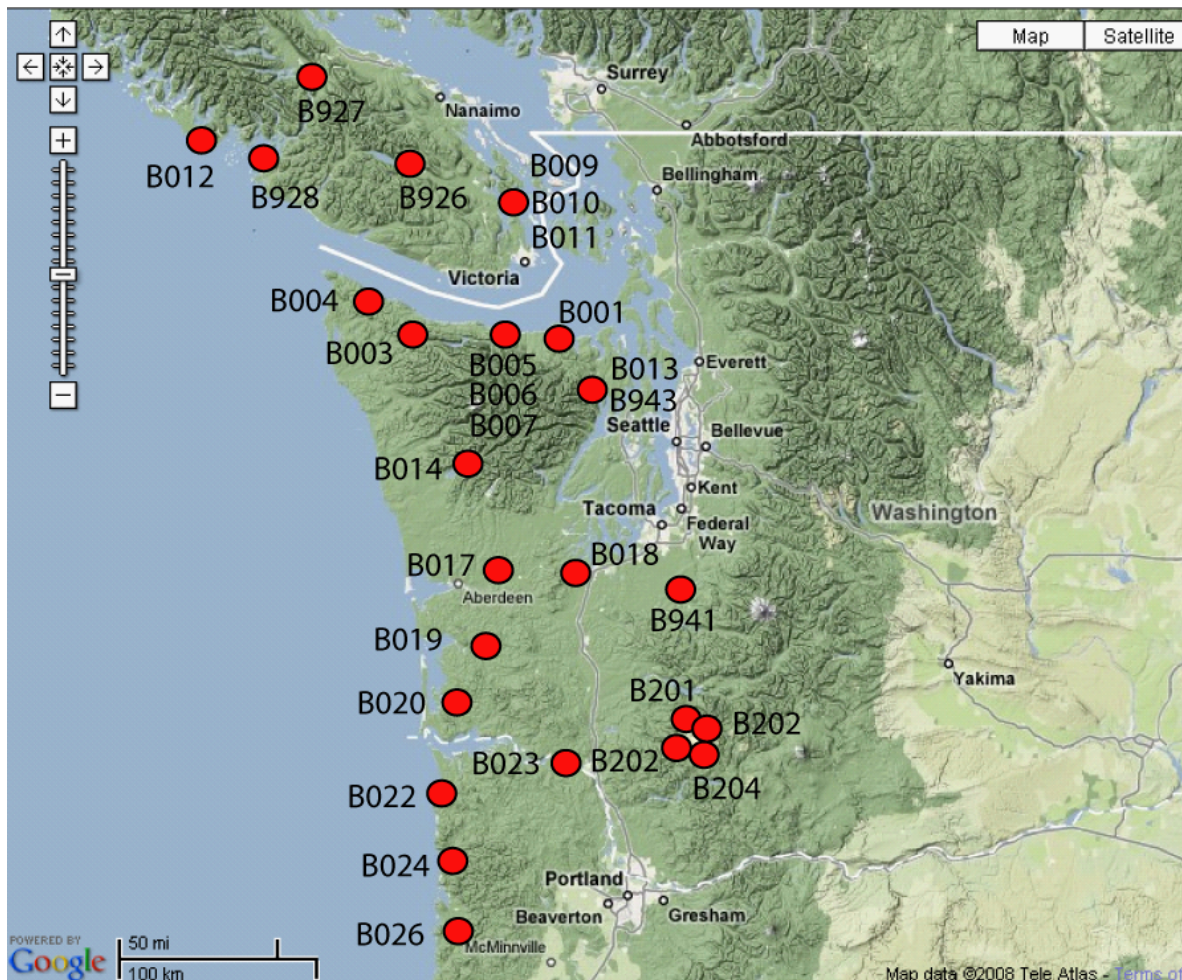


Station Notes for B020, wirkla020bwa2008

Latitude:	46.3827 (WGS 84)
Longitude:	-123.8445 (WGS 84)
Elevation:	31.2 m / 102 ft
Install Depth:	218.9 m / 718 ft
Orientations:	CH0=262.6, CH1=202.6, CH2=142.6, CH3=112.6
Install Date:	March 30, 2008
GTSM Technologies #:	US61
Executive Process Software:	Version 1.14
Logger Software:	Version 2.02.2
Home Page:	www.unavco.org/instrumentation/networks/status/pbo/overview/B020
Notes Last Updated:	October 17, 2019

