Daily Drilling Reports – 2019 Drilling Campaign

Snake River Plain – Geothermal Play Fairway Analysis Project
Geothermal Technology Office,
Department of Energy Project: EE0006733

Camas Prairie Test Well
Camas Prairie, Idaho: 43.2994º N, -114.9088º W

Camas Prairie Drillhole
October 2 Daily Report
Staff on site included USU Site Geologists Will Kersey, Pat Dobson, and the USGS drill crew (Derek, John, Shawn, Eddie, Jeff, and Jack).

Safety: Proper PPE including hard hats, safety glasses, ear plugs, gloves, and steel toes boots were worn on site. No incidents to report.

Weather: Clear and sunny

Operations: Operations started at 7:15. Initial mud weight was between 10.8 and 11.2 lb/gal, with the mud containing barite and quick-gel additives. Tripping in with NQ finished at 11:45, after which mud was circulated until 12:45. The mud was shifted to a lighter weight at 8.6 lb/gal. TD was determined to be 1612', a different value from the 1608' recorded previously, Will and Pat sampled the Camas Creek Ranch Well water at the hose in the AM, measuring a temperature of 34.3 deg C. The generator and rock saw were tested and determined to be working by Will and Pat in the AM. Pat participated in a phone call with the DOE at 13:00. A test of the NQ BOP was performed under less than ideal conditions (no concrete seal for HQ drillstring). No leak occurred at 40 psi, and the pressure could not be raised above this. The first run of core was retrieved at 14:30, spanning 1612'-1614.5' depth. The second run of core was retrieved around 16:45, spanning 1614.5'-1624.2' depth. The third run of core was retrieved at 18:30, spanning 1624.2'-1629.2'. A BOP was installed before each round of core retrieval and removed before resuming coring - the BOP is designed to seal around the wireline in case of unexpected fluid discharge. Lee Barron visited the site in the late afternoon/evening.

Geology: A total of 17.2' of core was retrieved today, spanning 1612'-1629.2'. The top 0.3' of core was dubbed a dark gray porphyritic dacite in sharp contact with underlying granitic rock. The dacite contained numerous calcite veins.
Granitic rock makes up the majority of the rest of the core obtained today. The granitic rock is finer grained closer to the contact, grading into a coarser crystalline texture (2-5mm crystals) over 0.3'. The granitic rock is composed primarily of quartz, plagioclase, k-feldspar, and amphibole. Fracture density ranges from extremely to moderately fractured, with some zones of rubble and some pieces of core exceeding 0.7' length. The granitic rock contains both mineralized and unmineralized fractures. Mineralized fractures contain calcite, quartz, and some sulfides. There are zones of finer-grained and less mafic granitic rock with gradational contacts which could potentially be metasomatised rhyolite dikes.

Camas Prairie Drillhole
October 3 Daily Report
Staff on site included USU Site Geologists Will Kersey, Pat Dobson, and the USGS drill crew (Derek, John, Shawn, Eddie (?), Jeff, and Jack).

Safety: Proper PPE including hard hats, safety glasses, ear plugs, gloves, and steel toes boots were worn on site. During pressure extrusion of run 9 core, high pressure buildup led to a sudden and energetic discharge of core from the core barrel. Core was found more than 25' from the end of the core barrel, and impacted a porta-potty without any visible damage. Per protocol, nobody was down range from the core barrel, and no injuries occurred.

Weather: Clear and sunny, some clouds in the afternoon/evening

Operations: Operations started at 7:15. Pat and Will arrived on site at 8:30. Drill crew thawed equipment in the early AM. Mud weight was measured as 8.4 lb/gal, and was mixed only with quickgel. The first run of core of the day (4th run total) was retrieved at 10:00, spanning 1629.2'-1634.2' depth. Run 5 was retrieved at 11:00, spanning 1634.2'-1639'. The drill crew's laser thermometer was deemed nonfunctional, so a USU thermometer was used to measure mud temperature. Mud temp was measured as 43.3 deg C at 11:55. Run 6 was retrieved at 12:00, spanning 1639'-1643'. Following this, the drill crew replaced the swivel atop the NQ rod to stop a leak. Mud temperature was measured as 39.1 deg C at 13:15. Run 7 was retrieved at 13:25, spanning 1643'-1652'. 40% of run 7 was not retrieved. Jeff believed that this was caused by vibration of the drill-string breaking up the rock at the bottom of the run too much for it to be moved with the core catcher. Mud temperature was measured as 39.6 deg C at 14:05. Run 8 was retrieved at 14:15, spanning 1652'-1654.5'. At this point, a 0.5' discrepancy between the driller's recorded depth and the actual total depth was discovered. It is unclear when this was introduced. Run 9 was retrieved at 15:20, spanning 1654.5'-1660.5'. The safety incident described above occurred during pressure extrusion of run 9. This led to the middle portion of this core being out of order and un-orientable. Jeff left the site around 16:00. Run 10 was retrieved at 16:25, spanning 1660.5'-1664.5'. Run 11 was retrieved at 18:00, spanning 1664.5-1672.5'. Mud temp was measured as 35.0 deg C at 18:35. Pat and Will left the site around 19:00. An attempt at a 1' long 12th run was attempted, but no core was recovered. Operations halted soon after.

A phone conference with DOE occurred at 11:00 with John Shervais, Pat Dobson, Steve Crawford, Jeff, DOE/DOE's technical monitoring team participating in the call. The conference concerned untested BOP's on the well. John reached out to IDWR and got the OK to continue operating with the present setup given the sub-boiling temperatures observed in the well. DOE requested that we make regular measurements of the mud temperatures during the call, which we did following our receiving this instruction.

Geology: A total of 43.3' of hole was drilled today, spanning 1629.2'-1672.5' Core recovery varied between runs, from as low as 60% to 137.5%. The core obtained was primarily composed of granitic intrusive igneous rock. This rock is composed of quartz, plagioclase, k-feldspar, and amphibole. It is commonly cut by calcite veins up to 2mm thick. Less commonly observed are silica/quartz veins up to 2cm thick. Many fracture surfaces in today's core have a black stain with no clear mineral habit. The core, generally, was intensely fractured. It is unclear how much of this fracturing was a

product of drilling and how much was already present. Sharp contacts between the granitic rock and extrusive, intermediate composition igneous rock were observed. This extrusive igneous rock comprised roughly 15% of today's core in one continuous body spanning two partial runs and one complete run (runs 4, 5, and 6). This extrusive igneous rock had calcite amygdules in some portions, and no amygdules in others. Dark mafic phenocrysts were observed in this extrusive rock. This extrusive rock was also commonly cut by calcite veins. Disseminated sulfides, while not completely ubiquitous, were common throughout both of these lithologies, both in veins and in the host rocks. Pyrite crystals as large as 2mm were observed in some fracture surfaces. At approximately 1666.3' depth, a 6cm thick dike cuts the core at a low angle. This dike has sharp boundaries, and is generally more mafic than the granitic intrusive rock that it cuts.

Camas Prairie Drillhole
October 4 Daily Report
Staff on site included USU Site Geologists Connor Smith, Pat Dobson, and the USGS drill crew (Derek, John, Shawn, and Jack).

Safety: Proper PPE including hard hats, safety glasses, gloves, and steel toed boots were worn on site. No incidents to report.

