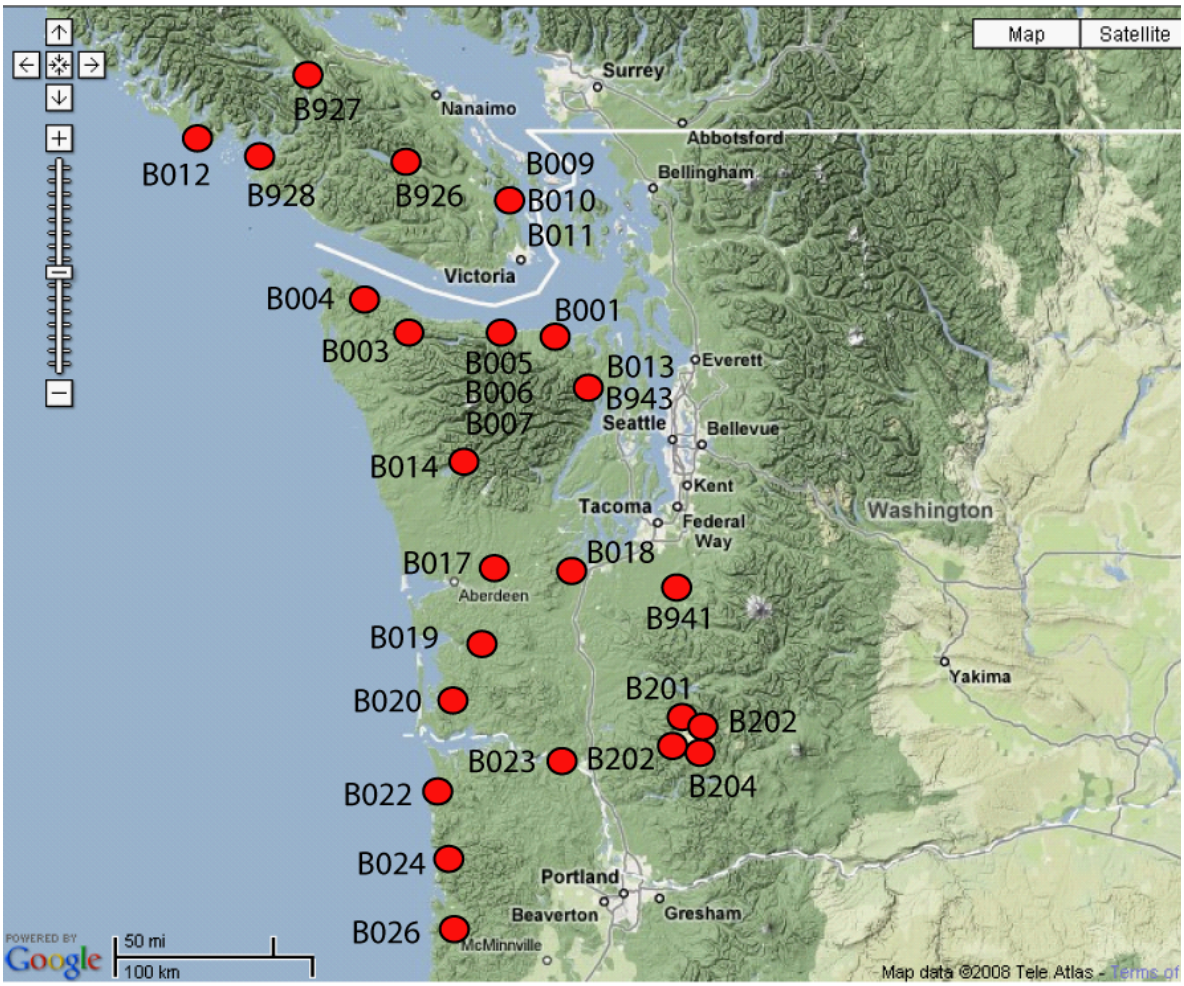
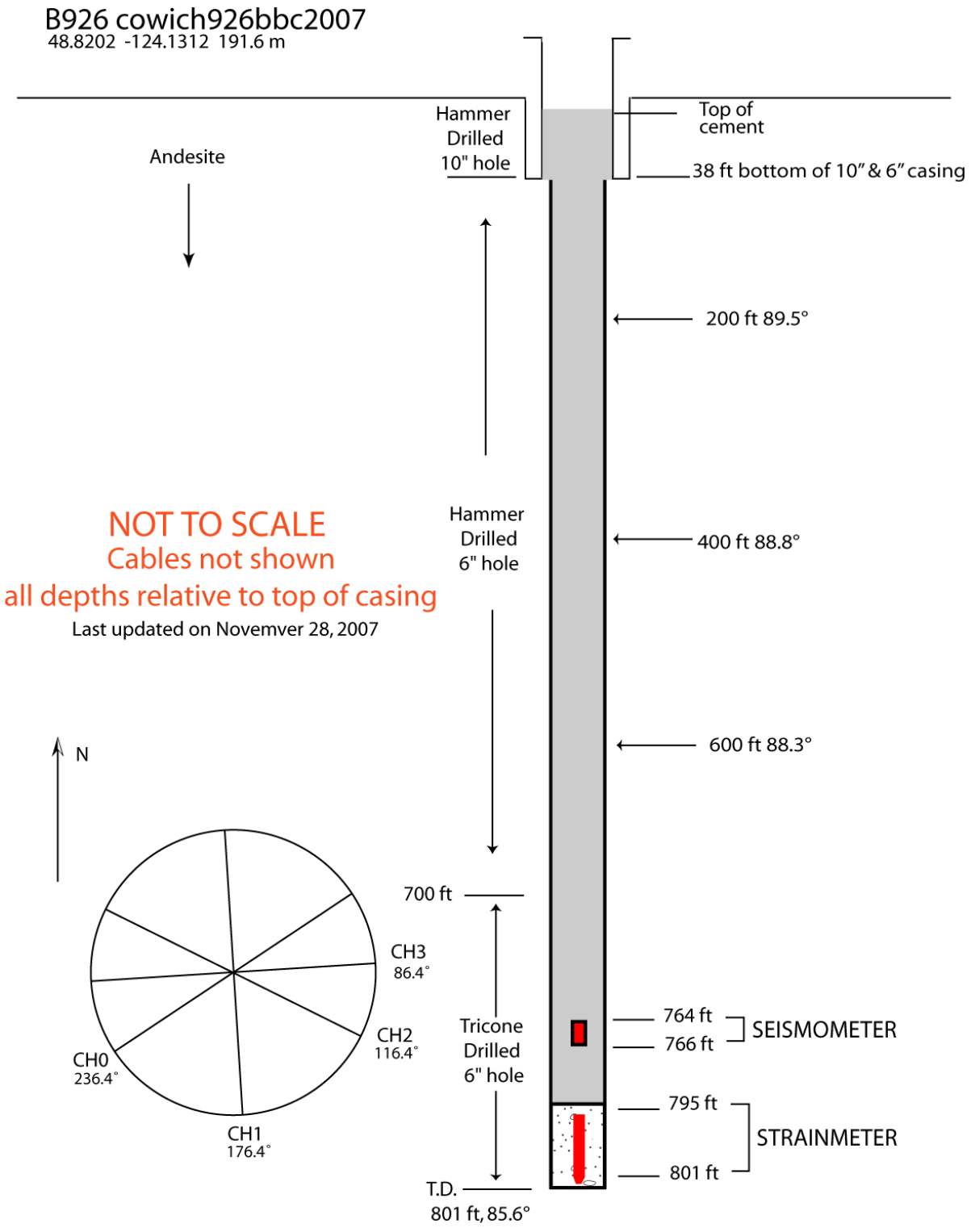
Station Notes for B926, cowich926bbc2007

