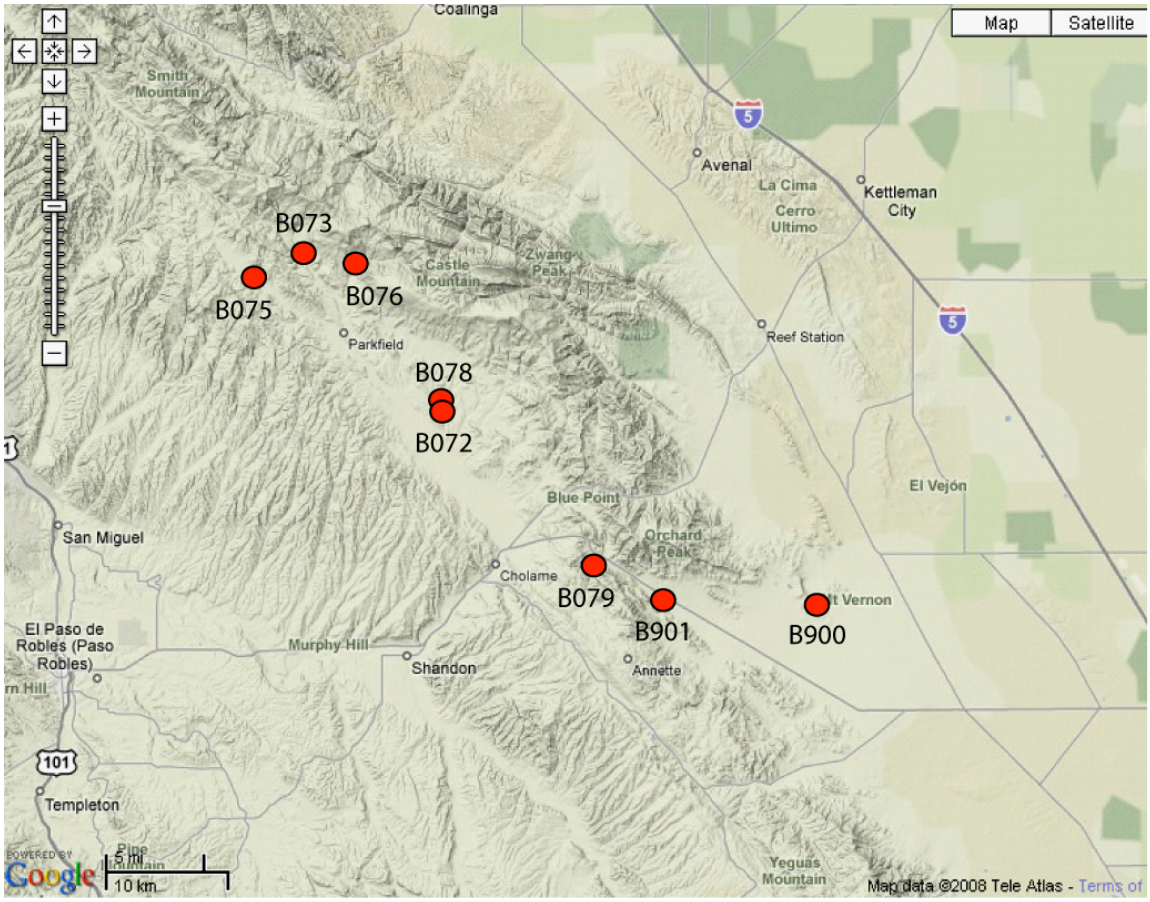
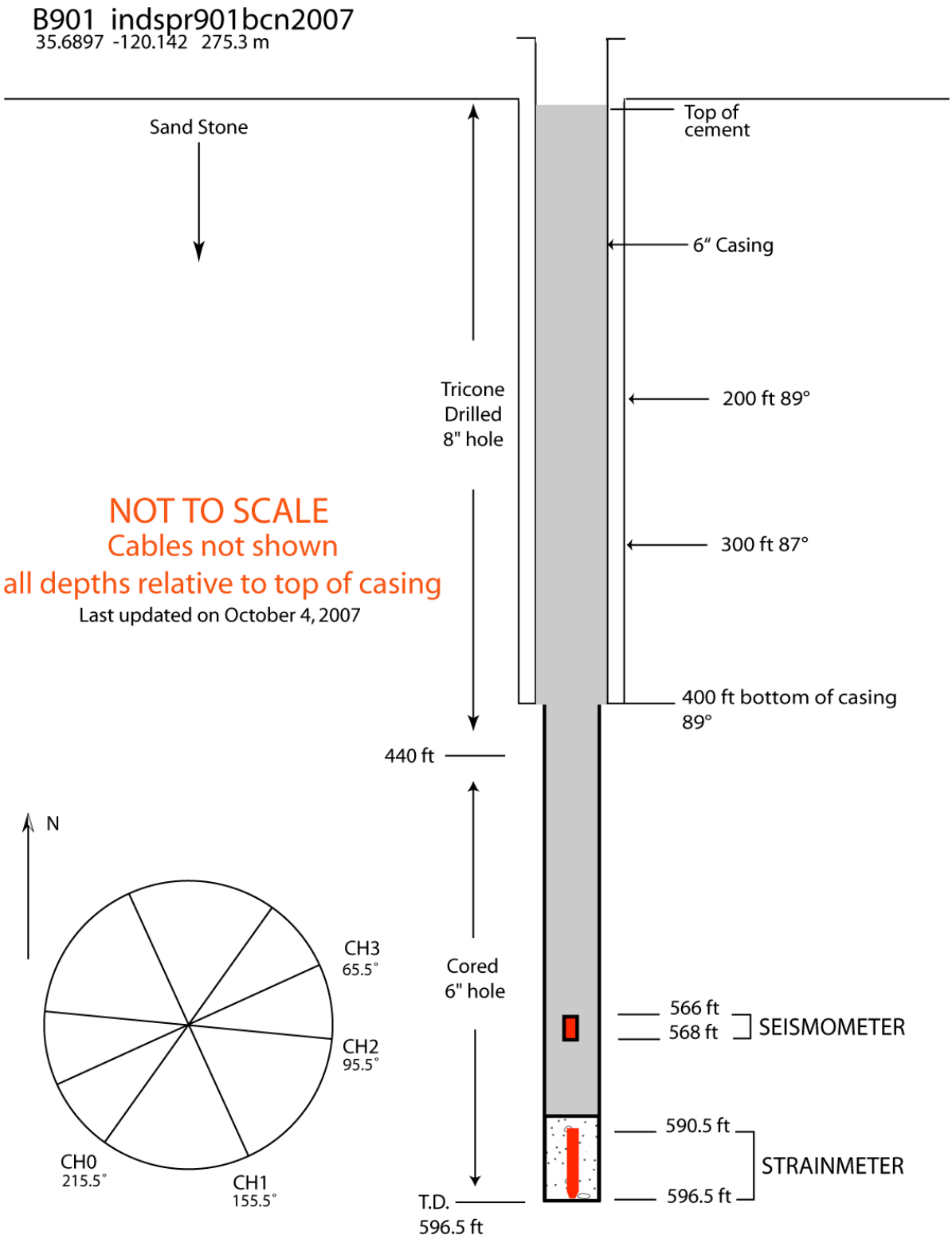
Station Notes for B901, indspr901bcn2007

