

General Electric Company

# Environmental Monitoring and Protective Measures Work Plan

**National Grid – Former Powerhouse Deconstruction  
Hudson Falls, New York**

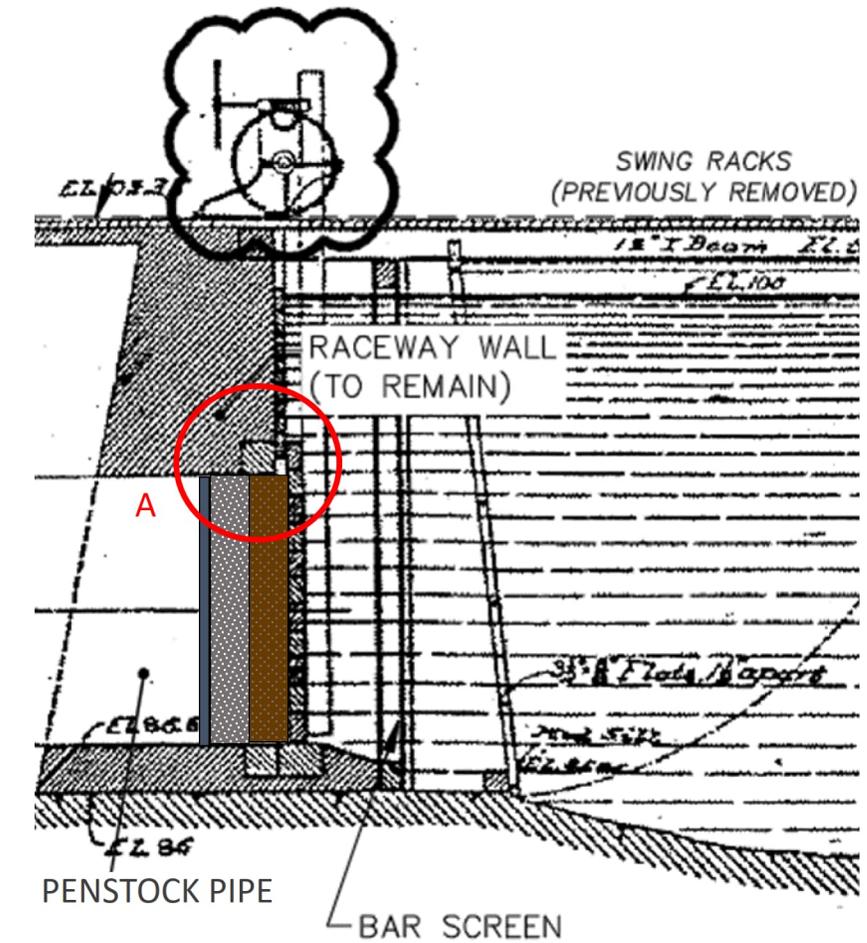
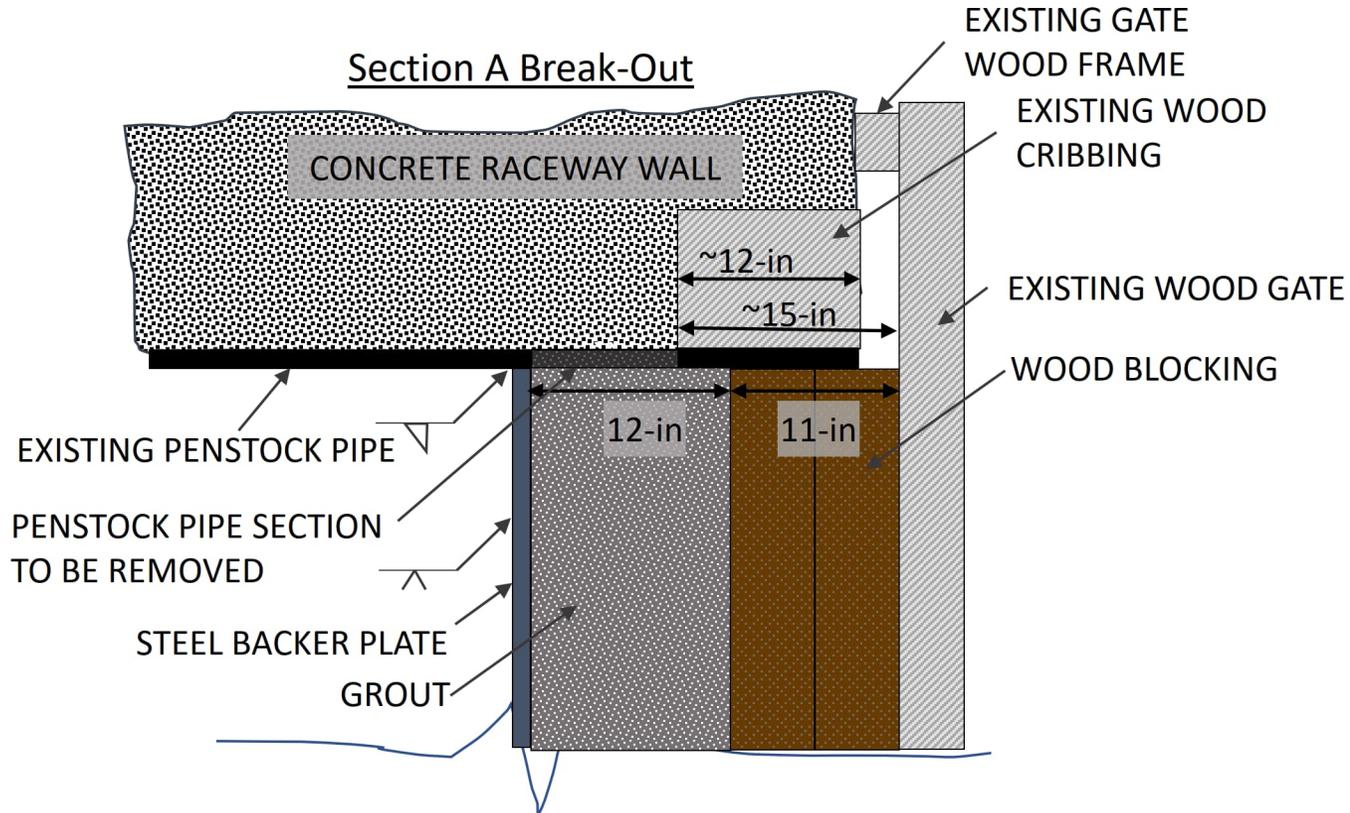
**Addendum to Attachment G - Special Environmental Conditions**

