DAVID A. CONDON
MAYOR

CITY OF SPOKANE - PURCHASING
808 W. Spokane Falls Blvd.
Spokane, Washington 99201-3316
(509) 625-6400

REQUEST FOR QUALIFICATIONS

City of Spokane, Washington

RFQ NUMBER: #4496-18

DESCRIPTION: ENGINEERING SERVICES, UPRIVER DAM EIGHTH PART 12D SAFETY INSPECTION REPORT

DUE DATE: MONDAY, October 8, 2018
No later than 1:00 p.m.

City of Spokane Purchasing
1st Floor City Hall - My Spokane Desk
808 W. Spokane Falls Blvd.
Spokane WA 99201-3316

Thea Prince

Purchasing

TABLE OF CONTENTS

REQUEST FOR QUALIFICATIONS
FOR CONSULTING ENGINEERING SERVICES

PART 12D INDEPENDENT CONSULTANT INSPECTION AND REPORT

FOR UPRIVER DAM

PART I. GENERAL INFORMATION

1.1 REQUEST FOR QUALIFICATIONS

The City of Spokane, Washington is seeking the services of a qualified engineering consultant to provide an engineering evaluation and report on the condition of Upriver Dam in accordance with Federal Energy Regulatory Commission (FERC) 18 CFR Part 12D Safety Inspection Guidelines.

The Part 12D safety evaluation and report submittal is to be completed no later than December 01, 2019.

1.2 INQUIRIES

Inquiries and other communications about this Request for Qualifications shall be through the City of Spokane Water & Hydroelectric Department. Direct communications with other management or elected officials may be grounds for rejecting a Proposal. Direct inquiries to:

Stephen Burns, P.E.
City of Spokane
Water & Hydroelectric Department
914 E. North Foothills Drive
Spokane, WA 99207-2794
(509) 742-8154
sburns@spokanecity.org

PART II. INTRODUCTION AND BACKGROUND

2.1 INTRODUCTION

2.1.1 Eighth Part 12D Independent Consultant Inspection and Report

The City of Spokane (City) is required to provide the Federal Energy Regulatory Commission (FERC) an updated Part 12D Safety Inspection of the Upriver Dam. This will be the eighth Part 12D Safety Inspection of the Upriver Dam.

- Engineering evaluation and report on the condition of Upriver Dam in accordance with FERC Part 12D Safety Inspection Guidelines. (18 CFR 12.35 provided in the FERC requirements letter in Appendix A, Enclosure 5).
- The services to be provided will include engineering evaluations and recommendations for corrective measures for structures, operational requirements, maintenance, monitoring and surveillance procedures.
- A "Potential Failure Modes Analysis (PFMA) Addendum Session" is required. Core team (as defined in Chapter 14 of the FERC Engineering Guidelines) members provided by the Part 12D Consultant are as follows:
    a) Independent Consultant (IC) performing the Eight Part 12D Inspection of Upriver.
    b) Facilitator who will facilitate the session and Peer Review the PFMA Report on behalf of the owner and all participants. The Facilitator shall, in general, be unfamiliar with the Upriver Dam operation and history but shall have the requisite experience to serve as Facilitator.
    c) Professional Engineering Geologist or Geotechnical Engineer registered in the State of Washington.
- Engineering analysis is required to establish piezometer levels stability thresholds for the project. There are a total of 30 piezometers that need thresholds established based on existing stability analysis criteria.
- The final Part 12D Report submittal shall be completed no later than December 1, 2019; subsequent clarifications or requirements may be requested by FERC possibly extending contract time for 12 months.
- The kick off meeting, field inspection, and PFMA Addendum Session for this project are expected to require three (3), eight (8) hour days total: field inspection (one day) and the PFMA Addendum Session (two days).

2.2 PROJECT BACKGROUND

The Upriver Dam is located at 2701 N. Waterworks Street in Spokane, WA. Initial construction of the existing Upriver Dam was completed in 1937 and replaced a timber-crib rock-filled structure constructed circa 1900. Power House No. 1 (6 MW) was constructed in 1936 and Power House No. 2 (11.7 MW) was completed in 1984.

Upriver Dam spillway is a reinforced concrete gravity, tainter gated spillway structure flanked by masonry wing walls and downstream earthfill embankment. It is approximately 208 feet long with a height of about 40 feet above the stream bed. The gated spillway diversion dam creates a small

riverine reservoir with a gross capacity of about 3,000 acre-feet and an active storage permit on the order of 1,500 acre-feet.

The spillway consists of an eight-bay tainter gate (radial gate) reinforced concrete structure with an ogee crest at El. 1910 (Old City Datum). The tainter gates are 17 feet high by 26 feet wide. The width of the spillway is 229 feet wide and the length is 69 feet. A reinforced concrete apron, 6 feet thick, is located downstream of the ogee crest and is fitted with two baffle piers in each bay to provide energy dissipation. These baffle piers were replaced during the 2016 Spillway Rehabilitation Construction project. The elevation of the apron is El. 1895. An additional apron is provided downstream and adjacent to the primary apron, at El. 1893 and varies in thickness from 3 to 6 feet; it is 56 feet long and has a reinforced topping slab that was constructed during the 2016 rehab project. The machinery deck spans the spillway gate piers, each 3 feet wide and provides a base for the tainter gate hoists at El. 1944. The discharge capacity of one gate is about 6,580 cfs at normal pool elevation 1927. A seepage barrier extends upstream 105 feet, across the full width of the spillway and is placed on the river bed at El 1906. It consists of a geomembrane covered with a reinforced concrete slab, 5 inches thick.

Abutting the spillway structure on the right bank (north bank) is a reinforced earth enclosure wall with crest El. 1934. The length of the wall is 140 feet. An upstream training wall on the right bank is provided to channel the flow to the spillway.

On the left bank (south bank), adjacent to the spillway, another reinforced earth wall closes the reservoir rim at El. 1934. It is located between the fuse plug and the spillway. An emergency generation building, housing Emergency Generator No. 3 is constructed on this closure structure, located adjacent to the spillway, and houses an 81.25 kVA diesel generator set to power the spillway gates if needed during a power outage. A masonry and concrete training wall extends upstream to provide a smooth flow path to the spillway.

PART III. PROPOSAL CONTENT AND FORMAT

3.1 OVERVIEW OF THE WORK

The following proposed summary has been provided to assist in understanding the City staff's concept for the project. Proposals that include alternate organization of the work to achieve efficiency and a better work product will be welcomed. This summary is in no way intended to hinder or introduce inefficiencies into the consultant's project management efforts.

TASK 1: Eighth Part 12D Independent Consultant Inspection and Report

Engineering evaluation and report on the condition of the Upriver Dam in accordance with Federal Energy Regulatory Commission (FERC) Part 12D Safety Inspection Guidelines.

The following items must be considered:

a) Review and consider all prior safety inspection reports.

b) Part 12 independent consultant(s) shall meet the FERC's independent consultant qualifications specified in Section 12.31(a) of 18 CFR and have been approved by:

Mr. David Capka, P.E., Director
Division of Dam Safety and Inspections
Federal Energy Regulatory Commission
Office of Energy Projects
888 First Street, N.E., Room 6N-01
Washington, DC 20426

A Copy of the independent consultant's approval must be filed with the City and with the FERC Portland Office (Attn: Mr. Douglas Johnson, Division of Dam Safety and Inspections, FERC Portland Regional Office, 805 SW Broadway Street, Suite #550, Portland, OR 97205).

Approval of the independent consultant(s) shall be prior to the initiation of the inspection.

c) Note that the independent consultant's approval letter and resume shall be filed to the FERC Portland Office at least six (6) months before the Part 12D Report is due; this is, by June 1, 2019.

d) The inspection of the Upriver Dam facilities shall be scheduled to include FERC staff to be present. FERC will perform their dam safety inspection of the Upriver Dam in conjunction with the independent consultant. FERC will review the failure modes identified in the existing Potential Failure Modes Analyses (PMFA), evaluate the assigned categorizations, and discuss them with the independent consultant(s) (See **Task 2**).

e) All evaluation and reporting must follow the FERC's Part 12D Safety Inspection Report Outline

f) Six (6) copies of the 90% draft report to the City including all conclusions and recommendations shall be presented and discussed with Upriver Dam staff by October 15, 2019. The City and FERC will provide feedback to be incorporated into the final report.

g) Nine (9) original copies of the final report shall be submitted to the City no later than December 1, 2019. Any changes as a result of FERC comments will be incorporated by letter or as a completely revised report depending on the nature of the FERC comments.

Pre-Proposal On-Site Visit: Coordinate with Stephen Burns of the Spokane Water & Hydroelectric Department at sburns@spokanecity.org or call (509) 742-8154 to set up an on-site visit at the Upriver Dam. A pre-proposal on-site visit is not required but is encouraged.

Proposed Schedule: The proposed work schedule for the final report spans 10 months. Notice-to-proceed is anticipated for February 1, 2019 with the final Part 12D report submitted to the City by December 1 2019. The consulting engineer shall be available to comment and respond to FERC comments within 12 months of submitting the final reports. The Consultant shall provide an updated schedule every month to show the progress and identify any unforeseen setbacks and solutions.

Sept. 26 & Oct. 3, 2018	Publication of Request for Qualifications
Oct. 8, 2018	Deadline for Proposal Submission
Oct. 22, 2018	Interviews/Presentation (if necessary)
Oct. 29, 2018	Final Recommendation of Consultant
Dec. 10, 2018	City Council Award of Contract

Schedule is tentative and could be changed.

CONSULTANT'S RESPONSIBILITIES

Under this proposal, the Consultant shall perform the following services:

1. Attend kick-off conference with City staff.
2. Review, analyze, reference and incorporate existing reports, studies and other records.
3. Review existing surveying deflection data, and if necessary, the City will conduct further surveys and field work.
4. Perform a site analysis of the dam and the related facilities.

