Maintenance Manual

Retractable Grounding Assembly (RGA) 750 Gen 2

Rev O, February 2021

1.0 Introduction

The RGA is designed to create the lowest impedance connection between the roof and shell of a floating roof tank by creating the shortest possible path between the two. This connection is obtained by keeping constant tension on the wide braided cable.

The following manual outlines the inspection and maintenance procedures required to ensure that an RGA is properly functioning from both a mechanical and electrical perspective. Maintenance and inspection procedures may be performed on a tank during maintenance shutdowns or while the tank is in service, depending on tank access and site safety policies. It is recommended that written records be kept for each RGA inspected for future reference.

Note: All site safety policies and procedures MUST be followed. Obtain all necessary permits before performing any maintenance. This requirement should be based upon each site's own procedures, etc. While LEC recommends the activities outlined in this document, each site is unique and must follow its own requirements, procedures, and protocols.

2.0 Frequency

RGAs are often installed in corrosive environments. The more corrosive the environment, the more frequently inspection and maintenance should be performed. At a minimum, inspection and maintenance should be performed on an annual basis. LEC recommends an increase in the frequency of inspection/maintenance as conditions require. For example, highly corrosive tank environments may require inspection every six (6) months or sooner.

Certain observations that are made during an inspection may prompt the need for a follow-up inspection. For example, if fraying or tearing of the ground straps or main cable appears imminent, they should be replaced or inspected again in three (3) months.

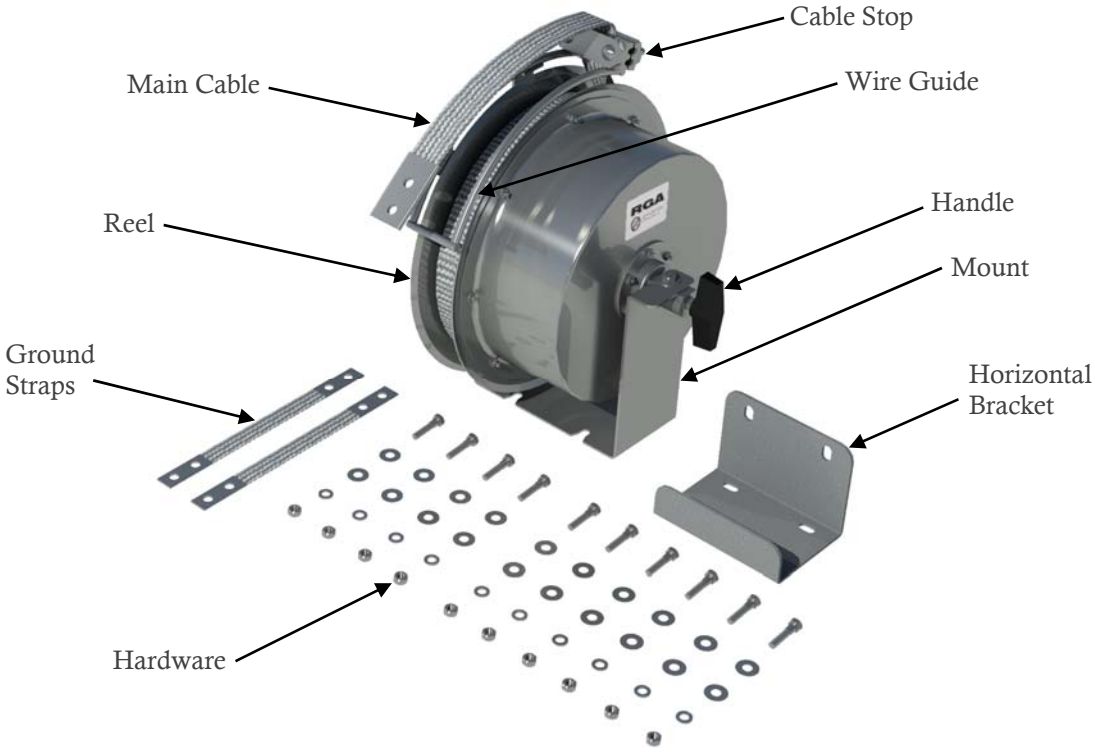

Figure 1: RGA Assembly

3.0 Equipment and Materials

RGAs may be inspected and maintained for proper function with a minimum amount of common hand tools, as listed below. If permissible, photographs should be taken to document the condition and method of attachment between each RGA reel and top of the tank, as well as each ground strap attachment to the foam dam or tank roof.

