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Newberry Exploratory Slimhole: Drilling and Testing

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NEWBERRY EXPLORATORY SLIMHOLE: DRILLING AND TESTING

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ABSTRACT

During July-November, 1995, Sandia National Laboratories, in cooperation with CE Exploration, drilled a 5360' exploratory slimhole (3.895" diameter) in the Newberry Known Geothermal Resource Area (KGRA) near Bend, Oregon. This well was part of Sandia's program to evaluate slimholes as a geothermal exploration tool. During and after drilling we performed numerous temperature logs, and at the completion of drilling attempted to perform injection tests. In addition to these measurements, the well's data set includes: over 4000' of continuous core (with detailed log); daily drilling reports from Sandia and from drilling contractor personnel; daily drilling fluid record; and comparative data from other wells drilled in the Newberry KGRA.

This report contains: (1) a narrative account of the drilling and testing, (2) a description of equipment used, (3) a brief geologic description of the formation drilled, (4) a summary and preliminary interpretation of the data, and (5) recommendations for future work.

CONTENTS

I. INTRODUCTION AND BACKGROUND

The Geothermal Research Department at Sandia National Laboratories is working with industry to evaluate slimhole drilling as a geothermal exploration technique. Traditionally, diamond-cored "slimholes" -- usually 3" to 4" in diameter -- have been used to measure temperature gradients while selecting sites for production-size exploration wells. If we can demonstrate that improved testing in slimholes reliably identifies a productive geothermal resource, the cost savings and reduced environmental impact, compared to production-size holes, are compelling incentives to use slimholes for exploration.[1]

Sandia first conducted an extensive survey of the geothermal industry to define its needs and priorities, and then confirmed the basic feasibility of slimhole exploration with in-house analysis and field experiments on existing geothermal coreholes. Industry contacts specified lower-cost exploration as a high priority, and were generally enthusiastic over the slimhole idea. Further negotiations with California Energy Company, Incorporated (now CalEnergy), which owns leases in the Newberry KGRA led to an agreement for a cost-shared exploratory drilling project on their lease. CalEnergy's project management was by CE Exploration (CEE), a subsidiary designated to direct the drilling and construction designed to result in a power plant at this site, and Sandia's management was by the Geothermal Research Department.

The Sandia/CalEnergy agreement was based on the assumption that two slimholes were to be drilled in this area, with at least four production wells to be drilled within the next year. During the slimhole drilling, CalEnergy would pay all the costs of the first hole to an approximate depth of 4500', Sandia and CalEnergy would share equally the costs of the second hole to 4500', and then, if either of the holes had significant probability of reaching a production reservoir, it would be deepened to as much as 7500', with Sandia paying all the costs for the deepening and testing.

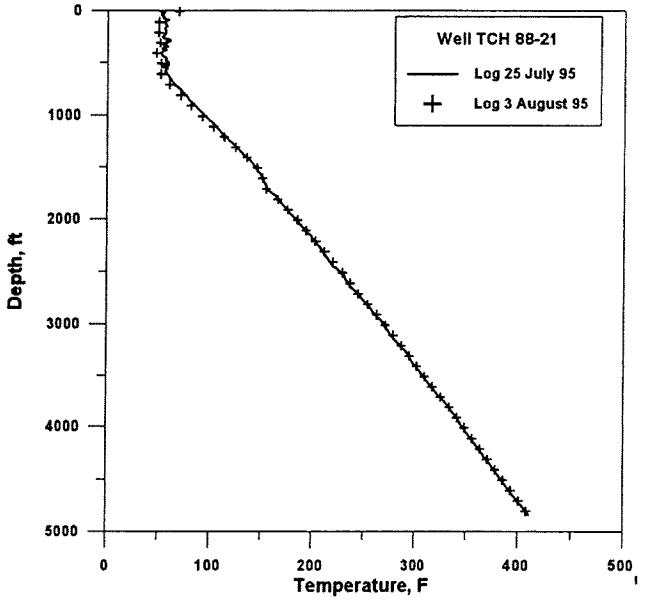

Figure 1 - Temperatures in TCH 88-21

In return for the cost-share, Sandia would receive testing, production, and cost data from the slimholes and from the production wells drilled nearby, giving a direct comparison of productivity predicted from tests on the slimholes and that achieved by the actual production wells. Since locations, depths and lithology were also similar, there would also be a close comparison of drilling costs. The actual drilling program during 1995 produced the two slimholes and two production-size wells. Because of low permeability in all the wells, no further drilling was done and no power development has taken place.

The first slimhole, TCH 88-21, was drilled to a depth of 4840' and has a stable bottomhole temperature of 410°F. While drilling the lower part of this hole, HQ hole diameter (3.85"), the core rods stuck while drilling at 3709' and could not be freed. The rest of the hole was then drilled with NQ (2.97" diameter) coring tools and 2" tubing was run to approximately 4835'. This tubing serves to keep the hole open for temperature logs and should be removable if the hole is eventually deepened. It is unlikely that, at the present depth, this hole has potential for either production or

injection tests because of the low permeability indicated by drilling (almost no lost circulation in the lower hole) and temperature logs (see Figure 1.)

II. SUMMARY OF OPERATIONS

This cost-shared exploratory slimhole, TCH 76-15, was drilled on the outer north-west flank of Newberry Crater (see Section VIII for geologic description). Its primary objective was to improve evaluation, by measurements of temperature and permeability, of this area's potential for commercial geothermal power production. The plan for data acquisition on this hole was that preliminary temperature measurements would be taken with the Sandia logging tools and truck. If bottomhole temperature and permeability (implied by lost circulation or measured by injection) indicated the possibility of a production flow test, then we would attempt to air-lift, or otherwise stimulate the hole for production. Flow-test data would be taken by a combination of Sandia and service-company instrumentation.

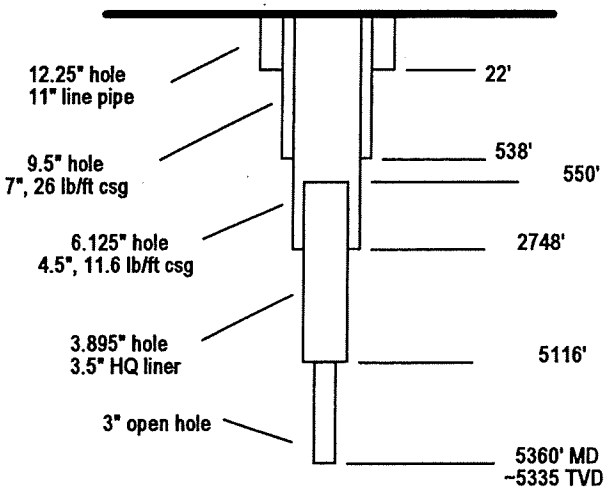

Figure 2 - Final hole configuration

The drilling plan was to set 7" surface casing to approximately 500', then set 4.5" casing to a depth dependent on the expected bottomhole temperature at TD, and finally directionally drill/core toward the postulated geothermal resource. Directional drilling was done below the 4.5" casing and was aimed toward the south-east, or toward the center of the caldera. Final well configuration is shown in Figure 2.

Drilling operations were lengthy, taking 116 days to TD. This was caused by a number of factors, including, to some degree: extensive lost circulation, stuck pipe, reaming the initial core hole for casing, directional-drilling problems, and forest fires. In spite of the time required for this hole, and the corresponding lessons learned, it still proved to be a cost-effective method of geothermal exploration. Temperature gradients in the lower parts of the two slimholes were similar to each other and were reasonably predictive of gradients in nearby production-size holes. Although the temperature gradient in the lower part of TCH 76-15 -- about 8°F/100' -- was almost identical to that in TCH 88-21 (compare Figures 1 and 3), the near-isothermal portion of 76-15 extended much deeper, resulting in a lower bottomhole temperature (350°F @ 5360') than in 88-21. This temperature, coupled with the reduction to NQ hole size (3")

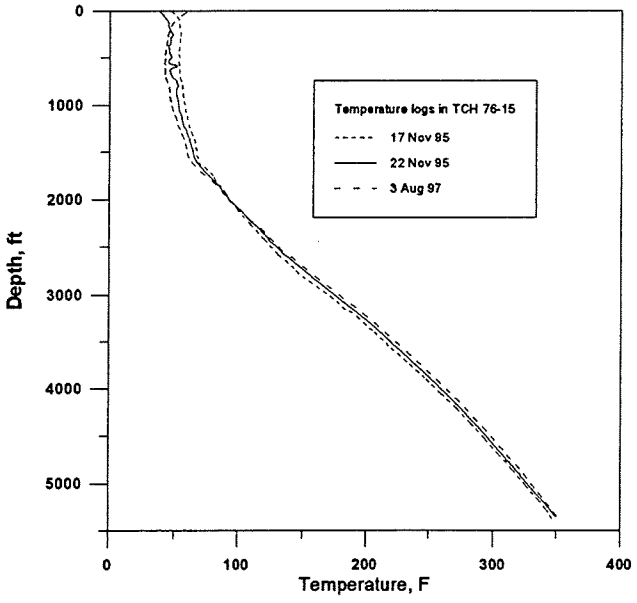

Figure 3 - Temperatures in TCH 76-15

and almost complete lack of permeability (measured by an attempted injection test), indicated that a production flow test was extremely unlikely at this depth. Wellbore simulations based on extending this gradient, in NQ-size hole, to the potential TD of 7500' indicated that a production test from that depth would be problematic. These factors, coupled with the very slow and difficult drilling at this depth and with the fact that two nearby production wells were already at TD, led to the decision for termination of drilling at this depth. Drilling problems and decisions are described in more detail in Section V.

III. DESCRIPTION OF EQUIPMENT AND METHODS

The following descriptions cover the major pieces of equipment used during the project and, where applicable, explanations of their use.

Drill rig: The drill rig used for this hole was a Longyear truck-mounted Model HD600, with a 60' mast, capable of pulling 40' stands of pipe, and a hoist rated at 60,000 pounds. The rig was supported on a hydraulic jack-up substructure which provided approximately 8' clearance between the bottom of the substructure and ground level. Two mud pumps were available; a Gardner-Denver duplex (150 gpm @ 260 psi) for surface drilling and reaming, and an FMC Model M12 triplex (60 gpm @ 1000 psi) for coring. A 40' parts trailer contained tools, bits, spare parts, and a welder.

This particular rig has a depth capability of approximately 8200' with HCQ rods, and below 6750' with CHD101 drill rods (approximately 4" hole diameter); it can reach to 8500' with CHD76 rods (approximately 3" diameter), and even deeper with hybrid strings, enabling slimhole exploration to be used in most known geothermal areas.

Core recovery in this hole was very good, more than 96% for the cored portion of the well (the interval to the first casing point at 544', and the portion which was directionally-drilled, were not cored).

