



March 16, 2012

Mr. Tim Brown
Bureau of Reclamation
Denver Federal Center
P.O. BOX 25007 (86-68140)
Denver, CO 80225-0007

**ACPPA Petition to Rescind Bureau of Reclamation Moratorium on use of
Prestressed Concrete Pipe in Bureau Specifications**

Dear Mr. Brown:

1. Executive Summary

The American Concrete Pressure Pipe Association (ACPPA) requests the Bureau of Reclamation (Reclamation) rescind the moratorium established in 1990 on the use of prestressed concrete pipe (PCP) in Reclamation project specifications. Due to significant changes in the design and manufacture of PCP in the intervening two decades, the stated reasons for the moratorium are no longer applicable. Additionally, by precluding the use of PCP, Reclamation is failing to take advantage of a highly durable product with an outstanding service record, potentially creating inefficiencies in Bureau construction projects.

2. Background

Founded in 1949, ACPPA is a nonprofit trade association representing manufacturers of concrete pressure pipe around the world. ACPPA sponsors research projects and conducts educational programs to promote and advance the use of concrete pressure pipe in water and wastewater applications. The association also manages an independent audit program to certify compliance with all applicable American Water Works Association (AWWA) standards for the design and manufacture of concrete pressure pipe.

In a March 12, 1990 memo to design managers, the chief of Reclamation's Water Conveyance Branch established a policy that PCP and fiberglass pipe "will not be considered as options in our specifications."¹ The memo indicated that the policy was intended to be "temporary" and

¹ Walter L. Long, Temporary Policy for Water Conveyance Branch Pipe Designs and Specifications (Specification, Pipelines), March 12, 1990 (Appendix A).

that “[i]f and when the ongoing research investigations are able to identify and clear up the problems with these pipe options, they may again be used in the future.” Despite meetings and substantive discussions between the Bureau, ACPPA and its members subsequent to the moratorium,² according to Reclamation’s response to ACPPA’s April 2011 Freedom of Information Act request, “[t]he policy that was issued in March 1990 is still in effect.”³

3. Explanation of Basis for ACPPA Petition

For purposes of this petition, we are assuming the reasons for the moratorium and conditions for lifting the moratorium are articulated in Reclamation’s notes of the March 1994 meeting with ACPPA.⁴

A. Freeze Exposure Pipe

Reclamation Position: “During manufacturing, pipe core and mortar coating would not be subjected to freezing conditions prior to completion of the applicable curing process. A sufficient cool-down period would be required for steam-cured pipe prior to exposure to freezing conditions.”

ACPPA Response: We agree with Reclamation’s position to avoid exposure to freezing conditions. Current industry practice as mandated in AWWA C301 assures that the pipe core and mortar coating are not subjected to freezing conditions prior to completion of the applicable curing process and/or cool-down period.

B. Storage of Finished Pipe

Reclamation Position: “Reclamation would review storage requirements for manufactured pipe and relate them to site-specific conditions and consistency with the requirements as stated in AWWA Standard C304. ACPPA will collect existing data on temperatures vs. color/darkness of pipe surface and provide same to Reclamation.”

ACPPA Response: We agree with Reclamation’s position to prevent the pipe from overheating. AWWA C304, Section 7.5.5 states “pipe manufactured and stored in hot and/or dry environmental conditions should be protected against excessive heat and drying effects.” When adverse environmental conditions are encountered, current industry practice includes the application of a supplemental light color coating to the pipe exterior to reflect solar radiation.

C. Cracks in the Pipe Core

Reclamation Position: “Longitudinal crack limitations would be consistent with AWWA C301-92 and recognize allowances at pipe ends and at outlets. Reclamation would

² See, e.g., Bureau notes of March 1, 1994 joint ACPPA-Bureau meeting obtained by ACPPA through April 2011 FOIA request (Appendix B)

³ Regina A. Magno-Judd, “FOIA Request for Records Related the Bureau’s Policy on the use of PCP in Projects”, June 30, 2011 (Appendix C).

⁴ *Id.*

review language regarding circumferential cracks, based upon its previous limits, and also considering definition of crack criteria near the ends of the pipe.”

ACPPA Response: We agree with Reclamation’s position to limit cracking. AWWA C301, Section 4.6.10 addresses acceptable crack criteria on interior and exterior surfaces. Section 4.6.11 dictates acceptable repair methods for cracks which exceed allowed tolerances.