Latitude:	48.8202 (WGS 84)
Longitude:	-124.1312 (WGS 84)
Elevation:	191.6 m / 627 ft
Install Depth:[1]	244.1 m / 801 ft
Orientations:[2]	CH0=236.4, CH1=176.4, CH2=116.4, CH3=86.4
Install Date:	November 12, 2007
GTSM Technologies #:	US59
Executive Process Software:	Version 1.14
Logger Software:	Version 2.02.3
Home Page:	www.unavco.org/instrumentation/networks/status/pbo/overview/B926
Notes Last Updated:	October 11, 2019

[1]Install depth is from the top of the casing to the bottom of the strainmeter.
[2]Orientations are in degrees East of North.



Pacific Northwest PBO strainmeter network, April 23, 2008


B926 cowich926bbc2007
48.8202 -124.1312 191.6 m
Andesite
Hammer
Drilled
10" hole
Top of
cement
38 ft bottom of 10" & 6" casing
200 ft 89.5°
400 ft 88.8°
600 ft 88.3°
Hammer
Drilled
6" hole
NOT TO SCALE
Cables not shown
all depths relative to top of casing
Last updated on Novemver 28, 2007
N
CH3
86.4°
CH2
116.4°
CH0
236.4°
CH1
176.4°
700 ft
Tricone
Drilled
6" hole
764 ft
766 ft
SEISMOMETER
795 ft
801 ft
STRAINMETER
T.D.
801 ft, 85.6°

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

November 9, 2007 UTC
20:42 - Put US59 on test.
21:50 - Shut off GTSM to adjust down hole temperature, which was at 0.001V. Adjust temperature to 0.263V (using test points and manipulating the dashpot, highest possible voltage is 0.67V). They spent the rest of the day video logging the hole and setting up for install. Setup was slightly modified due to limited site access (lack of traction on mud slope getting to the wellhead). According to A. Tiedeman, drilling was very straight forward with only one water producing zone at 699' (~100 gal). Led by S. Venator, logging discussion took place and consensus is the bottom of the hole has the best zone of rock. They decided to make 801', total depth, the target installation depth.

November 10, 2007 UTC
16:30 - Onsite.
17:00 - Instrument looks excellent on scope. Using WinQxp, data has some gaps. The minute data looks good, except for two strange gaps exactly one hour in duration. The one day file also has a strange gap in time. Further investigation reveals the GPS antenna is not properly attached. Timing jumps 165 seconds when the antenna is properly attached. The engineers decide to let the instrument remain on test for one more day to generate a proper Day file (with GPS antenna).

November 11, 2007
Engineers swing by site to check out the data on the GTSM. Data looked good, strange gaps were from GPS antenna, plan to go ahead with install.

November 12, 2007 UTC
15:30 - Onsite. Attach centralizers, nosecone, and chain up truck to get to the wellhead.
16:20 - Shut down GTSM and load it onto a flatbed to move it up to the site (~50 yds).
16:45-18:45 - Spent getting truck up to site and setting up capstan and reel.
18:50 - Pump hoist hydraulic motor won't start.
1900-21:00 - Spent tearing apart motor, eventually get it operational.
19:18 - Compass test Xmin= 0.718 Xmax= 1.500 Ymin= 0.351 Ymax= 1.120.
21:56 - Start mixing grout.
21:59 - Last grout added (MasterFlow 1341 #161607629T7).
22:01 - Last H20 added (14.2 gal H20 for 8 sacks).
22:10 - Stop mixing.
22:20 - Bailer on the bottom (801.5').
22:26 - Bailer out of grout, heading up.
22:33 - Lowering GTSM.
22:53 - GTSM lowered to bottom.