Surface instrumentation: Several instruments were placed at and near the wellhead, with data collected and recorded continuously in the Sandia mobile office. These measurements comprised the following:

- Drilling fluid inflow -- Flow rate was measured directly by a Doppler flow-meter mounted on the standpipe and indirectly by volume calculated from mud pump speed, obtained by a shaft encoder on the pump's crankshaft. When these readings were compared, the pump-stroke value was usually higher, because inefficiencies in the pump led to less-than-theoretical fluid delivery. The Doppler meter was especially valuable because it included a totalizer, giving an integrated total flow volume after a specified starting time. This enabled very accurate placement of mud, cement, LCM pills, mineral oil, etc.
- Annulus inflow -- When drilling without returns, drilling fluid was pumped down the annulus between the drill rods and the casing. This flow was measured by an encoder on the pump shaft.
- Drilling fluid outflow -- Return flow was measured by a magnetic flow meter (magmeter) on the line from the pitcher nipple back to the mud pits. When outflow becomes significantly less than inflow, this is usually an indication of lost circulation.
- Drilling fluid temperatures -- Temperature transducers were placed in the flow lines into and out of the wellbore.

- Standpipe pressure -- Pressure delivered to the drillpipe is measured. This pressure is not only important as an insight on drilling performance, but sudden drops in this pressure can indicate a hole or washout in the drillpipe.
- Ambient air temperature -- Weather conditions were indicated by the air temperature measured under the rig.
- Rotary speed -- Drill string rotary speed was recorded from the rig's tachometer.
- Chuck height -- During the latter part of the drilling operations, a linear-displacement transducer was connected to the chuck which rotates the drillpipe and travels down as the drill advances. Hole depth at the start of the core run was entered by the driller. Chuck-height versus time gives rate of penetration, which is sometimes useful to identify different lithologies.

All transducers were connected to a signal-processing station at the drill rig and then, via a simple twisted-pair wire to the data-logging computer in the Sandia trailer. Each morning, data from the computer was down-loaded onto diskettes.

Downhole instrumentation: Downhole data collection during this operation was primarily limited to temperature measurements. These temperature logs were taken with Sandia's platinum-resistance-thermometer (PRT) tool which, along with a Sandia logging truck, remained on-site for the entire project. This instrument uses a simple resistance bridge, with changes in resistance measured from the surface through a four-conductor cable. Since there are no downhole electronics, temperature drift with time is negligible and the PRT temperature measurements are considered a reference standard for this kind of drilling.

The acoustic borehole televiewer (BHTV) was run twice in the wellbore with limited success. There were several problems with the tool's functions, but images were successfully obtained over the interval from 2748' to 3635'.

IV. ANALYSIS OF DATA

Temperature: Downhole temperatures were taken during drilling with maximum-reading-thermometers (MRTs) which can be attached to the overshot which is sent downhole to retrieve the core tube or can be loaded into the running gear of the single-shot camera which is used to survey the hole trajectory. During reasonably good drilling, these will provide temperature readings approximately once a day. An MRT is simple and cheap, but does have several drawbacks: It requires some residence time to reach the wellbore temperature; it is subject to pressure effects below 4,000-5,000 feet; it records the highest temperature it has seen, which may not be at the bottom of the hole; and it measures temperature during a short pause in drilling fluid circulation, which tends to cool the wellbore. This latter effect is less important in core drilling, where drilling-fluid flow rates are less than 10% of those in rotary-drilled wells, and the MRT readings for the Newberry slimholes tended to give good agreement with post-drilling logs (see Figure 4).

Logs taken days or weeks after drilling show that temperature gradients in the lower sections of the two slimholes are quite similar, but that the point at which the gradient reaches a relatively constant ~8°F/100' is approximately 1000' deeper in TCH 76-15 than in TCH 88-21. It is likely that this effect is related to the relative elevations of the two drill sites; the TCH 76-15 pad is 800' higher than the TCH 88-21 location. Gradients in the slimholes are also reasonably similar to two production-size wells, one very near 88-21 and the other roughly halfway between the slimholes.

Permeability: Even though there was little lost circulation in the last 1000' of the hole, implying little permeability, it was important to quantify the transmissivity of the potential reservoir. After

circulating the mud out of the hole and replacing it with clear water, we attempted two injection tests; one into the open hole section (5116' - 5360') below the HQ liner, and one into the annulus outside the uncemented part (2748' - ~4800') of the liner. The much greater wellbore area exposed outside the liner was offset by the presence of mud which had been sitting there for several weeks, undoubtedly reducing the effective permeability. In both cases, however, surface injection pressures over 300 psi (which was the pressure limit for the instrumentation) could only drive a flow rate of less than 3 gpm. It was not even clear that this small flow rate was into the formation, because a defective joint in the HQ liner may have allowed this amount of leakage into or out of the liner. In either case, the formation was, for all practical purposes, impermeable.

V. DISCUSSION

Lost circulation: The upper 800' of this hole suffered extensive lost circulation. Even though it is possible to drill blind (without fluid returns), especially while coring, the drilling plan was to repair loss zones as they were penetrated, thus improving the probability of a competent cement job on the casing. This was an important objective, because the test plan included a production flow test, which requires good cement around the casing. The cost of this repair, however, was high.

In the interval from surface to 839', seventeen cement plugs were set to combat lost circulation. This led to direct costs for: 376 cubic feet of cement, 114 hours waiting on cement, time to drill out 1033' of cured cement, and trip time for running in and out of the hole with open-ended drill pipe. There were other costs, less well-defined, for: three days and five casing-advance bits consumed by stuck pipe directly attributable to cementing, discarded drilling fluid made unusable by drilling cement, and extra bit wear from drilling cement. Assuming an average daily cost of $8,000, lost circulation resulted in *at least* $80,000 in additional expense. Although the costs just mentioned apply solely to TCH 76-15, the experience was similar in TCH 88-21, which required 21 days to set 7" casing at 510'.

These costs would have been much higher if a commercial cementing contractor had been used for the lost circulation plugs, but cement quantities were small enough that the rig crews could mix cement in tanks and pump it with the rig pumps.

Directional drilling: Changing the hole trajectory was also a long process, requiring 12 days to directionally-drill and ream the interval from 2848' to 3388'. A large part of this time was spent in trying to get the proper equipment into the hole. An oil-field directional drilling company was used first, but their motor was inadequate for the job. When a minerals-drilling directional company was later contracted, the mud-motor work went much better, although the deviated section still required considerable reaming. The lesson to be learned from this is to hire companies who are accustomed to doing the job you want done.

Choice of the interval to be directionally-drilled is frequently affected by the casing design. In this hole, the decision was made to turn the hole below the 4.5" casing shoe. The alternative, directional drilling higher in the well so that the turn would be in the cased section of the hole, would have allowed the use of larger directional-drilling tools and would have put any potential dog-legs behind pipe. Later experience with downhole vibration and difficulty working some of the coring tools through the directional interval indicates that this might have been a better choice.

Value of the trajectory change was also unclear. The directional work turned the hole to an inclination of about 7°, which later built without further deliberate action to about 10°, giving a lateral hole-bottom displacement of about 300 feet. Even considering the hole's previous inclination and azimuth (i.e., where the hole would have gone without correction), the total effect of directional drilling was to change position of the hole-bottom by about 500 lateral feet. It is not

clear from geologic data that this could have had much effect on bottom-hole temperatures or permeability.

Reduction in hole size: A major objective of this drilling was to reach a potential reservoir, down to the maximum target of 7500', which could be tested with a production flow test. As depth increases, the penalty of small wellbore-diameter becomes more significant in a slimhole, compared to a production-size well. For that reason, we tried to keep the hole at HQ (3.9") diameter as long as possible, even after drilling problems indicated that we should reduce to NQ (2.98") diameter.

That decision was costly -- the last section of the hole from 4756' to TD required 31 drilling days, an average less than 20 feet per day. Most of the problems in this interval (see Appendices A and B for details) were related to caving, sloughing, squeezing clay, and differentially stuck pipe. If we had set an HQ liner from approximately 2700' (just above the 4.5" casing shoe) to 4800' and reduced to NQ drilling at that point, it is likely that (a) the drilling time in the 4800'-5360' interval would have been reduced by 50-75%, and (b) we would have had the option of continuing the hole to greater depth. Computer modeling, using a wellbore simulator, of production flow tests (see Appendix C) indicates that this diameter reduction would not have seriously diminished the ability to run a flow test, had the formation been suitable. In short, the decision to maintain HQ diameter after hole problems became severe led to excessive drilling cost which probably could have been avoided with an earlier reduction in hole size.

Cost comparison: During drilling operations at TCH 76-15 detailed daily cost records were kept by on-site Sandia personnel. A summary of total well costs is given below:

ACTIVITY		COST
Rig day rate		$317,075
Footage charges		199,357
Drilling fluids		87,883
H_2S service		12,000
Casing, accessories, and wellhead		92,092
Cement		31,871
Tools (bits, reamers, and directional)		52,570
BOPE rental		40,501
Other rental (sanitary, etc.)		33,712
Site preparation and maintenance		81,694
Supervision		62,250
Water trucks		36,207
Fuel		13,440
Transportation		3,368
Miscellaneous		6,856
TOTAL		1,070,876
Cost per foot	$199.79	

CalEnergy has also released daily reports and total cost figures on the two production wells which were drilled during the same period as the slimhole. That information is summarized below:

Well Number	86-21	23-22
Depth	8869' TVD 9200' TMD	9040' TVD 9602' TMD
Drilling days to TD	75	81
Casing program	20" @ 905' 13-3/8" @ 4199' 9-5/8" liner from 3987-9185'	20" @ 795' 13-3/8" @ 4418' 9-5/8" liner from 4200-9577'
Total cement	9126 cubic feet	8926 cubic feet
TOTAL COST	$3,333,427	$2,895,493
Cost per foot	$362.33	$301.55

The significant cost difference between these wells is primarily due to two workovers in 86-21, but even averaging the costs of the two wells, for a figure of $331.29 per foot, shows that the slimhole cost per foot was 200/331, or 60.4% of the large hole.

VI. CONCLUSIONS

The principal purpose of drilling a slimhole is prediction of productivity in a large well; in effect, prediction of temperature and permeability. To examine temperature first, the temperature gradients in the two slimholes (TCH 88-21 and TCH 76-15) and in the two production wells (86-21 and 23-22) are given below. These gradients were in the same 1000' interval relative to sea-level elevation; that is, they were not at the same measured depths in the wells. Note that the temperature gradients (derived from temperature logs) are corrected for the inclination of the wells and are defined as ^{o}F/100 vertical feet. Note also that 88-21 and 86-21 are within 1000' of each other, 23-22 is approximately 2400' north-east of them, and 76-15 is approximately 4700' north-east of 23-22.

Well Number	Approximate WH elevation, ft. ASL	Gradient in interval 2600-3600' ASL, (^{o}F/100 vertical feet)
88-21 (slimhole)	6240	8.2
76-15 (slimhole)	6820	7.4
86-21	6240	7.1
23-22 (12/95)	6600	6.8
23-22 (8/97)	6600	9.3

Temperature gradients in the slimholes were consistently higher than in the early data from the production wells. This would lead to over-prediction of reservoir temperatures from the slimhole data, but there are several possible explanations for this discrepancy. First, it is possible that the production wells actually did have lower gradients at that time, although 88-21 and 86-21 were only about 1000' apart and 23-22 is spaced between the two slimholes. It does not seem reasonable that the slimholes' formations would have uniformly higher gradients than the production wells.

