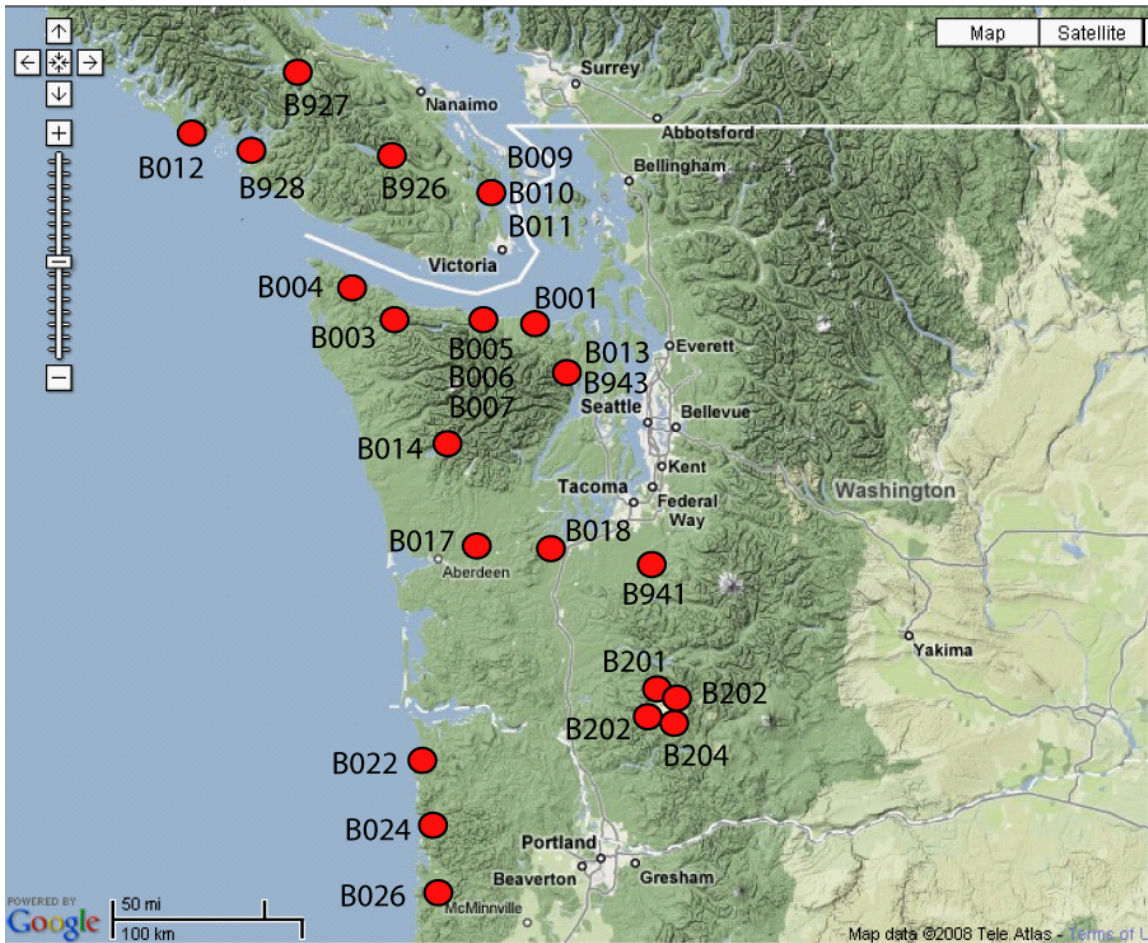


Station Notes for B943, pnycrk943bwa2008

Latitude:	47.8132 (WGS 84)
Longitude:	122.9113 (WGS 84)
Elevation:	84.2 m / 276 ft
Install Depth:	225.9 m / 741 ft
Orientations:	CH0= 329.5, CH1= 269.5, CH2= 209.5, CH3=179.5
Install Date:	February 26, 2008
GTSM Technologies #:	US64
Executive Process Software:	Version 1.14
Logger Software:	Version 2.02.2
Home Page:	www.unavco.org/instrumentation/networks/status/nota/overview/B943
Notes Last Updated:	December 20, 2020