22:57 - GTSM turned on, x=1.369 Y=0.412. Instrument looks good.
22:42 - Shutdown logger, set down hole temperature to 0.196V, accidentally turned dashpot between TP9&TP11 while adjusting down hole temperature (TP7). Break down pump hoist to take into shop, cleanup site, and pack up install gear.
24:00 - Offsite.

November 13, 2007 UTC
23:56 - Shut down GTSM.
23:57 - Restart GTSM.
November 14, 2007 UTC
00:29 - Start lowering in Seismometer #93 on 2500lb nylon mule tape (no wire rope), lower to 766'.
00:47 - Tripp in 1.5", grout to 779'.
02:00 - Offsite.

November 14, 2007 UTC
15:30 - Onsite, tag bottom.
16:00 - Try to look at GTSM data, USB port to doesn't work, download via ethernet port instead.
17:30 - Cement on site.
17:40 - Start pumping.
20:20 - Stop pumping (4.5 cubic meters), cleanup, dig pit, and trench for VSAT cable
22;20 - Shut down GTSM, pour pad, and install VSAT post
November 15 UTC
00:47 - Restart GTSM and adjust quadratures for longer jumper.
01:15 - Offsite.

November 15, 2007 UTC
16:30 - Onsite. Pad is still soft. Add additional concrete to VSAT posthole.
16:50 - Install VSAT conduit/cable.
17:45 - Electrician on site.
17:45 - Start installing uphole racks and electronics.
19:05 - Program cisco router.
19:40 - Shut off GTSM.
19:42 - Restart GTSM.
19:47 - Assign GTSM IP.
19:50 - Shut down GTSM.
19:55 - Set TP11 to 1.090V.
19:57 - Adjust down hole temperature, range is only between 0.006-0.697V, set to 0.339V.
20:08 - Shutdown GTSM and move it into the hut.
20:39 - Turn on GTSM..
20:53 - Program Q330 #3593.
21:02 - Program Marmot.
23:07 - VSAT is pointed.
23:15 - Adjust GTSM quadratures. Channel 3 is stuck on G2 due to change from long to short flex jumper. Finish site cleanup, make a dump run, and pack up gear.

2. General Information

- Sensitivities of all EH channels corrected in the dataless on March 4, 2010.

3. Strainmeter Maintenance

- February 9, 2009 - Mike Gottliebe and Wade Johnson visited the site to get it back online. There was a blown transformer that caused a loss of A/C power to this site in November. It was repaired in January, but the GTSM batteries had died and required a site visit to swap. They replaced 2 failed batteries with 4 new ones, and the GTSM came back up immediately. They also installed a barometer and fiber optic modems, and adjusted the quadrature. The auxiliary power board was adjusted so that if another power failure occurs, the GTSM will not destroy the batteries.

- March 18, 2009 – The logger software was upgraded from version 1.16 to 2.02.2.

- July 16, 2009 - Updates RT firmware to v. 1.20 .

- June 3, 2010 - A suspected power surge (lightning?) killed the power isolation block on the backpanel, as well as the GTSM logger board. The logger was replaced, and the isolation block was switched over to a lab power supply for the short term. CH2 has been recording a flat line since the station came back online.

- June 22, 2010 - The problem with CH2 isn't the RT board. From the diagnostics Wade could do it doesn't look like we are getting a signal from the down hole channel. Signals from the OS board are coming into the RT board. Someone will have to come back with a loadcell and probably a new enclosure to make sure the DH is not the part that is damaged. Visual inspection of uphole didn't indicate any damage to lightning protection. The LCD screen on rt3 was fixed and a new power isolation block installed.