Weather: Overcast for most of the day, High of 50, very windy and scattered drizzle

Operations: Arrived on site at ~8:30 am. Starting TD was 1672.5 ft. Will and Pat briefed Connor on drilling and core-logging etiquette. Will left around noon. Starting mud weight was 8.4 lb/gal with a 725 psi hydrostatic head. Drillers reported that mud was not returning through the core barrel when they attached the "inner piece". No returning mud temperatures were recorded for this very reason. Drillers reported making ~4 feet of progress. This will be verified when they run the hole tomorrow. No core was recovered. At ~10:40 drillers began tripping out to check the core barrel and determine the issue. At ~14:40 the drillers finished tripping out and determined that the culprit was a worn-out bit. Grooves of the NQ drill bit were reduced to polished steel with no matrix remaining. Reamers were nearly gone as well.


A new suite of drill bits was ordered from Salt Lake and en route to the drilling site at ~16:30. TD has not changed since yesterday. Pat left a voicemail for Alex at DOE delineating the project's status and sent her an email with pictures. Pat also contacted Doug Blankenship and updated John Shervais throughout the day. Roy Mink, Mike Weathers, John Shervais, and John's volcanology and petrology classes will be on site tomorrow. If all goes well, tripping in will commence early tomorrow morning with drilling scheduled to begin midday.

Geology: NA

Camas Prairie Drillhole

October 5 Daily Report

Staff on site included USU Site Geologists Connor Smith, Pat Dobson, John Shervais, and the USGS drill crew (Derek, John, Shawn, and Jack).

Safety: Proper PPE including hard hats, safety glasses, gloves, and steel toes boots were worn on site.

Weather: Clear and sunny, high of 54 °F

Operations: Arrived on site at ~8:45. The bits and reamers that arrived from Salt Lake were slightly too large to fit into the HQ drillstring. The drillers selected a harder bit that they previously had: a 12 D2 RSG. The mast was modified to accommodate 20' sticks for more efficient tripping. The drillers replaced the previous shiv with a smaller one allowing for 6 more inches of space for casings. At ~9:50 drillers began tripping in. While waiting for the casing to be tripped in, Pat and Connor inspected the mineralogy of a granitic portion of the core, noting the dominant presence of biotite in the mafic minerals. It was later observed by Pat that the granite contains disseminated cubic pyrite. Mike Weathers arrived on site at ~10:45. While tripping out occurred, Mike and Connor left the site to visit Craters of The Moon National Monument. Roy Mink and Dave Allman arrived on site at ~12:50 and left at ~13:50. When asked, Roy gave his expert opinion that testing the BOPs was of little importance for these particular well conditions and that not doing so would not pose a danger. At ~14:25 the bit was ~10' off bottom. Mud measuring a weight of 8.4 lbs/gallon and a temperature of 23.2 °C was circulated. John Shervais and students from his volcanology and petrology classes arrived on site at ~15:00. Mike and Connor arrived back on site at ~15:30. At ~15:50 2.5' of core was recovered spanning depths between 1674.5' and 1684.5'. Mud discharged through a point of weakness on the swivel due to pressure overload. Drillers thereafter reported a blockage of sediment in the hole. Core retriever dropped via the wireline into the hole to correct the blockage. ~16:45 hole was flushed to clean out bentonite coating the hole. Drillers said that the mud was mixed too quickly resulting in dry clumps of bentonite. Run 12 logged and boxed while drilling resumed. Third BOP added to the system. Two attempts to recover the core were made using the core catcher, followed by a third using a new core catcher. All attempts were unsuccessful. The added BOP was inflated. Drillers will trip out tomorrow, suspecting a broken latch as the culprit. Final depth reached: 1692'.

Geology: 10' of hole was drilled today where core was recovered. However, only 2.5' of core recovered spanning 1682'-1684.5'. The upper 0.5' of core obtained was andesitic extrusive rock that included fractured calcite veins and ~1-2mm plagioclase phenocrysts. The lower two feet of the recovered core was primarily composed of granitic intrusive igneous rock. This rock is composed of quartz, plagioclase, k-feldspar, biotite, hornblende, and a tiny proportion of disseminated cubic pyrite. The top 0.3' of the granitic portion of the core is incohesive gravel. The next 0.4' of the granite unit is

one solid chunk, followed by 0.4’ of more gravel. Two chunks span the next 0.4’ followed by ≤0.1’ unconsolidated chunks that compose the remaining 0.5’ of the core. The granite is cut by high angle calcite veins of ≤1mm thickness and includes trace amounts of very fine disseminated cubic pyrite. The granite exhibits a salmon hue when wet, suggesting a high grade of K-feldspar. A biotite phenocryst of ~2mm thickness, an orthoclase phenocryst of ~4mm thickness, and a larger K-feldspar phenocryst of ~1cm thickness were observed. No exposed contact was present in this section of the core.

Camas Prairie Drillhole

October 6 Daily Report

Staff on site included USU Site Geologists Connor Smith, Pat Dobson, and the USGS drill crew (Derek, John, Shawn, and Jack).

Safety: Proper PPE including hard hats, safety glasses, gloves, and steel toes boots were worn on site.

Weather: Clear and sunny, high of 57 °F

Operations: Arrived on site at ~8:40. Drillers made another attempt to retrieve the core. This attempt was unsuccessful. Broken finger(s) of core trap was the suspected culprit. Core pulled up to 1600' with one more attempt to retrieve the core via wireline. This attempt was also unsuccessful, so the drillers decided to retrieve the core by tripping out. Tripping out to retrieve the core began at ~9:05. Drillers were unable to retrieve the NQ drillstring in 20' intervals as previously planned. The mast was unable to accommodate the 20' sticks after all. Pat and Connor left site shortly after tripping out began to develop hypotheses as to what conditions formed the site's subsurface. At ~12:30 Pat and Connor returned to the site. Drillers tripped fully out and discovered that it was indeed broken fingers on the retrieval assembly that prevented retrieval of core. At ~13:15 core retrieved spanning 1684.5' and 1692'. Drilling only accounted for a gain of 7.5' of drill depth and received 8.6' of core. It is assumed that the extra 1.1' of core recovered was from the previous run where 7.5' of core was not recovered. Adjusted depth of 1683.4' for the bottom of run 12. Drill bit only had a small amount of wear, so it was put back onto the assembly for continued drilling. However, the reamer was slightly deformed. Jack was able to work on the threads so that the reamer could be reattached to the core barrel. At ~2:30 drillers reentered the hole to run the NQ string back to bottom. Connor will be leaving the site at ~4:10 tonight to return to USU for Monday class.

Geology: Core from run 13 logged and boxed. It was all granite. Core from boxes 1 and 3 reexamined. The mafic igneous rock intervals did not have amygdules; these features were actually plagioclase crystals. We are revisiting our previous interpretations of the mafic rock. It may be more likely to be dikes as opposed to lava flows.