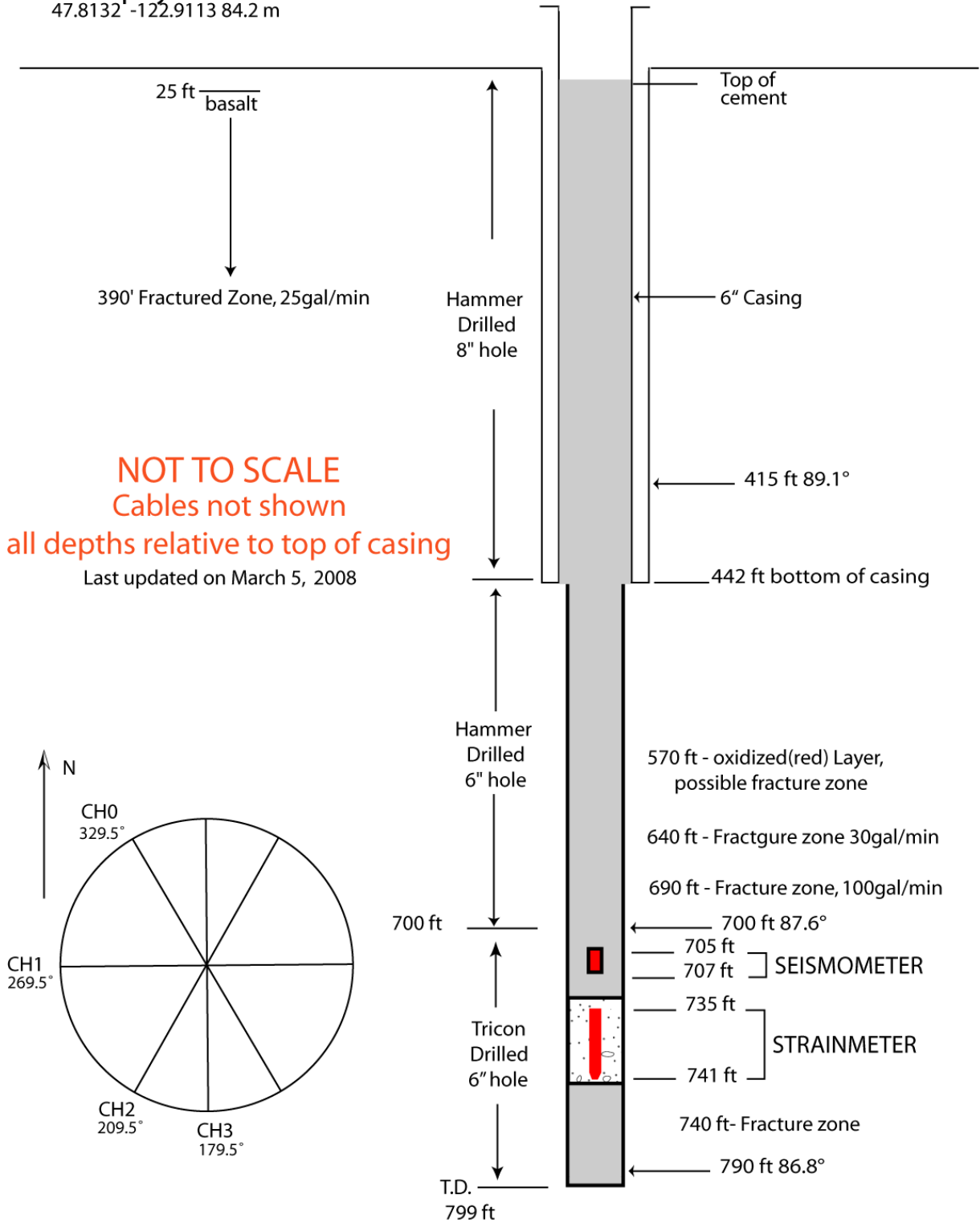
·Install depth is from the top of the casing to the bottom of the strainmeter.