D. Coating Ridge Heights

Reclamation Position: “Only intermediate coating ridge heights for multiple-wrap pipe would be limited. Reclamation will review C301-92 to assure core smoothness requirements are acceptable.”

ACPPA Response: We understand the basis for this concern is to avoid point loads on the wire. We agree with Reclamation’s objective and suggest it can be achieved by screeding the mortar surfaces during the fabrication process.

E. Dielectric Coating

Reclamation Position: “Reclamation’s intent in requiring dielectric coatings was said to be: act as a curing compound; provide protection to the mortar; or to reduce current requirements if cathodic protection were applied. Reclamation’s use of dielectric coating is primarily related to the application of cathodic protection.”

ACPPA Response: Requiring dielectric coating in all applications is unnecessary and inefficient. AWWA M-9, Chapter 12 suggests application of a “supplementary coating with dielectric properties to the pipe exterior” as one option when stray current interference is anticipated. Otherwise, the supplemental coating is not necessary. We submit that the design engineer is in the best position to determine on a project specific basis whether dielectric coating is warranted.

F. Bell Ring Thickness

Reclamation Position: “Reclamation would review its existing specification for bell ring thickness and also consider use of AWWA C301 requirements: 3/16-inch for 36-inch diameter; 1/4-inch for pipe larger than 36 inch. It was observed that thinner bell rings may become distorted, but that was the result of the manufacturing process and could be avoided.”

ACPPA Response: Joint/bell ring thickness has never been a cause of pipeline failure. AWWA C301, Section 4.5.3.2 stipulates a minimum bell/joint ring thickness of 3/16 inch for 36-inch pipe and smaller and 1/4 inch for pipe larger than 36 inch. This requirement for a progressive thickness versus diameter has proven to be a sufficient design standard.

G. Wire Spacing

Reclamation Position: "Reclamation indicated a preference of ½-inch minimum clear spacing for prestressing wire. While actual mortar strength and radial tension requirements were developed by Simpson Gumpertz and Heger, Reclamation recognized the criticality of getting mortar under the haunches of the wire. Reclamation perceived that the 1/2-inch minimum space is necessary for the mortar to fill under the haunches of the prestressing wire and that this increased spacing will provide better resistance to radial tension forces induced in the mortar."

ACPPA Response: We agree with Reclamation's position to limit radial tension. AWWA C304, Section 7.5.4 addresses radial tension and wire spacing by establishing minimum and maximum center-to-center design spacing of prestressing wires in the same layer. This assures sufficient space for mortar to fill under the haunches and optimizes resistance to radial tension.

H. Maximum Pipe Size

Reclamation Position: "Reclamation would accept a maximum pipe size of 144 inches in diameter and require that all pipe be manufactured in a permanent, fixed-site plant."

ACPPA Response: We agree with Reclamation's position. AWWA C301, Section 4.5.1.1 establishes a maximum pipe size of 144 inches, with an allowance for larger pipe "as specified by the purchaser." Current industry practice, as reflected by ACPPA's Compliance Audit & Certification Program, requires all pipe to be manufactured in a fixed-site plant.

I. Beveled joints

Reclamation Position: "Beveled joints would continue to be used and wire spacing within the beveled area would be required to meet the minimum spacing criteria."

ACPPA Response: We agree with Reclamation's position to meet minimum spacing criteria. AWWA C301, Section 4.6.7.1 requires the wire to be "wrapped around the core in a helical form at the designed predetermined spacing." This section also stipulates that the "number of wraps in any 2-ft (0.6-m) length of core shall not be less than required by the design."

J. BONNA Test Procedure

Reclamation Position: "Reclamation would prefer to use the BONNA test to check wire quality. It stated that the BONNA test more closely represented wire under cathodic protection."

ACPPA Position: At the time the moratorium was imposed, existing standards did not require wire testing. This is no longer the case. AWWA C301, Section 4.4.8.1 states "the wire for circumferential reinforcement shall conform to ASTM A648" (the

prestressing wire manufacturing standard). A supplement to ASTM A648 mandates hydrogen embrittlement testing in accordance with ASTM A1032, which sets forth the required testing method.