A more likely scenario is related to the way the holes were made. The slimholes were drilled with minerals-type diamond coring tools, which have very low flow rates (15-25 gpm) compared with the production wells drilled with conventional rotary rigs having mud flows of 500-600 gallons per minute. The cooling effect on the wellbore is much greater in the larger holes and, therefore, so is the temperature recovery once drilling is done. Figure 3 shows that temperatures in

TCH76-15 are very little different at the end of drilling, one week later, and almost two years later. In contrast, Figure 5 shows a comparison between temperatures in 23-22 a few days after drilling and almost two years later. The hole has heated up significantly, and the gradient at the bottom of the well is higher than before. It is not clear that this effect is entirely due to recovery from drilling fluid circulation, but the logs from 76-15 (the closest other well) do not indicate a regional change in temperature profile. The cooling effect is also aggravated by the short times after drilling at which the logs were done in the production wells -- only four days after circulation and testing in 23-22.

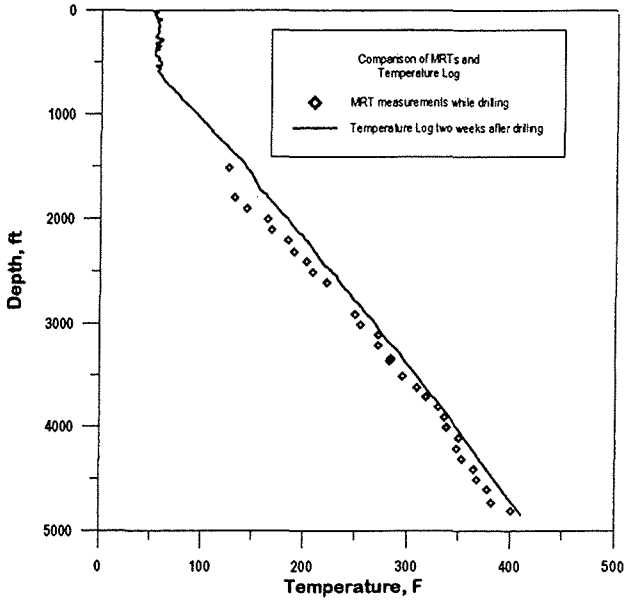

Figure 4 - Illustration of temperature recovery in slimhole

Circulation within the wellbore during drilling has a greater effect on the cold-water aquifer ("rain curtain") in the big wells than in the slimholes. [This zone, at about 6000' ASL, is 90°F in the big wells, but only 50°F in the slimholes, implying that the aquifer is heated by the greater circulation in the production wells.] Wellbore circulation past the warmer aquifer in the big wells, then, causes the top of the well to be warmer and the bottom of the well to be cooler, relative to the slimholes, lowering the temperature gradient.

There is also wellbore circulation after drilling; in Figure 5 the near-isothermal interval coincides with the "blank" section of an uncemented liner. Spinner logs in that interval show flow downward in the wellbore, which means that there is flow up the outside of the liner. Again, the relationship between this circulation and the marked increase in temperature is not clear.

Since the production wells were approximately 9000' deep and the slimholes were about 5000', predicting permeability is even more chancy. In fact, permeability was low in all the wells. It is certainly not the case that corresponding permeabilities would necessarily be similar over this depth range, but the slimholes did reflect the production wells' permeabilities.

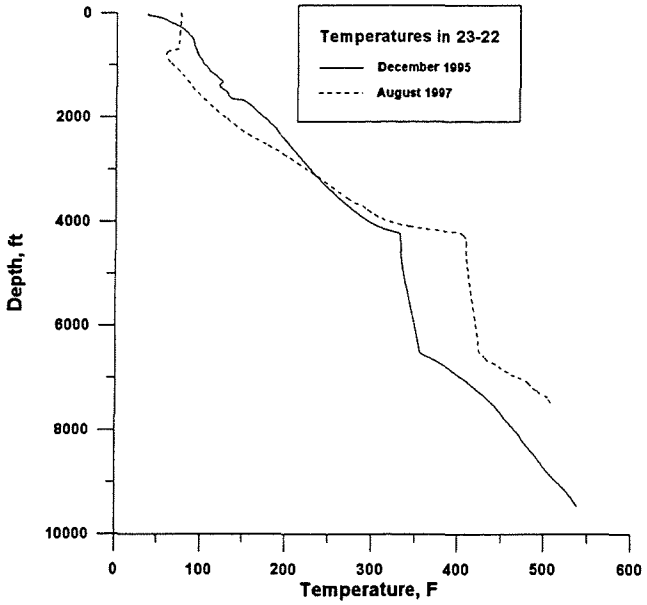

Figure 5 - Well temperatures over time in 23-22

In general, the slimholes were informative, particularly in terms of the temperature-gradient data and in the lithologic data inherent in the core samples. They were not, however, especially predictive of reservoir potential because they did not reach the postulated reservoir depth. Even if the temperatures had been accurately extrapolated from the slimhole profiles, little would have

been known about the permeability and productivity in a horizon several thousand feet deeper than the slimholes reached. Finally, if the two slimholes had not been drilled, it is highly likely that another production-size well would have been used to confirm reservoir characteristics. This would have entailed an additional cost of approximately $1 million.

VII. RECOMMENDATIONS

It would be worthwhile to further evaluate data collected from the slimholes so that we can better understand their benefits and shortcomings. Two major issues to be resolved are the discrepancy between temperature gradients in the slimholes and in the production wells, and the effect of surface elevation on comparison of data among wells. Some activities might clarify these questions:

- Monitoring water level in all the wells could help resolve the effect of wellhead elevation.
- Comparison of lithologic data (especially from core) might enable correlation of strata among the different locations.
- Late-time temperature logs in 86-21 would show whether it has heated up in the same way as 23-22.

VIII. BRIEF GEOLOGIC DESCRIPTION (summarized from Reference 2)

The Newberry Volcano, covering more than 500 square miles, is one of the largest Quaternary volcanoes in the conterminous United States. It lies at the west end of the High Lava Plains province in central Oregon, an extensive volcanic zone measuring approximately 150 miles east-west and 50 miles north-south. There have been many volcanic events in the Newberry area since the first lava flows about 1,200,000 years ago (ya), with major eruptions as recently as 1,250 ya.

At the summit of the gently rising volcano, there is a four-to-five-mile-wide caldera called Newberry Crater. This depression contains East Lake and Paulina Lake, each approximately 1.5 miles in diameter, and is a collapse structure made up of several nested sets of walls. It is probably the result of several large tephra eruptions, possibly from more than one magma chamber, each accompanied by chamber collapse. These eruptions are believed to have taken place over a period from about 500,000 ya to 200,000 ya. The caldera floor contains more than 1500 feet of assorted, mostly rhyolite, fill, including domes, flows, ash fall, and explosion breccias.

Since the caldera was formed, there have been three other major eruptive sequences, grouped around the periods 10,000-12,000 ya, 7,000 ya, and 1250 ya. Ages of most flows at Newberry are described in relation to the eruption of Mt. Mazama, about 7,600 ya, which formed the crater now occupied by Crater Lake. This event, approximately 65 miles south of Newberry, covered this area with two to three feet of ash, so local flows which over- or underlie the Mazama ash can be easily dated with reference to it. The Mazama ashfall also drove away the indigenous Native American population which had previously inhabited this region year-round

During the period 12,000 to 10,000 ya, most eruptive activity was to the south and east of the crater, but about 7,000 ya (shortly after the Mt. Mazama eruption) the Northwest Eruptive Period occurred along the Northwest Rift Zone, which extends nearly 20 miles from the caldera (to the vicinity of the present Lava Lands Visitor Center.) This zone of weakness was the source for at least 13 separate basaltic-andesite flows covering a total area of nearly 40 square miles. Later (about 3,500 ya) the East Lake Eruptive Period produced two small obsidian flows but these flows and the associated tephra were later covered by ashfall from the most recent and well-known event at Newberry, the Big Obsidian Eruptive Period. This was a three-stage eruption which produced, in order, (1) explosively-driven pumice and ash which were carried downwind (ENE) and accumulated almost a foot thick approximately 40 miles away, (2) the Paulina Lake Ashflow

extending almost two miles south-east of Paulina Lake, and (3) the Big Obsidian Flow, which covers an area about 0.8 by 1.5 miles, overlying part of the ashflow southeast of Paulina Lake. There is considerable evidence that a magma chamber existed through Holocene time (from 10,000 ya to present), without crystallizing between eruptions or since the last eruption, and may still exist. At present, the east and west flanks of the volcano are mostly covered by ash flows, pumice falls, mudflows, and other pyroclastic deposits; the north and south flanks probably also have these deposits at depth, but they are overlain by basalt and andesite flows.

The Newberry National Volcanic Monument, roughly including Newberry Crater and the Northwest Rift Zone, was created in 1990. The Monument is bounded in places by a Special Management Area, in which surface occupancy is prohibited but directional drilling beneath the SMA is allowed. The wells described in this report are just outside the SMA, generally north-west of Paulina Lake (see Figure 6.) Detailed descriptions of lithology penetrated by the corehole can be found in the Daily Drilling Reports (Appendix B.)

