
Madison, WI 53703

Mr. Nicholas Utrup
U.S. Fish & Wildlife Service
Wisconsin Ecological Services Office
2661 Scott Tower Drive
New Franken, WI 54229

Ms. Laatsch and Mr. Utrup:

Re: Proposed Amendment to Approved Water Quality Monitoring Plan and Article 409 –
Caldron Falls Hydroelectric Project

Pursuant to the Order Amending Water Quality Monitoring Plans dated April 30, 2002, Wisconsin Public Service Corporation (WPS) is conducting water quality monitoring for dissolved oxygen, temperature, and pH upstream and downstream of the Caldron Falls Hydroelectric Project. As described in the plan, water quality monitoring data is collected at one-hour intervals continuously for the months of June, July, August, and September using a Hydrolab Datasonde equipment, or equivalent, at the following locations:

- Upstream of the Caldron Falls Dam in the Caldron Falls reservoir, approximately 1 meter above the bottom of the reservoir near the powerhouse intake, and
- In the tailrace of the Caldron Falls Powerhouse downstream of the confluence of the spillway and powerhouse release.

Per the monitoring plan, the water quality instrumentation is cleaned, downloaded, and calibrated according to manufacturer instructions every 7 to 10 calendar days during the monitoring period. WPS is proposing the following amendments to the water quality monitoring plan and Article 409 of the license:

- Revise the water quality monitoring locations for the project;
- Eliminate the requirement to monitor pH;
- Remove language in the monitoring plan related to the use of agitators in front of the trash racks; and
- Modify the frequency of monitoring equipment maintenance.

January 31, 2012
Ms. Laatsch and Mr. Utrup
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Monitoring Locations

Pursuant to the project license, the facility is authorized to conduct peaking operation. During the 2011 water quality monitoring season, there were periods when the water quality monitoring equipment was not in the river during periods of low river flow (while the reservoir was refilling after peaking), which resulted in missing monitoring data. At the downstream monitoring location, the Peshtigo River is shallow and rocky. When the monitoring equipment was retrieved for maintenance and calibration while the facility was peaking, monitors were not able to be safely placed in the river at a location where it was known that the monitor would be under water at all times. Consequently, during refill periods when river flows decreased (and water levels receded), the monitor came out of the water, resulting in periods of non-representative data at this monitoring location.

At the upstream monitoring location, deviations from the DO water quality standard have been observed since water quality monitoring was initiated at the facility in 1999. The deviations are due to a natural stratification of the impoundment. As a result of this natural occurrence, WPS determined through past water quality monitoring efforts that the facility must release 56 cfs of water through a spillway gate in order for downstream dissolved oxygen levels to be attained.

As the upstream water quality monitoring location is no longer providing useful information relative to downstream water quality and since WPS is not able to ensure that the tailrace water quality monitor is in the water at all times during the monitoring season, WPSC is proposing the following water quality monitoring location changes to the water quality monitoring plan:

- Eliminate the upstream water quality monitoring location;
- Relocate the Caldron Falls tailrace monitoring location to where the Parkway Road Bridge crosses over the Peshtigo River (the High Falls Hydroelectric Project upstream monitoring location), approximately 2,700 feet downstream of the powerhouse.

WPS proposes to eliminate monitoring at the upstream location as this monitoring location is not providing useful information relative to downstream water quality standard attainment. For the downstream monitoring location, relocating the monitor to the Parkway Road Bridge will allow WPS to permanently affix the monitor in a location where flow changes will not affect the ability of the equipment to function properly and ensure the monitor is continuously in the water when deployed. A map depicting the location of the Parkway Bridge monitoring location attached.

pH Monitoring

The project license requires monitoring for dissolved oxygen, temperature, and pH at one-hour intervals continuously for the months of June through September. Since pH monitoring was initiated at the project, no deviations from the pH limitations have been observed due to facility

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operations. Further, if pH deviations were to be observed, WPS lacks the ability to take corrective action to mitigate pH levels. The project is not adding chemicals or process wastewater to the Peshtigo River which could cause or result in deviations from the water quality standards for pH. Accordingly, WPS proposes that Article 409 and the monitoring plan be amended to remove pH monitoring.