HQ BTM


10E5

Camas Prairie Drillhole

October 7 Daily Report

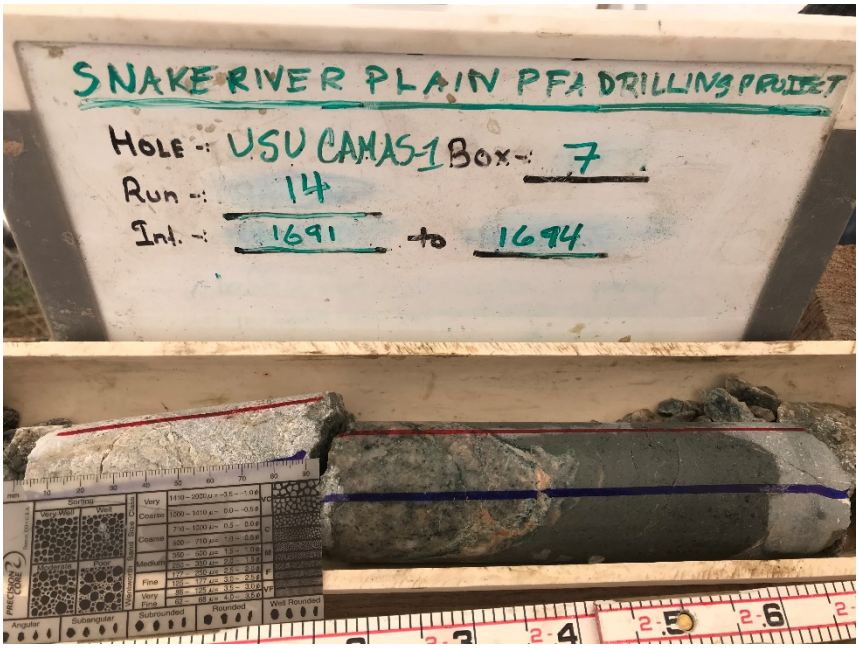
Staff on site included USU Site Geologists Will Kersey, Pat Dobson, and the USGS drill crew (Derek, John, Shawn, and Jack).

Safety: Proper PPE including hard hats, safety glasses, gloves, and steel toed boots were worn on site. No incidents to report.

Weather: Clear and sunny, high of 68 °F

Operations: Pat arrived on site at 8:50. The drill crew was in the process of winterizing/thawing equipment. This went on until 9:10. The drillers were able to drill through yesterday's obstruction successfully. Jack has been in touch with the drill bit supply company, and expects reamers to be delivered tomorrow, and coring bits the day after. The mud weight was measured this morning as 8.5 lb/gal. Mud temperature was measured as 12.4 deg C at 9:37. The drillers tripped in, removed an empty core barrel, and replaced a leaky swivel before noon. The first core of the day (run 14) was retrieved at 13:00, spanning 1691' to 1694.5'. The drill crew adjusted yesterday's final TD from 1692' to 1691'. The log sheets/core boxes of previous runs were changed to reflect this. The valve used for pressure extrusion was found to be leaking and was replaced. It is thought that it was damaged in the overnight freeze. Run 15 was retrieved at 14:45, spanning 1694.5' to 1698.7'. 6' of core were recovered for the 4.2' run 15, leading to some confusion with its characterization/the depths at which features are located. At 15:00, mud temperature was measured as 34.7 deg C. Run 16 was retrieved at 15:50, spanning 1698.7' to 1703.2'. At 16:26, mud temperature was measured as 33.4 deg C. At 16:48, mud temperature was measured as 37.5 deg C, but was measured from a hose being used to drain the mud rather than from the top of a BOP as had been done leading up to this point today. It is suspected that this is a more accurate method but is only available while wireline is being used to retrieve the core barrel. At 16:50, mud weight was measured as 8.5 lb/gal. Run 17 was retrieved at 17:00, spanning 1703.2' to 1704.5'. At 18:15, Roy Mink and Mary Mink arrived on site. Run 18 was retrieved at 18:50, spanning 1704.5' to 1713.5'. Operations ceased at 19:30.

Geology: Core collected today spans 1691' to 1713.5' for a total of 22.5'. This core is primarily composed of similar lithologies to those observed previously, with some interesting features which were not present in core from previous day. Generally, we still see alternation between granitic intrusive rock and intermediate composition dikes. One intact contact between these two lithologies was observed today. It is a sharp and irregular contact cut by a calcite vein and is located at approximately 1692.5' depth. Both lithologies are observed on both sides of the calcite vein in sharp contact with one another.



A slickensided slip surface is located at approximately 1697’ (2.5’ from the top of run 15), dipping ~30 degrees. The direction of slip appears to be parallel to the dip of this feature. This slip surface marks the upper boundary of a 1.9’ thick shear zone. The next 1.2’ of this shear zone is heavily altered, featuring a greater proportion of dark-colored minerals as well as a high abundance of pyrite. Within this heavily altered zone are two roughly horizontal horizons of purple clays up to 6mm thick. This zone is bounded below by a steeply dipping (70 deg) contact with a vibrant pink granitic rock. The remaining length of the shear zone is completely rubble.

A few smaller shear zones were observed in run 18. The largest of these three is roughly 0.5’ thick, and is generally darker in color than the surrounding rock. This shear

zone is characterized by anastomosing veins/slip surfaces, and features clay-rich fractures. The two other shear zones are much thinner, but share similar characteristics.

The intermediate igneous rocks from box 3 were revisited again today, and the white material was determined to be calcite rather than plagioclase. It is softer than steel and reacts vigorously with HCl. This material is generally found in round-edged blobs that range between oblong and round. Interpretation is being withheld until further information can be acquired. The two running hypotheses are that this calcite is replacing plagioclase phenocrysts, or that it is filling vesicles to form amygdules.

Camas Prairie Drillhole

October 8 Daily Report 1713.5'-1742.0' [28.5' cored]

Staff on site included USU Site Geologists Will Kersey, Pat Dobson, Eric Sonnenthal, and the USGS drill crew (Derek, John, Shawn, and Jack).

Safety: Proper PPE including hard hats, safety glasses, gloves, and steel toed boots were worn on site. No incidents to report.

Weather: Clear and sunny, high of 66 °F

Operations: Pat and Will arrived on site at 8:30. Mud temperature was measured as 40.8 degrees C at 8:45. Mud weight was measured as 8.5 lb/gal, and viscosity was measured as 32s by the Marsh funnel method using a 64 oz cup. The first run of the day (run 19) was retrieved at 9:30, spanning 1713.5' to 1714.5'. Eric Sonnenthal arrived on site at 10:45. Run 20 was retrieved at 10:55, spanning 1714.5' to 1719.7'. Chad Hersley from IDWR arrived on site at 11:20. Mud temperature was measured as 33.7 degrees C at 11:35, and as 35.2 degrees C at 11:55. Run 21 was retrieved at 11:55, spanning 1719.7' to 1723.5'. Eric left to get lunch at 12:30, returning at 13:30. Pat Dobson left for the airport at 13:00. Lee Barron arrived on site at 13:00 and left at 13:20. Run 22 was retrieved at 13:10, spanning 1723.5' to 1726'. Chad left the site at 13:20. Run 23 was retrieved at 14:45, spanning 1726' to 1732.5'. Run 24 was retrieved at 16:15, spanning 1732.5' to 1736.8'. Mud temperature was measured as 36.1 degrees C at 17:20. Run 25 was retrieved at 17:30, spanning 1736.8' to 1739'. Mud temperature was measured as 43.2 degrees C at 18:20. Run 26 was retrieved at 18:30, spanning 1739' to 1742'. Operations ceased at 19:00.

Geology: Core collected today spans 1713.5' to 1742' for a total of 28.5'. The primary lithology of all core obtained today is granitic intrusive rock. The proportion of mafic minerals (biotite and amphibole, variably altered to chlorite) varies, with some zones having significantly higher mafic content than others. Thin calcite veins and mineralized fractures are abundant throughout the core. Many of the dark colored mineralized fracture zones that have been observed previously are now believed to be chlorite-dominated mineralization. These commonly co-occur with abundant disseminated of pyrite. Disseminated pyrite is also common in the host rock. Numerous small shear zones were observed today, many of which hosted clay-rich fault gouge. At least five clay-rich zones were observed throughout the core from today. The clays are generally pale gray in color and are very sticky. The most well-preserved of these clay-rich zones is about an inch thick, and contains matrix supported grains that appear to be from the granitic host rock.