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

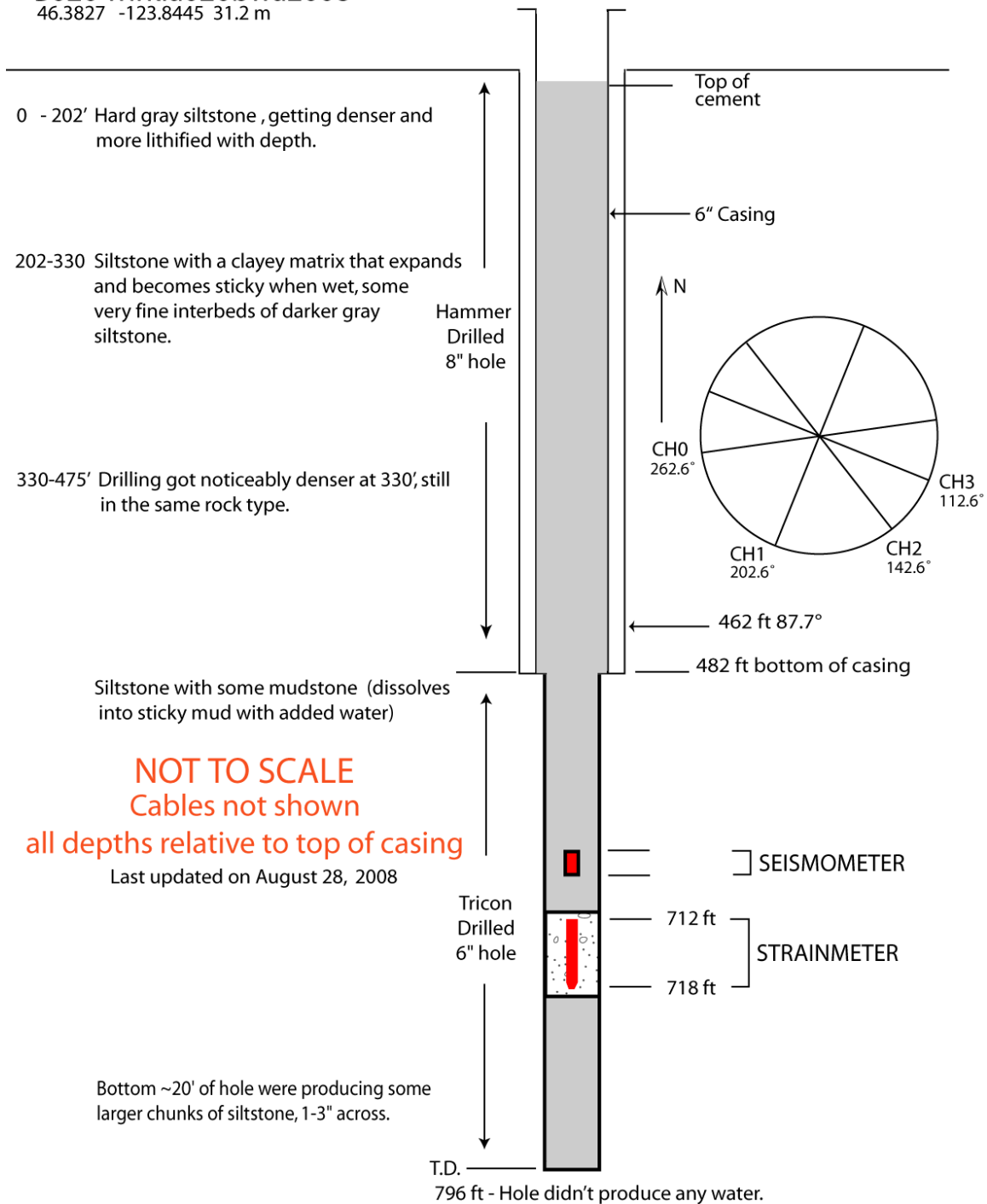
·Orientations are in degrees East of North.