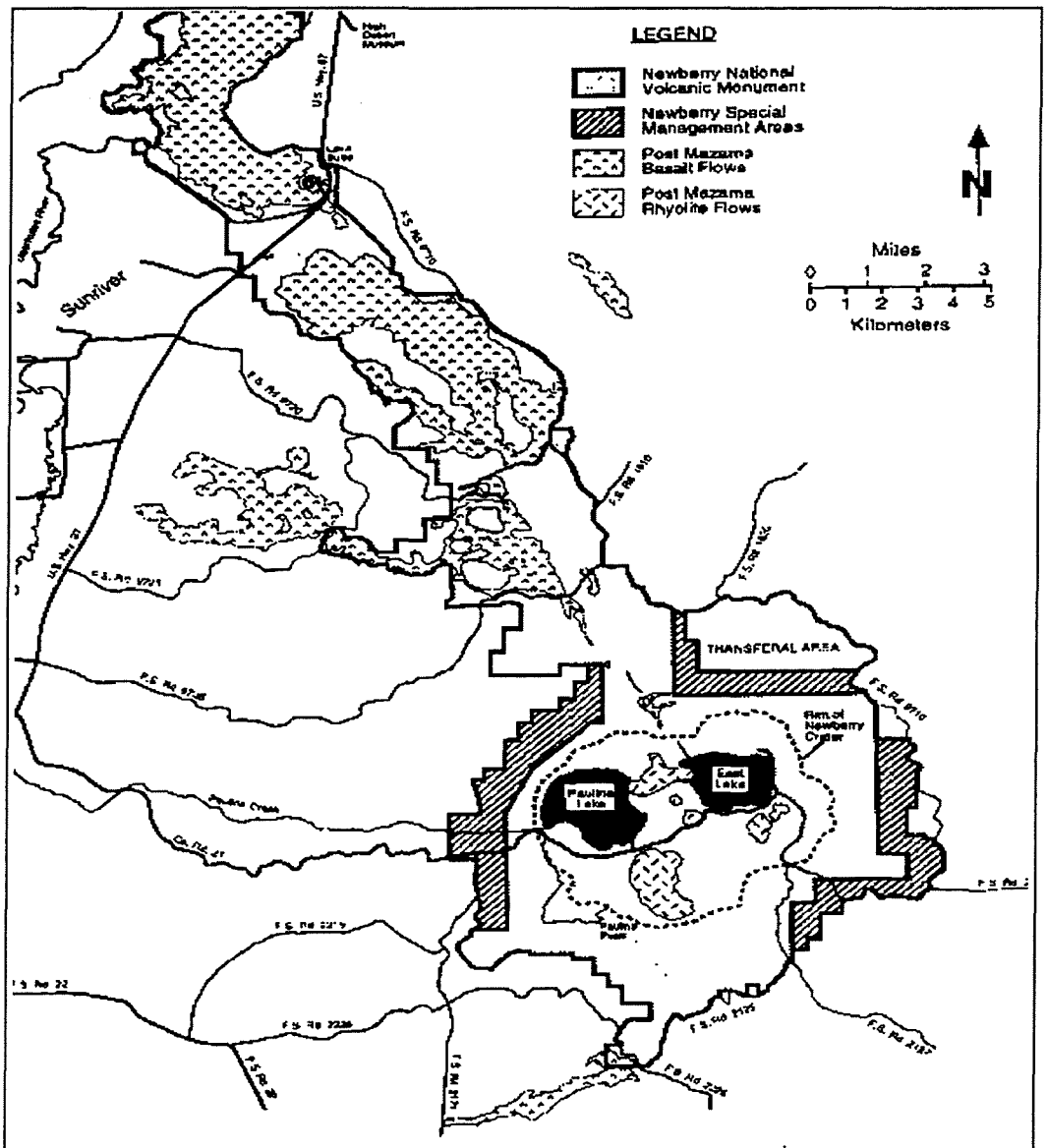

Figure 6 - Vicinity of Newberry National Volcanic Monument (from Reference 2)

IX. GLOSSARY

The following terms are common in drilling practice; many of them are used in this report:

annular preventer - part of the BOP stack; an inflatable bladder which seals around drillpipe, casing, drill collars, or irregularly shaped components of the drillstring.

Bowen spear - a fishing tool which expands inside a fish when the drillstring is pulled up

BOP - blow out preventer; one or more devices used to seal the well at the wellhead, preventing uncontrolled escape of gases or steam. Also BOPE - blow-out prevention equipment See *annular preventer, rams*.

block, or blocked run - a core run is blocked when fractured rock wedges into the core tube and prevents further drilling before the tube is full.

cave - debris that falls off the wellbore walls and accumulates in the bottom of the hole

fish - any part of the drillstring, or other tools, accidentally left in the hole

fishing - trying to retrieve a fish

float - essentially a check valve, used in the drillstring to keep liquid from flowing back up the drillpipe or casing

float collar - a coupling with built-in float; placed near the bottom of a casing string to prevent the heavy cement column in the annulus from flowing back into the casing. After displacement the casing between the float collar and the shoe will be full of cement

float shoe - a casing shoe with built-in float; used like a float collar, except there won't be cement inside the casing

Geoset - a type of synthetic diamond cutter used in impregnated bits

H or HQ - designation of a coring tool size; rod outside diameter is 3.5", bit is approximately 3.9" OD and 2.5" ID

H_2S - hydrogen sulfide; a poisonous gas sometimes found in geothermal drilling

jars - tools which apply an impulse force to the bottom of the drillstring when the string is pulled up; usually used for fishing, but sometimes included in the string for normal drilling

lay down - to take a piece of equipment out of service; e.g., to lay down a worn core rod

LCM - lost circulation material; any material used for plugging formation fractures to avoid loss of drilling fluid

lubricator - sealing element attached to the wellhead which allows a wireline to pass up and down, or which allows a logging tool to be transferred into or out of the wellbore, while there is pressure in the wellbore

matrix - the hard metal portion of a bit which holds the diamond cutting elements in place

mislatch - the condition when the core tube, or inner barrel, is not latched into the outer rotating barrel, sometimes caused by core dropped out of the core tube. If the core tube can't be worked down over the core in the barrel, then the drillstring must be tripped to clear it.

MRT - maximum reading thermometer; a mercury thermometer which retains the reading of the highest temperature it has seen (which may not be at the bottom of the hole)

N or NQ - coring tool size; rod OD is 2.75", bit is 2.98" OD and 1.875" ID (N fits inside H)

nipple up - to assemble something; usually applied to the wellhead or BOP stack

OEDP - open ended drill pipe; drillpipe without a bit or other bottomhole assembly, generally used when cement is pumped through the drillpipe

overshot - in general, any tool that latches around the outside top of another tool; usually refers to the assembly which retrieves the core tube with the wireline, or to a fishing tool which extracts a fish by gripping it around the top

PTS - pressure-temperature-spinner tool; downhole instrumentation to measure these quantities (spinner output is an indication of velocity or flow rate)

pick up - to put any piece of equipment into use; e.g., to pick up a new bit

pitcher nipple - the vertical tube around the top of the blow-out preventer; it collects the drilling mud returns and empties them back into the mud tanks

POOH - pull out of hole; bringing the drill string and tools out of the hole

rams, pipe or blind - rams are part of the blow-out preventer; pipe rams close around the drill pipe if it is in the hole, blind rams seal against each other if the pipe is not in the hole

RIH - run in hole; inserting the drillstring and tools into the hole

shoe - a heavy, tapered cap that attaches to the bottom of the casing string and protects it as the casing is lowered into the hole

spud - to begin drilling a well

stand - more than one joint of drill pipe screwed together; when tripping, pipe is handled in stands to avoid making and breaking every connection - for a coring rig, a typical stand is four ten-foot joints (40 ft), but for a large rotary rig, a stand is three thirty-foot joints (90 ft).

strip - to wear away the matrix in an impregnated diamond bit; the bit must strip to expose the diamond cutting surfaces

swage, inside or outside - a fishing tool which grabs the inside or outside of a fish by forcing an interference fit

trip - any event of pulling the drillstring or core barrel out of the hole and returning it

washout - a leak in the flow path through the drillstring, usually at a threaded connection. The hole is enlarged by high-pressure drilling fluid passing through it, and frequently causes the drillstring to fail and separate.

wiper trip - running the drill string, with a bit, to the bottom of the hole to make sure there are no obstructions in the hole

WOC - wait on cement, time spent waiting on cement

xover or xo - crossover; a coupling used to adapt from one thread size to another

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APPENDIX A

The following day-by-day narrative represents notes made by Sandia field personnel during the drilling operations. Definitions of abbreviations and jargon are given in the Glossary, Section IX. This narrative is complementary to the Daily Drilling Reports in Appendix B.

NEWBERRY EXPLORATORY SLIMHOLE
DAILY NARRATIVE

24 July 95

0700 - Rigging up Longyear rig #602. Pad construction (approximately 80' by 145') is complete except for fencing. Sump (500 bbl) is dug.

1500 - Making up BHA to drill hole for conductor.

1600 - Mixing mud.

1800 - Drilling 7-7/8" hole from 11' to 22' KB.

Kelly Bushing (KB) is 11' above ground level -- all reported depths are referenced to KB.

2130 - Open hole from 7-7/8" to 12-1/4" to 22'.

2330 - Circulate hole clean.

25 July 95

0400 - Set 10-3/4" conductor to 22' and cement with Redi-Mix from surface.

0800 - WOC; continue moving equipment from previous corehole (TCH 88-21) location to 76-15.

0900 - Run log with Sandia temperature tool and logging truck in 88-21. Bottomhole temperature is 410°F at 4833'.

2200 - Make up BHA for 9-1/2" hole.

26 July 95

0400 - Drill 9-1/2" hole to 31', lost returns. Mix and pump LCM pill.

1200 - Drill to 58', losing approximately 8 gpm.

1500 - POOH and pick up open-ended 101 drillpipe, and RIH to 56'.

1600 - Mix and pump 19.5 cubic feet cement + LCM. POOH and WOC.

2400 - RIH and tag cement at 20' (hole took 1 bbl of cement.)

27 July 95

0300 - Cleaned out cement from 20' to 58'.

1800 - Have drilled to 170'. Lost circulation at 150', regained with LCM, drilled to 170', lost returns again, regained with 10 bbl mud, drilled to 174' with partial returns. POOH.

2000 - RIH with open-ended 101 rods to 160'.

2230 - Pump 31 cubic feet (22 sacks) of cement; calculated top of cement at 111'. WOC.

28 July 95

0230 - RIH, did not tag cement (apparently no fill.)

0330 - Pump another 31 cf (equivalent to 63 linear feet in this size hole) cement. WOC.

0900 - RIH, tag cement at 124' (50' fill), mix and pump another 70' (30 sacks) plug.

1500 - WOC. RIH, tag cement at 64'

1630 - Begin drilling out cement at 60'.

1730 - Drill out cement to 84'. Forest Service arrives with news of a mid-size (100 acres) forest fire approximately 3/4 mile away. They order Longyear crew to evacuate drill site. Crew goes to holding area on gravel road (about 5-6 miles from location.)

2000 - Forest Service allows re-entry to drill site. Longyear crew pull mobile homes and trailers to holding area, and drive Winnebago and Smeal there.

2200 - Sandia personnel arrive and secure our vehicles.

29 July 95

0800 - Return to holding area and confer with Forest Service. Safety meeting by USFS at staging area. They allow return to drill site, we tow generators to holding area near well 88-21, assist in moving Longyear equipment.

1400 - Take all Sandia vehicles (Winnebago, Smeal, pickup) back to Bend.

1700 - Longyear resumes drilling out cement plug. Drill from 84' to 100'.

2200 - Rig shut down for night with fire watch.

30 July 95

0700 - Longyear resumes drilling. Sandia personnel restore Winnebago to operating condition, return it and Smeal derrick truck to drill site. LY continues to drill out cement plug.

1500 - Drilling new hole below 174', losing approximately 50 gpm.

1800 - Have re-connected most Sandia instrumentation to drill rig.

1830 - Drilling ahead at 253' with fairly steady lost circulation.

2000 - Lose complete returns at 264'.

2330 - POOH and cement from 273' back to ~190'. Drilling strategy is to cement up loss zones as we go, to assure that the first casing string gets a good cement job. WOC

31 July 95

0500 - Fill hole with 18 bbl mud, RIH and tag cement at 245' (incomplete fill.) Begin drilling out cement.

1200 - Drilling ahead at 318' with nearly full returns.

1600 - Lose complete circulation at 375', pump LCM pill.

1700 - Regain circulation after making a connection; drilling ahead.

2200 - Lost circulation again at 403'. POOH and lay down bit; RIH with open-ended CHD101 drill pipe; fluid level at ~245'.

1 August 95

0100 - Place 40' plug with OEDP at 245'. POOH and WOC.

0800 - RIH, tag cement at 242', drill out cement to 251', lose circulation.

0930 - RIH with OEDP to 240', pump 60' cement plug, POOH.

1200 - WOC.

1800 - Fill hole and RIH to tag cement at 172'.

2400 - Drill to 263', lose returns, POOH.

2 August 95

0200 - Pump 60' cement plug. Fill hole with 12 bbl mud. WOC.

0700 - Tag cement at 207'. Begin cleaning out cement.

1200 - Cleaned out cement to 308'.