Latitude:	35.6897 (WGS 84)
Longitude:	-120.142 (WGS 84)
Elevation:	275.3 m / 903 ft
Install Depth:[1]	181.8 m / 596.5 ft
Orientations:[2]	CH0=215.5, CH1=155.5, CH2=95.5, CH3=65.5
Install Date:	September 26, 2007
GTSM Technologies #:	US30
Executive Process Software:	Version 1.14
Logger Software:	Version 2.02.2
Home Page:	www.unavco.org/instrumentation/networks/status/pbo/overview/B901
Notes Last Updated:	July 30, 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.



Parkfield PBO strainmeter network, July, 2008


B901 indspr901bcn2007
35.6897 -120.142 275.3 m
Sand Stone
Top of cement
6" Casing
Tricone Drilled 8" hole
200 ft 89°
NOT TO SCALE
Cables not shown
all depths relative to top of casing
Last updated on October 4, 2007
300 ft 87°
400 ft bottom of casing 89°
440 ft
N
CH3 65.5°
CH2 95.5°
CH0 215.5°
CH1 155.5°
Cored 6" hole
566 ft
568 ft
SEISMOMETER
590.5 ft
STRAINMETER
596.5 ft
T.D. 596.5 ft

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. Installation notes

September 26, 2007, UTC
15:30 - Crew on site at Indian Springs, Parkfield, CA. Check instrument [US30 instrument w/ US35 electronics] on test, looks good. Test dump bailer and trip. Widen cable reel holes.
16:30 - Borehole total depth is 596.5'.
17:02 - Stage grout and water, and add centralizers and nosecone to GTSM.
17;24 - Shutdown GTSM, and perform compass test.
17:53 - Start mixing grout. (Masterflow 1341 batch #16161342877).
17:58 - Last grout added (9 bags).
18:02 - Last distilled water added to grout (total of 15.5 gal).
18:07 - Stop mixing.
18:17 - Dump bailer at total depth.
18:22 - Dump bailer out of grout and heading up.
18:27 - Lowering GTSM.
18:38 - GTSM on bottom; ~ 12" of cable stretch.
18:41 - GTSM turned on. Instrument looks good with the exception of Y compass value out of range of test (2.504). Discuss with Gladwin who says not to worry.
19:08 - Shut down logger to adjust DH temperature (adjust to 0.22V).
19:16 - Restart logger.
19:50 - Start charging batteries with AC generator.
20:00 - Off site.

September 27, 2007, UTC
15:30 - Crew on site.
15:40 - Break down quad block and capstan, and test out seismometer #54.
16:00 - Spool out seismic tensile line.
16:29 - GTSM Down hole temperature voltage = 4.416V, so shutdown logger to adjust temperature.
16:35 - Adjust down hole temperature to 0.432V (minimum possible with the dashpot).
16:36 - Restart GTSM and adjust quadratures.
17:30 - Start lowering seismometer on 3/32" vinyl coated stainless line.
17:46 - Seismometer lowered to 568'.
17:50 - Start tripping in 1.5" tremi.
18:40 - Tag grout at 576.5', and pull back 4' to start pumping.
19:45 - Start pumping cement.
21:20 - Stop pumping (~4.5 cubic yards).
21:45 - Start digging cable pit.
21:59 - Shut down GTSM and bury cable. Setup solar/VSAT conduit, pour pad, set solar panel posts and VSAT posts.
September 28, 2007
01:26 - Restart GTSM.
02:00 - Crew off site.

September 28, 2007, UTC
15:45 - Crew on site.
16:06 - Just prior to shutting down GTSM, notice channel 2 is at Gain 0. Hook the scope up and realize it is cycling between Gain 3 and 0, with intermediate steps along the way. The logger is

on test within the truck with a long flex jumper cable. Further investigation reveals that any movement of the jumper significantly affects the signal. The problem is believed to be with the long jumper, so shut down the logger (16:15) to prepare for its setup inside the enclosure (with its regular flex jumper). The logger is then anchored in the enclosure along with the electronics racks.
17:15 – Restart the GTSM. Run thorough diagnostics, but the problem is no longer there. The flex jumper must be bad.
17:50 - Setup 8 batteries for seismic/communications, 2 on the GTSM. Install and wire all up hole electronics.
19:00 - Assign GTSM IPs.
19:05 - Program the Q330.
The rest of the day was spent pointing the VSAT, installing solar panels, wiring power into the back panel, and cleaning up the site and finalizing electronics.
23:00 - Crew off site.

