

**JOINT REPORT OF THE TECHNICAL ADVISORS OF THE
INTERNATIONAL BOUNDARY AND WATER COMMISSION REGARDING THE
GEOTECHNICAL, ELECTRICAL, MECHANICAL & STRUCTURAL SAFETY OF
ANZALDUAS DAM**

To the Honorable Commissioners
International Boundary and Water Commission (IBWC)
United States and Mexico
El Paso, Texas and Ciudad Juarez, Chihuahua

Sirs:

The undersigned Technical Advisors to the Commission visited Anzalduas Dam on April 26, 2007, with the objective of physically inspecting the dam and reviewing the limited records available relative to the dam's geotechnical, electrical, mechanical, and structural features. We were briefed on actions taken to comply with recommendations of prior technical inspections. Our review did not cover hydrologic issues, hydraulic adequacy, or operating criteria of the dam.

Conclusions

The project appears in good visual condition and appears on the surface to be generally well maintained. The electrical and mechanical equipment is capable of operating under normal as well as flooding conditions. The recommendations which are presented below should be implemented within a reasonable time frame.

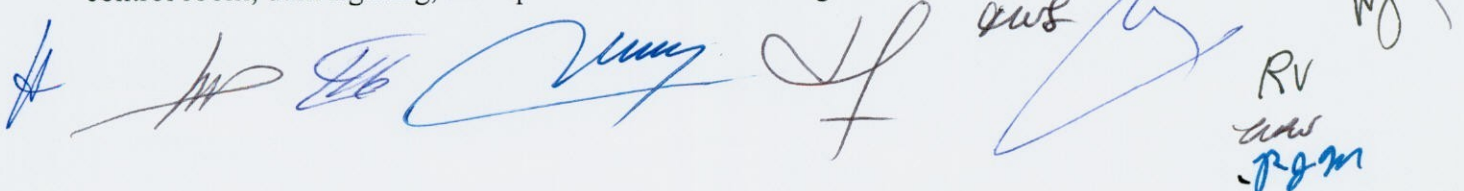
Based on our observations, review of records, and in consideration of the project experiences, we conclude that the dam is marginally safe as described below. Starting in the next funding request cycle, the recommendations below should be given priority.

General Recommendations

1. Providing future technical advisors with briefing packages that include summaries and histories of such items as project experiences, repairs, as-built drawings, and instrumentation readings (tabular and graphical) should be continued. The briefing packages should be furnished at least three weeks in advance of scheduled inspection dates. In addition, a historical digest or document (including photographs) should be created that records history of incidents, problems and conditions that have been observed and dealt with at the project.
2. Continue with actions associated with recommendations from previous joint inspections that are applicable.

Electrical/Mechanical Recommendations

1. Proceed with plans to purchase back up generator with automatic transfer switch for emergency power. The generator must have capability to supply power simultaneously to the control room, dam lighting, and operation of at least one gate.

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2. Continue digital upgrade of control room instrumentation for pool level, tail water level, flow in Rio Grande below Anzalduas Dam and Banker's Floodway, and gate opening. System should include digital recording and download capability.
3. Test and repair or replace main breaker control panel and wiring as needed. Current wiring is 50 years old, and some breakers are deteriorated and obsolete. Replacement breakers are no longer available.
4. Phone connections are lost during rain events. Consider purchase of satellite phone and antenna for control room as back up communication capability. It is noted that the U.S. project office has a satellite phone.
5. Continue to monitor the cracked gear in the primary gear of gate No. 1. Historically, a surface crack was found on a gear for gate #1. The gear was x-rayed at that time and all other gates were visually inspected. No other cracks were found. Prior to each 5 year Safety of Dam inspection, one gear cover should be removed to allow visual inspection.
6. Continue with the current maintenance program of two (2) spillway gates per year.

Geotechnical/Structural Recommendations

1. An annual Safety of Dams inspection and report should be prepared for Anzalduas Dam. This report would be similar in scope as the present Safety of Dams reports for Amistad Dam and Falcon Dam. Instrumentation of Anzalduas Dam should continue to be monitored and the data recorded. The data should be evaluated and presented in the annual Safety of Dams report.
2. Train personnel from both sections in the use of instrumentation in order for them to be able to preliminarily evaluate the data.
3. Replace the damaged joint monitors and install the appropriate protection on new monitors.
4. Additional effort is needed to control woody growth on the upstream and downstream embankment slopes in both countries.
5. Remove the sedimentation/sand bar located upstream of the structure on the left side of the approach channel.
6. Remove several sand bars located in the central portion of the discharge channel. The longer this is delayed, the harder it will be to get the necessary permits.