Required Inspection Items

Digital camera
Digital multimeter (DMM)
9/16" or adjustable wrench x 2
Wire wheel or brush
Sanchem Inc. NO-OX-ID "A-Special" or other electrically conductive lubricant
Lectra Shield or other electrically conductive corrosion inhibitor

4.0 Inspection and Maintenance Procedure

4.1 Top of Tank Inspections

4.1.1 Visually inspect the interface between the RGA mount and the tank rim/wall. During installation, paint and rust must be removed between all interfacing surfaces to ensure bare metal to bare metal contact. These interfacing surfaces should be sealed with an electrically conductive corrosion inhibitor, which may be transparent and therefore difficult to detect, or paint. If any corrosion is present, it must be removed and re-sealed with a corrosion inhibitor or paint to provide a reliable electrical connection between the RGA mount and tank wall.

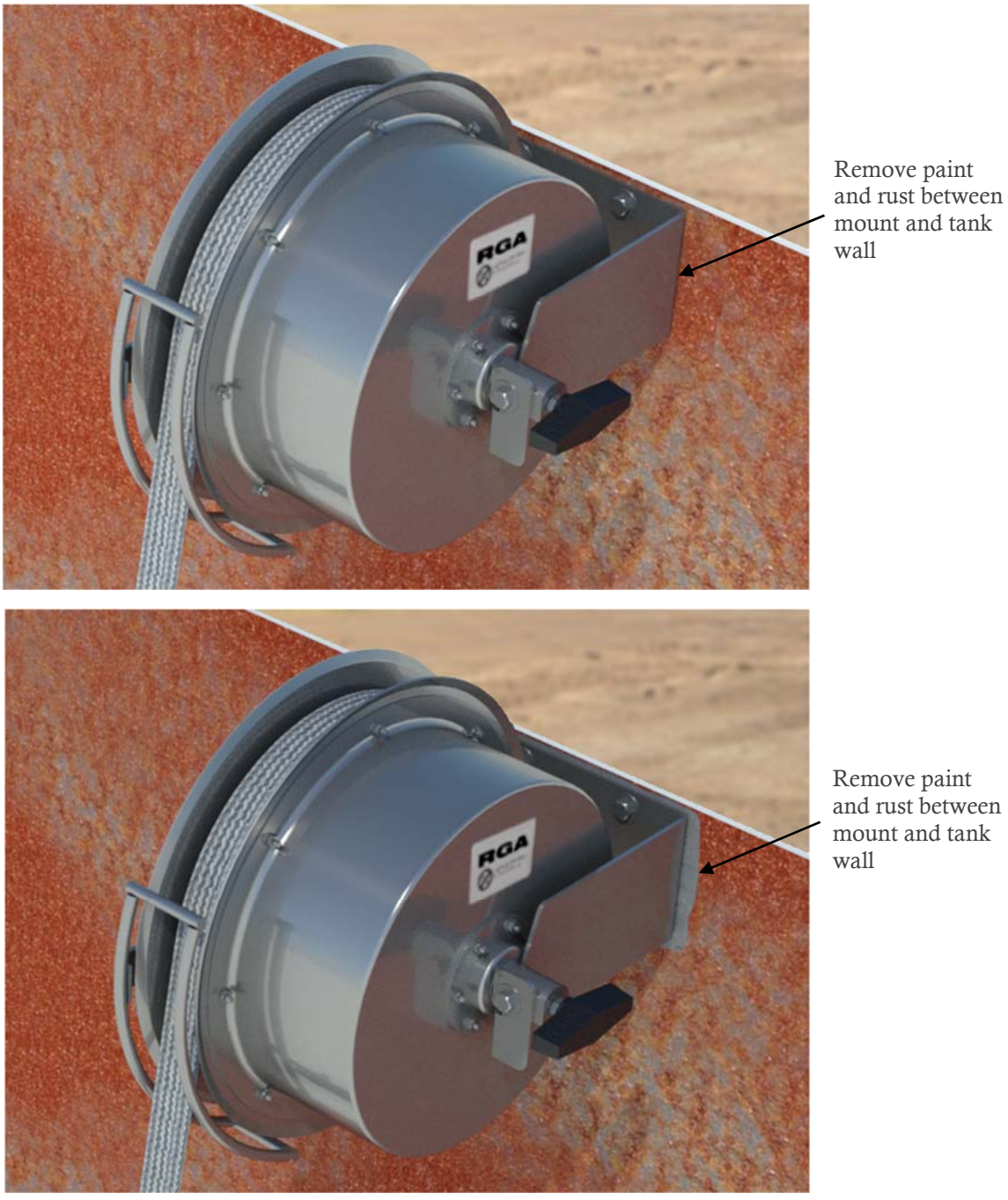

Figure 2: Paint and rust between mating surfaces must be cleaned to bare metal

4.1.1.1 Using a digital multimeter (DMM) measure the resistance between the RGA cable and tank rim/wall at the top of the tank. Verify that there is no measureable resistance or that the measurement is less than 0.03 ohms.

4.1.2 Remove any build-up (product, dirt, etc.) from the reel that may have accumulated.

4.1.3 As shown below in Figure 3, verify that all nuts and bolts fastening the RGA reel to mount and RGA mount or horizontal bracket to tank rim/wall are securely tightened.

