

MONTEREY COUNTY

WATER RESOURCES AGENCY

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July 14, 2017

Sharon K. Tapia, Chief
Division of Safety of Dams
Calif. Dept. of Water Resources
2200 X Street, Suite 200
Sacramento, CA 95818

**Subject: Spillway Work Plan including Condition Assessment Report for
Nacimiento Dam (No. 1008) and San Antonio Dam (No. 1008-2)**

Monterey County Water Resources Agency (MCWRA) has received your letter dated May 12, 2017 regarding spillway condition assessment and repair of known damage prior to next flood season. In response to that letter, attached are proposed Work Plans for Nacimiento Dam (No. 1008) and San Antonio Dam (No. 1008-2). Work Plans include submittal of a Spillway Condition Assessment Report for each spillway. Proposed Work Plans are attached as follows:

Attachment A – Nacimiento Dam (No. 1008) Spillway Work Plan, dated July 14, 2017
Attachment B – San Antonio Dam (No. 1008-2) Spillway Work Plan, dated July 14, 2017

Spillway Condition Assessment inspections and reporting scope of work is attached as follows:

Attachment C – Spillway Condition Assessment Scope of Work

Please contact me with any questions regarding this matter at telephone 831-755-8981 or email mosscc@co.monterey.ca.us.

Sincerely,

A handwritten signature in black ink, appearing to read "Chris Moss".

Chris Moss, P.E.
Senior Water Resources Engineer

cc: David E. Chardavoyne, General Manager
Brent Buche, Deputy General Manager

Frank L. Blackett, Regional Engineer,
Federal Energy Regulatory Commission
Div. of Dam Safety & Inspections, San Francisco Regional Office
100 First Street – Suite 2300, San Francisco, CA 94105

Attachment A

Nacimiento Dam (No. 1008) Spillway Work Plan

July 14, 2017

Following are known repairs that will be made at Nacimiento Dam Spillway before next flood season:

1. Seal spillway floor slab joints with elastomeric sealant.
2. Seal small cracks with elastomeric sealant. (Cracks that can receive sealant at least $\frac{1}{4}$ " below concrete surface with elastomeric sealant, and up to $\frac{1}{2}$ " wide.)
 - a. Any Existing joint or crack sealant will be removed to the extent possible.
 - b. Joint and crack preparation will consist of high pressure water jetting.
 - c. Backer-rod will be installed in joints and cracks as-needed to allow filling to concrete surface. Backer-rod will be installed $\frac{1}{2}$ " deep minimum.
 - d. Elastomeric sealant manufacturer(s) will be consulted for best sealant application.
 - i. Desirable elastomeric sealant properties include:
 1. Submerged environment compatibility
 2. Capable of 50% joint movement
 3. Non-sag material behavior (not self-leveling)
 4. Meets ASTM C-920, Type M
3. Repair concrete spalls and large cracks (cracks over $\frac{1}{2}$ " wide).
 - a. Site preparation may include water-jetting, concrete chipping, concrete saw-cutting, and non-shrink, high early strength grout placement.
4. Grind flush offset floor-slabs and wall-slabs, if found. One wall-slab joint offset on the south chute wall is known to exist that needs grinding flush.
5. Video survey spillway under drains.
 - a. Video survey internal condition of all under drains; examine for flushing and/or repair needs; flush as-needed; perform specific repair(s) if needed.
6. Check torque settings of inflatable spillway crest gate anchor bolts; re-torque to specifications as-needed. (This is performed after each year the gates impound water or every 5-years if no water is impounded. The gates impounded water in early 2017. Anchor bolt torque was last checked May 2016.)
7. Touch-up inflatable spillway crest gate coating chipped or corroded locations.
8. Repair the south high level gate operator.
9. MCWRA has hired GEI Consultants, Inc. to perform a Spillway Condition Assessment inspection, prepare a technical memo identifying additional items, if any, to be addressed before the next flood season, and complete a Condition Assessment Report for submittal to DSOD and FERC per **Attachment C**. An amended Work Plan will be sent to DSOD if anything not included above is discovered during the initial Spillway Condition Assessment inspection that needs repair before next flood season.

Attachment B

San Antonio Dam (No. 1008-2) Spillway Work Plan

July 14, 2017

Following are known repairs that will be made at San Antonio Dam Spillway before next flood season:

1. Seal spillway floor slab joints with elastomeric sealant.
 2. Seal small cracks with elastomeric sealant. (Cracks that can receive sealant at least $\frac{1}{4}$ " below concrete surface with elastomeric sealant, and up to $\frac{1}{2}$ " wide.)
 - a. Any Existing joint or crack sealant will be removed to the extent possible.
 - b. Joint and crack preparation will consist of high pressure water jetting.
 - c. Backer-rod will be installed in joints and cracks as-needed to allow filling to concrete surface. Backer-rod will be installed $\frac{1}{2}$ " deep minimum.
 - d. Elastomeric sealant manufacturer(s) will be consulted for best sealant application.
 - i. Desirable elastomeric sealant properties include:
 1. Submerged environment compatibility
 2. Capable of 50% joint movement
 3. Non-sag material behavior (not self-leveling)
 4. Meets ASTM C-920, Type M
 3. Repair concrete spalls and large cracks (cracks over $\frac{1}{2}$ " wide).
 - a. Site preparation may include water-jetting, concrete chipping, concrete saw-cutting, and non-shrink, high early strength grout placement.
- NOTE: Spillway floor panels near the upstream third of the spillway contain cracking such that sealant may be insufficient water control. The Spillway Condition Assessment inspection per **Attachment C** scheduled to be performed in July 2017 is expected to identify recommended additional testing and/or repair measures for that area, if such is needed.
4. Grind flush offset floor-slabs and wall-slabs, if found.
 5. Video survey spillway under drains.
 - a. Video survey internal condition of all under drains; examine for flushing and/or repair needs; flush as-needed; perform specific repair(s) if needed.
 - b. Repair of partially collapsed 10" dia. clay sewer pipe is needed at approximately STA 14+90 at the right (south) spillway side drain line (Ref. Drawing 3440-5-006).
 6. Repair spalled concrete with exposed rebar at the first left wall joint of the approach to the spillway.
 7. MCWRA has hired GEI Consultants, Inc. to perform a Spillway Condition Assessment inspection, prepare a technical memo identifying additional items, if any, to be addressed before the next flood season, and complete a Condition Assessment Report for submittal to DSOD and FERC per **Attachment C**. An amended Work Plan will be sent to DSOD if anything not included above is discovered during the initial Spillway Condition Assessment inspection that needs repair before next flood season.

Attachment C

Scope of Work and Work Schedule

Nacimiento Dam and San Antonio Dam Spillway Condition Assessments

Task 1: Kick-Off Meeting and Review of Existing Information

1.1 Kick-Off Meeting (via telephone/web)

Upon receiving Notice to Proceed (NTP) from MCWRA, GEI will conduct a kickoff meeting (via telephone/web) with MCWRA to facilitate transfer of existing knowledge of Nacimiento and San Antonio dams and spillways among project personnel. The agenda will include scope of work, schedule, and project member roles and responsibilities.

1.2 Review of Existing Spillway Information

GEI will review available spillway plans, specifications, construction documents, prior inspection reports, and other technical documents provided by MCWRA to familiarize project personnel with the structures to be evaluated and identify potential issues or vulnerabilities to direct attention to during field inspections. Findings from this review will augment development of each spillway inspection plan prepared under Task 2.

Task 1 Deliverables:

Findings from Task 1.2 will be summarized in each Spillway Condition Assessment Report.

Task 2: Detailed Inspection Plans, Field Inspections and Technical Memorandum

2.1 Detailed Inspection Plan

GEI will prepare a detailed Inspection Plan for each spillway, which will include Health and Safety Plans. Inspection Plans will describe items to be inspected, inspection methods, safe access procedures for conducting inspections, particular points of interest developed from Task 1.2, and any other needed topics. Inspection Plans will be provided to MCWRA for review and comment before GEI conducts the field inspections under Task 2.2.

2.2 Spillway Field Inspections

Field inspection of each spillway will include, but are not limited to, the following elements: Visual inspection, photo documentation, and assessment of the entire concrete surface including the approach, crest, chute slab and side walls, and terminal structures;

- Use of safety ropes and trained staff may be needed for inspection of the steeper portion of the Nacimiento spillway. Use of safety ropes is not anticipated for San Antonio Dam.
- Mapping of the concrete chute lining for significant cracks, joints, offsets, damage, prior repairs, spalling, erosion, exposed aggregate or rebar, and any other signs of visible structural distress including potential for undermining, uplift, or hydraulic jacking
- Visual inspection of all accessible elements of the spillway drainage system including cleanouts, discharge points, or related locations
- Striking the concrete surface with a hammer to check for drum-like or hollow sounding concrete that may indicate voids under or behind concrete
- Inspection of accessible ground conditions adjacent to and downstream of each spillway, to map the site geology, assess foundation conditions beneath the chute and crest, and obtain information to help determine the potential presence of adverse conditions that could affect spillway performance such as susceptibility to erosion under or adjacent the

spillway (including plunge pool area), or instability of spillway foundation or adjacent areas

- Nacimiento inflatable spillway crest gates and high level spillway gates as access allows.
- Bridge inspection is not included in this scope of work

Field inspection personnel for each spillway will include key members covering hydraulic, structural, and geotechnical/geologic disciplines.