Hole - USU CAMS-1 Box - 9
Run - 16-20
Int. - 1707 - to 1719.7
TIFFEN Gray Scale
TIFFEN Color Control Patches
1707'
BTM
1713.5'
Bottom


Hole - USU CAMS-1 Box - 10
Run - 21-23
Int. - 1719.7 - to 1729.3
TIFFEN Color Control Patches
TIFFEN Gray Scale
1719.7
1723.5'
Top run 23
1726'
HQ BTM


SNAKE RIVER PLAIN PFA DRILLING Project
Hole - USU CMMS Box - 11
Run - 28-29
Int - 1729.3' to 1739'
TIFFEN Gray Scale
TIFFEN Color Control Patches
1729.3'
1739.5'
1736.8'
BTM


1-1

Camas Prairie Drillhole

October 9 Daily Report

Staff on site included USU Site Geologists Will Kersey, Eric Sonnenthal, and the USGS drill crew (Derek, John, Shawn, and Jack(?)).

Safety: Proper PPE including hard hats, safety glasses, gloves, and steel toed boots were worn on site. No incidents to report.

Weather: Partly cloudy, high of 42 °F, strong winds

Operations: Will and Eric arrived on site at 8:30. Drillers were drilling by 9:00. 4.3’ of new core was drilled, but not retrieved. The core barrel and wireline got stuck at the bottom of the hole, leading the drillers to decide to trip out. Following this, Eric and Will left the site at 11:00. The drillers were able to remove the wireline without cutting it. Once the core barrel had been removed via tripping out the NQ drillstring, it was determined that a broken finger was the cause of the stuck barrel. Drillers began tripping back in. Operations ceased at 16:15 so the drillers could go to Bellevue to do laundry.

Geology: Nothing to report.

Camas Prairie Drillhole

October 10 Daily Report 1742.0' – 1770.2' [28.2' core]

Staff on site included USU Site Geologists Will Kersey, Eric Sonnenthal, and the USGS drill crew (Derek, John, Shawn, and Jack). Lee Barron visited the site in the afternoon (time noted on log).

Safety: Proper PPE including hard hats, safety glasses, gloves, and steel toed boots were worn on site. No incidents to report.

Weather: Clear and sunny, high of 41 °F

Operations: Eric and Will arrived on site at 8:50. The drillers finished tripping in and extruded core from yesterday's failed run, run 27. Run 27, was retrieved at 10:00, spanning 1742' to 1746.3'. The drillers began coring shortly after this. Jack left the site early this morning, but a time was not recorded. Run 28 was retrieved at 11:10, spanning 1746.3' to 1747.5'. Run 29 was retrieved at 12:30, spanning 1747.5' to 1753'. Run 30 was retrieved at 13:55, spanning 1753' to 1756.7'. The drillers had a hard time getting the core catcher to connect to the core barrel for this run but were able to make it work. No equipment was damaged. Mud temperature was measured as 31.1 degrees C at 14:20. Mud temperature was measured as 31.5 degrees C at 15:40. Run 32 was retrieved at 15:50, spanning 1759.7' to 1761.1'. Mud temperature was measured as 34.1 degrees C at 17:10. Run 33 was retrieved at 17:20, spanning 1761.1' to 1766.6'. Mud temperature was measured as 36.5 degrees C at 18:20. Run 34 was retrieved at 18:25, spanning 1766.6' to 1770.2'. Operations ceased at 18:50.

Note: The drillers replaced the drill bit (still with about 75% life left) yesterday (October 9), before beginning to trip back in. This was not included in yesterday's report.

Geology: Core collected today spans 1742' to 1770.2' for a total of 28.2'. The primary lithology in this stretch of core is granitic intrusive rock consisting mineralogically of quartz, plagioclase, k-feldspar, biotite, amphibole, and minor disseminated pyrite. Many portions of the core are heavily altered to chlorite, especially near shear zones and mineralized fractures. Many small shear zones, clay horizons, and brecciated zones were observed throughout today's core. Thin calcite veins cut the core at various angles with most fractures chlorite filled. One very thin intermediate composition (andesite?) dikelet similar to those observed previously was observed between 1746.3' and 1746.5'. A slickensided surface was observed at 1747.8'. The thickest shear zone observed today spanned at least 0.3' but was located at the end of a run with incomplete recovery so could have possibly been thicker.


SNAKE RIVER PLAIN TFA DRILLING PROJECT
Hole: USH CAMAS Box: 12
Run: 26-36
Int: 1734' 1747'
TIFFEN Gray Scale
TIFFEN Color Control Patches
1739'
1746.3'
BTM


SNAKE RIVER PLAIN TFA DRILLING PROJECT
Hole: USH CAMAS Box: 13
Run: 28-31
Int: 1747' to 1756.1
TIFFEN Color Control Patches
TIFFEN Gray Scale
1753'
1756.7'
Box 13


SNAKE RIVER PLAIN ITFA
Hole - USGS CAMAS
Box - 14
Run - 31-34
Int - 1758.1 to 1770.2
TIFFEN Grey Scale
TIFFEN Color Control Patches
1758.1
1759.7
1761.1
1766.6

Camas Prairie Drillhole

October 11 Daily Report

Staff on site included USU Site Geologists Will Kersey, Eric Sonnenthal, and the USGS drill crew (Derek, John, and Shawn).

Safety: Proper PPE including hard hats, safety glasses, gloves, and steel toed boots were worn on site. No incidents to report.

Weather: Clear and sunny, high of 49 °F

Operations: Eric and Will arrived on site at 8:30. Mud temperature was measured as 42.7 degrees C at 10:05. Mud rates were about 20 gpm, similar to that used earlier. Run 35 was retrieved at 10:15, spanning 1770.2' to 1774.5'. The drillstring got cross-threaded at 11:15 before the next run could be removed. The drill crew tried to break it free but were unsuccessful. At 11:35, the drillers began cutting the drill string to remove the stuck pieces. Drilling resumed soon after, and run 36 was retrieved at 12:25, spanning 1774.5' to 1776.8'. Mud temperature was measured as 43.1 degrees C at 13:35. Run 37 was retrieved at 13:55, spanning 1776.8' to 1783.8'. Run 38 was retrieved at 15:15, spanning 1783.8' to 1792'. Lee Barron visited the site between 15:15 and 16:30. Rod Gonzales drove through the site between 16:00 and 16:15. Further attempts at measuring mud temperatures with the available thermometer ceased after it became non-functional at 15:30. Run 39 was retrieved at 16:25, spanning 1792' to 1795.2'. Run 40 was retrieved at 17:30, spanning 1795.2' to 1801.2'. Run 41 was retrieved at 18:30, spanning 1801.2' to 1803.5'. Operations ceased at 19:00.

Geology: Core collected today spans 1770.2' to 1803.5' for a total of 33.3'. The primary lithology in this stretch of core is granitic intrusive rock consisting mineralogically of quartz, plagioclase, k-feldspar, biotite, and minor disseminated pyrite/other sulfides. Many portions of the core are heavily altered to chlorite, especially near shear zones and mineralized fractures. Calcite veins of varying orientation are common throughout the core. Some minor shear zones were observed today along with two thicker brecciated zones. Brecciated zones contained clasts ranging from mud-sized particles to pieces as large as 0.2'. Some clasts within the breccia contained calcite veins, dating the brecciation as younger than at least some of the calcite mineralization. A possible slickensided surface was observed at 1793.5' depth.