5. Submit six (6) copies of the 90% draft Part 12D report by November 1, 2019 and have a meeting with City staff. City and FERC feedback are to be incorporated into the December 1, 2019 final report.
6. Prepare and provide all final reports, designs, manuals, system reviews, calibration testing, etc. The Consultant shall submit the final report as specified above and the consulting engineer shall be available to comment and respond to FERC comments for the following 12 months after submitting the final report.
7. Provide a copy of all technical memoranda and reports/recommendations in digital format as Microsoft Word Documents.
8. Provide a copy of all technical memoranda and reports/recommendations in a digital format as PDFs.
9. Provide a copy of all design data in digital format acceptable to the City (preferably AutoCAD).

CITY'S RESPONSIBILITIES

In the development and implementation of this project the City of Spokane will assume the following responsibilities:

1. Provide a project administrator and liaison – Stephen Burns, PE – Chief Dam Safety Engineer (CDSE)
2. Provide available reports and existing data as per FERC guidelines and requirements
3. Conduct kick-off meeting
4. Provide a timely review of the 90% submittals.

TASK 2: POTENTIAL FAILURE MODES ANALYSIS ADDENDUM SESSION

Upriver Dam's Supporting Technical Information (STI) document was updated in June 2018. Section 1 of the STI contains the Upriver PFMA, with the Seventh Part 12D PFMA Assessment results and the results of any subsequent focused PFMA sessions (i.e. the Focused Fuse Plug PFMA). It is likely that many of our existing PFMs may require revision to meet the FERC requirements for fully developed PFM loading condition, mode of failure, consequences, and category. As a result, included in this project is a PFMA Addendum Session to fully develop Upriver's existing PFMs. It is expected that this will require two (2) days of face-to-face meeting time with the PFMA Core Team (see Chapter 14 of the FERC Engineering Guidelines). This will be considered a modified version of the full-scale Potential Failure Modes Analysis. Action Item time frames as outlined in Chapter 14 of the FERC Engineering Guidelines shall be used.

The following shall constitute the PFMA Addendum Session and may be coincident/complimentary to the Part 12D Inspection action items:

1. Designation of the PFMA Addendum Session participants –
    a. Independent Consultant (IC) performing the Eight Part 12D Inspection of Upriver.
    b. Facilitator who will facilitate the session and Peer Review the PFMA Report on behalf of the owner and all participants. The Facilitator shall, in general, be unfamiliar with the Upriver Dam operation and history but shall have the requisite experience to serve as Facilitator.
    c. Professional Engineering Geologist or Geotechnical Engineer registered in the State of Washington.
2. Collection of background data on Upriver Dam for review by the Core Team.

3. Site review including interviews with key owner personnel at the project to coincide with the Part 12D inspection activities.
4. Comprehensive review of all the background data on the dam by the Core Team.
5. Conduct the PFMA Addendum Session: The licensee is responsible for facilities, the Facilitator for assuring the process is followed, and the Core Team for performing the PFMA Addendum Session.
6. Consideration of Surveillance and Monitoring opportunities and/or Risk Reduction measure for Identified Potential Failure Modes – (Note that the Surveillance and Monitoring Plan for existing Potential Failure Modes is provided to the owner by the independent consultant in the Part 12D report)
7. Documentation of the PFMA Addendum Session, Surveillance and Monitoring, and Risk Reduction opportunities (independent consultant)

It is expected that the PFMA Addendum Session will require two (2), eight (8) hour days of meeting with the Core Team. Review Chapter 14 of the FERC Engineering Guidelines for Action Item Time Frames for the PFMA Addendum Session results.

TASK 3: ESTABLISHING PIEZOMETER THRESHOLDS

Upriver uses instrumentation to monitor piezometric levels at the closure sections of the facility. The FERC recommendations for the use of this instrumentation at hydroelectric projects is in Chapter 14 of the FERC Engineering Guidelines. It is recommended that threshold levels be established for each instrument. Upriver had thresholds developed by GeoEngineers in 2008 as a result of their stability analysis, their piping analysis, and historical trends in the data. Since that time, there have been changes to the spillway secondary apron that have changed the piezometric conditions. The Consultant will be responsible for completing the following:

1. Review and analysis of piezometer trends beginning from 2009 to the present as they relate to stability analysis criteria from past and current reports. Note that the significant changes to the spillway secondary apron were completed by November 2016 that changed the piezometric conditions.
2. Review and analysis of all stability analysis reports, erosion and piping analyses, and PFM analyses as they relate to the piezometers.
3. Develop an analysis and discussion of the difference in piezometer levels before and after the 2016 spillway rehabilitation project as they pertain to the stability analyses.
4. Establish upper and lower thresholds for the 30 piezometers at Upriver based on the governing stability criteria.
5. Prepare a detailed report of the methods and procedures for developing the thresholds, including any pertinent electronic files, tools, or special software used. Calculation package is required as an Appendix to the report.
6. Include in the report a detailed piezometer maintenance plan for continued operation and calibration (if necessary) of the instrumentation.

3.2 ORGANIZATION OF THE CONSULTANT'S RESPONSE

The format, organization and media of the submittal are completely open; the submitter may choose the style and format that best communicates their expertise, ideas, concepts, and proposal. The proposal has a 15 page limit (one sided); however, the cover letter, statement of non-discrimination of

employment, and resumes will not be counted in the page limit. Succinctness and clarity in the proposal, as well as originality, are important.

The submittal is an opportunity for the Consultant to demonstrate a thorough understanding of the proposed work and to suggest methods to improve the approach to achieve the project goals. The Consultant should feel free to modify the proposed tasks and schedule as appropriate to support the successful project completion. The proposal should address or include the following:

a. A cover letter that clearly identifies the Consultant and any sub-consultants.
b. The key project staff: including the Professional Engineer who would be the project engineer, qualifications, experience, and availability. As well as a Part 12D Independent Consultant, the other key Professional Engineers, and personnel.
c. The work proposal (project organization and task identification)
d. Staff allocation: include a spreadsheet indicating individual time allocation for each task.
e. The project schedule: include a bar chart showing tasks and sub-tasks.
f. A list and description of all tasks, responsibilities and qualifications of any sub-consultants who may be used in the work. All work will be the full responsibility of the prime consultant.
g. List three (3) recent Part 12D Reports (include dates and current client contact information). If you have not prepared three FERC approved Part 12D Reports, then provide references of three former clients and summaries of previous work that demonstrate the Consultant's ability to perform this work and their familiarity with FERC.
h. A formal statement of non-discrimination in employment from the prime Consultant and any sub-consultants.

PART IV. PROPOSAL EVALUATION AND SUBMISSION

4.1 CONSULTANT SELECTION PROCESS

Responses received in reply to this RFQ will be evaluated on the likelihood of the Consultant meeting the requirements therein. The evaluation will be based on the technical and administrative capabilities of the Consultant. A Selection Committee of technical professionals and laypersons will review the submitted consultant proposals according to the following criteria:

1) Cover Letter: (5 points) Has the Consultant clearly identified the firm(s) on the project team and has the Consultant demonstrated interest and enthusiasm for the project?

2) Key Project Staff: (25 points) Do the proposed key project team members have suitable experience and skills:
   Project Manager – 5 points
   Project Engineer – 10 points
   Other Key Staff – 10 points

3) Work Proposal: (35 points) Does the work proposal include all the tasks and work elements needed by the City? Has the Consultant included any recommended improvements and efficiencies?

4) Staff Allocation: (15 points) Is there enough staff to perform the tasks? Does the Consultant have additional resources available? Staff readily available for on-site visits or available to address questions by City or FERC staff?

5) Schedule: (5 points) Does the work schedule include all the work tasks and does it cover the estimated contract period? Are there additional resources for an expedited schedule?

6) Experience and References: (15 points) Are the example projects/Part 12D/DSSMP reports similar or related to the proposed dam project? Has the Consultant demonstrated suitable experience? Is the Consultant familiar with FERC Part 12D, Chapter 14, PFMA, and STI requirements?

No consultant interviews are planned at this time; it is the City's intent to select the most qualified consultant from the submitted proposals. However, the City reserves the option to interview the top two scoring consultants.

Consultants responding to this RFQ will be notified of the Selection Committee's decision not later than October 29, 2018.

4.2 SUBMISSION OF PROPOSALS

By signature on the cover letter, Proposers certify that they comply with all terms and conditions set out in this Request for Qualifications.

Proposals shall be delivered to the City no later than 1:00 p.m. PDT on Monday, October 8, 2018. The City reserves the right to not consider Proposals received late.

Place each copy of the Proposal in a separate sealed envelope. On the front of each envelope, clearly note if it contains the original or a copy and place the following information:

"SEALED PROPOSAL - IMPORTANT"
RFQ – UPRIVER DAM, EIGHTH PART 12D SAFETY INSPECTION REPORT
DUE 10/8/18 - 1:00 P.M.
COMPANY NAME

Submit one (1) paper original, one (1) paper copy, and one (1) reproducible electronic copy (CD or thumb drive) of the Proposal to:

DELIVERY BY MAIL:

City of Spokane – Purchasing
4th Floor – City Hall
808 W. Spokane Falls Blvd.
Spokane, Washington 99201

HAND DELIVERY:

City of Spokane – "My Spokane" Service Desk
1st Floor – City Hall
808 W. Spokane Falls Blvd.
Spokane, Washington 99201

NOTE: Proposals will not be accepted by fax or email

The Purchaser is not responsible for Proposals delivered late. It is the responsibility of the Proposer to be sure the Proposals are sent sufficiently ahead of time to be received **no later than 1:00 PM local time** on the due date.