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7. A diver or underwater remote-controlled camera (from the Falcon project office) inspection should be performed on all submerged concrete including the stilling basin and the spillway gate sills. If significant damages are observed, the areas should be unwatered and appropriate repairs made. Stilling basin inspections should be scheduled thereafter on intervals not to exceed 10 years.

8. The project Emergency Action Plan (EAP) should continue to be updated on an annual basis to maintain current emergency phone numbers, supply lists, and contractors. The effort should be continued to create a joint plan usable by both countries. The IBWC should continue to encourage the development and testing of evacuation plans by the responsible local authorities. Joint emergency exercises by both countries should be conducted to test the EAP.

9. The inspection team recommends that a risk based action classification that is being developed by the Corps of Engineers is appropriate for application to the IBWC dams. The Corps is assessing its dams and will place each dam into Dam Safety Action Classes (DSAC) based on their individual dam safety risk considered as probability of failure and potential failure consequences. This allows the Corps to focus on the correct dam safety issues and not the 'next on the list' or 'one size fits all' in a time of constrained resources. There are five Dam Safety Action Classes as follows:

- DSAC I – URGENT AND COMPELLING (Unsafe)
- DSAC II – URGENT (Potentially Unsafe)
- DSAC III – HIGH PRIORITY (Conditionally Unsafe)
- DSAC IV – PRIORITY (Marginally Safe)
- DSAC V – NORMAL (Safe)

Assignment of a DSAC to Anzalduas Dam at this point has to be based on engineering judgment because the level of risk is not known; i.e., the project has a low population and low infrastructure at risk in both the U.S. and Mexico, and the probability of unsatisfactory performance (failure) is unknown. As-built drawings and design documents have not been located. The undersigned recommend that Anzalduas Dam fits into DSAC-IV as marginally safe.

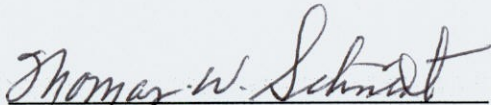
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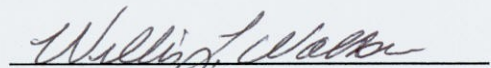
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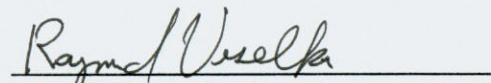
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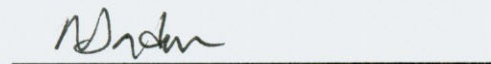
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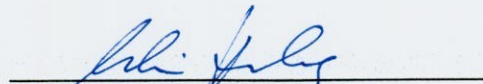

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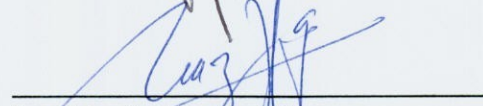

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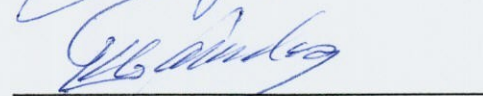
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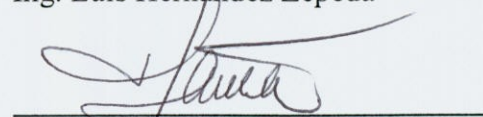

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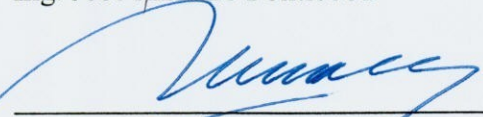

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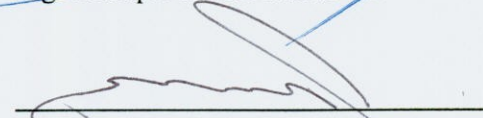

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- A large signature on the left.
- A signature in the center.
- A signature in the upper right.
- Initials 'RV' and 'my' in the middle right.
- Initials 'Wd' and 'RJM' in the lower right.
- Initials 'WJ' in the bottom right.
- A signature at the bottom.