- September 11, 2010 - When Mike Gottlieb arrived the RT numbers were (xxx represents digits rapidly changing):
  RT0: 40771xxx
  RT1: 507409xx
  RT2: 49999999
  RT3: 39275xxx
  Mike applied a dummy load to the instrument (logger was turned off for all experimentation to keep from recording erroneous data) and saw the following
  RT0: 50078xxx
  RT1: 31289xxx (only this channel was different on dummy load. not sure why...)
  RT2: 50364xxx (not 49999999!)
  RT3: 50076xxx
  Mike also tried running it with no load:
  RT0: 49999999
  RT1: 49999999
  RT2: 49999999
  RT3: 49999999
  The fact that RT2 is flatlined while connect to GTSM, but behaves normally with dummy load and no load implies that the issue is downhole.

  It appears that the V, H1, and ground wires have shorted in the seismometer(H2 seems fine still). Mike was getting very strange birddog results for V and H1 (1000+% error) , which

led him to ohm out the different channels. Resistances should be ~2.3 kohm for each channel and infinite between each channel and ground. This was not the case. V+, V-, H1+, H1-, and ground are all connected now, which was not the case during installation.

- July 11, 2012 – Mike Gottlieb installed a timer on the VSAT. It is set to power cycle from 00:00 to 00:05. He also repointed the VSAT. Mike Gottlieb found signal strength of 89 but crosspole of only 58-64, and failing about 50% of the time. He got it up to signal strength 91 and crosspole ~67, with a ~95% pass rate. He re-terminated the cables and weatherproofed the connectors. He set quads RTO, RT1, RT3, and chop RT0 and RT1.

- August 22, 2012 – Wade Johnson installed a Metpack.

- September 16, 2013 – Station was stuck by lightning at ~3:50 UTC. All four channels are now flatlined.

- September 17, 2013 – Mike Gottlieb tried a remote reboot, but there was no change. Probably needs a new oscillator board or at least a manual reboot.

- September 21, 2013 – Mike visited the site and power cycled the GTSM and CH0 and CH3 came back. CH2 was already damaged in 2010. CH1 was still flatlined, and at G1. Signal on oscilloscope was very noisy. Swapped RT1 board. New RT board returns to G3, and quadrature can now be set. Channel still flatlined though. By comparison, CH2 amp o/p signal is pure noise. Set quads and chop on Ch0, just quads on CH1 and CH3 (chop OK on these channels). RT1 also going through startup calibration too quickly. Cannot fix RT1 with supplies on site. Will need to return with Picoscope and do further analysis of downhole instrument signal response.

- September 24 - With the exception of CH2, B926 looks as though it has returned to normal operation.

- October 29, 2015 – Upgraded RT board firmware on CH1 & CH2 from version 1.18 to 1.20. Adjusted GTSM chops and quads.

- October 30, 2015 – Data flow had stopped. Tried pinging GTSM from 4-port FODP, no ping. Tried pinging from ethernet coming out of enclosure, no ping. Connected to GTSM logger board using serial port. Checked file set-up and IPs, all good. Tried reseating logger board and restarted several times. Re-seated ethernet connection into environmental box and FODP. Left site unable to ping GTSM, logger board or GTSM ethernet. Dataflow resumed over the following weekend.

- April 20, 2016 – Corrected file storage configurations from FW 2.02.3.

- September 21, 2016 – Completed down hole test procedure on GTSM and adjusted chops and quads.

- March 8, 2017 – System light was off on IDU. Status said "vsat service suspended due to billing lock on feb 18". Unclear why this was turned off, Bob did not ask to decom the unit. Got modem reactivated, same IP, no configuration changes needed. Replaced a failed LCD screen on CH2.

- July 27, 2017 – Installed RV50 coms, rogers wireless. Investigated met data outage. Marmot could not see metpack. Rebooted marmot, now kermit could see metpack. Contacted Otina to install met2orb on the marmot.

- July 31, 2018 – Replaced batteries from 2007, 4 mains and 4 gtsm.

- August 29, 2019 – Upgraded RV50 firmware from 4.8 to 4.12. Removed old VSAT dish and post. Added cam straps around ENV/PB, GTSM batteries, and marmot. Put zip ties on Q330. Set quadrature.