1530 - Back to bottom (less 6' of fill.) Drilling ahead, with hole staying full.

2400 - Drilled to 475' in competent formation with no losses.

3 August 95

0500 - Drilled to 515' with no losses.

1100 - Drilled to 544', proposed depth for setting 7" casing at 541'. Circulate.

1400 - Survey hole;

1500 - Having difficulty coming out of the hole for wiper trip. Drilling assembly is hanging up at ~372'. Working pipe.

1800 - Still working pipe; about 5' progress.

2200 - Work pipe free at 347'. POOH, check tools. Bit has one bad cone, change bits. Find that pipe tally is wrong and hole is actually only 524' deep. Run back in hole.

2400 - Ream to 446', no losses.

4 August 95

0400 - Ream to bottom, resume drilling ahead at 524'..

0900 - Drill to 544', circulate and POOH. Still a tight spot at 365', work back and forth through it three times.

1200 - No longer any apparent obstruction, so POOH and rig up to run casing.

1400 - Begin running 12 joints 7", 26# casing with guide shoe at bottom and insert float at top of first joint. Shoe is at 538', insert baffle is at 494'.

1500 - Casing in place; rig up Halliburton to cement. Pump 5 bbl water, 10 bbl Super-flush, lead slurry (95 sacks premium cement, 1:1 perlite, 40% silica flour, 3% gel = 202 cubic feet), tail (35 sacks premium, 40% silica flour, 0.65% friction reducer = 58 cubic feet.) Drop plug and displace with 18.8 bbl water. Land plug with 700 psi, float holds.

1610 - Cement in place. WOC

5 August 95

0800 - Cement has fallen back in the annulus. Drilling crews have mixed and added 88 sacks of cement to the annulus through the night. Volumetrically, this is equivalent to 410 linear feet, but much of this has probably gone out the persistent loss zone at ~245'. Cement is now stable, 7" casing is cut off just above ground level, and wellhead is welded onto the casing.

1200 - Have been laying down drill collars. Still ready to begin nippling up BOP.

1700 - Still nippling up BOP; double-gate and annular preventer are in place.

6 August 95

0300 - Start BOP test, witnessed by Dennis Davis, BLM, and Dennis Olmstead, DOGAMI

0430 - BOP test complete, all components hold 1000 psi except annular preventer, which is only required to be tested to 500 psi.

1000 - Wash to bottom (top of cement at 474') and start cleaning out cement with 6-1/8" bit.

1200 - Mud pump suction line is plugged. Dump and clean pits. Mix new mud and drill cement.

1800 - Have cleaned out cement to insert float at 494'. POOH and lay down CHD 101 drill rods. Running 4-1/2" flush joint casing to float. Bottom of this casing is landed on the float, with a steel donut at the top to center it in the wellhead. This casing will act as a bushing for the core rods, since there is too much annulus to run H-rods inside 7" casing.

7 August 95

0030 - RIH with H rods and core barrel. Drill cement.

0500 - Drilling cement at 509'.

1200 - Have drilled to 549' (out of cement and 5' into new formation.) Because of problems with the 7" casing leak-off test at TCH 88-21, CECI and BLM have agreed to the following test after drilling out the 7" shoe: Drill 5' into new formation, fill hole with water, let it sit for 30 minutes, measure water level - if water level remains stable, this constitutes a "percolation test", which is essentially a pressure leak-off test at a gradient of 0.433 psi/ft. Hole passed this test, so we can drill to an unstabilized bottomhole temperature of 330°F before setting the next casing, which should be far more than we need, based on the temperature gradient of TCH 88-21.

1530 - Drilling at 569'. Formation is much less competent (looks cindery, with rubble in core) than just below shoe. Some lost circulation and near-sticking.

1600 - Lose total returns at 575'. Mix LCM pill, regain returns.

2200 - Cored to 583', hole is sloughing with small fluid loss. POOH with drilling assembly and HW liner.

8 August 95

0345 - Cement (48 gal) from 583' to 505'. WOC for one hour, then close blind rams and squeeze cement. WOC.

1200 - Clean out cement stringers down to float with 6-1/8" roller bit.

1630 - Have RIH with HW liner sleeve, circulated mud behind it, and RIH with H coring assembly. Tag cement at 562'.

2000 - Clean out cement to 566', start losing about 8 gpm. Mix and circulate LCM, regain returns, clean out cement to 583' with ~1 gpm loss.

2400 - Core new hole to 600' with small loss.

9 August 95

0500 - Have cored to 604' and lost all returns. Water level holds at ~250'. POOH with drill pipe, POOH with HW liner sleeve, RIH with OEDP and pump another 5 sack (78 linear feet) plug. Squeeze cement with 50 psi, won't hold pressure. WOC.

0900 - Fill hole, RIH with 6-1/8" bit.

1330 - Finish cleaning out cement to 501'.

1430 - POOH with 101 rods and drill collars

1530 - RIH with HW liner sleeve.

1700 - Circulate high-viscosity mud up backside of HW sleeve.

1730 - RIH with H-rods and tag cement at 524'

1900 - Clean out cement to 604'.

2400 - Coring ahead at 644' with nearly full returns.

10 August 95

0530 - Coring ahead at 709' and lose complete returns.

0700 - Mix and pump four LCM pills, but there is almost no pump pressure, indicating that there is very little fluid in the hole. Do not get returns, so prepare to cement.

1000 - Cement in place (15 sacks = 228 linear feet) with OEDP at 709'. POOH with HQ, pull HW casing back two stands and rotate pipe while WOC.

1900 - Set HW back on bottom at 501', RIH with HQ. Tag cement at 604', pull up to 602', lay down 10' of H-rod to connect kelly hose, and pipe is stuck.

2400 - Work pipe, can't get free. Have called Longyear yard for more HW casing and washover shoe.

11 August 95

0800 - Still waiting on tools.

1400 - Additional HW casing and casing-advance shoe (washover bit) arrive. This bit has diamond-impregnated matrix, very similar to a core bit, and an outside diameter of approximately 4.7". It is attached to the bottom of the casing and then the casing is rotated to drill down the outside of the stuck core rods.

1700 - RIH with HW casing string and bit; begin washing over core pipe. Turning about 200 rpm and pumping about 40 gpm.

2200 - Drilling washover at 555'

12 August 95

0330 - POOH to pick up new casing-advance shoe (CAS).

0645 - Resume drilling.

0800 - Drilling washover at 577'.

1200 - POOH for new CAS at 582'. The casing shoes have a #2 matrix, which is the most abrasion-resistant available, but their life is not very good.

1800 - Drilling washover at 588', bit is torquing up. POOH to check bit, inside gauge is worn, probably from drilling around upper stabilizer. Can't put bit back in hole because it's cracked, and there is a possibility of a cutter/matrix segment (very serious junk) coming off if we re-use it. Will wait on tools, since that was the last CAS, and more bits won't be in Eugene until approximately 2300 tonight.

1830 - Screw into HQ and work stuck pipe, no movement.

13 August 95

0300 - New bits arrive.

0500 - Pick up new bit and RIH. Wash to bottom, no fill. Resume drilling.

0730 - High torque, POOH, bit is worn out on inside gauge. Comparison to previous bit indicates than it has drilled somewhat (a couple of inches) farther down the stabilizer.

0830 - Pick up new bit and RIH

1200 - Have apparently gotten past top stabilizer, drilling at 592'.

1700 - Have drilled to 602'. POOH with casing string.

1815 - Make connection with HQ string and pull up. String comes free, POOH with HQ.

2000 - RIH with OEDP and set 146 lin. ft. cement plug at 602'. POOH and WOC.

14 August 95

0900 - RIH with 6-1/8" bit and find no hard cement down to 501'. Circulate contaminated mud out of hole. POOH.

1400 - Have run in hole with open-ended HQ and circulated soft cement out of hole down to 550'. Pump 15 sacks cement at 550' and POOH, WOC.

15 August 95

0000 - RIH with 6-1/8" bit, tag good cement at 488', clean out cement to 500'.

0600 - POOH with bit, lay down drill collars, RIH with HW liner sleeve. Sleeve has a worn bit on bottom joint, will be landed on that bit at 500'.

1000 - RIH with coring string, begin coring cement at 500'.

2200 - Begin seeing some formation in core at 600' (which is where bit was stuck.)

16 August 95

0120 - Cored to 622', core is all formation by 617'.

0500 - Coring ahead in rock at 642'.

1500 - Coring ahead with some lost circulation; reach 701' and lose complete returns. Pump LCM pills, no help.

1600 - POOH with HQ, prepare to cement.

1730 - Pump 229 lin. ft cement plug through OEDP at 700'. POOH and WOC.

2200 - RIH with coring assembly, wash from 440' to 518'.

17 August 95

0500 - Have washed to 571', tagged good cement. Cored cement to 664' with good returns.

0800 - Cored cement to 701', new formation to 707', lost all returns.

0930 - Regained partial returns with LCM, drilling ahead.

1200 - Drilled to 720' with occasional returns, bit is gone. Will POOH and cement.

1430 - Pump 15 sacks (18.4 cu ft, 225 lin ft) cement through OEDP at 718'. POOH and WOC.

2100 - RIH with HQ, start washing at 440', tag cement at 590', approximately 40% returns.

2400 - Have drilled cement to 648', adding LCM. Full returns at this point.

18 August 95

0330 - Reached bottom of cement at 720', full returns.

0730 - Drilled to 734', formation is broken and rubble-like. Slow drilling.

1200 - Drilled to 739', hole is caving badly, POOH to cement.

1430 - Pump 15 sacks cement (225 lin. ft.) through OEDP. POOH and WOC.

2000 - Pick up new bit and two new reamer shells, wash in from 484', tag cement at 570'.

19 August 95

0330 - Have drilled cement to 739', now in new formation

0430 - Core to 747', lost returns.

0500 - Pump LCM pill, regain returns.

0900 - Core to 761', bit is gone. POOH, pick up new bit (#2 hardness) and change to 5' core barrel. RIH

1200 - Clean out 6' fill; condition hole.

1500 - Core to 769', lose returns.

1700 - Mix and pump LCM pill, regain full returns.

1900 - Core to 774', hole is sloughing, pull up to 690' condition mud to 50 sec viscosity

2200 - Clean out 5' fill.

2400 - Core to 780'.

20 August 95

0500 - Have cored from 780' to 795', pumping intermittent LCM slugs to maintain circulation.

1300 - Cored to 839', continual lost circulation, partially controlled by LCM. POOH for cement.

1600 - Cement in place (15 sacks = 225 linear feet) WOC

2030 - Waited on cement, RIH with new bit and reamer shell, wash to 568' in soft cement, lost circulation and pumped LCM. Regained partial returns.

21 August 95

0500 - Wash to 783'.

0700 - Clean out cement to 838'.

1100 - POOH from 872' to pick up 10' core barrel.

1900 - Cored to 902' with partial returns, pumping LCM slugs. Survey; inclination = 2.75°, BHT = 70°F. Core ahead.

2400 - Coring at 922' with partial returns.

22 August 95

0500 - Coring at 958' with partial returns.

1100 - Coring at 998', small returns, some competent formation, much is heavily broken.

