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March 11, 2014

Mr. Robert Kerr, PhD
Director, Arecibo Observatory
HC 03 Box 53995
Arecibo, P.R. 00612

Re: Earthquake Damage to Main Support Cable M8-4

Dear Dr. Kerr:

Personnel from Ammann & Whitney have met with Arecibo maintenance personnel to review the installation of the jumper system bypassing the damaged section of main support cable M8-4. They have also witnessed the final tensioning of the system and its performance testing.

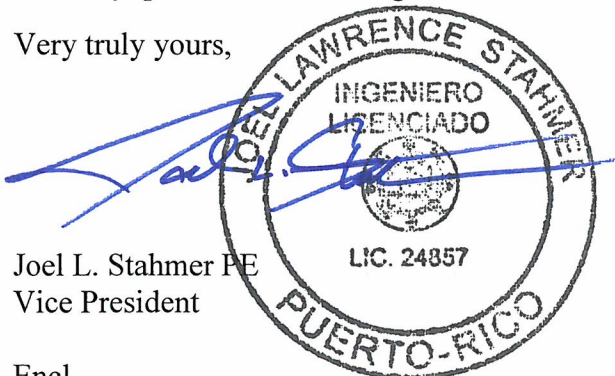
Based on these observations it is our professional opinion that the telescope may again be operated in accordance with parameters outlined in our October 10, 2010 letter to Dr. Donald Campbell (copy attached). We note that subsequent to that letter the reinforcement campaign has been completed, although verification strain gauge measurements have not been performed.

We also must reiterate that this repair should be considered a temporary accommodation. The jumper system does nothing to eliminate the seismic vulnerabilities inherent with cable M8-4. We strongly recommend that a complete replacement of cable M8-4 be performed at the earliest possible opportunity.

On a personal note, would you please relate our compliments to Felipe Soberal and the Platform Maintenance Crew? Based on photographs and our site observation this difficult and specialized repair has been accomplished in a highly professional fashion.

Please feel free to contact me at 212-462-8583 or jstahmer@ammann-whitney.com should you have any questions concerning the content of this report.

Very truly yours,



The seal is circular with the text "JOEL LAWRENCE STAHMER" around the top edge, "INGENIERO LICENCIADO" in the center, "LIC. 24857" at the bottom, and "PUERTO-RICO" around the bottom edge.

Joel L. Stahmer PE
Vice President

Encl.

Cc: J. Gould, A&W

September 10, 2010

Donald B. Campbell
Director, National Astronomy and Ionosphere Center
Professor of Astronomy
Space Sciences Bldg
Cornell University
Ithaca NY USA 14853

Re: **Arecibo Radio Telescope Operational Limits**

Dear Don:

Ammann & Whitney previously issued a moment versus tie-down tension graph limiting the operational range of the telescope to insure that the U2-U2L3 main truss members operate within the as-designed stress limits. At NAIC's direction we have documented reinforcing procedures for the U2-U2L3, U2-L2, U1-L2 and U3-L4 members and the U2-U2L3 reinforcement is currently being installed.

The U2-U2L3 members are the components most sensitive to variations in tie-down tensions. Following reinforcement of these members, the need to maintain a minimum tie-down tension will no longer be as critical a criteria for the safe operation of the structure. Based on Ammann & Whitney's analyses, with the reinforced U2-U2L3 members, the telescope may be operated at up to 14,000 foot-kip unbalanced moment with a zero tension in any one tie-down. The maximum tie-down force at any one corner should not be allowed to exceed 118 kips and the sum of the tie-down forces at all three corners should not be allowed to exceed 240 kips.

Following completion of the reinforcement of the U2-L2, U1-L2 and U3-L4 members we would recommend that strain gauge testing be repeated to an unbalanced moment of 19,600 foot-kip with the same tie-down restrictions discussed above. Assuming that the data obtained from these tests demonstrates the same close correlation with our analytical results as was obtained with the previous measurements, we could then recommend that the telescope be used at a maximum of 19,600 foot-kip unbalanced moment.

Should you have any questions or wish clarification for any of the items discussed in this letter, please feel free to call either James Gould or myself.

Very truly yours,



Joel Stahmer, PE
Vice President

Cc: J. Gould (A&W)