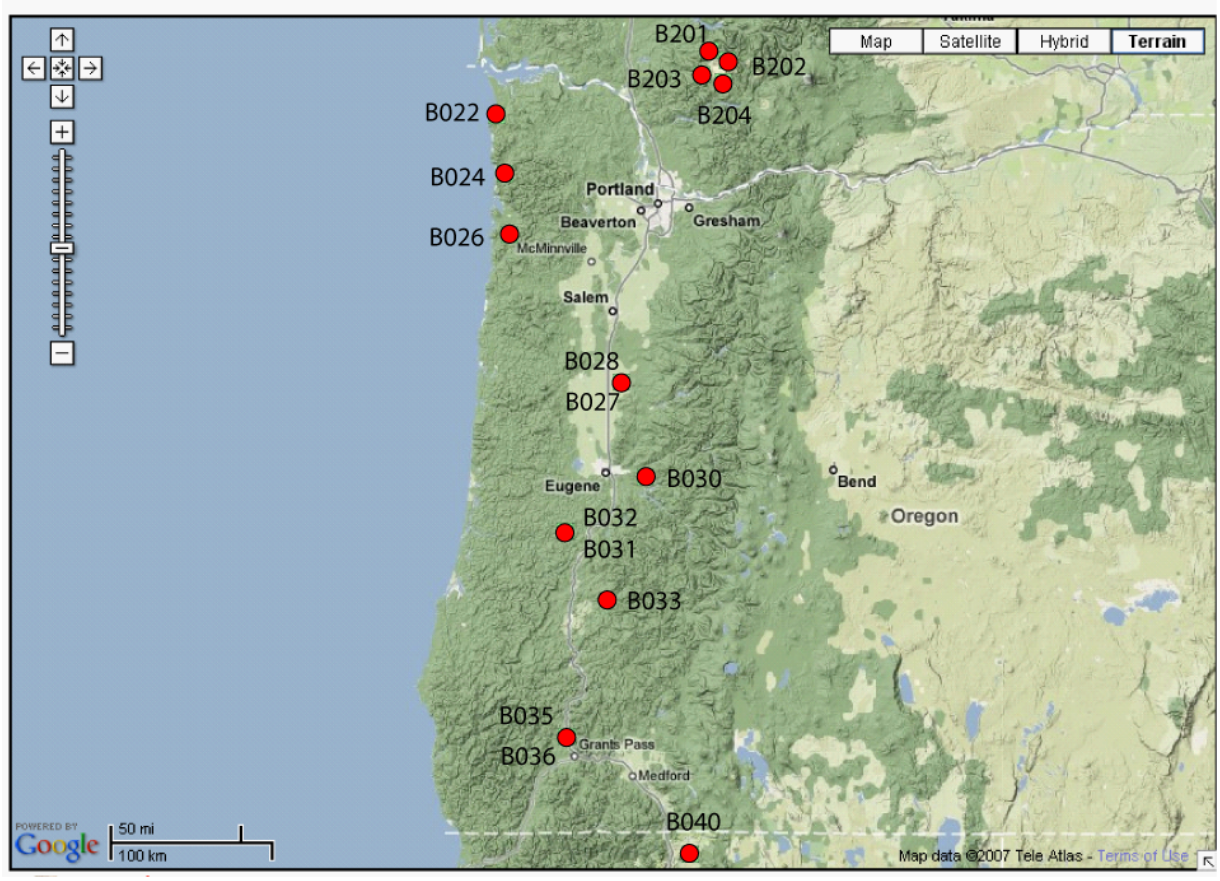
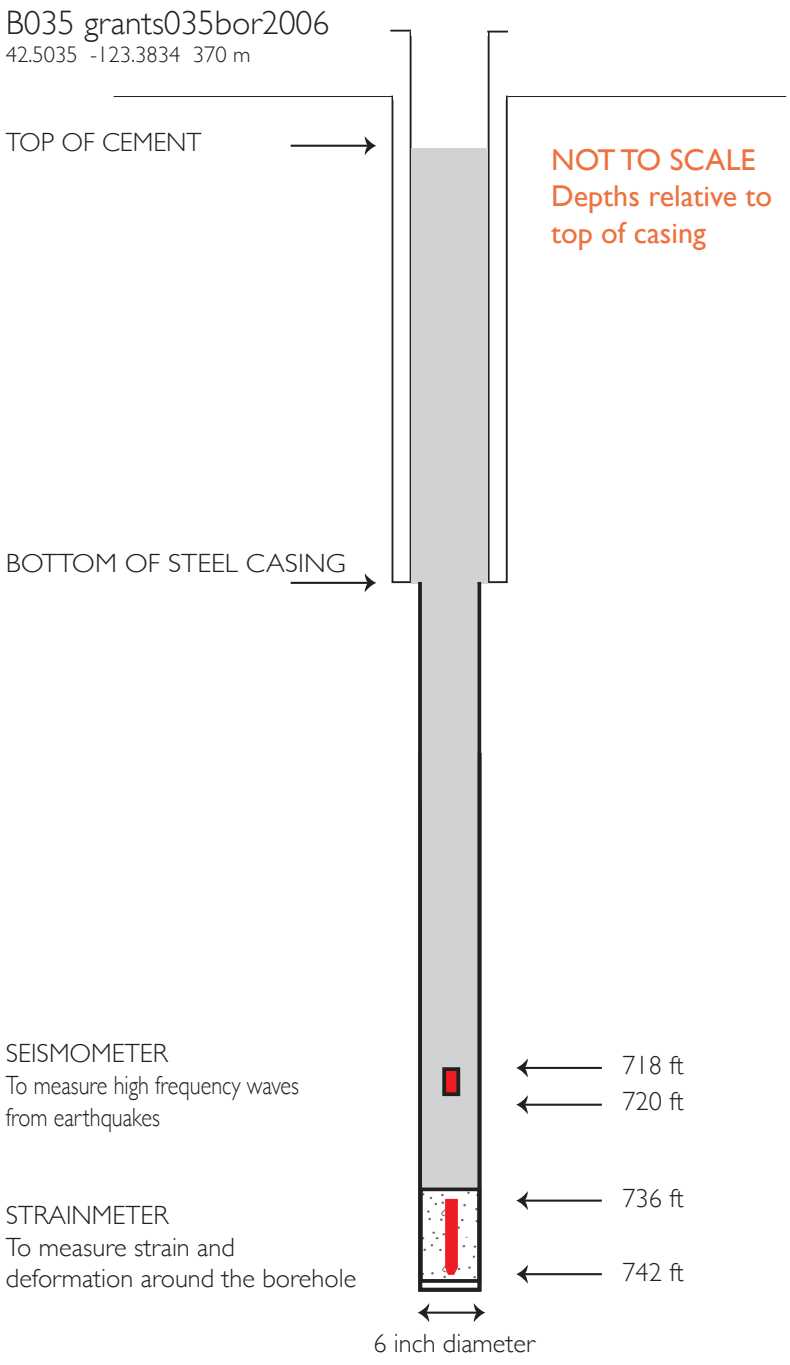
Station Notes for B035, Grants Pass, grants035bor2006