SNAKE RIVER PLAIN TFA DRILLING PROJECT
HOLE - USU CAMAS BOX - 15
RUN - 35-37
INT. - 1770.2' to 1780.3'
TIFFEN Gray Scale
TIFFEN Color Control Patches
1770.2'
1774.5'
1780.3'


SNAKE RIVER PLAIN TFA DRILLING PROJECT
HOLE - USU CAMAS BOX - 16
RUN - 37-39
INT. - 1780.3' to 1790.3'
TIFFEN Gray Scale
TIFFEN Color Control Patches
17383
Top Run 38
Box 16
USU Camas
1784.5'
1790.3'

Camas Prairie Drillhole

October 12 Daily Report

Staff on site included USU Site Geologists Connor Smith, Bruce Condie, Tom Lachmar, Eric Sonnenthal, and the USGS drill crew (Derek, John, and Shawn).

Safety: Proper PPE including hard hats, safety glasses, gloves, and steel toes boots were worn on site.

Weather: Clear and sunny, high of 59 °F and low of 10 °F

Operations: Arrived on site at ~8:00. At ~8:34 HOBO (temperature probe) was sent down the hole at a speed of ~2.1 ft/s to a depth of 1790' where it rested for 10 minutes. The max BHT recorded was 79.4 C (174 F). Eric sent out an email with the raw log over time plotted and will get the data out later. Drillers started circ ulating mud at ~9:35. Tom measured a mud temperature of 36 C and a weight of 8.5 lbs/gallon. At ~10:00 drillers finished circulating mud. Drilling commenced shortly thereafter. At ~10:40 the core barrel was retrieved, and the drillers reported drilling to a depth of 1806.3'. The drillers also reported the run top depth as being 1803.2' rather than 1803.5' as reported last night. 3.1' of core recovered. At `11:35 drillers recovered 3.5' of core, yet only drilled 2.8'. It may have been the gravel spreading out laterally once it left the core barrel, or we are seeing core from previous runs. Run 43 drilled to a depth of 1809.1'. At ~12:45 the drillers retrieved 2.8' of core. Drilled to a depth of 1812.0'. Drillers failed to catch the core barrel following run 44 at ~13:30, so they began to flush out the hole hoping to remove problematic sediment. Drillers successfully retrieved core at ~14:20 spanning depths of 1812'-1814.5'. At 15:35 the drillers reported drilling 10'. However, <1' of core was recovered. Drillers began to flush hole. Fluid temperature measured: 40 C. Drillers failed to retrieve more core. Because the drilling of the 10' went smoothly and without concern, the drillers believed that the failure to recover more core was due to the rock being crushed into bits too small to pull out of the hole. Drilling resumed at ~16:45. At ~18:34 the final run of the day was completed. ~4.7' of core was recovered (99%). Depths drilled on this run spanned 1827.9'-1832.0'. TD increased by ~28.8' today.

Geology: Core from runs 42-48 logged and boxed. It was mostly porphyritic granitic rock with calcite veins, disseminated pyrite, and unidentified copper-toned sulfides. Fractures dipping b/w 65 and 40 degrees present throughout the core with chlorite alteration on surfaces and sulfide mineralization on some as well. Brecciated fractures, bottom-most one clay-rich, present as well. Slickensides visible on one of the fracture surfaces viewed this morning.

Camas Prairie Drillhole

October 13 Daily Report

Staff on site included USU Site Geologists Connor Smith, Bruce Condie, Tom Lachmar, Eric Sonnenthal, and the USGS drill crew (Derek, John, and Shawn).

Safety: Proper PPE including hard hats, safety glasses, gloves, and steel toes boots were worn on site.

Weather: Clear and sunny, high of 63 °F and low of 29 °F

Operations: Arrived on site at ~8:45. Core of run 49 retrieved upon arrival. TD increased from 1832.0' to 1834.3'. ~3.0' of core was recovered. At 10:55 the next run (50) was completed. TD increased to 18341.4'. Fluid temperature measured: 32 C. This is where we began to recover the most cohesive core yet. The largest piece gathered from this run was ~1.2' in length. The next core section was recovered at noon. TD was increased to 1844.5'. At 13:00 John left the site (later returned at ~18:20). A friend/ business associate of the drillers arrived to deliver a set of new drill bits to the drillers around this time. At ~13:30 10' of core was recovered. TD increased to 1854.5'. At ~15:25 2.6' of core was recovered. TD increased to 1857.2'. At ~17:00 only 1.2' of core was recovered. TD increased by a mere 0.8' to 1858.0'. At ~18:00 the next section of core measuring 3.8' was recovered. TD increased to 1863.1'. The drillers were planning to make one more run for the day, but the swivel broke and needed to be replaced. Total of ~31.1' drilled today.

Geology: Core from runs 49-56 logged and boxed. It was mostly the same unit that we have been removing the last couple of days, porphyritic granitic rock with calcite veins, disseminated pyrite, and unidentified copper-toned sulfides. Fractures still include chlorite alteration on surfaces. Clay-filled fracture observed at the bottom of run 53, depth of ~1857', in core rubble. The largest section of core pulled from run 52 contained slickensides at a depth of ~1847.2' with heavy calcite mineralization and what we believe is red Fe-staining. ~4.8' below the slickensides, depth of ~1852.5', from the same core section was observed a brecciated shear zone. Not much orthoclase was present in the core today. Plagioclase, quartz, and mafic elements (some biotite altered by chlorite) composed the core mostly.

Camas Prairie Drillhole

October 14 Daily Report

By Will Kersey

Staff on site included USU Site Geologists Will Kersey, Jim Evans, Eric Sonnenthal, and the USGS drill crew (Derek, John, and Shawn).

Safety: Proper PPE including hard hats, safety glasses, gloves, and steel toed boots were worn on site. No incidents to report.

Weather: Clear and sunny, high of 62 °F, strong winds

Operations: Eric arrived on site at 8:30. The first run of the day, run 56, was retrieved at 8:30, spanning 1863.1' to 1864.5'. Jim and Will arrived around 9:45. The swivel was leaking upon our arrival. Eric left the site at 10:30. Mud temperature was measured as 41°C at 10:55. Lee Barron visited the site between 10:50 and 11:55. Run 57 was retrieved at 11:05, spanning 1864.5' to 1874.5'. Mud temperature was measured as 40°C at 12:20. The swivel was fixed prior to run 58's retrieval. Run 58 was retrieved at 12:35, spanning 1874.5' to 1882.2'. Mud temperature was measured as 41°C at 13:23. Run 59 was retrieved at 13:30, spanning 1882.2' to 1884.5'. Run 60 was retrieved at 14:40, spanning 1884.5' to 1889.5'. Mud temperature was measured as 39°C at 15:35. Run 61 was retrieved at 15:50, spanning 1889.5' to 1894.5'. Mud temperature was measured as 44°C at 17:00. Run 62 was retrieved at 17:05, spanning 1894.5' to 1901.4'. Mud temperature was measured as 39°C at 18:00. Run 63 was retrieved at 18:10, spanning 1901.4' to 1904.5'. Operations ceased at 18:30.

