SnT 2019
CTBT: SCIENCE AND TECHNOLOGY CONFERENCE

Infrasound Detection Capability Improvement on Wind Noise Reduction System

T4.1-P016

Andrés S. Pantin
Nuclear Regulatory Authority - apantin@arn.gob.ar

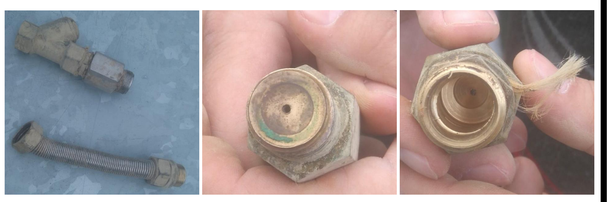
Marcelo A. Fernandez
Nuclear Regulatory Authority – mfernandez@arn.gob.ar

Introduction: Station IS02 is a 5 element infrasound IMS infrastructure certified in August 2006 located in a small town called Tolhuin in the southernmost province of Argentina, Tierra del Fuego. It was constructed in 2004, reconstructed because of flooding in the subterranean vaults in 2006 and more recently a mayor reengineered upgrade in 2010, replacing underground vaults with housing vaults and a new geometry on the wind reduction system of all sites.

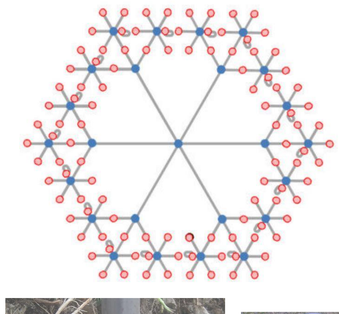
Planning the visit: After some months of planning, while we waited for the snowy season to pass, a week visit was scheduled for February 2016. Specific instructions were submitted to perform in H5 site. Procedure was expected to be quite simple…
All valves were closed to perform a pressure test disconnecting Micro Barometer from the array and pressurizing the system up to 2-3 bar for about 10 minutes, opening each valve expecting some water out in some of them and repeating this opening in all 72 valves individually.

The Visit: During the maintenance our first step was to make a visual observation of the scenarios to know how to apply the submitted instructions.
No valves were found in the end of the pipes to close the system and inside some manifolds had some drops of water.

Flexible pipe and resonance suppressor of main line connected to micro barometer dry.



Hexagonal Closed Pack

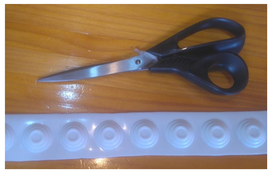


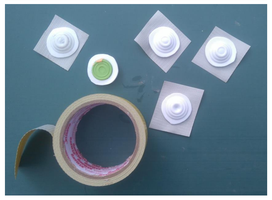
All 72 inlets were unearthed and replaced with threaded knobs with Teflon to close the entire wind reduction system.

Air compressor was connected to the main line where the micro barometer should be connected and air injected to the system. Some of the knobs were lose and a small amount of water was taken out of the array. The mayor problem during this test was that it was impossible to have enough pressure, or any pressure at all in the system, and the loud noise of air leakages in the whole site. The only way to isolate each of the branches of the array geometry was to cover 5 of the 6 holes in the main hexagonal manifold and start working and repairing one by one.

Background history: During February 2012 a small maintenance was performed in H4 site extracting water, fixing and sealing the connection of the flexible pipe to the resonance suppressor. All was reported in PR-76553. A PTS corrective maintenance visit was postponed indefinitely until mid 2015 when we started planning a new visit because IDC analysts informed that H5 site was behaving as if the pipes were blocked.

Because of the short amount of time to work and that in this small town (Tolhuin) it was impossible to buy any kind of rubber or cork stoppers for the manifolds, we managed to improvise a suitable solution and developed a way to replace them with checker game parts, bath-mat fragments, glue and silver tape.





Sealing each branch of the array and applying air with the compressor we started finding a lot of connection with leakages because the nuts where not tight or cracked. In one of the branches a secondary manifold O-ring was always spit out due to the screws of the top.

With these peculiar resources we managed to inject in each branch sufficient air to tighten all nuts and fix around 40 connections replacing some of the parts. Some of them were on

the bottom of the secondary manifolds having to dig in the gravel 30 to 40 centimeters down.

Fixing the problem with the rebel O-ring of the secondary manifold was the easiest task and it is still working until today with the carpenter´s screw clamp installed.

Due to the short time that was left of the week long visit, the best we achieved with the improvised technics, was we managed to enhance the noise reduction system from no pressure to a pressure of 3 to 0 (cero) Bar in 3 minutes and 48 seconds. All inlets where screwed again in the goosenecks and covered with gravel.

Conclusion: The importance of knowing and understanding the station, how it is set up and works and having the correct tools and accessories to work with should be enough, but there's always a possibility of a challenge.
In this situation time became short because there were no valves available to close the 72 ends of the system and digging up and replacing each 72 inlets took us more time than we thought.