·Orientations are in degrees East of North.



Pacific Northwest PBO strainmeter network, March 26, 2008

B943 pnycrk943bwa2008
 47.8132 -122.9113 84.2 m



Instrumentation at Strainmeter

Instrument	Units	Bottle/ASCII Scale Factor	SEED Scale Factor
Pore Pressure	Hecto Pascals	None Installed	---
GTSM Barometer	Kilopascals	1.0	0.0001
Rain Gauge	Millimeters/hour	1.0	0.252
Down hole Temperature Sensor	Degrees Celsius	1.0	0.0001
Logger Temperature Sensor	Degrees Celsius	1.0	0.0001
Setra Barometer	Hecto Pascals	None Installed	

1. Installation notes

February 20, 2008 UTC

21:00 - Arrive onsite. Begin set up of equipment. Tag bottom at 799'.

22:00 - Strainmeter running.

23:00 - Cement up hole with 4 bags of cement using dump bailer.

00:00 - Potential issues with planned pen grout mix, decide to postpone install until Monday to allow further discussion over the weekend.

February 25, 2008 UTC

17:00 - Arrive onsite, sound hole. Hole is at 762'. This is 18' higher than the target depth. Something must have broken loose and bridged the hole. Run banger and dump bailer without trip and get down to 764.5'. The dump bailer brought up finely ground basalt in its joints. Decide to lift hole to the next install zone at 740'.

18:45 - Raise hole using 3.3 bags of Portland cement. This should bring up the hole 20'.

19:21 - Done raising hole.

21:00 - Meet with electrician. Plan to have electrical installed on February 27, 2008.

February 26, 2008 - 0800 onsite

16:30 - Sound hole at 743'.

17:30 - Perform compass test on strainmeter.

18:03 - Add water to mixer.

18:05 - Add grout.

18:16 - Done mixing 5 minutes after last grout was added, 1 minute sitting and 2 minutes mixing.

18:19 - Dump bailer full.

18:25 - Dump bailer on the bottom.

18:33 - Dump bailer out of hole.

18:35 - Strainmeter in hole.

18:48 - Strainmeter at 741'.

18:55 - Strainmeter on.

19:00 - Strainmeter renamed.

19:05 - Called good. Tear down install gear and begin trenching for power and comms.

21:30 - Finished trenching and laying conduit.

February 27, 2008 UTC

16:15 - Onsite, adjusting quadrature, channel 0 looks pretty noisy.

16:30 - Test seismometer.

16:30 - 17:30 - Electrician on site, AC power in place and tested.

17:05 - 17:25 - Swap RT0 board to try and reduce noise, no change so swap back. Noise not evident in data pulled from the logger board.

17:37 - Shut down logger, adjust temperature from 0.778 to 1.253 V.
18:35 – 19:07 - Lower seismometer to 707.5' (24 hours after install, grout samples look good).
19:25 – 20:10 - Trip in tremie pipe.
21:08 - Quarry blast nearby.
21:20 – 32:00 - Pumping 5.5 yards of cement into hole, get return to surface.
23:30 - GTSM off, burying cable and pouring pad.

February 28, 2008 UTC

01:08 - GTSM back on.
01:30 - Offsite.
16:10 - On site, GTSM is off (a power cable appears to have fallen loose, the 2 batteries still attached only lasted until 07:00 UTC, strainmeter shut down at 12.45V).
17:36 - Strainmeter inside enclosure and back on.
17:47 - Program Marmot.
17:53 - Program Q330.
18:00 - Notice logger board is hung, unable to download data with USB. After reboot acts normal.
18:30 - Status report shows everything is functioning normal, rain gage tested.
19:00 - Site complete and clean, offsite.