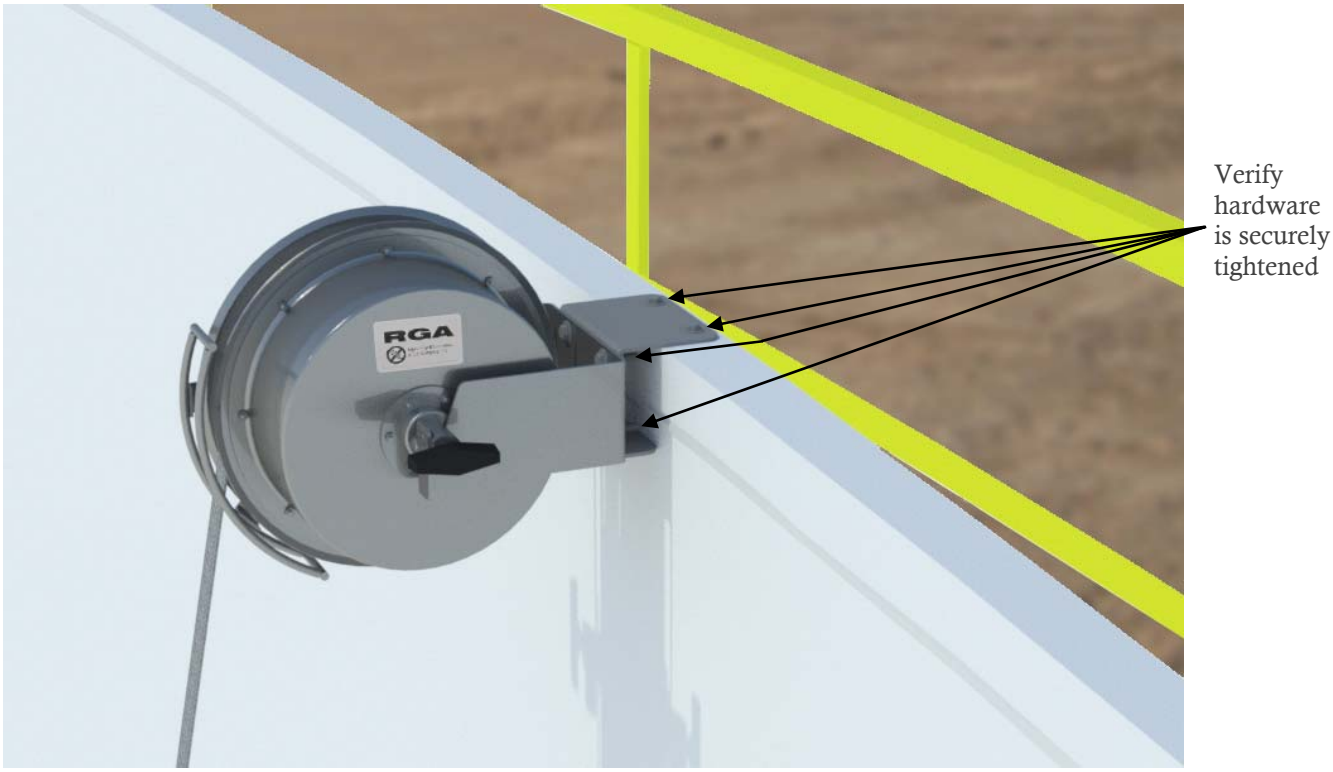

Figure 3: Secure reel attachment to the tank

4.1.4 The RGA reel rotates around an axle which is fixed in the RGA mount. Two (2) bushings (one on each side of the reel) facilitate rotation. Without removing the RGA from the mount, lubricate the bushing-axle interface with an electrically conductive lubricant (such as NO-OX-ID "A-Special") so that the unit will rotate without producing an audible squeak. Once applied, rotate the reel back and forth several times to ensure lubricant penetration.

