

## **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 that specific section of the STI. They must make an assessment of the assumptions, methods of analysis and/or evaluations as to their appropriateness and proper application for the structure, and whether they are appropriate given current guidelines and state of dam safety practice. The IC must perform sufficient review and/or independent analysis to document their rationale to support the required statement. This must include a brief summary (bullet form acceptable) of the parameters, methodologies, and results used that document their decision.

Listed below are non-all-inclusive items to consider when summarizing each section of the STI. The IC’s summary is not intended to be a detailed discussion of the STI Sections, but a summary list of the most important parameters used by the IC to reach their conclusion. This might be best accomplished by a bullet list. 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

## Chapter 14, Appendix H

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

### 7.6 Hydrology and Hydraulics

- Hydrology
  - o Summary of IDF/PMF, including key assumptions and rainfall/runoff parameters used.
  - o Applicability of flood to current methods, HMR, etc
  - o Specifically identify the studies of record

## Chapter 14, Appendix H

- Hydraulics
  - o Summary of key issues and assumptions, including review of rating curve for spillway.
  - o Summarize routing of IDF/PMF through spillway(s), peak reservoir elevation, and residual freeboard.

### 7.7 Surveillance and Monitoring Program

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

7.8 Stability and Stress Analyses of Project Structures – This section should have an introductory summary of the analysis of record for each analysis.. Other prior analyses can be briefly summarized if they are thought to be of significance.

- 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 safely 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. Example item 1
2. Example item 2
3. Etc...

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**

#### Positive:

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.