K. Wire Class

Reclamation Position: "Reclamation would use Class II wire due to perceived lower environmental sensitivity. Improvements to Class III wire were recognized by Reclamation. Demonstration of a reliable discrimination wire quality test system could result in reconsideration of this requirement."

ACPPA Response: Industry experience over the past 20 years has shown that Class III wire is reliable, particularly in the context of current ASTM standards – A648 Standard Specification for Steel Wire Hard Drawn for Prestressing Concrete Pipe and A1032 Standard Test Method for Hydrogen Embrittlement Resistance for Steel Wire Hard Drawn Used for Prestressing Concrete Pipe.

L. Pipeline Monitoring

Reclamation Position: "There remained continued developmental opportunities for pipeline monitoring practices."

ACPPA Response: We agree with Reclamation's position. Pipeline technology has progressed rapidly over the past 20 years. A number of condition assessment/monitoring systems are available today, including remote field eddy current testing, electromagnetic imaging, digital data loggers and acoustic sensors.

M. Intrinsic pH Concentration Cells

Reclamation Position: "Existence of 'line corrosion' on examined pipe sections is a concern for Reclamation. It suspects line corrosion progresses to more serious corrosion."

ACPPA Response: We agree with Reclamation's position. AWWA C301, Section 4.6.7.3 states "as the circumferential prestressing wire is wound, a portland cement slurry...shall be applied so that the portion of the wire bearing against the core will be coated with cement slurry." The high alkalinity of the cement slurry perpetuates the formation of a passivating oxide film on the steel surfaces, which precludes the possibility of corrosion, except in adverse environments.

N. Cathodic Protection

Reclamation Position: "Reclamation would require cathodic protection on all pipelines installed in the future. That position is based upon its observations regarding line corrosion and its lack of confidence in the ability of the mortar coating to protect the prestressing wire."

ACPPA Response: As is the case with dielectric coating (Item 3E), requiring cathodic protection in all applications is unnecessary and inefficient. AWWA M-9, Chapter 12 suggests the installation of cathodic protection in "unusual environmental conditions," such as high chlorides in the soil or when stray current interference is anticipated. Otherwise, cathodic protection is not necessary. We submit that the design engineer is in the best position to determine on a project specific basis whether cathodic protection is warranted.

4. Conclusion and Appeal for Relief

PCP has many benefits. It is durable and able to handle a wide range of external loads and internal pressures. As a rigid pipe material, it is easy to install and requires little maintenance, resulting in low life-cycle costs. Because PCP is custom designed and manufactured to meet the needs of a specific project, it is highly versatile. The product's reliability has been proven over nearly a century of use. PCP is regionally manufactured using recyclable, natural products, lowering its environmental impact. Finally, it is manufactured to the highest quality standards through ACPPA's annual audit program, administered by Lloyd's Register Quality Assurance (LRQA), ensuring that every member plant is in compliance with AWWA standards for design and manufacturing.

With all these facts in mind, it is no surprise that PCP is currently being used to provide a safe and consistent source of drinking water to the general public in 90 of the 100 largest metropolitan areas in North America.

For all of the foregoing reasons, we urge Reclamation to immediately rescind the outdated moratorium on the use of prestressed concrete pipe in its project specifications.

Thank you for your consideration of this request. I will contact you within the next few weeks to further discuss this issue. Meanwhile, should you have any questions or require other information, please feel free to contact me at 703.273.7227 or rlawhun@acppa.org.

Sincerely,

A handwritten signature in black ink, appearing to read "Richard Lawhun", written in a cursive style.

Richard Lawhun, P.E.
President

APPENDIX A

*Temporary Policy for Water Conveyance Branch Pipe Designs and Specifications –
(Specification, Pipelines)*

Walter L. Long; March 12, 1990

UNITED STATES GOVERNMENT
memorandum

Denver, Colorado

DATE: March 12, 1990

TO : Design Managers
Attention: D-3120 (Schoeman, Wegener, Mitchell, Fisher, Cowan)

FROM : Chief, Water Conveyance Branch

SUBJECT: Temporary Policy for Water Conveyance Branch Pipe Designs and Specifications -
(Specification, Pipelines)

Due to the recent Bureau of Reclamation problems with prestressed concrete pipe and reinforced thermosetting resin pipe (fiberglass), these two pipe types until further notice will not be considered as options in our specifications. If and when the ongoing research investigations are able to identify and clear up the problems with these pipe options, they may again be used in the future. Notice will be given at that time for rescinding this policy.