Use of Agitators

In 2001, WPS installed four agitating devices in front of the trash racks to provide mixing between the epilimnion and hypolimnion. The use of the agitators was thought to mitigate low DO water in the hypolimnion of the impoundment by reducing stratification in the area of the powerhouse intake. However; monitoring data in the headwater showed that the agitators were not effective at mitigating dissolved oxygen levels as the impoundment was still stratified with low levels of dissolved oxygen in the hypolimnion. As the agitators were not providing enough mixing to mitigate low DO downstream of the powerhouse, WPS determined that the facility must release 56 cfs of water through a spillway gate in order for downstream dissolved oxygen levels to be attained. WPS will continue to release flow 56 cfs of water through the spillway and proposes to remove the language from the monitoring plan referring to the agitators.

Monitoring Equipment Maintenance

WPS proposes to change the frequency at which the monitoring equipment is retrieved for data download, cleaning, and calibration from once every 7 to 10 days to once every 14 days. When the water quality monitoring plan was approved in 2002, WPS utilized water quality monitoring equipment that measured dissolved oxygen based upon membrane diffusion technology. Dissolved oxygen diffuses through the membrane, reacts with the electrodes, and generates an electrical current proportional to the oxygen concentration. Dissolved oxygen sensors using membrane technology are subject to a loss of calibration due to bio-fouling of the membrane, which consequently does not allow for oxygen to diffuse through the membrane properly. To address this issue, the monitoring plan called for equipment was retrieved every 7 to 10 calendar days to ensure the dissolved oxygen sensor worked properly.

The monitoring equipment currently being used utilizes luminescent dissolved oxygen technology (LDO). LDO technology uses a light emitting diode and determines oxygen concentration in water using a photodiode rather than diffusion across a membrane. Consequently, passive fouling does not affect the LDO sensor. As a result of using LDO technology, the monitoring equipment is more stable and less susceptible to calibration loss due to bio-fouling, allowing the equipment to be deployed for longer periods of time without impacting data quality.

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Ms. Laatsch and Mr. Utrup
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Attached for your review and comment a modified water quality monitoring plan. Please review the enclosed plan and make any comments you may have by March 2, 2012. Should you have any questions or concerns, please do not hesitate to call me at (920) 433-1833.

Sincerely,

A handwritten signature in black ink that reads "Mark Metcalf". The signature is written in a cursive, flowing style.

Mark Metcalf
Environmental Consultant – Air & Water
Integrays Business Support, LLC
mwmetcalf@integraysgroup.com

Enc.

Cc: Mr. Michael Donofrio – WDNR
Mr. Shawn Puzen – IBS
Mr. Ed Brandt – WPS
Mr. Bruce Crocker – WPS



My Notes

Caldron Falls Hydroelectric Project
Proposed Monitoring Plan Location
Change - January 2012

On the go? Use m.bing.com to find maps, directions, businesses, and more



Bird's eye view maps can't be printed, so another map view has been substituted.

Caldron Falls Hydroelectric Project (FERC No. 2525)

Proposed Amendments to the Approved Water Quality Monitoring Plan and Article 409

January 31, 2012

Original Issue Date: April 30, 2002

Revision No. 2

Caldron Falls Hydroelectric Project - FERC License No. 2525

Article 409: The licensee shall file with the Commission, for approval, a plan to monitor dissolved oxygen (DO) and water temperature of the Peshtigo River downstream of the Caldron Falls dam.

Water Quality Monitoring Plan Requirement:

Ensure flow releases from the project, as measured immediately downstream from the dam, maintain the following standards, except when natural conditions prohibit attainment of the standards:

- (1) DO concentrations shall not be less than 5.0 milligrams per liter (mg/L) (minus the precision of the monitoring instrument of 0.2 mg/L for Hydrolab Brand Equipment) for more than 24 hours per year;
- (2) Water temperature shall not exceed 89 degrees Fahrenheit.

I. Methods

The monitoring parameters include dissolved oxygen and temperature. The data is collected at one-hour intervals continuously for the months of June, July, August, and September using a Hydrolab Datasonde Equipment or equivalent. Instrumentation shall be cleaned, downloaded, and calibrated according to manufacturer specification at least every 14 calendar days during the monitoring period. A post calibration of the monitor will be conducted to determine the calibration drift. Calibration information is recorded in a maintenance log for each piece of equipment. Raw dissolved oxygen data will be corrected for calibration drift assuming a linear degradation of calibration based upon a post calibration of the equipment.

II. Location and Frequency of Monitoring

Monitoring downstream of the facility is scheduled to occur in 2016, and every five years thereafter for the term of the License. Monitoring downstream of the Project shall occur where the Parkway Road Bridge crosses over the Peshtigo River (NW ¼ of NW ¼, T33N, R18E, Section 11).