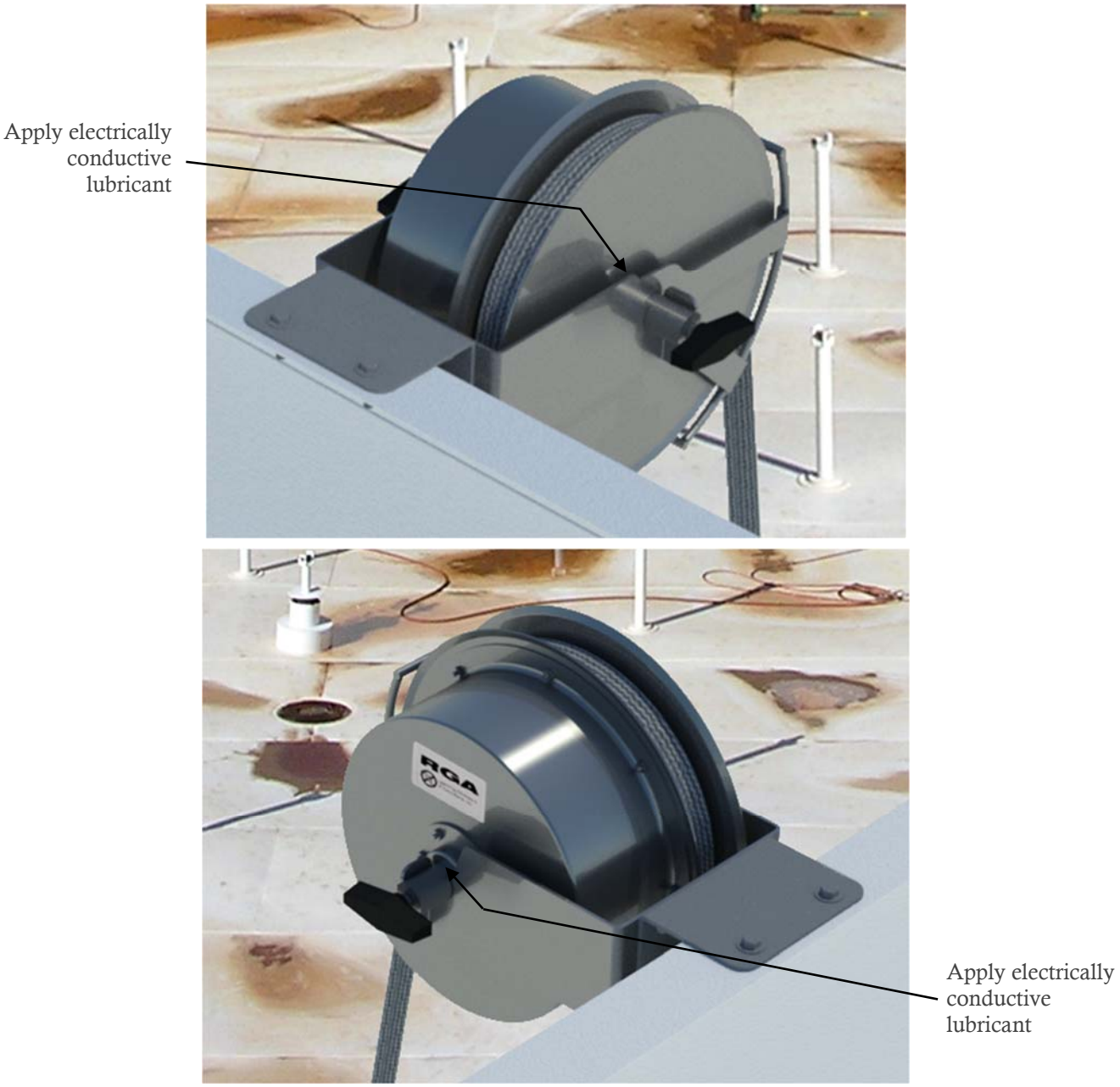

Figure 4: Lubricate axle-bushing interface on both sides of RGA

4.1.5 Visually inspect the main cable for dirt, buildup, corrosion or tearing.

4.1.5.1 Carefully remove any buildup or dirt from the main cable.

4.1.5.2 If the main cable is torn or frayed, replace the main cable with the appropriate replacement cable from LEC.

- **Aluminum**: 80 ft. 1,056/30 Braided Aluminum Cable, LEC #0010863
- **Copper**: 80 ft. 864/30 Tinned Braided Copper Cable, LEC #0004070

4.2 Floating Roof Inspections

4.2.1 Verify that the cable stop is firmly attached to the RGA main cable and is located approximately 12 in. [305mm] from the end of the cable.