Pacific Northwest PBO strainmeter network, April 23, 2008

B020 wirkla020bwa2008

46.3827 -123.8445 31.2 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	1.0	1.42925E-04

1. General Information

- We have not yet received the orientations and install depth for this strainmeter.
- Sensitivities of all EH channels corrected on March 4, 2010.

2. Strainmeter Maintenance

- August 20, 2008 PST
14:00 - On site, propane tank is empty and everything is down. Leave to go to P397 to set up radio test.
16:30 - Back on site after trip into Astoria. Add 5dB whip and radio for GPS. Shut off gas valve at the TEG and switched to local setting to protect batteries. Battery voltages at 10.5 on coms bank, 11.5 on GTSM bank. Disconnect strainmeter to protect batteries per conversation with Wade. Radios are programmed and connected to Cisco, but are not connected at the GPS end.
- March 6, 2009 – Mike Gottlieb visited the site to get it back online. The propane tank was refilled, and the batteries on the coms side were swapped. The TEG starter was also rewired into the LVD1 to protect batteries in the future.
- March 26, 08:05:27 UTC 2009. Logger software upgraded from version 1.16 to version 2.02.2.
- July 14, 2009. Korey Dausz at site. RT upgrade to 1.20. Setra barometer installed. New power box installed to correct barometric pressure issue.
- August 13, 2009 – Marmot was power cycled and the final strainmeter orientations were collected. Note: over half a minute the Y value dropped to 2.982. The 9v batteries in the compass test box had voltages of 8.
- March 26, 2010 – Korey Dausz moved the radio comms from B020 to TPW2.
- October 31, 2011 – the broadband ORIE has been set up again and appears to be collecting data. We should be able to verify good data in the next day or two. The plan is to leave the broadband seismometer at the site through November 8, 2011.

- March 28, 2013 – The GSP time was showing as invalid. Liz remotely applied the commands for the GPS cold start. The site has a valid GPS time again.
- April 16, 2013 – When Liz arrived on site the TEG was running, but there were other issues. A few of the locks were rusted and may need to be cut. Liz was only able to open the lock to the equipment side of the enclosure. There were ants in the power block where the equipment is wired into the LVD's. Liz added diatomaceous earth to remove them, but this may have caused power failures to the equipment. There were only 4 batteries at the site, two for the main bank and two for the GTSM. She also noted that the VSAT pointing is low. Receive was only 59% and transmit was only 39%. Liz tested for cell service, but there was none.
- April 17, 2013 – Adjusted chops and quads, CH1 did not need to be adjusted. Secured all equipment to the equipment rack. Added more Diatomaceous earth and refreshed GTSM desiccants.
- April 19, 2013 – MetPack was installed and connected to the Marmot. The IDU needs to be replaced. Liz adjusted the VSAT, receive is now at 79% and transmit between 60 - 70%. After adjusting the LVD settings the TEG kept switching on and off quickly. Liz rewired the VSAT IDU into the coms block (was wired into equipment power block). The LVD and TEG were stable after this. The four batteries at the site were replaced.
- April 20, 2013 – All equipment is on, but the IDU has failed. Liz did not have a spare IDU/power inverter. They will need to be replaced.
- May 1, 2013 – The Four batteries at the site were replaced with 10. 4 to the GTSM and 2 banks of 3 for the main battery bank.
- May 22, 2013 – Liz visited the site. All equipment was on with the exception of the comms (router & IDU). Batteries were not reaching the voltage to turn on LVD2. Later during the site visit the IDU and router were moved over to the main power block, restoring comms. The TEG did ignite while she was at the site, but only shortly. She switched it to Local and attempt to re-ignite, which never happened. Nothing came out of the drain, and the filter was taken apart. It was white, and looked good. The ignition stick was in there really tight. It cracked in two places and has some residue at the tip. Liz re-assembled everything. The TEG still did not ignite. She adjusted the ignition stick and oxygen levels, but still nothing. She replaced the LVD board in the TEG, so that when it does start back up, the batteries will charge enough to turn LVD2 on. The TEG never ignites. The exposed metal on the ignition stick is measured in relation to any metal it comes in contact with, and it does line up with metal. The spark is most likely jumping, not making it to the tip. She left the generator at the site to power equipment until she can get a new ignition stick. This will only add a few hours, but will help with dataflow until the TEG is fixed.
- May 23, 2013 – Troubleshoot TEG focusing on the ignition stick, disassembling the ignition chamber to look at the filter, adjusting the air intake, and replacing the LVD board in the TEG. TEG still did not restart. GTSM batteries - 10.84V (GTSM off). Main Battery bank - 11.66V. Attempted to leave generator at site the two previous nights, but the generator shut off early both times.