September 29 2007
16:00 - On site.
16:10 - Shut down logger to adjust the down hole temperature.
16:16 - Adjust down hole temp to 1.248V.
16:17 - Restart logger and adjust quadratures.
The rest of the morning was spent building the fence, bracing the VSAT, sounding landowners well, and cleaning up.

2. General Information

- The US30 strainmeter was installed with the US35 electronics.
- There is no pore pressure sensor or pore infrastructure at this site.
- Sensitivities of all EH channels corrected in the dataless on March 4, 2010.

3. Strainmeter Maintenance

- October 1, 2007. Warren Gallaher and Mick Gladwin visited B901and performed some testing, evaluation, and made a few adjustments.

- October 4, 2007 – Warren Gallaher visited the site to perform some maintenance. The power box was adjusted for proper charge voltage and the quadrature and delay were set. The solar regulator was found to be causing radiated noise on the GTSM system. As a temporary solution one set of solar panels was hooked directly to the GTSM power box and the wires were re-routed to provide physical separation.

- December 17, 2007 UTC
  21:50 Mike Gottlieb arrived on site to investigate power problems. The site has been coming on and off line.
  Voltages upon arrival are as follows:
  GTSM (2 batteries) - 14.5 V
  Bank 1 (4 batteries) - 12.95 V
  Bank 2 (4 batteries) - 12.95 V
  All uphole electronics were currently powered on and he was able to connect to the internet. No modifications were made to site at that time. Need to figure out how to increase power at the site.
  22:15 Off site.

- April 10, 2009 – B901 was upgraded from 1.15 to the correct version of 2.02.2 that matches the compact flash size.

- May 4, 2009 – Setra barometer installed.

- August 1, 2009 – All RT boards were upgraded to firmware 1.20, and the quadratures were adjusted.

- November 20, 2009 – Liz VonBoskirk replaced the two and one port fiber optic modems. She also readjusted the quadratures on the GTSM. CH1 & 2 were good, but CH3 & 4 were off 50% and readjusted.

- December 13, 2009 – Four GTSM batteries were replaced. GTSM quadrature were adjusted for all channels, which were roughly ¼ off-phase.

- October 27, 2010 – A broadband seismometer, marmot and Q330 were temporarily deployed at the site. The seismometer will be used to orient the borehole seismometer.

- November 16, 2010 – The battery main bank of 6 was replaced with 8 new batteries. Both the main bank and GTSM batteries were rewired so that each bank (of four) has the negative (black wire) attach on one end of the bank and the positive (red wire) feeds to the other end of the bank.

- December 9, 2010 – Liz arrived in the afternoon to see what sun light the solar array receives during the shortest day of the year. By 3:30 pm local time the panels begin to be shaded by the hill. By 4 pm local time the sun dropped below the hills to the west, completely shading the panels. The solar power system was reviewed. The GTSM batteries were good. There are 12 solar panels, in four sets of three solar panels. In the middle set of three, all three panels were bad. There was no current. On the set of three panels near the VSAT dish, the bottom panel was bad (no current). In this solar power set up, six panels feed the main battery bank and the other six go directly to the GTSM power box. The solar panels by the VSAT dish go to the GTSM. As for the other three sets, it was harder to determine where they go as they all enter the enclosure at the same place. Liz suspects the three failed solar panels feed to the GTSM. The plastic film on the ODU had been pecked through by birds.