2.3 Additional Investigations (to be determined)

Based on the findings from Tasks 1.2 and 2.2, supplemental field and laboratory investigations may be recommended. Additional investigations may include but are not limited to:

- Geotechnical borings with rock coring to evaluate subsurface soil and/or rock conditions
- Laboratory testing of soil and/or rock core samples to evaluate engineering properties
- Impulse Response Method of void investigation under or behind concrete
- Ground penetrating radar to investigate slab thickness, presence of reinforcing steel, and potential presence of voids beneath concrete slabs
- Concrete drilling and boroscope exploration of void locations
- Coring of spillway chute slab and/or wall concrete to evaluate condition and provide samples for laboratory testing
- Laboratory testing of concrete core samples for strength, durability, deterioration, and other properties
- Detailed structural scanning and/or photogrammetry to document existing conditions and geometry and to provide a basis for comparison with future surveys
- Video inspection of existing spillway subdrains

Recommendations for additional investigations will be developed during inspections performed under Task 2.2. Once a scope of recommended additional investigations is finalized and agreed to by MCWRA, it is anticipated that review and approval will also be required from DSOD (and FERC for Nacimiento). GEI will prepare work plans for the additional investigations proposed at each dam for submittal to DSOD and FERC. GEI will participate in meetings or telephone conference calls with DSOD and FERC to review the recommendations and facilitate procuring approvals to proceed with the additional investigation work.

Because the scope of additional investigations is undefined until Task 2 is completed and DSOD/FERC approval is obtained, the budget estimate included in Exhibit B may need to be modified.

2.4 Preparation of Technical Memorandum (TM) Summarizing Spillway Inspection Findings

A TM summarizing findings from the field inspections will be prepared for each spillway after completion of Task 2.2. The TM will include recommendations of items that, in GEI's opinion, should be repaired before the coming winter and recommendations for additional investigations, if any. Draft TMs will be issued for review and comment by MCWRA. Final TMs will be provided to MCWRA.

Task 2 Deliverables:

Draft Inspection Plans will be provided for review and comment by MCWRA prior to performing spillway inspections. Final Inspection Plans will be provided to MCWRA.

Draft TMs will be provided for MCWRA's review and comment. Final TMs will be provided to MCWRA.

Task 3: Spillway Condition Assessment Reports

Draft Spillway Condition Assessment Reports for the spillways at each dam will be prepared. The following will be included in each Spillway Condition Assessment Report:

- A summary of construction history, key design details, and other pertinent facts and findings from Task 1.2
- A summary of the inspection plan prepared under Task 2.1
- A summary of the field inspection completed under Task 2.2
- A summary of the additional investigations, if any, completed under Task 2.3
- Detailed observations and findings from the field inspection and additional investigations, including descriptions of concrete condition, drainage system function, plunge pool and discharge channel condition, and Nacimiento inflatable crest gate and high level gate condition as access allows. Relevant photographs from the field inspection and additional investigations will be included as needed
- The potential for undermining and hydraulic jacking will be evaluated
- Conclusions regarding the condition of the spillway will be presented and recommendations for remediation, if any, will be provided

Task 3 Deliverables:

A Draft Spillway Condition Assessment Report for each spillway will be provided for MCWRA review and comment. After receiving comments from MCWRA on the Draft Reports, Draft-Final Spillway Condition Assessment Reports will be prepared for submittal to DSOD for both spillways and FERC for Nacimiento. If needed, comments from DSOD and FERC will be reviewed and addressed and Finalized Reports will be issued. It is assumed that one meeting with DSOD covering both spillway reports and one meeting with FERC regarding Nacimiento will be needed.

Task 4: Project Management**4.1 Project Management**

GEI is confident that with proper planning, communication, and commitment from the project team, we can work with MCWRA to meet the project goals within the schedule provided. Under this task, GEI will include the following activities to ensure effectiveness in these important areas:

- Project Management and QA/QC (see Task 4.2 below), including engineering team and subcontractor services (as-needed)
- Monthly invoices including Project activities and status updates
- Project communications and correspondence, including meetings, site visits, and phone and e-mail communication

4.2 QA/QC

GEI has Quality Assurance (QA) and Quality Control (QC) procedures in place and is committed to providing MCWRA with quality service through our system of integrating quality control with the project management process. All staff assigned to MCWRA will be brief on the use of QA/QC procedures prior to commencing work. GEI is committed to systematically ensuring that we understand MCWRA's needs for all aspects of the services. GEI will provide a level of service that satisfies those needs. This policy is implemented by establishing controls that ensure continuous improvement. Quality control is performed by the technical team leaders identified on the organization chart, and these leaders will ensure that QA/QC procedures are followed from task order inception through sign-off all reports, recommendations, and other deliverables.

Work Schedule

Date	Activity
July 3, 2017	MCWRA issues Notice to Proceed
Week of July 10	Kick-off Meeting
5 Working Days following the Kick- off Meeting	Draft inspection plans provided to MCWRA
Weeks of July 17 or July 24	Spillway Field Inspections
August 16, 2017	Spillway Field Inspections Completed
August 18, 2017	Draft Technical Memoranda provided to MCWRA
August 23, 2017	Draft Condition Assessment Reports provided to MCWRA
September 8, 2017	Draft-Final Condition Assessment Reports provided to MCWRA