1430 - Survey at 1008'; inclination = 2-3/4°, BHT = 75°F

1730 - Coring at 1047' with approximately 40-50% returns, much more competent rock.

2400 - Core to 1107' with partial returns.

23 August 95

0100 - Survey at 1107'; inclination = 2-1/2°, azimuth = 4°, BHT = 76°F.

0500 - Core to 1148'

1600 - Cored to 1208' and survey; inclination = 2-1/2°, azimuth = 296°, BHT = 76°F.

2230 - Core to 1304' and survey; inclination = 2-3/4°, azimuth = 285°, BHT = 74°F.

24 August 95

0500 - Coring at 1368' with partial returns.

1100 - Cored to 1408' and survey; inclination = 2-1/2°, azimuth = 286°, BHT = 74°F.

1500 - Cored to 1448', pump two LCM slugs, get high pump pressure.

1600 - POOH

1700 - Make up 20' core barrel and pick up new bit

1800 - RIH; hole is tight at 1200'.

1900 - Pull back to 640' and wash to bottom.

25 August 95

0300 - Resume coring at 1448' and run into broken rock; have not had long core runs.

0500 - Coring at 1465', pumping down annulus to maintain fluid there, generally having partial returns. Current strategy is to drill to casing point (~2400') without repairing loss zones, unless the hole dictates otherwise.

1030 - POOH to lay down 20' barrel.

1300 - RIH with 10' barrel to 640'.

1530 - Have washed to 1489' with approximately 50% returns.

1800 - Core to 1499', lose returns.

2400 - Have mixed and pumped LCM, regained 50% returns, cored to 1510'.

26 August 95

0200 - Core to 1518' and survey; inclination = 2-1/4°, azimuth = 288° true, BHT = 72°F.

0500 - Core to 1528' with ~50% returns.

1200 - Core to 1561'

1800 - Broke wireline pulling a tube from 1582'. POOH far enough to retrieve core tube, and then come rest of the way out to look at bit, since it was drilling slowly.

1900 - Bit is in good condition, replace top reamer shell and RIH.

2300 - Core to 1591'; core tube is stuck. Work core tube.

27 August 95

0100 - POOH for stuck inner barrel.

0500 - RIH, pump LCM slugs, core to 1608'.

0900 - Survey; inclination = 2-3/4°, azimuth = 282° true, BHT = 71°F

1200 - Coring ahead at 1624'.

2400 - Coring ahead at 1664'. Have been pumping LCM slugs to maintain 20-50% returns.

28 August 95

0500 - Coring ahead at 1679', pumping LCM slugs.

1200 - Core to 1707' and survey; inclination = 2-3/4°, azimuth = 278° true, BHT = 74°F.

2400 - Continue coring to 1747', pumping intermittent LCM sweeps. Returns range from 0-70%.

29 August 95

0200 - Core to 1751', POOH for bit change.

0500 - RIH, mix and pump LCM slugs.

1200 - Core to 1785'

1430 - Have cored to 1807' and surveyed; inclination = 3-1/4°, azimuth = 278° true, BHT = 78°F.

2400 - Core to 1825'

30 August 95

0500 - Core to 1843'.

1200 - Core to 1871'

2200 - Core to 1907' and survey; inclination = 3-1/4°, azimuth = 274° true, BHT = 78°F.

2400 - Core to 1911'.

31 August 95

1200 - Core to 1950'.

1300 - Core to 1955', core tube stuck, work stuck tube.

1345 - POOH to retrieve stuck tube.

1630 - Extract stuck tube (latch-head bearing had broken, dropping a ball between inner and outer tubes), splice broken wireline, wireline release didn't work

1730 - RIH with new bit (serial # 51755, type ahqzuh/2 - #7)

1930 - On bottom; start coring @ 1955'

1 September 95

0000 - POOH for chuck bearing repair

0530 - Back on bottom without returns, pump LCM pill

0630 - Back on bottom coring from 1975'

1330 - Core to 2010' and survey; inclination = 3-1/2°, azimuth = 277° true, BHT = 93°F.

1600 - Losing core, start short runs

2 September 95

0500 - Coring ahead at 2081'.

0900- -Pumped LCM pill and regained 50% + returns

1130 - Core to 2102' and survey; inclination = 3°, azimuth = 276° true, BHT = 85°F. Rock getting more competent

1400 - Coring ahead at 2118', clean outflow magmeter.

1500 - Coring ahead with good returns.

1800 - Working on stuck tube, wireline release worked, drilled on stuck core, and got tube free

3 September 95

0030 - Pulled back 240' to wipe hole, hole trying to pack off

0500 - Coring ahead at 2187'

0900 - Core to 2202' and survey; inclination = 3°, azimuth = 274° true, BHT = 91°F

1900 - Cored to 2252' then pull back to casing shoe and prepared to leave area due to forest fire in area.

2000 - RIH and resume coring after "all clear" from Forest Service.

4 September 95

0500 - Coring ahead at 2287' after 4 hour pump repair.

0930 - Survey at 2304', bad picture, MRT = 93°F.

1200 - Core to 2314', repeat survey at 2304'; inclination = 2-3/4°, azimuth = 274° true, BHT = 95°F.

2400 - Cored to 2381' with partial returns.

5 September 95

0500 - Cored to 2400', surveyed; inclination = 2-3/4°, azimuth = 274° true, BHT = 98°F.

1000 - Cored to 2416' with 50-75% returns. This is nominal casing setting depth, but rock is fractured, meaning that casing set here would probably not get a good leak-off test after cementing and drilling out the casing shoe. Since the ability to drill to a high temperature (~550°F) is important for testing the hole, we will probably drill deeper in an effort to find more competent rock. Although the rock is fractured, it may not be permeable, so another

option is to set a packer where the core indicates competent wellbore near the bottom of the hole and pressure test the hole bottom to predict the results of a leak-off test.

1030 - POOH to retrieve stuck inner tube.

1400 - Service rig while out of hole. Function test BOP, pick up new bit, RIH with no hole problems.

1600 - Resume coring.

2400 - Core to 2464' with 30-50% returns.

6 September 95

0500 - Coring at 2486', adding a handful of LCM at each connection. Rock is still fractured, although not as badly as higher in the hole, and geologist is still looking for a good continuous interval to set the casing shoe. We have approximately 2540' of casing on hand, but there will be time to order new casing while we are opening the hole from HQ to 6-1/8", or we can use some of Longyear's HW casing which is now in place as a bushing inside the 7" casing. Benefit of setting casing deeper is that a leak-off test at lower pressure gradient will allow drilling to the same temperature as higher gradient at shallower depth.

1200 - Cored to 2518', survey at 2508'; inclination = 2-3/4^{o}, azimuth = 280^{o} true, BHT = 95^{o}F

1700 - Cored to 2543' with small returns (<10%). Lost all returns at 2543'.

2200 - Coring at 2582', mix and pump LCM sweep, regain 30-40% returns.

2400 - Cored to 2593'.

7 September 95

Core drilled steadily throughout the full 24 hours. Footage was from 2593' to 2718', with generally <50% returns. Surveyed at 2603'; inclination = 2^{o}, azimuth = 276^{o} true, BHT = 95^{o}F. Core runs in the upper part of this interval were short, but below about 2700', formation became more competent.

8 September 95

0100 - Surveyed at 2718'; inclination = 2-1/2^{o}, azimuth = 280^{o} true, BHT = 111^{o}F

0800 - Cored to 2748', formation still seems to be competent rhyolite. Geologist picks this as casing point.

1200 - POOH with HQ rods, stand most HQ back in derrick, lay down remainder of rod and core barrel.

1500 - Unload gel truck with hydrocrane, move and measure drill collars.

1900 - POOH and lay down HW casing which has been the bushing inside the 7" casing.

2200 - Pick up drill collars, make up BHA.

9 September 95

0500 - RIH with drill collars to 490', try to pump through drill string but it is plugged.

1200 - POOH and clean drillstring.

1430 - RIH and resume reaming.

2400 - Open hole to 620'.

10 September 95

Full day - Reamed steadily for almost 24 hours, reaching 1012'. ROP averaging about 20 ft/hr, with little lost circulation (returns > 80%)

2300 - Tripped to check tools, all in good shape.

11 September 95

0400 - RIH to 1012', continue reaming.

1215 - Ream to 1072', hole began losing fluid at about 1040'

1445 - Have circulated hole clean and POOH with 101 rods and drilling assembly.

1615 - RIH with HQ rods to 1072' and circulate another 30 minutes.

1745 - Have mixed and pumped 20 sacks cement (theoretical 124 linear feet) through HQ rods.

2400 - Have POOH with HQ, filled hole, and squeezed with rig pumps (50 psi at surface). WOC.

12 September 95

0200 - RIH with new bit.

0900 - Have washed and reamed from 820' to 971', where tagged cement (23' lower than theoretical fill), and cleaned out cement to 1072'.

2400 - Have reamed from 1072' to 1229' with good returns.

13 September 95

0730 - Opened hole to 1328'.

1530 - Opened hole to 1430' with full returns.

2400 - Opened hole to 1554' with full returns.

14 September 95

0730 - Opening hole at 1650', still not losing circulation.

1200 - POOH from 1694' to check tools.

1345 - Bit has several buttons broken from heel row and shirt-tails are thin; pick up new bit.

1750 - RIH and resume opening hole.

2400 - Opening hole at 1801'

15 September 95

0100 - Repair water swivel.

1200 - Opened hole to 1925'.

2400 - Opened hole to 2086'; have had essentially full returns all day.

16 September 95

0500 - Opening hole at 2136', full returns.

0950 - POOH from 2179' to check tools.

1500 - Bit is in fairly good condition, although showing some wear on gauge buttons. Pick up new bit and RIH.

2100 - Survey hole (inside drill pipe) to check trajectory. Inclination is the same as in the core hole at this depth, can't get azimuth because camera compass is inside pipe.

2400 - Open hole to 2204'.

17 September 95

0800 - Open hole to 2293'.

1200 - Open hole to 2342'.

2400 - Open hole to 2520'.

18 September 95

0700 - Open hole to 2638'.

1200 - Opening hole at 2722'.

1345 - Open hole to 2748', which is casing point. Will circulate for one hour.

1445 - POOH for wiper trip.

2400 - Have run back in hole, washing to bottom through tight spot about last 80'.

19 September 95

0400 - Have circulated and pulled two joints of pipe out of the hole; three strands broken on main drilling line. Will circulate and rotate until we get replacement line.

1200 - Replace drilling line. Begin POOH and laying down CHD 101 rods.

1530 - Begin laying down drill collars.

1800 - Rig up and start running casing; 78 joints 4.5", 11.6#/ft, K-55, BT&C

2400 - Finish running casing. Shoe at 2748', baffle at 2690'

20 September 95

0330 - CIP, pumped 5 bbl water ahead of lead: 478 cu. ft. Type G with 35# per sack Spherlite, 40% silica flour, followed by 51 cu. ft. tail. Displaced with 41 bbl water.. Good job with full returns. WOC.

1700 - Howco pumps top job. Takes about 10 bbl, this is enough cement to fill 528'. Original cement must have fallen back to just above the 7" shoe. WOC.

2000 - Cut loose 4.5" casing and start cutting off 7" head and installing 4.5" head.