February 2023



**Addendum to Attachment G - EPM-03**  
**Penstock Pipe Seepage Control**

# Penstock Pipe Seepage Control - Figures



# Penstock Pipe Seepage Control - Notes

- 1 – Grout is to be SikaGrout-350, or approved equivalent, prepared and installed in accordance with manufacturer recommendations at a flowable consistency.
- 2 – Existing penstock pipe is to be cut around the circumference at a distance of approximately 15-inches and 23-inches from the interior face of the wood gate. Resulting 8-inch pipe section is to be removed and properly disposed. Pipe section removal is intended to provide for concrete raceway wall-to-grout contact. If poor quality concrete, or materials other than concrete are determined under removed pipe section, notice shall be provided before proceeding. If penstock pipe embedment into the raceway wall interferes with pipe removal, subsequent area preparation, or grout installation, notice shall be provided before proceeding.
- 3 – Two courses of lumber blocking shall be affixed to the west face of the existing wood gate. Lumber shall be 6"x6" pressure treated with waterborne preservatives in accordance with American Wood Protection Association (AWPA) Standard U1, Use Category 4 (UC4). The second installed course shall be turned 90-degrees lengthwise to the first installed course. Lumber shall be anchored by 5/8-inch x 8-inch A307 grade A hot dip galvanized hex head lag screws. Lag screws shall be installed at approximately 24-inches on center in 3/8-inch pilot holes with heads countersunk flush. Lumber shall be installed to the full perimeter, with weight bearing on the floor of the opening. Do not suspend lumber by the anchor bolts. Polyurethane foam may be used to fill minor gap at the lumber perimeter.
- 4 – Upon removal of the 12-inch penstock pipe section, exposed concrete shall be mechanically scarified, to the extent accessible, to provide good sound concrete, prepared in accordance with grout manufacturer recommendations.
- 5 – Area to receive grout shall be free of foreign and loose materials and prepared to grout manufacturer's installation requirements.
- 6 – Temporary lumber formwork may be used to facilitate grout installation and shall be prepared in accordance with grout manufacturer guidance. If used, temporary lumber formwork shall be removed and discarded upon grout setting, just prior to steel backer plate installation. If form release agent(s) are used on temporary formwork, product(s) shall be submitted for approval.
- 7 – Steel backer plate may be used as permanent formwork, in lieu of temporary formwork. If the steel plate is used as formwork, appropriate bracing shall be installed until grout setting is achieved.
- 8 – Grout shall be poured in each penstock in one continuous pour to eliminate cold joints, to the extent possible. Cold joints are prohibited within six feet of the pipe invert.
- 9 – Grout shall be installed through a minimally sized opening in the top of the formwork.
- 10 – If water is likely to accumulate within the formwork, water mitigation measures shall be implemented to include tremie pouring grout and installation of a weep outlet in the base of the formwork. Weep outlet shall consist of a formwork penetration with an approximate two-inch diameter schedule-40 polyvinyl chloride (PVC) pipe, or similar, for conveyance of flowing water from the penstock pipe invert to outside the formwork. Weep outlet pipe shall be removed, and formwork penetration sealed during the grout installation pour, once grout reaches a minimum depth of four-feet. Ensure sufficient vibratory compaction of grout to fill weep pipe void upon pipe removal.
- 11 – Vibratory methods shall be used to ensure grout placement to full extent of formwork. Void spaces and honeycombing of the grout are not permitted.
- 12 – If temporary formwork is used, grout surface shall be visually inspected upon removal of formwork. If grout cracking or evidence of groundwater seepage is observed, an injectable polyurethane grout sealant shall be installed at targeted locations. Grout sealant product(s) shall be submitted for approval.
- 13 – Steel backer plate shall be a minimum 5/16-inch-thick carbon steel. Steel plate may be sectioned to facilitate installation.
- 14 – Steel plate section V-groove welds shall consist of one root and two cover passes with 1/8-inch or 5/32-inch E7018 electrode, or approved equivalent. All sections shall be full perimeter welded.
- 15 – Steel plate to penstock pipe fillet welds shall consist of one root pass and two cover passes. Root pass shall be completed with 5/32-inch E6011 electrode, unless preparation of penstock pipe allows for successful implementation of a root pass with E7018. Cover passes shall be 1/8-inch or 5/32-inch E7018, or approved equivalent.
- 16 – Penstock pipe shall be prepared for steel plate welding by needle gunning, and/or grinding to remove undesirable materials, rust, scale, and debris around the full circumference to receive welds.
- 17 – Additional welding requirements: Welder shall be AWS certified for the type of welding being performed. Prior to welding, base metals shall be heated to dry the area and promote good quality welds. Weld thickness will be 5/16-inch. Weld preparations shall be in accordance with AWS D1.1. Welding down on vertical surfaces is prohibited. All welds shall be free of visible defects.
- 18 – Plug is intended to mitigate groundwater seepage through the penstock pipes. Upon installation of seepage control, construction of the base contract design may proceed.