III. Data Submittal and Review

A. When data is downloaded from the equipment, it will be screened for periods of non-compliance with the standards. If periods of non-compliance are identified, the WDNR will be notified within five working days. The results of the monitoring will be supplied to the Wisconsin Department of Natural Resources (WDNR) and the U. S. Fish and Wildlife Service (USFWS) in a tabular format in an excel spreadsheet or equivalent.

B. The resource agencies will be given 30 days for review of the results of the study. The monitoring results, agency comments and responses to agency comments will be provided to the Federal Energy Commission (FERC) by February 28th of the year following the year in which monitoring occurred.

IV. Correction of Potential Problems

A. Through monitoring conducted in 1999, 2000, and 2001, it was determined that it is necessary to increase the flow through the sluice gate during periods of the summer. Past accurate data from 2000 and 2001 indicate all periods of low dissolved oxygen levels occur between July 15 and September 1. Therefore, annually during the period July 15 and September 1, Wisconsin Public Service Corporation (WPSC) will release a minimum flow of 56 CFS out of a sluice gate.

CORRESPONDENCE/MEMORANDUM

DATE: March 13, 2012 FILE REF: WPS Caldron Falls P-2525
TO: Wisconsin Public Service
FROM: WDNR, Cheryl Laatsch, Acting FERC Coordinator
SUBJECT: Final WDNR Comments to the Caldron Falls Water Quality Monitoring Plan Modification

General Comments:

1. WDNR feels the licensee should continue to monitor the DO and pH above the project discharge. Even though the DO does drop out when stratification occurs, it is important to confirm what the oxygen is at the depth in which the dam draws water. The alternative would be to do monthly monitoring of the water column profile in the flowage measuring DO, Temperature, and pH just above the dam in the deepest location at every meter in the years of monitoring so as to determine the status of oxygen in the flowage water column. The pH parameter does reflect upon productivity in the flowage in the relation to the bicarbonate and CO₂ balance from macrophyte and algae biomass photosynthesis in the project flowage. Also the multi probe Sondes usually include pH probes. It is usually a parameter which is monitored in any water quality monitoring scheme to track basic water quality in a system. Future water quality management on the Caldron Falls Flowage even, as an Outstanding Resource Water could cause a need to deal with issues in the pool which are not currently evident. It is good to keep a handle on the water quality above the dam which may impact water quality below the dam.
2. Monitoring for pH should be maintained below the project in relation to the reasons in item 1. The dissolved oxygen should be monitored closer than Parkway Road crossing, at a location which would allow the monitoring Sonde to be submersed and the water mixed completely from the dam discharge or consider some suggestion in the one article of locations for monitoring. Can the peaking regime be analyzed in relation to its impact from what was agreed in the license and determine if there is another alternative for enhancing oxygen concentrations at the project dam?
3. Monitoring devices must be maintained per manufactures instructions to assure quality of measurements. DNR recommends that equipment maintenance and calibration logs be kept onsite. (Hydrolab does make new Sondes which are lower maintenance. Yellow Springs is another company which the Department likes as far a multiprobe monitoring devices.)
4. WDNR water quality staff are providing two interesting articles concerning DO monitoring and mitigation of low DOs which should be considered in relation to approaching the oxygen issue at this project. They will be sent in a separate email.

Please contact me to set up an agenda, and time for a meeting or conference call. I can be reached at 920-387-7869 or cheryl.laatsch@wisconsin.gov.

Response to comments from the Wisconsin Department of Natural Resources

Comment: “WDNR feels the licensee should continue to monitor the DO and pH above the project discharge. Even though the DO does drop out when stratification occurs, it is important to confirm what the oxygen is at the depth in which the dam draws water. The alternative would be to do monthly monitoring of the water column profile in the flowage measuring DO, Temperature, and pH just above the dam in the deepest location at every meter in the years of monitoring so as to determine the status of oxygen in the flowage water column. The pH parameter does reflect upon productivity in the flowage in the relation to the bicarbonate and CO₂ balance from macrophyte and algae biomass photosynthesis in the project flowage. Also the multi probe Sondes usually include pH probes. It is usually a parameter which is monitored in any water quality monitoring scheme to track basic water quality in a system. Future water quality management on the Caldron Falls Flowage even, as an Outstanding Resource Water could cause a need to deal with issues in the pool which are not currently evident. It is good to keep a handle on the water quality above the dam which may impact water quality below the dam.”