21 September 95

0000 - Start nippling up BOPE. Missing API ring between well head and mud cross.

0300 - Order API ring from H&H, they will hot-shot it here.

0700 - Waiting on API ring.

1000 - API ring arrives. Continue nippling up.

1200 - Complete BOP test with no leaks. Tested to 1000 psi on rams, 500 psi on the annular. Tests witnessed by Dennis Davis (BLM) and Dan Wermiel (DOGAMI)

1230 - Start in hole with HQ coring tools.

1700 - Tag cement at 2438', which is higher than expected. Start washing in.

2000 - Begin coring hard cement at 2512'

0400 - Core rubber top plug at 2575'; it should have been at 2700'.

0700 - Coring hard cement at 2618'. Making about 10 ft/hr.

1200 - Still coring cement at 2668'.

1500 - Core out insert float at 2700'. Insert appears cocked and flapper open slightly.

1800 - Pressure test casing to 680 psi at 2721' before coring out shoe. Casing held pressure for 5 minutes with no pressure drop.

2200 - Cored to 2751' and pulled tube. Good cement and 2.5' of core. About 1/2" of mud between core and cement.

2245 - Ran leak off test at 400 psi surface pressure, which is 0.6 psi/ft pressure gradient in hole. Pressure dropped 40 psi in 10 minutes. Increased pressure to 680 psi; dropped to ~ 600 psi in 25 min; repressured to 670 psi and dropped to 660 psi in 5 minutes.

2330 - Approved by Dennis Davis (BLM) as a good 0.7 psi/ft gradient test.

23 September 95

1000 - Coring ahead at 2781'. Rock much more fractured.

1600 - Planning to pick up mud motor at 2848' or when bit goes.

24 September 95

0000 - Cored to 2848' and surveyed; inclination = 2-1/4^{o}, azimuth = 267^{o} true, BHT = 134^{o}F.

0100 - POOH at 2848' to pick up mud motor. Service rig while out of hole.

0700 - Start in hole with motor to kick hole back toward the south-east. BHA is surface plug bit/bit sub/motor/bent sub/monel/monel/cross-over/HQ rods.

1000 - Circulate bottoms up and orient motor.

1100 - Trying to motor drill but pressuring up when on bottom

1200 - Call out Halliburton to try bigger pump. Still trying to drill.

1400 - Halliburton arrives and starts to rig up. Using motor and rig pump, ROP ~ 0.5"/hr.

1900 - Still not drilling, release Halliburton and POOH. Will pick up spare mud motor and try running it with rig pumps.

25 September 95

0030 - Second mud motor will not drill, stalls when on bottom. POOH, will pick up core barrel and go back to coring

0500 - Back on bottom at 2848.9' and coring.

0800 - Coring ahead at 2858'.

1200 - Call out CBC Welnav to try to turn hole, Eastman doesn't have tools.

1600 - Pulling core at 2897'. Will core until CBC tools arrive late tomorrow.

26 September 95

0000 - Cored to 2938' and surveyed; inclination = 2-1/4°, azimuth = 251° true, BHT = 140°F.

0800 - Coring at 2985' with full 10' runs.

1200 - CBC on the way from Elko, NV.

1400 - Cored to 3026' and surveyed; inclination = 2°, azimuth = 252° true, BHT = 150°F.

1500 - CBC directional hand called, he is not bringing a pump.

1600 - Call Mannard at CBC Salt Lake, he will try to get pump coming.

1730 - CBC called, pump will be leave Elko at first light on hot-shot truck.

2200 - CBC arrives and makes up tools.

27 September 95

0500 - Cored to 3106' and surveyed; inclination = 2°, azimuth = 251° true, BHT = 158°F.

0600 - Start POOH laying down some HQ to make room in derrick for NQ motor string.

1000 - Start in hole with motor; 1/2° bend in motor, drilling with surface-set bull-nose bit.

1600 - CBC pump arrives, pipe is just about in hole. Rig up pump and get ready to drill.

1800 - Near bottom orienting motor, inclination closer to 3° with CBC setup.

2000 - Motoring ahead at ~ 2 ft/hr.

28 September 95

0000 - Motor drilling at 3112'

0700 - Motor ROP getting very slow, pressure down also. Bit may be gone. POOH

1130 - Out of hole with motor; bit getting dull.

1240 - Motor checked; pick up impregnated "gray" plug bit (CBC classifies bits by color, this is the same as a Longyear #2.)

1830 - Back on bottom, oriented and drilling.

29 September 95

0000 - Drilling ahead with mud motor at 3135'.

0230 - Drill to 3142', pull back and survey at 3118'; inclination = 1.25°, azimuth = 242° true.

0800 - Motoring at 3152'.

1200 - Drill to 3162' and survey at 3138'; inclination = 0.5°, azimuth = 87° true. Attempt is to spiral hole around to the right direction without actually going vertical; appears that hole has come out of the spiral trajectory.

2000 - Drill to 3182 and survey at 3158'; inclination = 0.5°, azimuth = 87° true.

30 September 95

0000 - Drilling ahead with mud motor at 3191'.

0800 - Motoring at 3212' with 90 to 95 % returns. Hole has a calculated dog leg severity of 8.21°/100' at the 3158' survey. This may be misleading due to the near vertical direction. Need to POOH and ream.

1130- Drill to 3222' and survey at 3198', inclination = 2-3/4°, azimuth = 82° true. The hole wants to go east.

1200 - POOH to lay down motor and pick up core barrel.

1530 - Out of hole; make up core barrel w/o near-bit reamer shell, using a stepped surface set bit to act as a pilot to stay in 3.75" motor hole

2100 - Start reaming motor drilled hole.

1 October 95

0000 - Reaming at 3147'

0500 - Start coring at 3222'.

0730 - Finish core run at 3238'.

0800 - Cored to 3238', surveyed; inclination = 3-1/2°, azimuth = 88° true, BHT = 170°F.

0900 - POOH with coring tools to pick up mud motor with new bit and directional tools.

1200 - Out of hole with coring tools. Surface set bit looks good.

1600 - On bottom and orienting. Surveyed at 3218'; inclination = 3-3/4°, azimuth = 82° true. Turned drill pipe ~180° and re-surveyed to check reading.

2 October 95

0000 - Motoring at 3256'.

0200 - Drill to 3262', survey at 3238', inclination = 4-1/4°, azimuth = 89° true.

0900 - Drill to 3282', survey at 3258', inclination = 4-1/2°, azimuth = 91° true.

1500 - Drill to 3302', survey at 3278', inclination = 5-1/2°, azimuth = 94° true.

2100 - Drill to 3317', survey at 3298', inclination = 6°, azimuth = 100° true.

3 October 95

0700 - Drill to 3354', survey at 3328', inclination = 6-1/4°, azimuth = 112° true.

0800 - Will directional drill 20 to 40 more feet then ream and core.

1300 - Drill to 3370', survey at 3348', inclination = 6-1/2°, azimuth = 119° true.

1800 - Drill to 3388', survey at 3368', inclination = 7-1/4°, azimuth = 125° true.

1900 - Start POOH to lay down mud motor and NQ core pipe. Will lay NQ down in 20' lengths for possible use in flow testing.

4 October 95

0400 - Start in hole with core barrel (w/o near-bit reamer shell) on HQ core pipe, using a stepped surface-set core bit to act as a pilot to stay in 3.75" motor hole.

0700 - Stop running in hole with HQ because sump is full and additional pipe will overflow sump.

0800 - Pump off excess fluid from top of sump into frac tank.

1000 - After finish RIH to top of second motor run, start to circulate but hole pressures up. Unable to wash. Pull back to casing and wash in.

1500 - Washed to 3238' and start reaming motor run.

5 October 95

0200 - Finished reaming to 3388' and start coring.

0330 - Cored to 3395', surveyed; inclination = 6-3/4°, azimuth = 123° true, BHT = 176°F.

0800 - Coring ahead at 3405'.

1200 - Cored to 3420' and surveyed; inclination = 7°, azimuth = 127° true.

1600 - Ran MRT on core retrieval at 3438'. This is farther off bottom than survey MRT readings. MRT = 177°F.

6 October 95

0000 - Coring ahead at 3473'.

0900 - Pull core from 3508'. Pipe trying to stick after pulling tube. Pull back to casing and work on mud and pump.

1130 - Due to mud and hole problems decide to POOH and replace mud and BHA. Will use a 20' core barrel with top and bottom stabilizers. Will reduce bentonite and remove Tork-ease from mud system.

1600 - Out of hole. Surface-set bit in good shape but will change to impreg to increase ROP. Change out core barrel to two new 10' barrels with new top and bottom reamer shells.

1900 - RIH to 2748' and circulate out old mud.

2200 - Wash and ream in.

7 October 95

0000 - Start reaming motor run with stiff coring assembly.

0800 - Reaming at 3300'. Reamed hard through motor run and bottom 120' of cored hole with stiff casing assembly.

1400 - Coring to 3508', surveyed; inclination = 8°, azimuth = 132° true, BHT = 185°F.

1900 - Pull core at 3528'. Having trouble with core slipping in core catcher.

8 October 95

0800 - Trying to pull core at 3594'. Still having core slip problems. Tube stuck.

0930 - Start out of hole with HQ rods to remove stuck tube.

1130 - Bearings in latch head dropped ball and locked tube. Could not disassemble. Replaced upper 10' core barrel and latch head.

1230 - Replace hydraulic valve while out of hole.

1500 - Start RIH with old 10' upper core barrel and new latch head.

1700 - Start washing and reaming from casing shoe.

1900 - Reaming through clay squeeze from debris flow.

2000 - Start coring partial new hole at 3589'. Kicked out 5' off bottom.

9 October 95

0000 - Core to 3599'

0430 - Core to 3619', survey; inclination = 7-1/2°, azimuth = 139° true, BHT = 200°F.

0830 - Pulling core at 3639'. Water pressure high from clay squeeze

1300 - Pull back 240' for wiper run through clay at 3659'.

2200 - Core to 3719', surveyed; inclination = 8°, azimuth = 144° true, BHT = 226°F.

10 October 95

0000 - Core to 3732'.

0700 - Pulling core at 3779'.

1400 - Core to 3819', surveyed; inclination = 8-1/2°, azimuth = 146° true, BHT = 239°F.

11 October 95

0000 - Cored to 3879'.

0700 - Core to 3919', surveyed; inclination = 9-1/4°, azimuth = 140° true, BHT = 247°F.

2000 - Core to 4019', surveyed; inclination = 9-1/4°, azimuth = 147° true, BHT = 252°F.

12 October 95

0000 - Core to 4052'.

0800 - Core to 4096'.

1300 - Core to 4116', surveyed; inclination = 9-3/4°, azimuth = 145° true, BHT = 255°F.

2300 - Stand pipe pressured up to 1000 psi after dropping tube. Pull tube and tighten core lifter case.

13 October 95

0100 - Tube back on bottom and pressure now normal. Coring ahead at 4189'.

0800 - Core to 4229', surveyed; inclination = 10°, azimuth = 147° true, BHT = 264°F.

1400 - Run temperature log on CE 86-21

1900 - Will core ahead to 4329' then make wiper trip to casing, then back to bottom and circulate bottoms up.