Geology: Core collected today spans 1863.1' to 1904.5' for a total of 41.4'. The primary lithology in this stretch of core is variably sheared and altered granitic intrusive rock consisting mineralogically of quartz, plagioclase, k-feldspar, biotite, and minor disseminated pyrite/other sulfides. Numerous shear zones, brecciated zones, and clay horizons were scattered throughout the core. Fractures range from nearly vertical to many that dip 50-70°; where visible slickenlines rake 50-70°. Subhorizontal chloritic fault surfaces were encountered throughout the core. Some brecciated zones are lithified to semi indurated while other zones consist of non- to slightly lithified granules. Unlithified brecciated zones contained clasts ranging from mud-sized particles to pieces as large as 0.2'. Many portions of the core are heavily altered to chlorite, especially near shear zones and mineralized fractures. Calcite veins of varying orientation and thickness (up to 1 cm) are common throughout the core, many in en echelon sets. Slickenlines were observed in several places in today's core, including in hematite-lined surfaces. Pyrite was observed in the upper parts of the core runs of the day.


SNAKE RIVER PLAIN ITFA DRILLING
Hole - USGS CAMP
Box- 23
Run - 55-57
Int. - 1861.1' - 1866'
TIFFEN Color Control Patches
TIFFEN Gray Scale
1863.1' Top Run 56
1866.6'


SNAKE RIVER PLAIN ITFA DRILLING
Hole - USGS CAMP
Box- 24
Run - 57-58
Int. - 1866.6 - 1877.4
TIFFEN Gray Scale
TIFFEN Color Control Patches
1874.5 Top Run 58 Box 24 USGS
1877.4'


SNAKE RIVER PLAIN TFA DRILLING
HOLE - USGS CAMMS Box- 25
Run - 56-60
Int - 1877.4 - 1885.8
TIFFEN Gray Scale
TIFFEN Color Control Patches
HD BTM
1885.8


SNAKE RIVER PLAIN TFA DRILLING
HOLE - USGS CAMMS Box- 26
Run - 60-62
Int - 1885.8' - 1895.2'
TIFFEN Color Control Patches
TIFFEN Gray Scale
1885.8
End Run 60
1895.2

Camas Prairie Drillhole

October 15 Daily Report

Staff on site included USU Site Geologists Will Kersey, Jim Evans and the USGS drill crew (Derek, John, and Shawn).

Safety: Proper PPE including hard hats, safety glasses, gloves, and steel toed boots were worn on site. No incidents to report.

Weather: Clear and sunny, high of 69 °F

Operations: Jim and Will arrived on site at 8:55. Mud temperature was measured as 45° C at 9:30. The first core of the day, run 64, was retrieved at 9:40, spanning 1904.5' to 1910.2'. Run 65 was retrieved at 10:40, spanning 1910.2' to 1913.1'. Run 66 was retrieved at 11:55, spanning 1913.1' to 1916.1'. Run 67 was retrieved at 13:10, spanning 1916.1' to 1920.5'. Mud temperature was measured as 43°C at 14:03. Lee Barron and Roy Armstrong visited the site in the afternoon. Run 68 was retrieved at 14:10, spanning 1920.5' to 1924.5'. Mud temperature was measured as 48°C at 15:18. Run 69 was retrieved at 15:20, spanning 1924.5' to 1930.1'. Mud temperature was measured as 53°C at 16:10. Run 70 was retrieved at 16:15, spanning 1930.1' to 1931.7'. Mud temperature was measured as 51°C at 17:20. Run 71 was retrieved at 17:25, spanning 1931.7' to 1934.3'. Run 72 was retrieved at 18:35, spanning 1934.3' to 1937.7'. Operations ceased at 19:00.

Geology: Core collected today spans 1904.5' to 1937.7' for a total of 33.2'. Two major lithologies were observed in today's core. The dominant lithology in this stretch of core, spanning 1904.5' to 1930', is variably sheared and altered granitic intrusive rock consisting mineralogically of quartz, plagioclase, k-feldspar, some as phenocrysts, biotite, and minor disseminated pyrite/other sulfides. Numerous shear zones, brecciated zones, and clay horizons were scattered throughout the granitic rock. Many portions of the granitic rock are heavily altered to chlorite, especially near shear zones and mineralized fractures. Sericitized portions of the granitic rock were identified between 1921' and 1925'. Calcite veins of varying orientation and thickness are common throughout the core. Between 1904.5' and 1913.1', several fractures and fracture surfaces were observed to contain macrocrystalline randomly oriented micaceous minerals of varying color. Fracture and fault dips in the granitic rocks dip 60-70°, or are relatively shallowly dipping, and fault striae are observed on the calcite and chloritic fault surfaces. The second major lithology, spanning 1930' to 1937.7', is a light tan to light reddish-brown porphyritic igneous rock containing millimeter-scale amphibole phenocrysts and plagioclase phenocrysts pseudomorphically replaced by calcite in an aphanitic matrix with nearly no porosity. This porphyritic rock contains disseminated sulfides of undetermined composition. The contact between these two lithologies is not

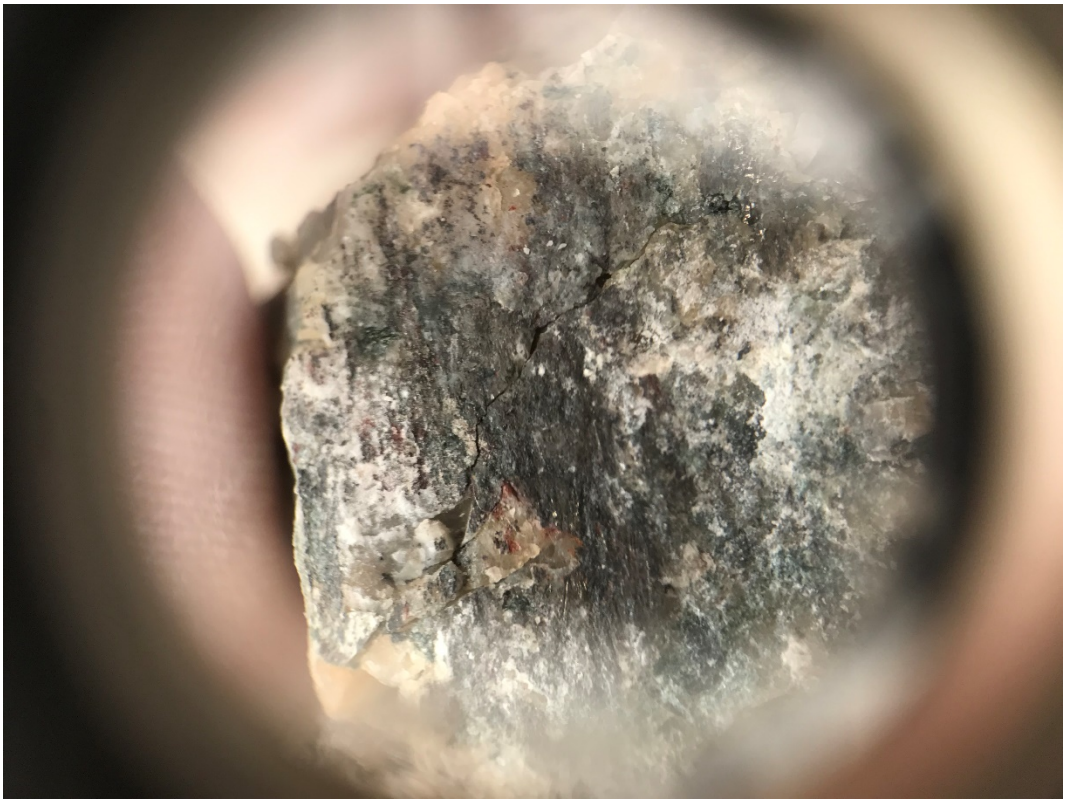
intact. Fractures in the aphanitic sequence are either unmineralized or exhibit some thin calcite coatings.