Latitude:	42.504 (WGS 84)
Longitude:	-123.383 (WGS 84)
Elevation:	370 m / 1214 ft
Install Depth:[1]	226.2 m / 742 ft
Orientations:[2]	CH0=279.1, CH1=219.1, CH2=159.1, CH3=129.1
Install Date:	19 March 2006
GTSM Technologies #:	US12
Executive Process Software:	Version 1.14
Logger Software:	Version 2.02.2
Home Page:	www.unavco.org/instrumentation/networks/status/nota/overview/B035
Notes Last Updated:	August 19, 2020

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



Oregon PBO strainmeters, January 2008


B035 grants035bor2006
42.5035 -123.3834 370 m
TOP OF CEMENT
NOT TO SCALE
Depths relative to
top of casing
BOTTOM OF STEEL CASING
SEISMOMETER
To measure high frequency waves
from earthquakes
718 ft
720 ft
STRAINMETER
To measure strain and
deformation around the borehole
736 ft
742 ft
6 inch diameter

Instrumentation at Strainmeter

Instrument	Units	Bottle/ASCII Scale Factor	SEED Scale Factor
Pore Pressure	Hecto Pascals	N/A	N/A
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	N/A	N/A

1. General Information

- First set of processed data released July 5 2006.

- September 18, 2006 - 2B data updated to the 1 September, 2006. During the 2b processing it was found that the matrix used to generate shear strain was incorrect. All XML files generated before 20060917 used the incorrect shear matrix values. This has been corrected for XML files generated after September 17, 2006.
  B035.2006.2006262164126.xml.bz2

- November 9, 2006 - Record amounts of rain fell on the Olympic Peninsula between the 1st and 9th November 2006.