Sealed Proposals will be publicly acknowledged at 1:15 p.m., Monday, October 8, 2018 in the City of Spokane City Hall Council Chambers, 808 West Spokane Falls Boulevard, Spokane, Washington 99201.

4.3 PREPARATION COSTS OF PROPOSAL

The City will not be liable for any costs incurred by the Proposer in preparation of a Proposal submitted in response to this RFQ, in conduct of a presentation, or any other activities related to responding to this RFQ. Submitted materials become the property of the City and will not be returned.

4.4 PROPRIETARY INFORMATION / PUBLIC DISCLOSURE

Materials submitted in response to this competitive procurement shall become the property of the City.

All received Proposals shall remain confidential until the award of contract recommendation has been filed with the applicable Council Committee or the City Clerk for City Council action. Thereafter, the Proposals shall be deemed public records as defined in RCW 42.56, "Public Records."

Any information in the Proposal that the Proposer desires to claim as proprietary and exempt from disclosure under the provisions of state law shall be clearly designated. Each page claimed to be exempt from disclosure must be clearly identified by the word "Confidential" printed on it. Marking the entire Proposal exempt from disclosure will not be honored.

The City will consider a Proposer's request for exemption from disclosure; however, the City will make a decision predicated upon state law and regulations. If any information is marked as proprietary in the Proposal, it will not be made available until the affected Proposer has been given an opportunity to seek a court injunction against the requested disclosure.

All requests for information should be directed to the RFQ Coordinator.

4.5 REVISIONS TO THE RFQ

In the event it becomes necessary to revise any part of this RFQ, addenda will be posted on the City of Spokane Purchasing Webpage https://my.spokanecity.org/administrative/purchasing/current-projects/. For this purpose, any pertinent information shall be provided as an addendum to the RFQ.

The City also reserves the right to cancel or to reissue the RFQ in whole or in part, prior to final award of a contract.

4.6 ACCEPTANCE PERIOD

Proposals shall remain in effect for sixty (60) days for acceptance by the City from the due date for receipt of Proposals.

4.7 RESPONSIVENESS

The Proposer is specifically notified that failure to comply with any part of the RFQ may result in rejection of the Proposal as non-responsive.

The City also reserves the right, however, at its sole discretion to waive minor administrative irregularities.

4.8 NO OBLIGATION TO CONTRACT

This RFQ does not obligate the City to contract for services specified herein.

4.9 REJECTION OF PROPOSALS

The City reserves the right at its sole discretion to reject any and all Proposals received without penalty and to not issue a contract as a result of this RFQ.

4.10 AWARD OF CONTRACT

The City of Spokane reserves the option of awarding this contract in any manner most advantageous for the City. More than one contract may be awarded.

Award of contract, when made, will be to the proposer whose Proposal is the most favorable to the City, taking into consideration the evaluation factors. The City Council shall make the award of contract or purchase. Unsuccessful Proposers will not automatically be notified of Proposal results.

PART V. CONTRACT REQUIREMENTS AND TERMS

5.1 MINORITY AND WOMAN-OWNED BUSINESS PARTICIPATION

The City of Spokane recognizes there is a need to provide the maximum practicable opportunity for increased participation by minority and women-owned business enterprises (MBE's and WBE's). The City therefore establishes the following laudatory goals for this contract:

MBE	6%
WBE	4%
Or a combined total of	10%

Selection of the successful applicant will not be based on meeting these laudatory goals.
Achievement of the above goals is encouraged. Accordingly, each Proposer will be required to take the following affirmative steps in considering award of subcontracts to the fullest extent possible to qualified minority and women owned business:

a) Including qualified minority and women's businesses on solicitation lists;

b) Ensuring that minority and women's businesses are solicited whenever they are potential sources;

c) Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation of minority and women's businesses;

d) Establishing delivery schedules, where requirements of the work permit, which will encourage participation of minority and women's businesses;

e) Using the services and assistance of the Small Business Administration and the Washington State Office of Minority and Women's Business Enterprises

5.2 CITY OF SPOKANE BUSINESS REGISTRATION

Section 8.01.070 of the Spokane Municipal Code states that no person may engage in business with the City without first having obtained and being the holder of a valid annual business registration or temporary business registration. The vendor shall be responsible for contacting the State of Washington Business License Services at http://bls.dor.wa.gov or 1-800-451-7985 to obtain a business registration. If the Vendor does not believe it is required to obtain a business registration, it may contact the City's Taxes and Licenses Division at 509-625-6070 to request an exemption status determination

.

5.3 ANTI-KICKBACK

No officer or employee of the City of Spokane, having the power or duty to perform an official act or action related to this contract shall have or acquire any interest in the contract, or have solicited, accepted or granted a present or future gift, favor, service or other thing of value from or to any person involved in the contract.

5.4 NONDISCRIMINATION

No individual shall be excluded from participation in, denied the benefit of, subjected to discrimination under, or denied employment in the administration of or in connection with this Contract because of age, sex, race, color, religion, creed, marital status, familial status, sexual orientation including gender expression or gender identity, national origin, honorably discharged veteran or military status, the presence of any sensory, mental or physical disability, or use of a service animal by a person with disabilities. The Contractor agrees to comply with, and to require that all subcontractors comply with, Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act, as applicable to the Contractor.

5.5 LIABILITY

The Consultant shall indemnify, defend and hold harmless the City, its officers and employees from all claims, demands, or suits in law or equity arising from the Consultant's negligence or breach or its obligations under the contract. The Consultant's duty to indemnify shall not apply to liability caused by the sole negligence of the City, its officers and employees. The Consultant's duty to indemnify for liability arising from the concurrent negligence of the City, its officers and employees and the Consultant, its officers and employees shall apply only to the extent of the negligence of the Consultant, its officers and employees. The Consultant's duty to indemnify shall survive termination or expiration of the contract. The Consultant waives, with respect to the City only, its immunity under RCW Title 51, Industrial Insurance.

5.6 INSURANCE COVERAGE

During the term of the contract, the Consultant shall maintain in force at its own expense, each insurance coverage noted below:

A. Worker's Compensation Insurance in compliance with RCW 51.12.020, which requires subject employers to provide workers' compensation coverage for all their subject workers and Employer's Liability Insurance in the amount of $1,000,000;

B. General Liability Insurance on an occurrence basis, with a combined single limit of not less than $1,000,000 each occurrence for bodily injury and property damage. It shall include contractual

liability coverage for the indemnity provided under this contract. It shall provide that the City, its officers and employees are additional insureds but only with respect to the Consultant's services to be provided under this contract; and

C. Automobile Liability Insurance with a combined single limit, or the equivalent of not less than $1,000,000 each accident for bodily injury and property damage, including coverage for owned, hired and non-owned vehicles.

D. Professional Liability Insurance with a combined single limit of not less than $1,000,000 each claim, incident or occurrence. This is to cover damages caused by the error, omission, or negligent acts related to the professional services to be provided under this contract. The coverage must remain in effect for at least three [3] years after the contract is completed.

There shall be no cancellation, material change, reduction of limits or intent not to renew the insurance coverage(s) without sixty (60) days written notice from the Consultant or its insurer(s) to the City.

As evidence of the insurance coverages required by this contract, the Consultant shall furnish acceptable insurance certificates to the City at the time it returns the signed contract. The certificate shall specify all of the parties who are additional insured, and include applicable policy endorsements, the sixty (60) day cancellation clause, and the deductible or retention level, as well as policy limits. Insuring companies or entities are subject to City acceptance and must have a rating of A- or higher by Best. Copies of all applicable endorsements shall be provided. The Consultant shall be financially responsible for all pertinent deductibles, self-insured retentions, and/or self-insurance.

PART VI. REFERENCES AND ATTACHMENTS

References:

Independent Forensic Team (IFT) Report, Oroville Dam Spillway Incident, January 5, 2018, https://damsafety.org/article/oroville-investigation-team-update

Federal Energy Regulatory Commission (FERC) Engineering Guidelines for the Evaluation of Hydropower Projects, https://www.ferc.gov/industries/hydropower/safety/guidelines/eng-guide.asp

U.S. Government Publishing Office, Code of Federal Regulations, Annual Edition, https://www.gpo.gov/fdsys/browse/collectionCfr.action?collectionCode=CFR
Construction Failure, 2nd Edition, by Jacob Feld and Kenneth L. Carper, 1997

Attachments to this Request for Qualifications:
Letter to Stephen Burns, City of Spokane, from Douglas Johnson, Federal Energy Regulatory Commission, dated August 28, 2017

FEDERAL ENERGY REGULATORY COMMISSION
Office of Energy Projects
Division of Dam Safety and Inspections - Portland Regional Office
805 SW Broadway, Suite 550
Portland, Oregon 97205
(503) 552-2700 Office - (503) 552-2799 Facsimile

8/28/2017

In reply refer to:
P-3074-WA
NATDAM# WA00074
WA83050

Mr. Stephen Burns
Superintendent
Upriver Dam
914 E. North Foothills Drive
Spokane, WA 99207-2794

Subject: Eighth Independent Consultant's Safety Inspection Report for the Upriver Dam Project due by March 31, 2018 with revised PFMA requirements.

Dear Mr. Burns:

Three copies of the Eighth Independent Consultant's Safety Inspection Report (Report) for the Upriver Dam Project, FERC No. 3074, are to be submitted to this office by March 31, 2019. Code of Federal Regulations (CFR) 18, Part 12, Subpart D, of the Commission's regulations prescribes the scope of the Independent Consultant (IC) evaluations and field inspection, as well as the information that must be contained in the Report. An electronic version of the report in a searchable format should also be included with the submission. **To ensure that the Report will not be rejected you are encouraged to take time and review these responsibilities and our guidance as some requirements have changed.** Enclosure 1 is a bullet list highlighting the changes in the Part 12D process discussed in this letter. Your responsibilities as the Licensee, as well as those for your IC, are discussed in more detail in Enclosure 2; and the Report outline to be used by the IC is included as Enclosure 3. We recently posted updates to Chapter 14, Appendices H, J, and K, and encourage you to review these updated Engineering Guidelines located at:

http://www.ferc.gov/industries/hydropower.asp

We have noticed a disturbing trend regarding the lack of attention to some of the Part 12D requirements. We will be calling you two times during the process of developing a Part 12D report to go over our expectations for the Part 12D report and that of your Independent Consultant (IC). The first call will occur shortly after you receive

this letter. Having this call early in the Part12D process should help you frame the scope of work entered into with your IC. The second call will occur at least 90 days before the PFMA review discussed below and will be conducted with your IC also participating.