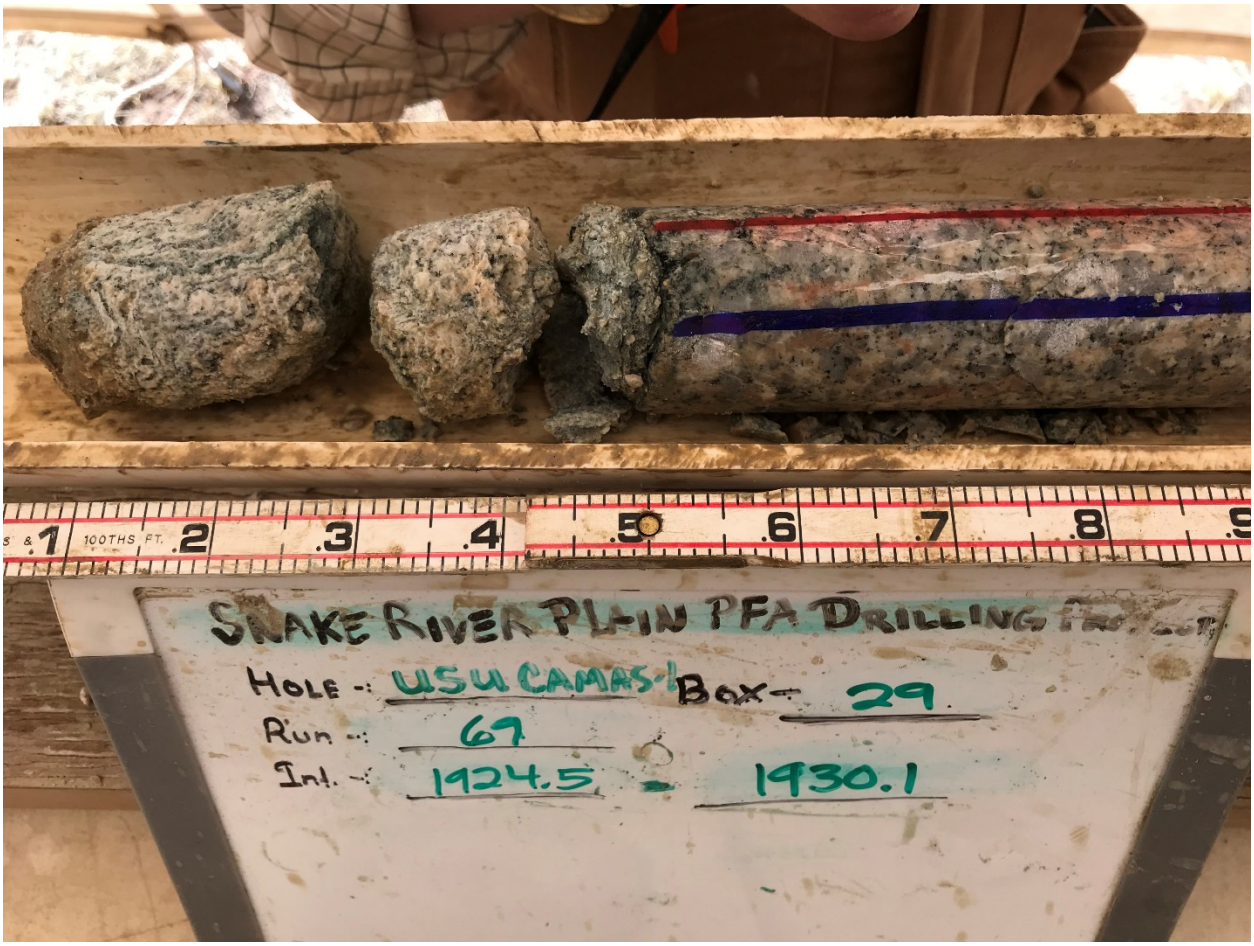

SNAKE RIVER PLAIN TFA DRILLING
HOLE - USU CAMAS Box- 27
Run - 62-64
Int. - 1895.2 - 1906.9'
TiFFEN Color Control Patches
TiFFEN Gray Scale
1895.2
End Run 62
1901.4'
1904.5'
1906.9'
TOP
BTM


SNAKE RIVER PLAIN TFA DRILLING
HOLE - USU CAMAS Box- 28
Run - 64-66
Int. - 1906.9 - 1916.1'
TiFFEN Color Control Patches
TiFFEN Gray Scale
1916.1'

Fracture containing bronze-colored macrocrystalline mica

Dark colored macrocrystalline mica


Slickenlines and sulfides through a hand lens



Sericitized shear zone

Camas Prairie Drillhole

October 16 Daily Report

Staff on site included USU Site Geologists Will Kersey, Jim Evans and the USGS drill crew (Derek, John, and Shawn).

Safety: Proper PPE including hard hats, safety glasses, gloves, and steel toed boots were worn on site. No incidents to report.

Weather: Clear and sunny, high of 73 °F

Operations: Jim and Will arrived on site at 8:30. The drillers prepped the drilling equipment while the geologists loaded core boxes into a truck. The first run of the day, run 73, was retrieved at 9:45, spanning 1937.7' to 1943.0'. At approximately 10:15 and at a depth of 1944.5', the drillers reported that they had lost all mud circulation and were "drilling blind". Run 74 was retrieved at 10:55, spanning 1943.0' to 1946.0'. It appeared that mud circulation had been restored by the time run 74 was retrieved. Run 75 was retrieved at 12:15, spanning 1946.0' to 1951.2'. Jim and Will left for Logan around 13:00. The drillers spent the rest of the day packing equipment and preparing for their week off. All core has been taken to Logan.

Geology: Core collected today spans 1937.7' to 1951.2' for a total of 13.5'. The primary lithology observed in today's core is a reddish-brown aphanitic, dense, porphyritic igneous rock containing millimeter-scale amphibole phenocrysts, quartz phenocrysts, and plagioclase phenocrysts that have been pseudomorphically replaced by calcite. This porphyritic rock contains minor disseminated copper-colored sulfides. The core is cut by hairline calcite veins, usually at a 45° angle to the core axis. Microcrystalline quartz was observed as a coating on some fracture surfaces. Anastomosing fracture networks were observed in some segments of the core, with fractures tending to fall between 60 degrees and 90 degrees from horizontal. The fracture character is similar to stylolites in their sutured appearance. Near-vertical fractures split open in the core as it left the core barrel, perhaps a result of its removal from the subsurface stress regime.


SNAKE RIVER PLAIN I.F.A. DRILLING
HOLE - USU CAMMS Box - 30
Run - 71-73
Int. - 1931.7 - 1941.8'
TiFFEN Color Control Patches
TiFFEN Gray Scale
TOP Run 72
1941.8


SNAKE RIVER PLAIN I.F.A. DRILLING
HOLE - USU CAMMS Box - 31
Run - 73-75
Int. - 1941.8 - 1951.2
TiFFEN Color Control Patches
TiFFEN Gray Scale
1941.8
1946.7
HQ BTM
1951.2

Camas Prairie Drillhole

October 26 Daily Report

Staff on site included USU Site Geologists Connor Smith, Tom Lachmar, and the USGS drill crew (Derek, John, and Shawn).