- December 12, 2006 - 2B data updated to 12 December 2006.
  B035.2006.2006354072131.xml.bz2

- Environmental door opened and closed on Aug 1, Oct 7,8, and 11, Nov 29-30 (4 times), 2006.

- Logger restarted on March 19-21 (4 times), April 3, Aug 17, 2006

- Switch checking whether environmental door is open or shut is reversed (shows the door is closed when open, and open when closed)

- Beginning 3 November 2006, CH1 began acting strangely. There are large amounts of electronic noise occurring on CH1

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

- No Setra barometer at this site.

2. Strainmeter Maintenance

- 4 April 2006 - Wade Johnson gets B035 VSAT running.

- April 24, 2006 - Mike Hasting working at B035. "Today I was working at GP-1, aka B035, setting up the Thermal Electric Generator (TEG). I also installed a Q330 and as such the seismic should be online as of now but without the Marmot. The TEG will be hooked up and turned on tomorrow when I get the propane tank delivered. It will only be attached to the seismic and strainmeter systems and tested with the oscilloscope to see how the data looks and if there is any induced noise in the system when it is turned on. I will leave the solar system

installed for now with the plan down the road to install a special value that will sense the voltage of the batteries and turn on the TEG when the batteries get to a low state of charge and then turn off when the system is fully charged. This way when the solar is good the TEG will be off and during inclement weather the TEG will kick in and provide the power. While there I checked the batteries for the VSAT and they were fully charged. After talking with Dave Mencin we decided to turn it on fulltime and bypassed the timer for now as we are getting good sun. For now the TEG will not be hooked to the VSAT as down the road it will be moved to the GP-2 site where we will have A/C power. "

- April 25, 2006 - Mike Hasting visit B035 - "Today we had propane delivered to the site. Yesterday when I was there I noted that channel 1 was on gain 2 and changed around the time I was hooking up the power system but had not turn it on. It had not gone back to gain 3 so today at about 17:30GMT I reset it and it went to gain 3 and has remained there. I made no other adjustment to the system and the gain change occurred before I hooked anything up to the system so not sure why it changed. I will check the TEG tomorrow morning before leaving the region but as of now all looks good. The TEG is showing about 4amps at 14.2V on the current meter so this is within range of the TEG and appears to be working fine."

- August 8, 2006 - Mike Hasting upgraded the RT firmware. The logger did not resume normal operation after the upgrade. The data essentially were a flat line with spikes.

- August 11-12, 2006 - Mike Hasting returns to B035 to repair things after the upgrade. He reports the following, "I went back to B035, Grants Pass, today. Upon opening the box I found that the power switch for the oscillator board was in the on position but not quite all the way and the power light was not flashing. Flipping the switch off then on the board came up. All I can think is maybe some dirt in the switch and I did not notice the power light. I verified that all was well then shutdown the system to do the upgrade on the GPS. However, like B010, I was not able to get the GPS chip to respond when put in the setup mode. I tried a few power cycles on it but without any luck. Since I could not communicate with it I went ahead and put it back into normal operation mode, put it back together and rebooted the entire system. After about 5 min I started getting position information from the GPS so it is back working but on the older code. Will have to look into why this and B010 would not communicate in the setup mode."

- December 7, 2006 - Today Michael Hasting made some changes to the power systems at GP1. This should make the communications more stable as he combined the power systems such that the 4 batteries for the VSAT are now being charged via the TEG and is part of the seismic package.

- February 3, 2007 – Today Michael Hasting worked on both the GTSM and VSAT systems at B035.

- February 5, 2007 – Michael Hasting visited the site. “The B035 VPN link is having a lot of trouble. Steve Smith and I spent a bout 1hr working on it and it is up for now. For some reason it seams to get out of sorts and loses it VPN connection with Boulder. The reason is unclear and did it several times on us while we were working on it. Steve will be monitoring the situation for now. As for the Channel 1 noise problem I switched out the RT Controller board US12RT1 with US45RT1, made the basic adjustments and will wait to see how it looks. I checked for uphole wiring problems and did not find any.”

- February 25, 2007 – Michael Hasting replaced the IDU for the VSAT and also replaced the Cisco router.

- April 11, 2007 – A strain signal was recorded when the drillers cleaned out the hole for B036.