- May 24, 2013 – Mike Gottlieb and Liz visited the site. The GTSM batteries were at 10.6V, and the main battery bank was at 11.5V. The GTSM battery bank should have a higher voltage than the main battery bank. They tested the voltage at different points on the panel. The voltage stops on the GTSM side of the isolation block. They compared the isolation on the old panel that was replaced. The old isolation block is removed from the old board and placed on the new one, restoring power to the GTSM. The Power Box is reset and the GTSM is turned back on. They checked points on the TEG to test power flow. There are highly corroded connectors in the TEG decreasing the voltage to the ignition. There are no spares so the connection was cleaned. There was a lot of water in the chamber, creating a corrosive environment. The fuel filter was taken apart and replaced. The orifice looked clogged and was cleaned. The TEG was reassembled. The TEG began to ignite, but only briefly. The air and pressure were adjusted. Once the ignition sustained they tested the TEG for an hour, adjusting the air and pressure. While testing the TEG they hooked up three charge controllers to the generator to charge the main battery bank and GTSM batteries. The IDU and router were moved back over to LVD2. The Q330 was moved to the enclosure floor as a test related to thermal noise. The TEG wiring on the enclosure panel was changed. The wires for igniting the TEG were moved from the LVD1 block up to the battery block, meaning it can draw the batteries down if there are further ignition issues. Even with adjusting and observing the TEG for over an hour, the max output was not 120 watts. They were getting something between 60-80W (based on memory, not notes). When they left the TEG was running. Comms may not be restored until the batteries finish charging, which could be up to three days. The TEG may be failing and will be replaced. A fuel cell may be installed at the site in the future.
- June 3, 2013 – Liz visited the site to check on power issues. When she arrived the TEG was running and LVD1 was on, but LVD2 was off. The VSAT pointing was re-adjusted and the cable ends were re-terminated. The generator was filled with gas and chained to the fence. The landowner visited and a potential power drop was discussed.
- June 18, 2013 – Turned off GTSM, added heatsink to the GTSM isolation block, and turned the GTSM back on. The site will either run off AC power or the TEG will be replaced in the long term.
- November 20, 2013 – TEG was running and all equipment was on and collecting data. However, the coms block (VSAT and router) was off.
- November 21, 2013 – TEG was still running, but is not outputting at capacity, causing the batteries to slowly drop below the LVD3 cutoff. GTSM data was manually downloaded, and desiccants were replaced.
- December 26-28, 2013 – Liz set up a generator and refueled twice daily until the battery main bank was at capacity enough for the TEG LVD to trigger the TEG to turn off. There was a separate unanticipated issue with the VSAT. Liz only had the light VSAT kit. Only the IDU lights for system and power came on. Receive would only go up to 20%. Tested cables, pointing, and new cone, no improvement. Need to bring new IDU and power block next visit.
- January 17, 2014 – Liz visited the site. The TEG was running. LVD2 was off, which powers communications. A generator was set up to help charge the batteries while working at the site. The only lights on the IDU that came on were the LAN and Power lights. The optimal