2. General Information

- B943 is about 140' from strainmeter B013. The site is near a quarry where blasting occurs. This is the first PBO strainmeter to be installed with Penn Grout.

3. Strainmeter Maintenance

- March 3, 2008 UTC – Wade Johnson visited the site.
21:40 - Onsite. GTSM on, main LVDs off. Main voltage is at 11.41V, no output from IOTA charger. Check TripLite surge protector. Output is 122V AC from all outlets except plug the IOTA is plugged into, it is at 120mV. Swap surge protector. IOTA is now charging batteries. Site back online.
22:07 - Reset RT0.
22:30 - Tap stem at -0.00, counts only changing by 4-5.
Chan 0 DC Offset= 1.250 at 22:30:11 Mar 3 Tap Step= -0.000 at 22:30:10 Mar 3
Chan 1 DC Offset= 1.250 at 22:30:11 Mar 3 Tap Step= 0.399 at 22:30:10 Mar 3
Chan 2 DC Offset= 1.250 at 22:30:11 Mar 3 Tap Step= 0.364 at 22:30:10 Mar 3
Chan 3 DC Offset= 1.250 at 22:30:11 Mar 3 Tap Step= 0.399 at 22:30:10 Mar 3

22:36 - Shut down RT0, pull board and reseal in chassis. Turn on. Wait until next status check is created at 23:30. Counts are now changing by 20-200.
23:30
Chan 0 DC Offset= 1.250 at 23:30:11 Mar 3 Tap Step= 0.402 at 23:30:10 Mar 3
Chan 1 DC Offset= 1.251 at 23:30:11 Mar 3 Tap Step= 0.396 at 23:30:10 Mar 3
Chan 2 DC Offset= 1.250 at 23:30:11 Mar 3 Tap Step= 0.397 at 23:30:10 Mar 3
Chan 3 DC Offset= 1.249 at 23:30:11 Mar 3 Tap Step= 0.400 at 23:30:10 Mar 3

This indicates an issue with the connection on the back panel and RT0 board, needs to watch

closely. If it fails again Wade recommends swapping the RT board. If that does not help the entire box may need to be swapped out.

23:51 - Mains at 12.64V, GTSM at 13.35V.

00:00 - Offsite.

- March 7, 2008 UTC – Wade Johnson visited the site.
21:26 - Onsite. RT0 shows only a few counts change. Jumper cable under a lot of stress at the connector. Shut down gtsm21, swap cable, and secure with bungee cord.
21:30 - Back online. RT0 shows normal count changes.
22:30 - Normal tap step.
23:30 - Still looks good.
23:38 - Leave site.
- March 27, 2008
22:58 - Onsite. CH0 only changing by one to two counts. It is possible to force RT numbers to unrealistic ranges and board does not balance itself and stays at G3.
March 28, 2008
00:01 - Shut down gtsm21.
00:05 - Power up with dummy cell. CH0 flat lined, tap step -0.001. Amp/op looks way too quite compared to other channels.
00:10 - Shut down and swap with spare RT board. Spare RT board is bad, it will not go above G0 and RT numbers can not be forced.
00:30 - Swap original RT board back. Now recording normally, but has 2V peak to peak high frequency noise on amp o/p output.
00:36 - Swap RT0 with RT4. Results are the same. CH0 working, but with high HF noise. CH4 looks normal.
00:52 - Shut down B013 to swap oc boards. B943 CH0 still has noise.
01:04 - Swap board back between B013 and B943. Both sites running and online. B943 CH0 tap step= 0.403.
01:20 - Button up and head to hotel.

From this test it looks like there is a bad connection in the back panel. The best course of action is to replace the environmental box so that bad connection can be found in a lab setting.