Safety: Proper PPE including hard hats, safety glasses, gloves, and steel toes boots were worn on site.

Weather: Clear and sunny, high of 63 °F and low of 29 °F

Operations: Tom and Connor arrived on site at ~20:00. Prior to their arrival, the drillers circulated mud to remove the blockage that was obstructing the bottom ~200 ft of the hole. 1.9’ of core was retrieved from run 76. TD increased from 1951.2’ to 1964.5’. The drillers believe that we hit a clay seem and that most of the material is washing away. This is the suspected reason for only recovering 14% of core.

Geology: Core from run 76 logged and boxed. A fractured, brown/ brick-colored aphanatic porphyritic igneous rock with calcite veins composes the core. Calcite coats some of the fractured surfaces and is present in small assemblages where it has replaced phenocrysts of other minerals. Orthoclase is the main mineral present with quartz, relatively large amphibole phenocrysts (4-5 mm in diameter), some chlorite-altered mafic minerals, and a small proportion of plagioclase present in the core as well. Fractures run ~45° from the horizontal plane.

Camas Prairie Drillhole

October 27 Daily Report

Staff on site included USU Site Geologists Connor Smith, Tom Lachmar, and the USGS drill crew (Derek, John, and Shawn).

Safety: Proper PPE including hard hats, safety glasses, gloves, and steel toes boots were worn on site.

Weather: Clear and windy then cloudy with snow, High of 47

Operations: Tom and Connor arrived on site at ~9:20. Connor left site to type up and send out daily drilling report from yesterday. Run 77 was recovered spanning depths of 1964.5'-1971.6'. Connor returned at 10:30. Run 78 recovered. New depth reached: 1974.5'. Run 79 1976.3'. Run 80 1980.2'. Run 81 1984.5'. Run 82 1993.7'. Three attempts were made to retrieve the core barrel of run 83. Following the unsuccessful retrieval of the first two attempts, the drillers circulated mud. Thereafter, the third attempt to retrieve the core barrel was successful. Sediment/ clay likely prevented the retrieval apparatus from latching onto the "fingers" of core barrel. Run 83 ending TD for the day: 1996.2'. Hole deepened by 31.7' today.

Geology: Core from runs 77-83 logged and boxed. The brown/ brick-colored aphanitic porphyritic igneous rock with calcite veins composes the upper portion of core and is intermittently dispersed throughout the core there below. The core is brecciated in some sections and often recemented with calcite. These zones tend to be rich in clay. Copper-colored sulfides and pyrite observed throughout. Midway through the core of run 80 the brick-colored rock becomes brecciated and transitions into a clay rich horizon that shares a contact with granite. Large quartz phenocrysts are present in the granite ~7mm in diameter. Hairline calcite veins and altered mafics throughout. The rest of the core pulled today is rich in clay. The brick-colored igneous rock (altered granite?) returns and then transitions back to granite with chlorite alterations and relatively large pockets of pyrite. Plagioclase-dominant, possibly smectites (would like to hear what Jim has to say).

Camas Prairie Drillhole

October 28 Daily Report

Staff on site included Drew Siler from USGS, USU Site Geologist Bruce Condie, and the USGS drill crew (Derek, John, and Shawn).

Safety: Proper PPE including hard hats, safety glasses, gloves, and steel toes boots were worn on site.

Weather: Partially cloudy and windy, cold. Daytime high in the mid-30s(?)

Operations: Drew arrived on site from Boise via SFO at 2:15p and me Bruce. The first drilling run was in progress at the time, it started at ~1:45. The delay was due to the drillers having run out of bentonite. First run of the day (Run 92) came out at 2:50p, spanning 2020.0-2023.9' Run 93 was recovered at 4:40p, spanning 2023.9-2025.4'. Run 94 (last run of the day) was recovered at ~5:45p spanning 2025.3-2028.5'. So three runs for a grand total of 7.7' were drill today.

Geology: Core from runs 92-94 logged and boxed. All recovered core consisted of pink/brick-colored aphanitic-to-porphrytic igneous rock, with occasional 1-2 mm dark green amphiboles (?) as the primary lithology (we have been in this since 2005.5', so ~13' and counting). If memory serves, this looks a lot like the rocks that I (D.S.) saw in the Johnson Hills when I mapped structure there a few years back. I called them dacite lavas at the time, although the may be sills, the exposure isn't great. These are mapped as Eocene Challis volcanics. I plan collect some outcrop hand samples tomorrow for comparison.

In runs 92-94 the recovered core is very rubbly and broken up, with numerous sub-mm thin calcite veins. Core is friable and generally breaks on the veins. Most of the veins are steep, ~40-80° to the core axis, though the vein networks are chaotic. In run 92 at ~ 2020.3' one steep (73° to core axis) ~1/2 cm wide fracture is well preserved with semi-euhedral laminated calcite filling the fracture. Run 93 core was shot out of the core barrel, so even the intact pieces broke up and we lost up/down orientation for this 1.5' of core. Run 94 core was moderately well intact, though broken on several steep (40-80° to core axis) antithetic fractures with sub-mm-thick calcite filling. Mm-scale Amphibole phenocrysts are less prevalent in 94 versus 92 and 93, 94 groundmass is eqingranular.

Camas Prairie Drillhole

October 30 Daily Report

Staff on site included Drew Siler from USGS, USU Site Geologist Bruce Condie, and the USGS drill crew (Derek, John, and Shawn).

Safety: Proper PPE including hard hats, safety glasses, gloves, and steel toes boots were worn on site.

Weather: Clear, sunny, and **cold**. -14°F at 9am, -20°F overnight, apparently.

Operations: At 9am driller reports that all the diesel has gelled up overnight, so they can't get any of their equipment running or thawed out. Estimated that drilling may be able to resume at 12-1p.

By 2:30p not all equipment could be made ready for drilling, so no drilling was done today.

D.S. hiked up to the southern-most point of the Johnson Hills for an outcrop sample. Sample collected from 43.2586827, -114.9120086 is a pink-grey porphrytic dacite lava (?). 1-3 mm amphibole and felspar phenocrysts in a pink-grey groundmass. It looks a lot like and thus may be an extrusive equivalent of dacites intruding granite at 2005.5-2032.' Labeled sample will be transported back to USU with core boxes by Bruce C.

Geology: None.

Camas Prairie Drillhole

October 31 Daily Report

Staff on site included, USU site geologist Tom Lachmar, USGS geophysical logger Tony Brown, and the USGS drill crew (Derek, John, and Shawn).

Safety: Proper PPE including hard hats, safety glasses, gloves, and steel toes boots were worn on site.

Weather: Sunny with high thin clouds and cold. High of 36°F and overnight low of 2°F.

Operations: Arrived at drill site at 9am. Tony Brown was on site, as well as drill crew, and was preparing to run geophysical logs. He began lowering first tool (temperature and pressure) into well at 1330; reached bottom of hole at 1515; tool left on bottom for 10 minutes; reached ground surface at 1600. Tony Brown and drill crew decided to remove drill rods but leave mud in hole and run full suite of geophysical logs, not just gamma. Drillers began removing rods. They will finish tomorrow and Tony Brown will run geophysical logs either tomorrow afternoon or Saturday morning. Starter on water truck needs to be replaced. Either a mechanic will replace it or another water truck will be driven to the site. Consequently, drillers will have to wait until Saturday to haul water to replace mud and to use for injection test, which will have to be postponed until Sunday.

Geology: None.