You are reminded that failure to conform to the requirements of the Part 12D process will result in rejection of the report.

Potential Failure Modes Analysis Update Requirements

Section 1 of your Supporting Technical Information (STI) document should be a PFMA report completed during a previous submittal under the Part 12D process. During a recent FERC-wide reevaluation of PFMs, we discovered that many still do not meet the expectations that we have for complete PFMs. You should be aware that it is likely that many of the existing PFM's may require revision to more fully describe the actual mode of failure. Each PFM must have a specific loading condition, mode of failure, defined consequence to public safety, and category. To that end, we are requiring you to set up a telephone conference or a face-to-face meeting at least 90 days prior to the PFMA review with your independent consultant to discuss our expectations for the PFMA review. During this meeting, we will review the level of effort required for the PFMA review, as discussed in our first telephone call. This effort could range from simply reviewing the PFMA Report, to performing a complete revision of the PFMA process overseen by a Facilitator. Enclosure 4 provides and outline for additional topics to be discussed during the pre-meeting.

For more information on how to complete well-developed PFMs, please refer to the D2SI website at http://www.ferc.gov/industries/hydropower/safety/initiatives/pfms.asp.

Project Features

Commission Regulations require that the project works of a development subject to Part 12, Subpart D, of the Commission's Regulations be inspected and analyzed periodically by an IC. This includes all dams and all principal works of the development. If applicable, the IC's inspection should also include inspecting the spillway apron for undermining. The following dams and associated appurtenant water retaining structures require inspection at your project:

Upriver Dam
Upriver Forebay

The following [analysis/analyses and/or study/studies], which were either outstanding from previous Part 12 Reports, previously requested by FERC letter, or became apparent

during our review of existing documents, will also need to be provided to the IC and this office for review together with this Report:

Forebay closure wall stability analysis for static and seismic loading
Seismicity evaluation considering revised USGS PGA of 0.2g

IC Approval

You must obtain approval of your proposed IC(s) prior to the initiation of the field inspection. You should send three copies of your letter requesting approval of the IC (together with the proposed IC's detailed résumé) to:

Mr. David Capka, P.E., Director
Division of Dam Safety and Inspections
Federal Energy Regulatory Commission
Office of Energy Projects
888 First Street, N.E., Room 6N-01
Washington, D.C. 20426

One copy of the letter and resume should also be sent to this office. By regulation, the request for the approval of the IC and the resume are to be filed at least 60 days prior to the initiation of the safety inspection. In order to allow your IC adequate time to inspect your project and prepare the Report, we request that you submit the request letter and resume at least six months before the Report is due; that is, by **September 30, 2018.**

The first Report for newly constructed projects or projects where a major dam safety remediation has recently been completed may be done by the design engineer or an engineer from the design engineer's firm. The next Report must be completed by a different engineer not associated with either the design or construction firm. Subsequent Reports may be completed by an engineer associated with the design, construction, or remediation work. However, an engineer or engineers from the same firm will not be approved as the IC for more than two consecutive Reports for any project. We will be contacting you shortly after your receive this letter to coordinate a teleconference or meeting prior to selecting an IC. This meeting will serve to coordinate any outstanding issues, studies, discuss the condition of the existing PFMA, and otherwise gain an understanding of our expectations for the inspection. This will enable you to better develop a complete scope of work for the IC.

Once the IC has been approved, it is your responsibility to provide the IC with copies of, or access to, all project files well in advance of the field inspection. You should include file review in your scope of work and strongly encourage the IC to adequately prepare for the field inspection by adequately reviewing all the pertinent

background information for the project in advance. Inadequate preparation of your IC may result in the need to reschedule the inspection until they are properly prepared to perform a thorough inspection.

Report

It is critically important that the IC review, evaluate, and comment on the appropriateness and current validity of all the previous analyses located in Section 8 of the STI. Section 7 of the Report should contain your IC's detailed assessment of the STI including the PFMA report. Acceptable technical criteria are prescribed in FERC's Engineering Guidelines. If needed, this publication can be downloaded from our website at:

http://www.ferc.gov/industries/hydropower/safety/guidelines/eng-guide.asp

The Report outline to be used by the IC is also included as Enclosure 3 and Enclosure 5 provides a copy of 18 CFR 12D.

Report Follow-Up

If the IC makes specific recommendations in the Report, Section 12.39 of CFR 18 requires you to submit to us, within 60 days of the date the Report is filed, your plan of action and schedule to satisfy these recommendations. It is also necessary to confirm your agreement with the IC's recommendations to continue any ongoing measures (e.g. annual settlement survey) specifically identified in the Report. Your plan of action may include any proposal, including taking no action, that you consider a preferable alternative to any corrective measures recommended by the IC in the Report. However, any proposed alternative must be supported by complete justification and detailed analysis and evaluation in support of that alternative.

Unresponsive Reports Will Be Returned

We have noted several instances lately where an IC did not make "*a clear statement that they have reviewed the pertinent analyses and evaluations along with the underlying assumptions and that they have concluded that the assumptions and methods of analysis or evaluation were appropriate for the structure, were applied correctly and are appropriate given current guidelines and the state of dam safety practice*" as is required by the Commission's Guidelines. A general statement is not acceptable. The Report should indicate in each section that this review and concurrence has been completed. Please ensure that the Report fulfills this requirement, as unresponsive Reports received by the D2SI will be returned for resubmittal.

The Commission's dam safety program is a cooperative process that includes the licensee, the IC, and the FERC. The most important of the three elements is the licensee, as they operate the dam, see the dam on a regular basis, and are responsible for the surveillance and monitoring plan used to determine if a potential failure mode is developing. It is the licensee's responsibility to submit the IC's Report to the FERC and ensure that the Report meets the requirements of the Commission's Regulations and Guidelines before it is submitted. The Report is a FERC requirement and a valuable resource for you as the dam owner. Enclosure 2 provides a more complete discussion of the requirements of the Commission's Regulations and Guidelines.

If you have any questions regarding this letter or Enclosures, please do not hesitate to call me at 503-552-2700. Your support is critically important and I am available to discuss any concerns or comments that you may have.

Sincerely,

Douglas L. Johnson, P.E.
Regional Engineer

Enclosures:

1. Bullet list highlighting changes in responsibilities and guidance
2. Licensee and Independent Consultants Responsibilities
3. IC's Safety Inspection Report Outline
4. 90 Day Pre-Meeting Agenda Conference Call
5. 18 CFR 12D

THIS PAGE INTENTIONALLY LEFT BLANK

Changes to Part 12D Process

- Page 1, Paragraph 1 - An electronic version of the consultant's Part 12D report, in a searchable format, is required.

- Page 1, Paragraph 1 - Chapter 14 of our Guidelines: Appendices J and K have been updated and contain new requirements.

- Page 2, Paragraph 1 - Two teleconferences with D2SI staff and management are required: 1) After you receive this letter, with your staff, to discuss our expectations of your consultant and help you develop the scope of work, and 2) At least 90 days before the Potential Failure Modes Analysis (PFMA) review, with your staff and consultant, to discuss our expectations for the PFMA review and documentation.

- Page 2, Paragraph 3 - Note paragraph(s) summarizing specific deficiencies in initial PFMA or specific PFMs that need to be re-developed, and list of outstanding studies that need to be reviewed by and incorporated into the consultant's Part 12D report.

- Page 5 – Unresponsive Reports will be returned

  Reminder: The PFMA review and documentation must be thorough and complete. The consultant's Part 12D report must contain specific statements about their independent review and agreement with the analyses, evaluations, and assumptions described in the Supporting Technical Information (STI) document; and must confirm the analyses and evaluations meet current guidelines and are in accordance with current dam safety practice. *The Part 12D report will be rejected if all requirements are not met.*

- Enclosure 3 – Revised Section 7 IC assessment outline

  Revised Chapter 14, Appendix H, Section 7.0, IC assessment of STI document. Further described the responsibility of the IC to assess the contents of the STI and clarified items to consider when summarizing each section of the STI. Added example statements offered as general guidance for use by the IC when making a definitive statement regarding each section of the STI. PFMA review and documentation must be thorough and complete. The IC's report must contain specific statements about their independent review and agreement with the analyses, evaluations, and assumptions described.
  http://www.ferc.gov/industries/hydropower/safety/guidelines/eng-guide/chap14.asp

THIS PAGE INTENTIONALLY LEFT BLANK

Licensee and Independent Consultant Responsibilities

The FERC dam safety process encompasses three distinct and separate entities each with their own responsibility in assuring dam safety; the dam owner, the Independent Consultant, and the FERC Division of Dam Safety and Inspections (D2SI). The triad of dam owner, Independent Consultant, and D2SI was put in place to provide three independent assessments of a dam's suitability for safe and reliable operation.