- October 6, 2007 – Michael Gladwin visited the site. He found a major pulse interference duration 0.2 mS at 3 mS repetition rate on oscillator and elsewhere. He found that it goes away with Flex charger off. These resolve to about 900mV at Amp out where better than 10 mV is needed. There were no layout or topology change options, so he left the station as it was. Batteries and power systems seemed OK.
  Off site 23:50 UTC.

  Note: This site has gone off comms on October 9, three days following this visit. It is possible but unlikely that he disturbed something in the power system before leaving the site. Diagnosis required switching off many subsystems. All systems were operational when he left.

- December 15, 2007 UTC – Chuck Kurnik visited the site.
  17:45 – Onsite. He disconnected the solar power leads, rerouted, and reconnect them. He also tightened up the terminal blocks.
  18:59 – off site.

- December 16, 2007 UTC – Chuck Kurnik visited the site to convert it to AC.
  17:10 – Onsite, swap black fiber optic modem.
  18:25 – Offsite.
  Talk with Warren, all net devices but radio on line.
  19:59 – Onsite, power cycle Cisco. Radio back on line.
  20:35 – Offsite

- February 12, 2008 UTC – Emily Seider visited the site to install a marmot.
  01:05 – She unplugged NetRS from fiber modem to free up a port for the new marmot and plugged the NetRS directly into the Cisco router. She then programmed and plugged in marmot.

- September 18, 2008 – Warren Gallaher upgraded the GTSM logger software from version 1.15 to 2.02.2. The site was offline from about 22:45 on the 17th until about 14:00 UTC.

- May 17-18, 2010 – Mike Gottlieb visited the site to upgrade the hut. During the process the radio failed and they were unable to restore coms.

- May 25, 2010 – Kory Dausz visited the site to get the coms working again. He replaced the radio, cable and antenna. He also replaced the fiber modems.

- November 29, 2010 – Investigated power issue, propane tank was empty. Todd Williams acquired key and visited site with Ron from Amerigas. Leak test was performed after filling tank and found to be leaking at visible rate on regulator gage. Ron was required to lock out tank until the copper line between the tank and TEG is repaired or replaced. Todd was told copper lines were not acceptable to code anymore so likely it will be replaced.

- November 19, 2012 – Adam visited the site, restarted the TEG and replaced two batteries.

- Nov 28, 2012 – Liz replaced the BSM battery main bank (currently 6) and the GPS batteries (currently 2). Later it was learned that the batteries Adam left need to be replaced as well. The site is due for a battery swap in 2013. The GTSM and one battery labeled with Adam's name should be replaced. One more battery should be added to the GPS enclosure, and the other battery in the GPS enclosure needs to have the terminal filed. The TEG is one of the original models used. It has not been cleaned or maintained. The TEG should be replaced, which will also give more power to the site.

- February 19, 2013 – Replaced the 3 GTSM batteries, and one battery from the main bank. The solar charge controller was replaced the newer version. Diatomaceous earth was added to the cement pad in the enclosure.

- February 20, 2013 – The TEG was replaced, started, and tested for an hour. Velcro straps and Velcro tape were added to all equipment to make the site “earthquake proof”.

- March 7, 2013 – When Liz arrived on-site the TEG was not running. She switched the TEG from "remote" to "local" and re-ignited it. It took 10-20 minutes before it re-ignited. Once running she switched it over to "remote" so that the batteries could charge. The battery main bank was at 12.3 V and GTSM batteries were at 13.4V. When she left the site the TEG was running.

- March 8, 2013 – When Liz arrived on-site the TEG was still running. She tested the voltage cut off. She kept it on "remote." The TEG re-ignited at 11.8V and turned off at 14.4V. While doing this test the TEG was turning off and re-igniting. A good sign.

- June 6, 2013 – Adjusted quads and chop. Added desiccants. Replaced the gate chain (the chain at B036 had been cut). The VSAT was also adjusted.

- December 17, 2013 – Liz visited the site. The propane tank was 60% full, and the TEG was not running. Main battery bank was @ 11.13V and all main equipment were off. GTSM battery bank was @ 13.14V and the GTSM were on. The TEG was having difficulty igniting. The ignition stick was touching the back. Liz readjusted the placement of the ignition stick until the TEG had no issue re-igniting and was at the ideal distance. She also added a lock and cable ties to the TEG. Main battery bank was at 11.36V before leaving and all equipment was on again.

- January 13, 2014 – Radio had failed. The piece that plugs into the radio had to be re-seated for the radio to turn back on. The radio was transmitting at 40% and should undergo routine maintenance to improve signal. The TEG was adjusted until it could ignite on its own.