receive was only 16%. The IDU power inverter was switched with two spares, and these were not the issue. She checked the pins coming from the power panel with the volt meter and all pins were good. She replaced the cable with a spare and there was no change. The cable was checked during the last visit with an Ohm test and passed. The cable was good. The ODU was replaced with a new spare. The only change was pointing went up to 21%, so the ODU was not the issue. The new ODU was left at the site for site completion. The site needs a new IDU. It was ordered Jan 21, and will be tested in the field on Jan 27/28. The satellite for the IDU on site was G16. The spare in Boulder is for satellite H1. Liz will try to point for H1 since this is the standard spare IDU, but there is tree coverage which may be in the way. The IDU was left "unplugged" at the site. It uses a lot of power and Liz wanted the TEG to be able to charge the battery main bank so that LVD2 will stay on. Data was manually removed from the GTSM and delivered to Kathleen. The Q330 was on the floor of the site to test Q330 equipment noise and seismic data. This test was over and the Q330 was returned to the equipment rack and secured for earthquakes.

- January 27, 2014 – Liz left the IDU unplugged after her last visit, hoping LVD2 would stay on. LVD2 was off on arrival and the TEG was running. She turned on the generator to help charge batteries while on-site and hooked up the new IDU, which will be pointed at the satellite HZ1. This required large movements on a mount that has been at the site since 2008. Outdoor parts were showing signs of rust and corrosion from being near the ocean. The plastic piece for adjusting elevation broke. Liz had a spare mount, however the mount and dish at this site were smaller than other VSAT mounts/dishes. Liz decided to go back to the Portland storage and rebuild the VSAT dish/mount.
- January 28, 2014 – Liz left the IDU unplugged overnight and LVD2 was off on arrival. She ran the generator while working to power the main battery bank. She rebuilt a new VSAT mount/dish and leveled the mount. The new mount/dish adds some height to the set-up. Point towards new satellite HZ1. She got receive up to 91%. For Cross-pole, it was always waiting, she was never put in line to test the cross-pole. She waited 30 minutes. She checked the cable and it was good. She checked all the parts and cables and was never able to get the cross-pole test to work.
 She also met with the electrician to get the other half of a power drop estimate and replaced the IDU power inverter. Liz left the site with the VSAT mount locked down close to optimal receive. It should be adjusted further during the next visit. She left the IDU unplugged on site.
- March 11, 2014 – Mike and Liz visited the site to try and fix the TEG. They left a generator onsite and plan on going back with the necessary parts to fix the TEG. Pointed VSAT. Limiter converter is set at 30/28V and will not adjust. It should be factory set at 14V.
- March 13, 2014 – Replaced limiter converter box and ignition stick on the TEG. Replaced VSAT with Lancel III CDMA with Verizon service to reduce power consumption.
- May 2, 2014 – Liz on-site. The TEG was running and all equipment was running with the exception of comms. LVD2 for comms was off. The battery main bank was at 12.7V. She power cycled LVD2 and all comms equipment comes back on. Liz had noticed that the Met Pack barometer data was bad. She reseated all the connectors between the instrument and the Marmot. There was no improvement in data quality, the Met Pack will need to be replaced.
- May 15, 2014 – Metpack was replaced.

- June 2, 2014 – TEG was disassembled and propane service stopped. Generator was left onsite to power equipment while waiting for construction to be completed.
- June 9, 2014 – Arrived on site to fill generator until power drop is completed. On arrival noticed that Pacific PUD had completed construction. Turned on breakers and plugged in site.
- July 9 -TFT on site and spreads gravel. Removed VSAT dish and router. Moved Lancell III.
- September 16, 2015 – Annual site visit to adjust chops and quads.
- October 11, 2018 – Upgraded LanCell to RV50. Swapped out white Redbull antenna with newer Redbull antenna. All boards except logger board were on upon arriving on-site, replaced logger board.
- September 25, 2019 – RV50 had all lights green, but no internet connection (APN not found). Upgraded firmware to 4.12, upgraded radio module, still would not connect. Manually added APN (vzwinternet) and it started working.