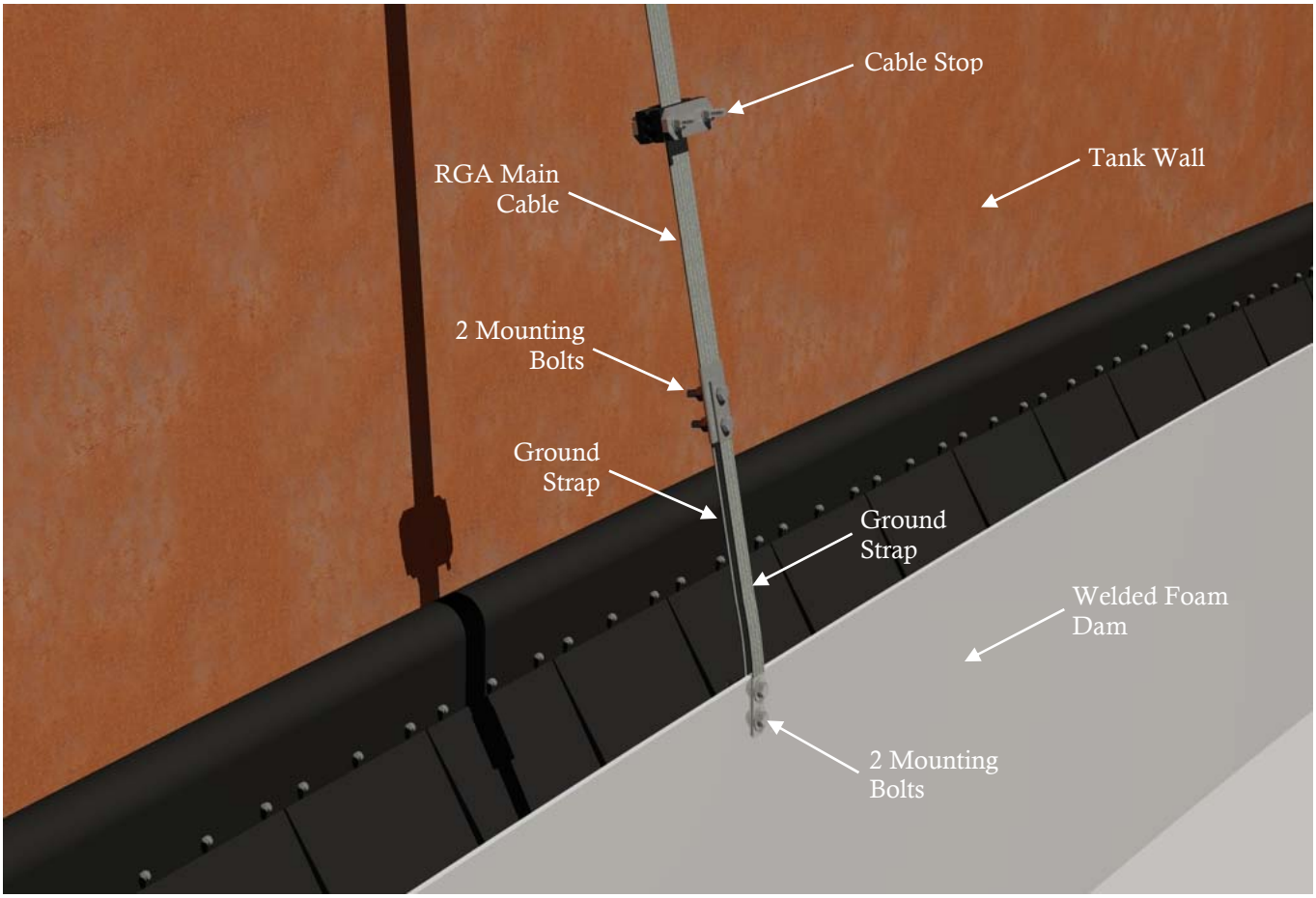

Figure 5: Ground straps on either side of welded foam dam

4.2.2 Ensure that two straps are securing the main cable to the foam dam/floating roof. One strap should be used on each side of the main cable and each side of the foam dam/floating roof connection point, as shown above in Figure 5, in order to ensure sufficient electrical contact area at the connection points.

4.2.3 Two bolts should be used to connect the RGA main cable to the ground straps and two bolts should be used to connect the ground straps to the foam dam/floating roof. Verify that the RGA main cable to ground strap and ground strap to foam dam/floating roof connection each uses both mounting holes at each end of the ground straps.

4.2.4 Visually inspect the interface between the ground straps and the foam dam/floating roof connection point. During installation, paint and rust must be removed between all interfacing surfaces to ensure bare metal to bare metal contact. These interfacing surfaces should be sealed with an electrically conductive corrosion inhibitor, which may be transparent and therefore difficult to detect, or paint. If any corrosion is present, it must be removed and the connection re-sealed with a corrosion inhibitor or paint to provide a reliable electrical connection between the ground straps and foam dam/floating roof connection point.

4.2.4.1 Using a digital multimeter (DMM) measure the resistance between the RGA cable and foam dam/floating roof connection point on the floating roof. Verify that there is no measureable resistance or that the measurement is less than 0.03 ohms.