- January 13, 2011 – A set of three panels were inspected, as no current was flowing from the set of three to the GTSM. The negative wire from the middle panel was lose and came out while opening the box on the back of the panel. It was wired tightly from the enclosure. Once it was placed back into the solar panel and screwed in tightly, all three solar panels had a current flow. The lower panel on the set of three that was tested as bed (also goes to the GTSM) was retested. While it was in direct sunlight it tested as good, but once the enclosure door cast a shadow on half the panel, the current dropped drastically. All solar panels were tested. The two sets of three panels going to the main power supply both recorded 18V each. The two sets of three panels going to the GTSM recorded 19.5 V each. The GTSM will be monitored to see if it still restarts daily. The film on the transmitter on the ODU has been pecked through by birds, so cellophane wrap was placed over the film to keep moisture out (which would cause it to fail). This should be replaced soon.

- January 31, 2011 – The ODU was replaced on the VSAT dish. Four GTSM batteries were replaced.

- August 17, 2011 – Power system upgraded. Replaced 10AWG battery jumpers with 4AWG battery jumpers. Replaced solar controller.

- November 9, 2011 – Communications failure. No power to IDU. Tested voltage at terminal block (14V, nominal). Disconnected all cables, replaced primary power cable, and tried 3 working power supplies. Still no power to IDU. Bad IDU, replaced with a new one.

- December 21, 2011 – Installed EFOY fuel cell. Batteries were reconfigured to make room. Solar array was reconfigured: 3 PV panels are directly wired to the GTSM, 9 PV panels are wired to back panel. GTSM power now supplied from LVD isolator block as well as solar array. Fuel cell positive wiring (sense, power supply) connected to one battery on up-hole electronics side, negative to back panel. Unit online and performed self test.

- February 14, 2012 – Installed BB Vlinx serial adapter for EFOY fuel cell communications.

- November 8, 2012 – Swapped out 1-port fiber modem and fiber optic cable.

- August 5, 2014 – Adjusted LVD settings, cleaned solar panels, replaced ODU horn, added bird netting, replaced one EFOY cartridge and left a spare inside the enclosure.

- July 22, 2015 – Comms had failed. Installed an AT&T LS300 attached to a yagi antenna. Removed old VSAT dish and ODU, which were no longer being used. Adjusted quadrature and chop. Fuel cell was out of fuel. Operating hours 1861.1. There were not enough ports to connect the fuel cell ethernet cable, it was left unplugged. When the fuel is refilled an NS205 switch should be added as well for extra ports.

- March 31, 2016 – Added 5-port network switch. Measured resistance and capacitance on all four GTSM channels.

- July 12, 2016 – Tested resistance and capacitance on all GTSM cell channels.

- December 6, 2016 – Continued down-hole GTSM testing by changing 1st decade RT value and observing voltage change on channel input signal. Swapped 2 EFOY fuel cell cartridges, and left two full cartridges inside enclosure. Adjusted quad/chop. Tested downhole instrument response. Modified strain-logger.conf to enable internal event logging

- March 28, 2017 – GTSM data flow was failing intermittently. GTSM as not returning pings while onsite, but the GTSM was operating. Swapped 1-port fiber modem, no change. Swapped and configured logger, no change. Swapped 5-port fiber modem, GTSM returned pings. Swapped original logger back in to preserve data flow.

- April 11, 2018 – Adjust quadrature, instrument response looked normal. Fuel cell had > 5000 hrs, 14 l of fuel left on site. Needs service fluid.

- January 4, 2019 – Replaced missing rain gauge screen, cleaned funnel. EFOY 5063 hrs, error needs service fluid. Added 1 bottle service fluid, error cleared. Would not start manually (battery to high?). Checked remotely later, new error 84, contact service. Too many hours to RMA probably.

- July 15, 2019 – LS300 to RV50 upgrade. Used black red bull antenna, but wilson would be better, cable and pipe already in place. Replaced RT3 board. Previously had been very noisy, after data looked better. Had been dropping to G2 every minute. Replaced oscillator which Improved tap step on Ch0 (.2714 -> .4797). Seemed like less gain changes on CH2. Noticed hourly noise in data after swap, could be due to an issue with new oscillator.