First and foremost is the dam owner. The Federal Power Act, under Section 10, places full and complete liability for the safe operation of the project on the owner; 16 U.S.C. Section 803c states that:

> "the licensee shall maintain the project works in a condition of repair adequate for the purposes of navigation and for the efficient operation of said works in the development and transmission of power, shall make all necessary renewals and replacements, shall establish and maintain adequate depreciation reserves for such purposes, shall so maintain, and operate said works as not to impair navigation, and shall conform to such rules and regulations as the Commission may from time to time prescribe for the protection of life, health, and property. ***Each licensee hereunder shall be liable for all damages occasioned to the property of others by the construction, maintenance, or operation of the project works or of the works appurtenant or accessory thereto***, constructed under the license and in no event shall the United States be liable therefore." (Emphasis added)

The owner is also liable under United States common law (see Legal Liability for Dam Failures, Denis Binder, 2009 and Liability for Water Control Structure Failure Due to Flooding, Edward A. Thomas, 2006).

The second entity, for dams which fall under the requirements of the 18CFR12D of the Commission's Regulations (Regulations – copy attached), is the Independent Consultant. The Regulations specify that dams that meet the requirements outlined in 18CFR12D be:

> "... periodically inspected and evaluated by or under the responsibility and direction of at least one independent consultant, who may be a member of a consulting firm, to identify any actual or potential deficiencies, whether in the condition of those project works or in the quality or adequacy of project maintenance, surveillance, or methods of operation, that might endanger public safety." (18CFR12.32)

The Consultant's report is submitted to the FERC by the licensee. It is the licensee's responsibility to assure that the report meets the requirements of the Commission's Regulations and Guidelines before it submitted to FERC. Although the report is required

by the FERC under the statutes noted above, the report is also a valuable resource for the dam owner, especially those that do not have the staff necessary to assure the safe and reliable operation of the dam.

The FERC is the third entity involved in assuring the safety of dams under Commission regulation. As the regulator, the FERC is responsible for assuring that the requirements of the Commission's Regulations and Guidelines are met and to check licensee's submissions for apparent errors or omissions. FERC's acceptance of a report is recognition that the report, at the time it was submitted, met the Commission's Engineering Guidelines. It does not imply that the report will continue to meet the Guidelines into the future as our Guidelines may change due to evolution in the practice of dam safety; loadings may change due to a better understanding of the seismic or hydrologic regime in which the dam is located, or deterioration of the dam itself.

Chapter 14 of the Commission's current Engineering Guidelines (Guidelines) requires the owner to prepare a Supporting Technical Information Document that is intended to include summaries of "all relevant reports on the safety of the development made by or written under the direction of Federal or state agencies, submitted under Commission regulations, or made by other consultants" related to the safety of the dam. Chapter 14 of the Guidelines also includes the outline for the Independent Consultant's Report. The outline requires

> "in each section, where appropriate, the Independent Consultant shall make a clear statement that they have reviewed the pertinent analyses and evaluations along with the underlying assumptions and that they have concluded that the assumptions and methods of analysis or evaluation were appropriate for the structure, were applied correctly and are appropriate given current guidelines and the state of dam safety practice."

This statement is intended to fulfill the requirement in 18CFR12.37 for the report to "Analyze the safety of the project works and the maintenance and methods of operation of the development fully in light of the independent consultant's reviews, field inspection, assessments, and evaluations described in §12.35".

When the Consultant fails to "make a clear statement that they have reviewed the pertinent analyses and evaluations along with the underlying assumptions and that they have concluded that the assumptions and methods of analysis or evaluation were appropriate for the structure, were applied correctly and are appropriate given current guidelines and the state of dam safety practice," the Consultant is failing to meet both the requirements of 18CFR 12.37 to "Analyze the safety of the project works and the maintenance and methods of operation of the development fully in light of the independent consultant's reviews, field inspection, assessments, and evaluations described in §12.35" and the requirements of Chapter 14 of the Guidelines. When a

Consultant justifies the adequateness of a section in the Supporting Technical Information document by stating that the FERC conducted its own study or that the FERC had previously accepted a report submitted by the licensee, the Consultant is, in essence, attempting to delegate their responsibility to the FERC.

The necessary three parts of the dam safety process provided for assuring the safe and reliable operation of FERC regulated dams is effectively reduced to only two when a Consultant does not "analyze the safety of the project works and the maintenance and methods of operation of the development fully in light of the independent consultant's reviews, field inspection, assessments, and evaluations described in §12.35." This is unacceptable to the FERC and should be unacceptable to any dam owner with an appreciation of their responsibility and liability.

Reports that fail to meet the requirements of the Regulations and/or Guidelines may be considered patently deficient and will not be accepted until they meet the requirements

THIS PAGE INTENTIONALLY LEFT BLANK

Part 12D Safety Inspection Report Outline

Table of Contents

The Table of Contents must show the initial page numbers for each section. If any subsection is not applicable, include the subsection with a statement of "Not Applicable" and an explanation of the reason(s) why.

For licensed projects that include multiple independent dam and powerhouse developments, separate Part 12D reports should be published for each development.

1. **Findings and Recommendations**
2. **Project Description**
3. **Discussion of Potential Failure Modes Analysis Report**
4. **Surveillance and Monitoring with Respect to Potential Failure Modes**
5. **Field Inspection**
6. **Operation and Maintenance Programs Relative to Potential Failure Modes**
7. **Assessment of Supporting Technical Information Document**

List of Tables (with location)

List of Figures (with location)

List of References

Appendices for Part 12D Inspection Report

A. **FERC Letter Requiring Part 12D Inspection**

B. **FERC Letter Approving Part 12D Consultant** - Include date of current report outline provided by FERC. Use report outline provided with FERC letter, not latest revision.

C. **Project Figures**

Only provide general overview drawings necessary to understand the project and items discussed in the report. If figures are placed in Section 2, provide a statement that figures may be found in Section 2. Optionally, if the STI document is bound with the Part 12D report provide a statement that figures may be found in the STI document; duplicate drawings from the STI document do not need to be included in the Part 12D report.

Detailed drawings should be included in the Supporting Technical Information document.

D. **Instrumentation Monitoring Data Plots**

List each figure and drawing included in the report. Optionally, instrumentation plots may be placed in Section 4 of the report and a statement included in Appendix D that the plots may be found in Section 4.

E. **Inspection Photographs**

Optionally, some or all of the photographs may be included in the appropriate sections of the report. If photographs are included within the report, provide a list of the photographs and the corresponding page number in Appendix E.

F. Inspection Checklists and/or Field Notes (Optional)

G. Operation and Maintenance Documentation (If required)

1.0 Findings and Recommendations

This Section includes a summary of the Part 12D Independent Consultant's findings and assessments and the Part 12D Independent Consultant's conclusions and recommendations.

1.1 Findings

1.1.1 Summary assessment of the PFMA report

1.1.2 Summary assessment of the Surveillance and Monitoring Plan

1.1.3 Summary of Field Inspection Findings

1.1.4 Summary of O&M status

1.1.5 Summary Assessment of "Supporting Technical Information" document

Note: Specifically identify any new calculations prepared subsequent to the previous Part 12D Report.

1.2 Conclusions

The conclusions of the Independent Consultant regarding the condition and suitability for continued safe and reliable operation of the project and specific conclusions regarding the information in each Section of this Part 12D report.

1.2.1 Conclusions regarding the suitability of the Project for continued safe and reliable operation.

1.2.2 Conclusions regarding the Project Description

1.2.3 Conclusions regarding the Potential Failure Modes Analysis Report

1.2.4 Conclusions regarding the Surveillance and Monitoring Plan

1.2.5 Conclusions regarding the Field Inspection

1.2.6 Conclusions regarding the Operation and Maintenance Programs

1.2.7 Conclusions regarding the "Supporting Technical Information" document.

1.3 Recommendations

The recommendations of the Independent Consultant to improve or maintain the condition and suitability for continued safe and reliable operation of the project and specific recommendations regarding the information in each Section of this Part 12D report.

1.3.1 Recommendations regarding the suitability of the Project for continued safe and reliable operation.

1.2.2 Recommendations regarding the Project Description

1.3.3 Recommendations regarding the Potential Failure Modes Analysis Report

1.3.4 Recommendations regarding the Surveillance and Monitoring Plan

1.3.5 Recommendations regarding the Field Inspection

1.3.6 Recommendations regarding the Operation and Maintenance Programs

1.3.7 Recommendations regarding the "Supporting Technical Information" document

1.4 Certification

Note: By signing this document, the Part 12D Independent Consultant is stating that the entire report has been developed by and under the direction of the undersigned. The Part 12D Independent Consultant shall make a clear statement that he/she generally concurs with the assumptions, methods of analyses, and results of all studies documented in the report.

The Part 12D Independent Consultant is thus taking responsibility for the Part 12D report content as a Professional Engineer.

1.4.1 List of all field inspection participants

1.4.2 Reference to FERC Order 122 dated March 1, 1981, and paragraph 12.37 (c) (7).

1.4.3 Signature(s) of Part 12D Independent Consultant(s) and PE Stamp

See Appendix A: FERC Letter Requiring Part 12D Inspection

See Appendix B: FERC Letter Approving Part 12D Consultant - (Include date of current report outline provided by FERC)

2.0 Project Description

2.1 Brief Project Description

For each major element and ancillary structure, provide a brief description of the type of structure, general dimensions, etc. The detailed project description will be in the "Supporting Technical Information" document.

For multi-project or development licenses, include a brief outline of how this site fits with the other projects.

Include a short paragraph with very brief project history. When constructed, when modified, any incidents.

2.2 Hazard Potential Classification.

Based on views from the dam, other project works inspected and discussion with the licensee, document any changes in upstream or downstream conditions that might affect the Hazard Potential Classification. Review with the licensee the methods and assumptions used to develop the IDF. If the IDF is less than the PMF, the IC should confirm that the IDF is still valid based on an assessment of the downstream conditions as noted above.

2.3 Summary of Standard Operating Procedures

2.3.1 Purpose of Project (Run of river, storage, flow augmentation, flood surcharge storage, control reserve, pumped storage, etc.)