4.2.4.2 Verify that the combined total of the resistance measurements taken in steps 4.1.1.1 and 4.2.4.1 is less than 0.03 ohms.

4.2.5 Visually inspect the ground straps for dirt, build-up, corrosion or fraying. Immediately replace any straps which show signs of fraying.

Note: Copper straps can only be used with copper cables and aluminum straps can only be used with aluminum cables.

- **Aluminum**: 12"Flexible Ground Strap, LEC #0010874
- **Aluminum**: 12" Flexible Ground Strap (x2) and 3/8" stainless steel hardware, LEC #0010861

- **Copper:** 12" Tinned Flexible Ground Strap, LEC #0008529
- **Copper:** 12" Tinned Flexible Ground Strap (x2) and 3/8" Bronze Hardware, LEC #0009433

4.2.6 As shown below in Figure 6, verify that all nuts and bolts connecting the RGA main cable to ground straps and ground straps to foam dam or floating roof connection point are securely tightened.

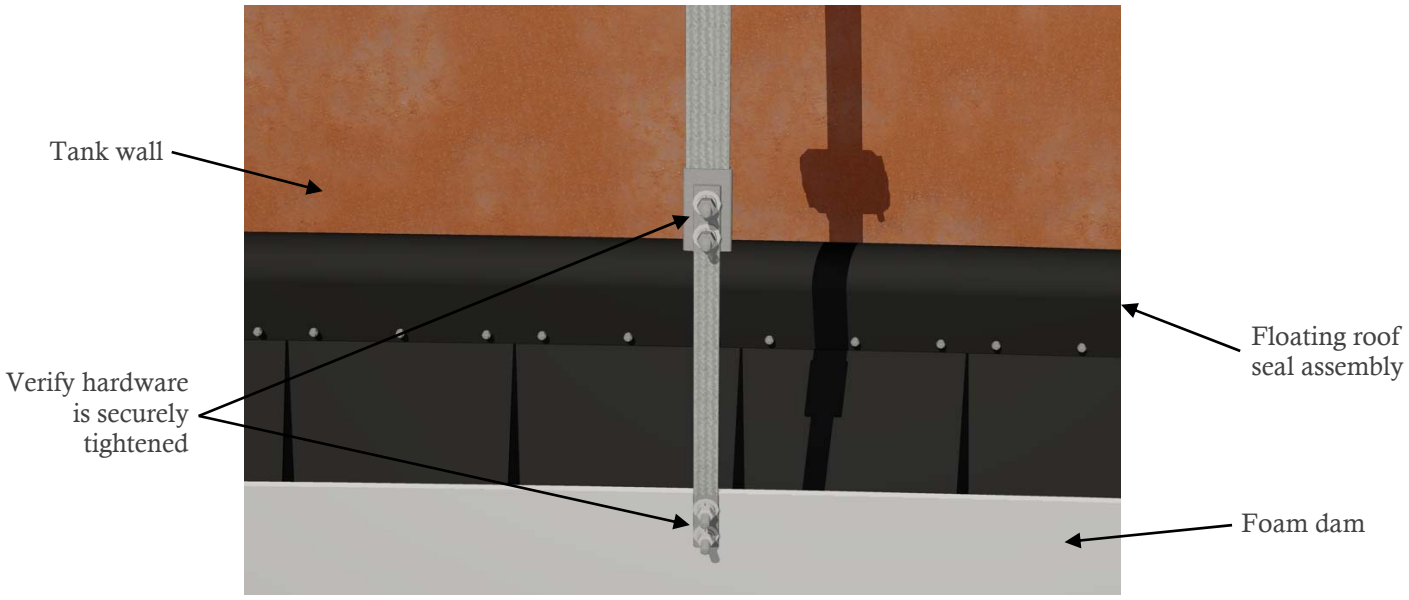

Figure 6: Ensure cable and ground straps are securely attached to foam dam

5.0 Technical Support

For technical support please contact:

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