Walter L Long

cc: D-3100
D-3120 (Long)
D-3500
D-3523
D-3700

WBR:JPBaysinger/WLLong:cmm:03/12/90:236-4203
PC-WP(5.0)2:WLL3.MEM

APPENDIX B

Joint Meeting

Bureau of Reclamation

American Concrete Pressure Pipe Association

Denver, CO; March 1, 1994

**JOINT MEETING
BUREAU OF RECLAMATION
AMERICAN CONCRETE PRESSURE PIPE ASSOCIATION**

Denver, Colorado

March 1, 1994

Representatives of the Bureau of Reclamation (Reclamation) and the American Concrete Pressure Pipe Association (ACPPA) met in Denver, Colorado on March 1, 1994, to discuss the technological aspects of future Reclamation practice regarding specification of prestressed concrete cylinder pipe.

Representatives of the Bureau of Reclamation

Richard Fuerst
Walter Long
Michael Peabody
James Pierce
Lowell Pimley
John Smart
Douglas Wegener
Christi Young

Representatives of the American Concrete Pressure Pipe Association

Henry Bardakjian, Ameron, Inc.
Richard Mueller, Gifford-Hill-American
David Prosser, ACPPA
Armand Tremblay, Price Brothers Company

Following is a representation of discussions which took place.

Freeze Exposure of Pipe - During manufacturing, pipe core and mortar coating would not be subjected to freezing conditions prior to completion of the applicable curing process. A sufficient cool-down period would be required for steam-cured pipe prior to exposure to freezing conditions.

Storage of Finished Pipe - Reclamation would review storage requirements for manufactured pipe and relate them to site-specific conditions and consistency with the requirements as stated in AWWA Standard C304. ACPPA will collect existing data on temperature vs. color/darkness of pipe surface and provide same to Reclamation.

Cracks in the Pipe Core - Longitudinal crack limitations would be consistent with AWWA C301-92 and recognize allowances at pipe ends and at outlets. Reclamation would review language regarding circumferential cracks, based upon its previous limits, and also considering definition of crack criteria near the ends of the pipe.

Coating Ridge Heights - Only intermediate coating ridge heights for multiple-wrap pipe would be limited. Reclamation will review C301-92 to assure core smoothness requirements are acceptable.

Dielectric Coating - Reclamation's intent in requiring dielectric coatings was said to be: act as a curing compound; provide protection to the mortar; or, to reduce current requirements if cathodic protection were applied. Reclamation's use of dielectric coating is primarily related to application of cathodic protection.

ACPPA asked that dielectric coatings and any other special treatment to the pipe, such as cathodic protection, be related to site-specific criteria. Mortar coatings have been materially improved with higher moisture content, and requirements for compressive strength and absorption.

Bell Ring Thickness - Reclamation would review its existing specification for bell ring thickness and also consider use of the AWWA C301 requirements: 3/16-inch for 36-inch diameter; 1/4-inch for pipe larger than 36-inch. It was observed that thinner bell rings may become distorted, but that was the result of the manufacturing process and could be avoided.

Wire Spacing - Reclamation indicated a preference of 1/2-inch minimum clear spacing for prestressing wire. While actual mortar strength and radial tension requirements were developed by Simpson Gumpertz and Heger, Reclamation recognized the criticality of getting mortar under the haunches of the wire. Reclamation perceived that the 1/2-inch minimum space is necessary for the mortar to fill under the haunches of the prestressing wire and that this increased spacing will provide better resistance to radial tension forces induced in the mortar. ACPPA indicated that the higher moisture content in mortar, as currently required by AWWA C301-92, made placement much better around the wire. Also, it was explained that such a requirement would result in many more double-wrapped pipes and increase the cost of the pipe. ACPPA offered to provide sections of currently manufactured pipe to demonstrate the effectiveness of mortar placement under the wire haunches. Reclamation would reexamine its views after reviewing the results of current practice.

Maximum Pipe Size - Reclamation would accept a maximum pipe size of 144 inches in diameter and require that all pipe be manufactured in a permanent, fixed-site plant.