2.3.2 Reservoir rule curves by season (include seasonal reservoir level operating levels and restrictions of reservoir level due to safety concerns, if any)

2.3.4 Standard gate operation procedures (lead and following gates, emergency power systems, etc.)

2.4 Modifications Conducted for Project Safety

Document any modifications to project works since the last Part 12D inspection that have been done to improve project safety. (i.e.: spillway gates reinforced, seepage drain, berm added, crest raised, post-tensioned anchors installed, foundation drains or relief wells cleaned, etc.). In the next Part 12D Safety Inspection Report, these items will become part of Section 2.1. This information should be fully described in the updated "Supporting Technical Information" document submitted with the Part 12D report.

Do not include routine maintenance such as unit overhaul, gate painting, etc. Note that generators, transformers, and transmission facilities are excluded from the Part 12D program under 18CFR subsection 12.35.

2.5 Flood History

2.5.1 Flood of Record, PMF, IDF

2.5.2 Zero freeboard spillway capacity

2.5.3 Peak spillway discharge during last five year period

2.5.4 Peak reservoir elevation during last five year period

See Appendix C: Project Figures (Note: If the STI document is bound with this report, do not duplicate figures)

3.0 Discussion of Potential Failure Modes Analysis Report

Do not include security issues in the Part 12D report. For licensed projects that include multiple independent dam and powerhouse developments, separate PFMA studies and reports should be made for each development.

3.1 General

Identify the Core Team members, and their affiliations, who developed the comprehensive Potential Failure Modes Analysis (PFMA) or its update. Note that the process was in accordance with FERC "Engineering Guidelines for the Evaluation of Hydropower Projects," Chapter 14.

3.2 Assessment of Potential Failure Modes Analysis Report

Assess the viable potential failure modes identified in the PFMA report. These would generally be Category 1 through Category 3 PFMs. Provide an assessment of the reasonableness and completeness of the failure mode scenario and whether the PFMs identified have a real possibility of occurrence. Potential Failure modes should be listed in order of importance. Each PFM assessment should include:

- A description that includes the sequence of conditions and events that would lead to the potential failure mode;
- An assessment of the risk reduction opportunities for each PFM; and
- An assessment of the Surveillance and Monitoring Plan for each PFM.

For example, the report would be formatted as follows.

3.2.1 PFM 1. (i.e. internal erosion, piping)

3.2.1.1 Description of PFM (may be taken from PFMA report)

3.2.1.2 Assessment of Risk Reduction Opportunities

3.2.1.3 Assessment of Surveillance and Monitoring Plan

3.2.2 PFM 2. (i.e. Seismic induced deformation)

3.2.2.1 Description of PFM (may be taken from PFMA report)

3.2.2.2 Assessment of Risk Reduction Opportunities

3.2.2.3 Assessment of Surveillance and Monitoring Plan

Etc.

3.3 Are there new potential failure modes that have been identified and addressed in this report or that should be assessed? If so, include the appropriate Description of the PFM, Assessment of mitigation actions and Assessment of the SMP as discussed above.

See "Supporting Technical Information" document: **Potential Failure Modes Analysis Study Report** (Update as appropriate)

4.0 Surveillance and Monitoring with Respect to Potential Failure Modes

Note: Review and assessment of Surveillance and Monitoring Plans must always be done from the point of view of potential failure modes. Although the primary assessment is with respect to the potential failure modes identified in the PFMA study, the Independent Consultant must determine if there are potential failure modes not previously addressed or not adequately considered.

For the purposes of this section, a Threshold Level is the value used in the analysis or design, or is established from the historic record. An Action Level is the instrument reading that triggers increased surveillance or an emergency action.

4.1 Operator's Surveillance Program

Daily and weekly operator's inspections and reports.

4.2 Active Instrumentation: Include a schematic figure showing location of instrumentation (not detailed or cross section).

This will vary by project. Discuss only the instruments actually at the project. Is instrumentation in accordance with Chapter IX of the FERC "Engineering Guidelines for the Evaluation of Hydropower Projects?" Is the instrumentation functioning properly? Examples of instrumentation to be included:

- Piezometers
- Weirs
- Settlement/alignment monuments
- Crack gages
- Upstream river and/or rain gage stations
- Headwater/tailwater (alarm systems)

4.3 Threshold and Action levels

For each instrument, or group of instruments as appropriate, provide a table of Threshold and Action levels as defined above.

4.4 Reading procedures/frequency

For each instrument, or group of instruments as appropriate, discuss:

- Data acquisition procedures (manual/automated)
- Data evaluation procedures (process; is data evaluated in a timely manner by a qualified engineer; are readings compared to Threshold and Action levels defined for each instrument)
- Spurious readings (are spurious readings confirmed or explanations provided)

4.5 Assessment of Instrumentation Data and Surveillance and Monitoring Plans Relative to Potential Failure Modes.

Include newly identified potential failure modes

5.0 Field Inspection

5.1 Field Inspection Observations

For each element of the project (i.e.: spillway, earthfill embankment, gravity section, intake, powerhouse, conveyance system, etc.), observe and report visual observations of the following issues as appropriate. Include pictures to document significant project features and observations. If an inspection checklist is used, include a copy of the checklist Appendix F. A site-specific inspection checklist should be formatted to include specific visual surveillance items identified in the PFMA.

The intent of this section is to highlight changed conditions for the report reviewer, not to document unimportant or minor details.

The report should be in text format by structure or element addressed individually. For each structure or element of the project, the Part 12D Independent Consultant should consider the following items as appropriate:

- Settlement
- Movement – including abutments (cracks or other signs of distress or change)
- Erosion
- Seepage/Leakage
- Cracking
- Deterioration
- Spillway gate Operation/Standby Power (At a minimum, the Part 12D Independent Consultant needs to review the licensee's annual certificates of spillway gate operation and interview project operating staff to assure that emergency backup systems work and that operating personnel know how to use them. At least one spillway gate should be operated at least one foot during the Part 12D inspection using the standby generator.)
- Outlet/Sluice Gate Operation
- Water conveyance systems (canals / flumes / penstocks / tunnels / surge chambers, emergency bypass or closure systems, etc.)
- Foundation Drain/Relief Well Operation
- Evidence of high artesian or uplift pressures (structures / foundations / abutments)
- Observations of sediment transport (piping evidence)
- Observations of seeps, wet areas, springs, green grass
- Other Pertinent Observations
- Reservoir Rim Stability

5.2 Status of Response(s) to Recommendation(s) in Last Part 12D Report.

5.3 Field Observations with Respect to Potential Failure Modes

Document field observations pertinent to each potential failure mode noted in Section 3

5.4 Adequacy/Operation of Public Alert Systems

Note: Are upstream spillway warning buoys, and downstream sirens and lights operable?

See Appendix E: **Inspection Pictures** (Optionally, some or all of the pictures may be included in the appropriate sections of the report. If pictures are included within the report, provide in Appendix E a list of the pictures and the corresponding page number)

See Appendix F: **Inspection Check List** (optional)

6.0 Operation and Maintenance Programs Relative to Potential Failure Modes

Do not include security issues in the Part 12D inspection report. If observations of significant O&M issues are made, include in report for possible new potential failure mode analysis.

6.1 Summary of PFMA identified O&M issues (from PFMA report)

6.2 Operation and Maintenance Procedures

6.2.1 Communication/Response

Address adequacy and reliability of remote monitoring, communication and control systems (Operations / Instrumentation / Telemetry – Do the systems provide adequate reliability and redundancy? Can a specific spillway gate, valve or other project component be operated remotely on demand?)

6.2.2 Electrical/Mechanical Systems

- Spillway Gate Motors (line/line voltage, amperage draw, motor name plate rating information)
- Standby and Redundant Power Sources
- Manual/Remote/Automatic Operation of Gates and Valves
- Gate Operation Sequence
- Icing protection (heaters/bubblers/reservoir level restriction)

6.2.3 Human Factors

- Adequate Staff for Emergency Response (Multiple Sites)
- Reliable Access Routes (winter/storm conditions)
- Training
- Electricians/Mechanics/Laborers
- Adequate Time to Respond
- Call Out Systems (time for crew to reach site after call out)

6.3 Assessment of O&M Procedures Relative to Potential Failure Modes

See Appendix G: **Operation and Maintenance Documentation**

7.0 Assessment of Supporting Technical Information Document

The purpose of this section of the Part 12D Report is for the Part 12D Independent Consultant (IC) to assess the contents of the "Supporting Technical Information" (STI) document compiled by the licensee and determine both its completeness and appropriateness to the current standard of the practice of dam safety. The STI document should be considered an executive summary that includes general, yet critical summary information needed to fully understand the design, construction, operation, and performance of the project. It should also contain sufficient information to summarize and confirm the underlying assumptions and the conclusions of the analyses of record supporting the assessment of the safety of the Project.

For each section of the STI, the Independent Consultant shall make a clear statement regarding their assessment of the completeness and appropriateness of the section of the STI. In sections where appropriate, they must state that they have reviewed the pertinent analyses and evaluations along with the underlying assumptions and that they have concluded that the assumptions and methods of analysis or evaluation were appropriate for the structure, were applied correctly and are appropriate given current guidelines and the state of dam safety practice. The IC must perform sufficient review and/or independent analysis and document their rationale to support their statement. This must include a brief summary of the parameters, methodologies, and results that document their decision.

Listed below are items to consider when summarizing each section of the STI. This is not intended to be an all-inclusive listing since each project is unique and requires careful review and consideration when reviewing for dam safety. In addition, this section of the Part 12D report is not intended to repeat the STI verbatim, but to summarize key components used by the IC to make their assessment and conclusions regarding the completeness of the STI.