Response: Comment noted. WPSC currently monitors dissolved oxygen, temperature, and pH in the Caldron Falls reservoir at a location approximately 1 meter from the bottom of the reservoir at one-hour intervals continuously during the monitoring season near the powerhouse intake. The monitoring plan has been modified to conduct vertical profiles for dissolved oxygen, temperature, and pH at one (1) meter intervals once a month during the monitoring season.

Comment: “Monitoring for pH should be maintained below the project in relation to the reasons in item 1. The dissolved oxygen should be monitored closer than Parkway Road crossing, at a location which would allow the monitoring Sonde to be submersed and the water mixed completely from the dam discharge or consider some suggestion in the one article of locations for monitoring. Can the peaking regime be analyzed in relation to its impact from what was agreed in the license and determine if there is another alternative for enhancing oxygen concentrations at the project dam?”

Response: Comment noted. In order to keep the monitor in the water at all times, WPSC will move the monitoring location downstream to a location where a monitor can be deployed in the river and not be affected by changes in release flow from the project during the summer months. The exact monitoring location will need to be evaluated during the summer months when peaking operation is occurring.

WPSC recommends that the water quality monitor be located at the Parkway Bridge where a standpipe is permanently affixed to the bridge in the middle of the river. This location is approximately 2,000 feet downstream of the current monitoring location and is used as the upstream monitoring location for the High Falls Hydroelectric Project. At this location the monitor is maintained in the middle of the river, in the water at all times during all release flow volumes, and can safely be accessed by field personnel. Between the Caldron Falls Powerhouse

and the Parkway Bridge, there are no structures to permanently affix a standpipe or other device to.

WPSC has been monitoring water quality at a location approximately 400 feet downstream of the powerhouse where release from the powerhouse and spillway can adequately mix. The Peshtigo River at the current monitoring location is approximately 75 feet wide, shallow and rocky. During the 2011 monitoring season, the water quality monitor deployed downstream of the Caldron Falls powerhouse was in a metal cage attached to a cable that was locked to a tree to prevent theft of the equipment. During periods of peaking operation, water levels in the river at the monitoring location fluctuate in response to the volume of water being released. When equipment retrieval corresponded with peaking operation, field staff were not able to safely place the monitor in the middle of the river where it would be in the water during low flow periods (refilling of the reservoir) due to high water levels and flow. Consequently, during periods of low flow (refilling of the reservoir), there were periods between July 11th and August 11th where the water quality monitor was out of the water and non-representative data was collected. Between August 11th and the end of the monitoring period, WPSC was able to place the monitor far enough out into the river so that it was in the water at all times. As the timing of peaking operation varies based upon the inflow rate to the reservoir, WPSC cannot schedule equipment retrieval and maintenance activities around refill periods when water levels are lower and field staff can deploy the monitors in the middle of the river. In order to maintain the monitor in deeper water that would be unaffected by changes in release flow volumes, we estimate that the monitor will need to be moved an additional 300' to 750' downstream from the current monitoring location.

With regards to WDNR's comment of "Can the peaking regime be analyzed in relation to its impact from what was agreed in the license and determine if there is another alternative for enhancing oxygen concentrations at the project dam?", WPSC is conducting peaking operation in accordance with the Project License. Past water quality monitoring activities determined that it is necessary to release 56 cfs of water from a sluice gate during peaking operation in order to mitigate low dissolved oxygen levels in the water released through the powerhouse.

Comment: "Monitoring devices must be maintained per manufactures instructions to assure quality of measurements. DNR recommends that equipment maintenance and calibration logs be kept onsite. (Hydrolab does make new Sondes which are lower maintenance. Yellow Springs is another company which the Department likes as far a multiprobe monitoring devices.)

Response: Comment noted. As indicated in the water quality monitoring plan, WPSC maintains equipment calibration and maintenance logs for each water quality monitor used during the monitoring season. WPSC utilizes sondes manufactured by Hydrolab. As noted by the Department, these sondes do require less maintenance, which is the reason WPSC requested to modify the frequency at which the sondes are retrieved and maintained from at least once every 7 to 10 days to once at least every 14 days.

Comment: WDNR water quality staff are providing two interesting articles concerning DO monitoring and mitigation of low DOs which should be considered in relation to approaching the oxygen issue at this project. They will be sent in a separate email.

Response: Comment noted.

Response to Comments from the U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service did not provide comments on the proposed changes to the water quality monitoring plan at the Caldron Falls Hydroelectric Project.

Document Content(s)

20120320 FERC Caldron WQM Plan Amendment Rqst.PDF.....1-19