- August 16, 2009 – Korey upgraded the firmware to 1.20 and adjusted the quadratures.
- October 7, 2009 – Wade Johnson visited the site. The site had a bad antenna and power box. He swapped the power box with B013 and tested the rain gauge to make sure it was working.
- March 22, 2013 – Liz cleaned out the rain gauge.
- April 3, 2013 – Liz pulled the CHAN 0 RT board to look at the connection to the back plane. No corrosion was found. She re-seated the board. Chops and quads are adjusted. The chops on CHAN 1-3 were ok and nothing had changed. CHAN 0 was very noisy, making adjusting chops very difficult. Also noted it was a large adjustment, and was almost off the screen. While at the site she took photos, secured all equipment, took the LVD settings, added diatomaceous earth, removed the dense spider webbing, and removed some black berry vines.

- June 20, 2013 – Mike sent the coldstart command to fix the GPS time.
- July 23, 2013 – Liz replaced the power strip.
- March 26, 2014 – Replaced RT0 RT board with new RT board. While setting quads CH0 was unresponsive. Liz tried adjusting the pots and turned them on and off. There was a sine wave for CH0 that was out a phase, and would not move. CH2 went to G2 and could not be adjusted.
- March 27, 2014 – Liz returned to the site to test CH0. Swapped RT board from CH1 and placed it in CH0. Channel went back to G3 (temporarily), but still could not adjust quads. Installed old CH0 RT board into CH1 and it worked fine. The RT board is not the problem. Shut down GTSM and looked at cable that connects Environmental box to the downhole instrument cable. There was some cement/grout in the downhole cable connector. Liz attempted to clean the fine dust off. Wade had mentioned a strained cable. It was bent at a bad angle, but not a tight fit. Over the years this angle could perhaps loosen connectors? Replaced the oscillator board. Adjusted chops and quads for all channels. Since they have the same setting, Liz put CH0 in the same setting on the oscillator board and turned the GTSM back on. CH0 was at G2 again. Attempted reseating board a few times, but no change. While working with CH0, Liz forced RT last number to go up while looking at Oscilloscope sine waves. No change in sine wave. However she did notice the RT is RT4999NNN (last three numbers always changing), but while she was in the menu forcing the RT, it reverted to 50000.
- April 2, 2014 – Liz and Ken replaced the environmental box to see if CH0 would improve. CH1 and CH3 were difficult to adjust quads. CH1 was stuck in G2. They tried swapping oscillator and RT boards, but there was no improvement. They also tried an old cable, also with no change. CH0 showed slight improvement. Liz could adjust it, but could not get it in phase. It would jump to G2 or just stop moving. It did have a normal RT number instead of the previous 599999. When adding to the RT manually the quad sine wave would move. This is now a tap step for CH0, but CH0 and CH3 cannot be adjusted into phase for setting quads.
- October 7, 2015 – Adjusted chops and quads. Channels 2 & 3 were difficult. Cleaned out rain gauge.
- August 12, 2016 – Changed file storage configuration to match 1 G flash card.
- September 26, 2016 – Turned off GTSM and documented resistance and capacitance of downhole instrument. Cleaned tree needles out of rain gauge.
- September 13, 2017 – Removed pine needles clogging rain gauge. Documented logging operations around both sites.
- October 3, 2017 – Station had original GTSM power box from install and needed modifications. Updated strain_logger.conf for CCs and PP in power box.
- January 24, 2018 – Rain gauge was pooling water and clogged with fir needles. Cleaned out rain gauge. Power cycled CH3 RT board. Come back on with Gain 3.

- June 7, 2018 – Installed Setra, set up Q330 for strainmeter data flow, and cleaned out rain gauge
- August 8, 2018 – Cleaned out rain gauge. CH2 is often in G2 on arrival.
- December 6, 2018 – GTSM CH3 always reverts to Gain 2. May require a few visits to identify and test failed part. Swapped CH3 RT board, which was in Gain 2, with CH2 RT board. Observed remotely to see if the channel or board reverts to Gain 2. Adjusted chops and quads. All channels drift and are difficult to adjust. Cleared clogged rain gauge.
- October 15, 2020 – Cleared out clogged rain gauge. Adjusted chops and quads. CH2 will not go into phase.