7.1 Potential Failure Modes Analysis Study Report (Include a statement referring to Section 3 for a detailed discussion of the Potential Failure Modes Analysis)

- Adequacy of the summary of current PFMA Report
- Changes in PFMA during current review, including any new PFMs
- Any changes in category for any PFM

7.2 Description of Project

- Summarizes major components of the project, including all those listed in the project Order
- Review description for accuracy and completeness (elevations, capacities, etc.)

7.3 Construction History

- Summarized procedures/methods used for construction

- Includes construction difficulties that could influence long-term performance of the project.
- Summarize any design changes in the project during construction and any modifications since originally constructed
- Construction photographs

7.4 Standard Operating Procedures

- Summary of key operating procedures for dam safety
- Include procedures/sequence for passing flows (gate/powerhouse/flashboard/fuseplug, etc. operation)
- Does the SOP include all the necessary requirements to safety operate the project?
- Discuss any changes that have been made in the operation of any component of the project that is different than originally designed and if there is any impact resulting from the change.

7.5 Geology and Seismicity

- Geology
  - Adequacy of the summary of regional and local geologic conditions
  - Geologic conditions that could impact dam safety performance
  - Any geologic conditions that are important for monitoring the project
- Seismicity
  - Summary of seismic analysis, including key parameters
  - Date of recent analysis and applicability to current studies
  - Design PGA and recurrence interval (if available)

7.6 Hydrology and Hydraulics

- Hydrology
  - Summary of IDF/PMF, including key assumptions and rainfall/runoff parameters used.
  - Applicability of flood to current methods, HMR, etc
  - Specifically identify the studies of record
- Hydraulics
  - Summary of key issues and assumptions, including review of rating curve for spillway.
  - Summarize routing of IDF/PMF through spillway(s), peak reservoir elevation, and residual freeboard.

7.7 Surveillance and Monitoring Program

This section should have an introductory summary of the analysis of record: the actual analyses should be included or attached as an Appendix. Other prior analyses can be included in the Appendix if they are thought to be of significance.

- Status of current DSSMP and DSSMR
- Applicability of program to PFMs
- Determine if any changes to program are required and recommend those changes.
- Discuss the appropriateness of current threshold and action levels

7.8 Stability and Stress Analyses of Project Structures

- Summary of methods, procedures, critical elements, assumptions, input/design parameters, etc… for each structure analyzed
- Resulting factors of safety and comparison to FERC guidelines
- List of all analysis of records and any supplemental studies currently in process or completed

7.9 Spillway Gates

- Category of gates and appropriate requirements
- Date and brief conclusion of most recent detailed gate inspection
- Date and brief conclusion of most recent test operation.

7.10 Pertinent Correspondence Related to Safety of Project Works

- Completeness of documents required to be included in the STI.

7.11 Status of Studies in Process and Outstanding Issues

- Summarize any ongoing analyses, studies, etc.

7.12 References

- Completeness of the list of references and the attached electronic files, if applicable

7.13 Conclusions

- Overall assessment of the condition of the STI

General Statements

The following example statements are offered as general guidance for use by the IC when making definitive statement regarding each section of the STI, **in addition** to the discussion indicated above. The Positive statements are examples of when the STI is acceptable. The Negative statements are examples where the STI does not meet minimum requirements and must be improved upon. There are intended only as examples to be used for the section indicated. *Copying these examples verbatim into the IC's assessment of each section of the STI may result in the rejection of the Part 12 D report; the assessment should be specifically customized for the project under review.*

7.1 PFMA Review

Positive

The PFMA was reviewed for completeness during a PFMA review conducted in conjunction with the Part 12 inspection. I/we reviewed the following items (itemize here) and as a result, consider the PFMs to be, fully developed and appropriately separated by load case and location, well documented, and complete relative to the project information.

Negative

I/we reviewed the following items (itemize here). PFM Number XX was not fully developed and a recommended revision is included in the recommendation section of this report.

After review and concurrence by FERC, the revised PFM should be adopted. The other PFMs are considered to be well written, well documented, and complete relative to the project information.

7.2 Project Description

Positive

The description of the project is correct and adequately summarizes the major components of the project and provides a good executive review level discussion about the project.

Negative

The project description is inadequate. It is recommended that the description of the project included in the STI be enhanced to include a more detailed description of the spillway gate operators, as noted in the recommendation section of this report

7.3 Construction History

Positive

The construction history is adequately described, including all significant construction issues documented during the construction which include the following key points that could potentially impact the operation and performance of the project features. All available construction photographs are included on the accompanying CD and were reviewed to ensure there are no other previously unidentified defects from the original construction or later modifications.

Negative

The construction history is generally adequately described. However, the construction history did not include the modifications made to the project in 1999, which included (describe the modifications). A recommended revision is included in the recommendation section of this report.

7.4 Standard Operating Procedures

Positive

The Standard Operating Procedures are adequately summarized in the STI and include (list here) that are of specific interest regarding the continued safe operation of the project. The SOP includes all the necessary requirements to safety operate the project.

Negative

The SOP does not account for changes in gate operation to accommodate flow releases required for environmental purposes in 2004. It is recommended that the SOP be rewritten to account for this change.

7.5 Geology and Seismology

Positive

The geology and seismology of the project are adequately summarized and highlight specific issues that could impact the operation and performance of the project and include (summarize here). Our/my review of the seismicity indicates that site seismicity was developed

using the most current data and approach available. The assumptions, methods, and use of the data and its application to this project meet the current guidelines and the state of dam safety practice.

Negative

The Geology section of the STI is adequate with the following exceptions:

- The geology does not contain a description of the problematic areas encountered in the foundation during construction. Nor does the geology summarize the actual geology of the site, but only includes a broad regional summary of the area.

- The seismology section of the STI is inadequate. The most current seismic hazard evaluation is not adequately summarized and the design Peak Ground Acceleration is not listed.

- The Geology and Seismology sections of the STI must be enhanced in accordance with the recommendations contained elsewhere in this report.

7.6 Hydrology and Hydraulics

Positive

The hydrology of the project is adequately described in the STI. My/our assessment of the hydrology included a review/analysis of (list studies/reports here). The key assumptions and parameters include (summarize here) and are considered appropriate to the current methodologies, data, and state of dam safety practice for evaluating the hydrologic safety of a dam. The PMF inflow of xxxx cfs is appropriate for this project.

The hydraulics of the project are adequately described in the STI. The spillway and tailwater rating curve(s) are correct and adequately represents the current spillway hydraulics. The project spillway(s)/outlets can pass the PMF/IDF with xx feet of freeboard on the dam. This freeboard is adequate for predicted wind and wave run-up at the dam.

Negative

I/we do not concur with the PMF analysis of record for this project. The PMF was based on PMP developed using HMR43, which was superseded by HMR57 in 1994. It is recommended that the PMF analysis be updated using the updated PMP values from HMR57.

The hydraulics of the project are not properly described in the STI. The rating curve used for the spillway is incorrect and needs to be recalculated.

7.7 Surveillance and Monitoring Program

Positive

The Surveillance and Monitoring Program is adequately described in the STI. My/our review of the DSSMP indicate the most critical elements of the monitoring include (summarize here) and contain appropriate threshold and action levels for each instrument. During the PFMA review, the need for additional surveillance for the project with respect to both identified PFMs

and general health was discussed. It is my opinion that existing monitoring program is adequate and no changes are recommended at this time.

Negative

My/our review indicated that several key elements of the project instrumentation are missing (list here). Thus the SMP is inadequate and needs to be revised.

7.8 The Stability and Stress Analyses of Project Structures

Positive

I have reviewed the pertinent analyses and evaluations along with the underlying assumptions and that have concluded that the assumptions and methods of analysis or evaluation were appropriate for the structure, were applied correctly and are appropriate given current guidelines and the state of dam safety practice. I also performed an independent check of the stability calculations and my results agree with the analysis of record. The following project structures are thus found to be safe for continued operation:

- Main embankment
- West diversion dam
- Integral power house
- (List all)

Negative

The STI is inadequate with regards to a summary of the stability and stress analyses for the project structures. The design assumptions are missing for the (xxxx) structural analysis. In addition, the resulting factors of safety on the recently submitted stability analysis do not meet the FERC minimum guidelines and must be reviewed with regards to dam safety concerns.

7.9 The Spillway Gates

Positive

I have reviewed the pertinent inspection reports and stability and stress analyses (if applicable) and have determined that the spillway gates are safe for continued operation.

Negative

I have reviewed the pertinent inspection reports and stability and stress analysis for the spillway gates. The analyses do not properly account for the bent strut on Gate No. 1 that I observed during my field inspection. Thus, before I can determine if the spillway gates are safe for continued operation, the stress analyses need to be redone to account for this issue with Gate No. 1.

7.10 The Pertinent Correspondence Related to Safety of Project Works

Positive

The Pertinent Correspondence Related to Safety of Project Works is complete and adequate in accordance with the requirements of the FERC. This correspondence includes the following items of specific note that are most important regarding the continued safety of the project:

1.
2.

Negative

The Pertinent Correspondence Related to Safety of Project Works is incomplete with regards to the requirements of the FERC. The following documents are missing and my/our recommendation is included to obtain and include the following documents in the STID:

- Past three years of the FERC Annual Dam Safety Inspection Reports
- Etc… (detail all accordingly)

7.11 Status of Studies in Process and Outstanding Issues

The Status of Studies in Process and Outstanding Issues include the following:

- List specifics and summarize the issue

OR

There are no outstanding studies in process or outstanding issues with the project that are in process or need to be initiated resulting from my/our conclusions of this Part 12D review and inspection.

7.12 References

Postive:

The References included in the STI and associated electronic files enclosed with the STI are complete and accurate and are formatted for easy reference.

Negative:

The references in the STI are incomplete and inadequately contain all the information contained in the STI. It is recommended that all studies and reports listed below be transferred to a disk and included in the end of the STI.