Beveled Joints - Beveled joints would continue to be used and wire spacing within the beveled area would be required to meet the minimum spacing criteria.

BONNA Test Procedure - Reclamation would prefer to use the BONNA test to check wire quality. It stated that the BONNA test more closely represented wire under cathodic protection. ACPPA felt that there was insufficient evidence to demonstrate the ability of the BONNA test to discriminate between good and poor wire. ACPPA described its current wire testing program, designed to develop correlating evidence between the BONNA, FIP, and United States and European mechanical tests. Both parties need additional information on reliable and discriminating wire performance tests.

Wire Class - Reclamation would use Class II wire due to perceived lower environmental sensitivity. Improvements to Class III wire were recognized by Reclamation. Demonstration of a reliable discriminating wire quality test system could result in reconsideration of this requirement.

Pipeline Monitoring - ACPPA and Reclamation monitoring investigations were discussed. A copy of a paper on ACPPA's Palmdale, California pipeline monitoring project, prepared by Ms. Sylvia Hall, was provided to Reclamation. Reclamation's development work on impact-echo and the hydrophones was briefly discussed. It was recognized that there remained continued developmental opportunities for pipeline monitoring practices.

Reclamation expects to invite ACPPA to witness impact-echo testing to be conducted later in the spring of 1994, in conjunction with research being performed by Olson Engineering, Inc.

Intrinsic pH Concentration Cells - Existence of "line corrosion" on examined pipe sections is a concern for Reclamation. It suspects line corrosion progresses to more serious corrosion. ACPPA described the inherent nature of line corrosion as observed on new and old pipe. Representatives suggested examination of plugs, taken from pipe taps performed by members, as a way of demonstrating their position that line corrosion is not of significance. Reclamation will consider if such examination would be helpful and how the results would be reviewed. ACPPA will poll members on the presence of line corrosion during manufacturing.

Cathodic Protection - Reclamation would require cathodic protection on all pipelines installed in the future. That position is based upon its observations regarding line corrosion and its lack of confidence in the ability of the mortar coating to protect the prestressing wire. ACPPA asked that a site-related criteria be used as the basis for applying dielectric coating and/or cathodic protection so that less sophisticated groups which may follow Reclamation practice would not be led to do something which was unnecessary in their respective environment. It was suggested that many tools (clay backfill, soil cement encasement, thicker mortar coating, tape coating, plastic wrapping, cathodic protection, etc.) were available to provide supplemental protection to a buried pipeline and that the appropriate tool for the particular environment should be selected, based upon site-related criteria.

End of Discussion

APPENDIX C

*FOIA Request for Records Related to the Bureau of Reclamation's Policy on the use of
Prestressed Concrete Pipe in Projects (FOIA No. BOR-2011-00178)
Regina A. Magno-Judd; June 30, 2011*



United States Department of the Interior

BUREAU OF RECLAMATION
P.O. Box 25007
Denver, Colorado 80225-0007

IN REPLY REFER TO:
84-21300
RIM-6.00

JUN 3 0 2011

SENT VIA FEDERAL EXPRESS OVERNIGHT

Mr. Christian A. Klein
Obadal, Filler, MacLeod & Klein, P.L.C.
117 North Henry Street
Alexandria, VA 22314-2903

Subject: Freedom of Information Act (FOIA) Request for Records Related to the Bureau of Reclamation's Policy on the use of Prestressed Concrete Pipe in Projects (FOIA No. BOR-2011-00178)

Dear Mr. Klein:

Your request dated April 21, 2011, was received in our office on April 21, 2011, and perfected by telephone calls and e-mail on June 2, 2011.

In an e-mail dated June 2, 2011, the scope of your request was changed to the following information requested:

- Documents that evidence Reclamation's current policy on the use of concrete pressure pipe
- Documents (e.g., research studies) that support or serve as the basis for the current policy (if any)
- Documents that show that Reclamation is implementing that policy internally and/or promoting it externally

The policy that was issued in March 1990 is still in effect.

Enclosed are the requested records. This constitutes a full disclosure under the FOIA (5 U.S.C. 552). The fees for this response are minimal and have been waived.

If you have any questions concerning your request, please contact me at 303-445-2056.

Sincerely,

Regina A. Magno-Judd
Management Analyst, Bureau of Reclamation

Enclosures