- February 13, 2014 – Mike and Liz arrived on site to find TEG off, LVDs off and GTSM on. There was minimal solar input from cloudy weather. They tried to get TEG to fire, adjusted spark electrode, but no luck. Replaced spark electrode and were able to get TEG to start (in remote setting). Warmed it up for hour and adjust airflow for maximum output (Vset @ 1 hr was 6.572). Rewired TEG to backpanel. Investigated weak radio shot between B035 and B036. Diagnostics showed receive rate only 25%. Pings returned either very quick (30 ms) or not at all (~60% loss). Reflected power at both sites is low (<3), signal to noise looked fine. Replaced antenna cable in B036, improved receive rate up to 60% in diagnostics page, and < 5% pings dropped. Suspect that the antenna combination (B035 omni and B036 whip)

are not ideal for noisy EM environment at airport. Maybe try different antenna types if problems persist?

- October 29, 2014 – TEG was not running. LVD1&2 and equipment were off. Batteries were below LVD1 turn on. Flipped switch and LVD1 and equipment turned on. Site appeared to have only been running off of solar during the storm. TEG would not ignite. Begin with swapping out TEG ignition stick. The connector broke on the ignition cable side and was not very well connected. Drove into Grants Pass to repair ignition cable. Took apart and investigated TEG filter, it looked ok. Replaced TEG ignition stick. TEG ignited. Hang around to make sure TEG keept running, and made some minor adjustments.

- January 13, 2015 – The marmot and Q330 wer not recording data, and remote attempts to resolve the issue had been unsuccessful. Replaced the marmot and Q330.

- February 24, 2015 - Site was only running off of solar. All equipment, with exception of GTSM, shut off nightly. Seismic data was being lost. TEG was off on arrival. TEG ignited easily, but faded out after a few minutes. Spent two hours adjusting TEG until it stabilized.

- March 5, 2015 – GTSM of offline. Turned breaker switch back on and reset the GTSM power box.

- March 17, 2015 – Liz visited to the site to check on the TEG. Switch TEG to local to make sure it started, then switched it back to remote.

- March 18, 2015 – Returned to the site to make sure the TEG ran. There may be an issue between the TEG boards and the TriStar solar controller. Q330 was set up for a Setra, giving a false reading. Confirmed there was no Setra.

- March 23, 2015 – Station lost GPS time on March 5, 2015. Liz sent the GPS Cold Start command, but this did not resolve the issue.

- May 18, 1015 – The strainmeter cable was accidentally damaged by the electrical contractor. The contractor was trenching to install A/C power at the station, and dug through a protective layer of concrete and severed the buried strainmeter cable. They began work prior to the agreed upon schedule, and so this occurred before the UNAVCO engineer had arrived on site.

- June 15, 2015 – Warren Gallaher repaired the strainmeter cable. The power box and auxiliary board were also replaced. Quads and chops were adjusted. Replaced 3 fuses that were blown when the cable was cut. The TEG was removed. Site will be powered by solar until the AC power drop is completed.

- June 25, 2015 – Electrician finished work (still needs to cover conduit in trench near the site). Wired site for AC and moved GPS receiver over to BSM panel. Could ping all equipment remotely. Propane tank still on-site. Solar panels will be removed at a later date.

- June 30, 2015 – Removed solar panels.

- April 20, 2016 – Comms upgrade from VSAT to RV50 CDMA. Moved comms over to co-located site P368. Switched gateway/end point settings on radios. Increased power from 5 to 6, upping the receive from 50% to 65%.

- April 21, 2016 – Finished filling in trench from electrician job. Adjusted chops and quads.

- January 31, 2018 – CH2 was in G2. Power cycled RT board. Replaced all EB-6 radio connectors, cables, and whip antenna. Mounted whip antenna to the outside of the enclosure. Several trips back and forth between B035 and B036 to improve radio comms.

- December 17, 2019 – Radio shot was intermittent and slow. Upgraded radio to nanostation loco M900. Pings to other side dropped from 2-3 seconds down to <5 ms. Tried to update clock speed from 200 mhz to 400 mhz. There was am error due to redboot version on this logger. 3I3 does not support update, will need to figure out a workaround. Versions 3I4 and 3I5 work ok.

- July 30, 2020 – GTSM was online but not creating data files. Replaced compact flash card and replaced files creating errors. Station started creating data files again.