7.13 The Conclusions

Positive

The overall STI document is complete, well organized, and adequately addresses all of the requirements of the FERC but more importantly provides a complete executive summary document that is useful to all those associated with this project.

Negative

The STI document is inadequate. Rather than summaries of the necessary information, the document contains random copies of studies, project information, and incomplete information that does not allow the user to obtain a general overview of the entire project. Specifically, Sections (list sections) are particularly poor in content and must be completed in accordance with our recommendations.

APPENDICES

List of Tables (with location)

List of Figures (with location)

List of References

A. FERC Letter Requiring Part 12D Inspection

Note: May include specific FERC concerns to be addressed by Part 12D Independent Consultant.

B. FERC Letter Approving Consultant

Note: Include date of report outline provided by FERC.

C. Project Figures

This Appendix should include the following figures as appropriate. All Figures should be consecutively numbered. Figures should be general without excessive detail so as to be clearly legible. Figures should include documentation of significant changes since last Part 12D report. If STI document to be directly bound in this report, do not duplicate the figures. FERC Exhibit and relicensing drawings can be used.

- Location map with project facilities located including conveyance systems and access routes from main roads and nearest town
- Plans of project facilities
- Typical sections and profiles of key project features (dams, spillways, powerhouses, intakes, emergency/fuse plug spillways, chute profiles, etc.)
- Profiles and typical sections of water conveyance systems (canals, tunnels, penstocks, flumes, surge chambers, etc)
- Satellite or aerial picture of project and downstream area
- Spillway and tailwater rating curves

D. Instrumentation Monitoring Data Plots

Note: Plans and cross-sections with locations of each instrument, including design phreatic surface or uplift pressure profile, and tabulated data for each instrument are included in the "Supporting Technical Information" document only. See Chapter IX, Instrumentation and Monitoring, of the FERC Engineering Guidelines for the Evaluation of Hydropower Projects for additional information. Only time versus reading graphs are included here as NEW information. Tables of data should be provided on a CD bound into the Part 12D report

If data plots are included in Section 4 of the Part 12D report, a statement should be provided here directing the reader to Section 4 for the information.

- Time versus Reading data plots

- Plot all data to date, not just last five years (alternative is to plot last 15 years and note historic range for each unit)
- Do not put too many instruments on one plot
- Try to put all instruments from one section or profile on the same plot
- Mark tip elevation, unscreened length, ground elevation and top of piezometer elevation for each piezometer on the data plot. This information can be provided in a Table to enhance legibility of the graph.
- Use symbols and/or different line types for each unit, not just colors (colors do not reproduce in black and white and some people are color blind - Note that yellow and blue do not reproduce on certain copiers)
- Include headwater and tailwater levels on each plot
- Force all time scales to show full year cycles from January through December
- For multiple plots for the same project, force vertical and horizontal scales on all plots of the same type to have the same scale or total range so plots can be directly overlaid
- Mark threshold values
- Show monthly precipitation on one sheet
- Mark action levels requiring emergency response

E. Inspection Pictures

F. Inspection Checklist (optional)

G. Operation and Maintenance Documentation (if required)

THIS PAGE INTENTIONALLY LEFT BLANK

90 Day Pre-meeting Agenda Conference Call

1. Purpose of call.
    a. To discuss what is expected from the Owner.
    b. To discuss what is expected from the P-12 Consultant.
    c. To discuss what is expected during the PFMA review.
    d. To discuss outstanding studies and items of special interest.
2. Owner
    a. The Owner should provide a copy of the STI, 3 past Part 12D Reports and any items of special interest to the IC well in advance of the inspection.
    b. All portions of the site must be readily assessable and cleared of excessive vegetation. If a complete visual inspection cannot be completed the IC will need to re-inspect before the Part 12D Report is submitted.
3. P-12 Consultant
    a. Must review the STI including the PFMA report and the past Part 12D Inspection Reports prior to the inspection.
4. Discussion of the PFMA Report.
    a. FERC to review and provide clarification as to the PFM categories.
    b. Discuss current PFMs and the level of effort that may be expected to review. This may range from a review of the PFMA report to a complete revision of the PFMA process including a facilitator and full document review.
5. Items of special interest.
    a. Outstanding studies.
    b. Past Part 12D recommendations that have not been fulfilled.
    c. Schedule for inspection.
    d. Any other items of interest.

THIS PAGE INTENTIONALLY LEFT BLANK

§ 12.35 Specific inspection requirements.

(a) *Scope of inspection.* The inspection by the independent consultant shall include:

(1) Due consideration of all relevant reports on the safety of the development made by or written under the direction of Federal or state agencies, submitted under Commission regulations, or made by other consultants;

(2) Physical field inspection of the project works and review and assessment of all relevant data concerning:

(i) Settlement;
(ii) Movement;
(iii) Erosion;
(iv) Seepage;
(v) Leakage;
(vi) Cracking;
(vii) Deterioration;
(viii) Seismicity;
(ix) Internal stress and hydrostatic pressures in project structures or their foundations or abutments;
(x) The functioning of foundation drains and relief wells;
(xi) The stability of critical slopes adjacent to a reservoir or project works; and
(xii) Regional and site geological conditions; and

(3) Specific evaluation of:

(i) The adequacy of spillways;
(ii) The effects of overtopping of non-overflow structures;
(iii) The structural adequacy and stability of structures under all credible loading conditions;
(iv) The relevant hydrological data accumulated since the project was constructed or last inspected under this subpart;
(v) The history of the performance of the project works through analysis of data from monitoring instruments; and
(vi) The quality and adequacy of maintenance, surveillance, and methods of project operations for the protection of public safety.

(b) *Evaluation of spillway adequacy.* The adequacy of any spillway must be evaluated by considering hazard potential which would result from failure of the project works during flood flows.

(1) If structural failure would present a hazard to human life or cause significant property damage, the independent consultant must evaluate the ability of project works to withstand the loading or overtopping which may occur from a flood up to the probable maximum flood or the capacity of spillways to prevent the reservoir from rising to an elevation that would endanger the project works.

(2) If structural failure would not present a hazard to human life or cause significant property damage, spillway adequacy may be evaluated by means of a design flood of lesser magnitude than the probable maximum flood, if the report of the independent consultant pursuant to Sec. 12.37 provides a detailed explanation of the basis for the finding that structural failure would not present a hazard to human life or cause significant property damage.

§ 12.37 Report of the independent consultant.

(a) *General requirement.* Following inspection of a project development as required under this

subpart, the independent consultant must prepare a report and the licensee must file three copies of that report with the Regional Engineer. The report must conform to the provisions of this section and be satisfactory to the authorized Commission representative.

(b) *General information in the initial report.*

(1) The initial report filed under this subpart for any project development must contain:

(i) A description of the project development;

(ii) A map of the region indicating the location of the project development;

(iii) Plans, elevations, and sections of the principal project works;

(iv) A summary of the design assumptions, design analyses, spillway design flood, and the factors of safety used to evaluate the structural adequacy and stability of the project works; and

(v) A summary of the geological conditions that may affect the safety of the project works.

(2) To the extent that the information and analyses required in paragraph (b)(1) of this section, are contained in a report of an independent consultant prepared and filed in compliance with Commission regulations in effect before March 1, 1981, the information and analyses may be incorporated by specific reference into the first report prepared and filed under this subpart.

(c) *Information required for all reports.* Any report of an independent consultant filed under this subpart must contain the information specified in this paragraph.

(1) *Monitoring information.* The report must contain monitoring information that includes time-versus-reading graphs depicting data compiled from any existing critical or representative monitoring instruments that measure the behavior, movement, deflection, or loading of project works or from which the stability, performance, or functioning of the structures may be determined.

(i) Any monitoring data plotted on graphs must be presented in a manner that will facilitate identification and analysis of trends. The data may be summarized to facilitate graphical representation.

(ii) Plan and sectional drawings of project structures sufficient to show the location of all critical or representative existing monitoring instruments must be included. If these drawings have been included in a previous report prepared and filed by an independent consultant, they may be incorporated by specific reference to that earlier report.

(2) *Analyses.* The report must:

(i) Analyze the safety of the project works and the maintenance and methods of operation of the development fully in light of the independent consultant's reviews, field inspections, assessments, and evaluations described in Sec. 12.35;

(ii) Identify any changes in the information and analyses required by paragraph (b) of this section that have occurred since the last report by an independent consultant under this subpart and analyze the implications of those changes; and

(iii) Analyze the adequacy of existing monitoring instruments, periodic observation programs, and other methods of monitoring project works and conditions affecting the safety of the project or project works with respect to the development.

(3) *Incorporation by reference.* To the extent that conditions, assumptions, and available information have not changed since the last previous report by an independent consultant under this subpart, the analyses required under paragraphs (c)(2)(i) and (ii) of this section may be incorporated by specific reference to the last previous report.

(4) *Recommendations*. Based on the independent consultant's field observations and evaluations of the project works and the maintenance, surveillance, and methods of operation of the development, the report must contain the independent consultant's recommendations on:

(i) Any corrective measures necessary for the structures or for the maintenance or surveillance procedures or methods of operation of the project works;

(ii) A reasonable time to carry out each corrective measure; and

(iii) Any new or additional monitoring instruments, periodic observations, or other methods of monitoring project works or conditions that may be required.

(5) *Dissenting views*. If the inspection and report were conducted and prepared by more than one independent consultant, the report must clearly indicate any dissenting views concerning the analyses or recommendations of the report that might be held by any individual consultant.

(6) *List of participants*. The report must identify all professional personnel who have participated in the inspection of the project or in preparation of the report and the independent consultant who directed those activities.

(7) *Statement of independence*. The independent consultant must declare that all conclusions and recommendations in the report are made independently of the licensee, its employees, and its representatives.

(8) *Signature*. The report must be signed by each independent consultant responsible for the report