14 October 95

0100 - Core to 4329', surveyed; no picture, BHT = 261°F.

0430 - Core to 4349', surveyed; inclination = 10-1/4°, azimuth = 146° true. Start wiper trip to casing.

0830 - On bottom circulating bottoms up with lignite mud.

1215 - Rig up and run SNL temperature log.

1400 - Out of hole with temperature tool and rigging up BHTV log. Tool set down on hard cave at 4225' and could not work through. Maximum temperature to this depth = 260°F.

1530 - BHTV failed at ~ 3400' after working through motor run dog-leg. Tool's acoustic transducer crystal stopped rotating.

1830 - BHTV will work on surface check cable but not on logging cable. Logging cable checks out with no anomalies. Changed conductor assignments but BHTV still will not turn. Will run a second temperature log while working on the televiewer.

2100 - Finished temperature log and tried BHTV again, but crystal still will not rotate. Maximum temperature on second log is 267° Fahrenheit. Start trip in hole to casing shoe.

15 October 95

0000 - Break circulation at shoe and stage in to 3540'.

0500 - Wash down on solid bridge at 4245'. Start coring and washing cave to bottom.

1000 - Core to 4358' and pull core. Core pipe stuck after dropping inner tube. Worked free and drilled back out of clay squeeze.

1300 - Back on bottom coring after wiper trip and ream back from 4218'. Will pull back after each core run until clay squeeze is stabilized.

16 October 95

0100 - Core to 4439', surveyed; no picture, BHT = 269° F

0300 - Core to 4446', surveyed; inclination = 10-1/2°, azimuth = 147° true, BHT = none.

0800 - Coring ahead at 4466'.

1200 - Hole at 4500'. SNL will now take over 100% of drilling costs. CE will start a new AFE and submit daily reports as if this were a new well.

1500 - Clay squeeze is much better but we are still dumping some mud.

1900 - Core to 4544', surveyed; inclination = 10°, azimuth = 142° true, BHT = 283°F.

17 October 95

0000 - Coring ahead at 4581'.

0200 - Pull back to 4108' and change kelly and chuck over to CHD101. Repair tongs.

0630 - SNL generator goes down. Change generators.

0830 - Back on bottom coring at 4608'.

1630 - Core to 4658', surveyed; inclination = 10-1/4°, azimuth = 141° true, BHT = 290°F.

18 October 95

0000 - Pipe stuck after pulling core at 4716'. Work free and pull back 450' to wipe hole.

0700 - Pipe stuck after pulling core at 4756'. Trying to work free.

0900 - Cannot work free. Start rigging up to pump mineral oil and Pipe Lax.

1320 - Spotting fluid in place. Set 510 gal of Pipe Lax and displaced with 1540 gal. mud

1500 - Will work pipe every 15 minutes and circulate 6 gal every 30 min. for 24 hours. This will move the Pipe Lax. After 24 hours, ~ 84 gal will still be inside of the HQ.

19 October 95

0700 - Still working stuck pipe.

1030 - Pump the last of the spotting fluid by the bit at 4722'. Start circulation at full pump rate and work pipe hard. Pipe comes free; will rotate and move up and down freely. Will circulate spotting fluid out and change hole over to good mud, then POOH.

1400 - Start out of hole.

1800 - Out of hole, bit and BHA in good condition. Rig up oil saver for pulling core.

2000 - Start back in hole.

20 October 95

0000 - Circulate bottoms up at casing shoe.

0300 - Run in to 3758' and circulate 30 minutes.

0500 - Hit bridge at 4150'; drill and push to 4220'. Pull back to 4000' and redrill.

0800 - Reaming in at 4200'.

1200 - On bottom and circulating.

1300 - Start coring ahead.

1430 - Pull core at 4762' through the head with oil saver in place. (Oil saver is a pack-off, similar to a lubricator, that fits on top of drill pipe and seals around wireline so that fluid can be pumped into the drill pipe while running the wireline to retrieve core.) We will try to maintain pipe movement and circulation during core retrieval. About 6' of clay gouge on top of core.

21 October 95

0000 - Water pressure too high at 4813'. Chuck slipping while pulling tube. Trip back to 4100' and pull tube.

0700 - Water pressure still too high.

1100 - Core to 4835' and pull back to casing for wiper trip and mud change out.

1615 - Back on bottom coring. Didn't touch anything on wiper trip but pressure is still high, 750 psi.

1640 - Pressure starting to drop.

1900 - Pipe stuck after pulling tube at 4855'. Did not work pipe during this core retrieval. Did close pipe rams to keep from swabbing. New mud was not around yet.

2030 - Mix and spot Pipe Lax and mineral oil. 5 gal Pipe Lax per bbl of mineral oil, 10 bbl total.

2300 - Oil in place; working pipe every 15 minutes and pumping 5 gal every 30 minutes.

22 October 95

0600 - Pipe came free. Rotate and pump oil out and fresh mud down.

0900 - Trip back to shoe, then wipe to bottom. POOH for logs.

1200 - Back 40' off bottom and didn't touch a thing. POOH.

1600 - Rig up and run BHTV log.

2000 - BHTV set down on cave at 3638'. Could not work through.

2200 - Out of hole with BHTV. Good log from casing to 3635' with several repeat sections. Rig up for temperature log.

2300 - Temperature log set down at 3641'. Solid bridge, could not drop through. POOH and rig down.

2330 - Baker-lock all connections in core barrel and lower 200' of core pipe.

23 October 95

0900 - On bottom and pulling tube. Rotating while running overshot in, moving pipe up and down and pumping down the annulus while retrieving tube. Rotate and circulate while dropping tube. Hole conditions still trying to differential stick.

1200 - Coring OK but having vibration problems.

2000 - Pull core at 4905'. Pressure high and slipping core. Circulate and condition hole.

2200 - POOH to look at bit.

24 October 95

0800 - Bit was not bad but changed anyway. Baker lock did not work well. Washing back in hole.

1100 - Back on bottom coring ahead.

1500 - Vibrations continue to slow rotary speed and rate of penetration. BHT = 299°F at 4933' core retrieval. Not doing directional surveys until hole conditions improve.

25 October 95

0000 - Coring ahead at 4966'.

0400 - Drop core at 4975'. Try to work out of core barrel.

0730 - Start POOH to remove core from drill pipe.

1130 - Out of hole, bit gone, crown gone.

1400 - After servicing rig for 2 hours, start back in hole with new series 2 bit.

1600 - Out-flow magmeter inoperative. Leaked water into electronics.

1740 - Hit bridge at 4335'.

1800 - Unable to pump into core pipe. Core barrel plugged.

1900 - Trip back to casing and try to pull tube. It won't come. POOH.

26 October 95

0700 - Washing into hole at 3400'.

1400 - Reaming back in at 4300'. Out-flow magmeter back on line.

1900 - Washing in at 4600'.

27 October 95

0000 - Pull tube at 4953' and remove cave pushed, drilled and blocked in core tube.

0100 - Pull tube, pressure up and cannot wash.

0230 - New tube down; reaming to bottom.

0400 - On bottom coring ahead.

0600 - Pulling tube from end of core run at 4992'. Latch head broke (twist off) off inner tube.

0700 - Start POOH to remove inner tube. Wet pull.

1330 - Out of hole. Bit is worn on outside gage from drilling cave. Pick up new bit and Baker Lock and run in hole.

1900 - Hit bridge at 4100'.

28 October 95

0700 - Still drilling on cave and squeeze at 4300'.

1530 - Finally on bottom coring at 4992'.

1700 - Pulling core at 4997'. BHT = 300^{o}F.

1800 - Rig goes on day rate, off footage rate at 5000'.

1900 - Core pump pop-off fails, repair.

29 October 95

0700 - Pulling core at 5040'.

1000 - Tube blocks after 1'. pull at 5041'.

1100 - Pump pressure is over 800 psi when drilling. Drops back off bottom. Pull tube.

1200 - Tube is not blocked, POOH w/o inner tube to change bit.

1530 - Out of hole. Bit outside gage totally gone. Reamer shell cracked. Change out both and install with Halco Weld.

1630 - Start back in hole.

30 October 95

0700 - Back on bottom at 5044' and coring ahead. Good trip without reaming. Washed from 4000' to bottom.

1500 - Trying to pull core at 5070'. Tube will not release. It's loose but won't come out. Work pipe and try to pull again.

1600 - Got tube out. Drop new tube and resume core drilling.

31 October 95

0000 - Coring ahead at 5103'.

0400 - Bit goes at 5110', surveyed; inclination = 9-1/4^{o}, azimuth = 136^{o} true, BHT = 336^{o}F

1030 - POOH. Bit outside gauge is totally gone and upper reamer shell is missing segments. Vibration is very hard on tools. Pick up new shell and #7 bit. Halco weld all core barrel connections.

1130 - Start in hole after cleaning mud tank. Will use Tork-ease in the mud to try to reduce vibrations and hole torque.

1500 - Start to wash in at 4000'.

2200 - Coring ahead at 5111'.

1 November 95

0000 - Pulling tube at 5124'. Torque down and RPM up.

0800 - Pulling core at 5150'.

0930 - Drill pipe tries to stick after pulling core. Cave at 5110'. Pull back 80', wash back to bottom, and core ahead.

1140 - Pull back after coring to 5162' and get stuck trying to get above cave to pull tube. Work stuck pipe.

1240 - Can't turn or go up. Can get down some but not much. Pull tube to clear pipe.

1400 - Core tube is out. Can't move pipe up, down or rotate. Pumping heavier mud to clean hole. Preparing to spot Pipe Lax. Stuck bit at 5116.2'.

1800 - Pipe Lax in place. Spotted 13.2 barrels of mineral oil and Pipe Lax. Displaced with 1740 gal. of mud. Work pipe every 15 minutes and pump 5 gal. every 30 minutes.

2 November 95

0800 - Still working stuck pipe.

1500 - Will work stuck pipe until 0600 hours tomorrow then pump and work hard. If pipe comes loose, either set it on bottom or POOH with this string and RIH with used HQ for casing. If pipe does not come free, pick up BQ stinger and RIH on NQ to spot and squeeze cement.

3 November 95

0600 - Pump hard and work pipe.

0800 - Pipe will not move. Back off CHD 101 just below foot clamp.

1000 - Start picking up 100' of BQ and 5060' of NQ for cement job.

2330 - Circulating and washing to bottom.

4 November 95

0100 - Wash and drill 6" of fill to within 2' of HQ TD. Start mixing cement. Mixed 10.5 sacks of type G cement with 40% silica flour, 1.6% CFR-3, 1.5% HR-12, 0.75% TB-47. Yield 120 gal of 15.4 ppg cement.

0200 - Pumped 120 gal clear water, 120 gal. cement, 60 gal clear water, and displaced with 1120 gal mud. Pulled back 10 stands (400') keeping drill pipe full. Had problems picking up and pumping the cement but the rest was successful.

0315 - Packed off between NQ and HQ and squeezed with ~ 75 gal of mud at 100 to 400 psi. Shut in with 100 psi.

0345 - Released pressure and POOH with NQ, keeping pipe full.

1000 - Lay down BQ stinger. Some dry cement on BQ and bottom NQ rods. Start to make up NQ coring tools.

1145 - Halco weld Kelly to CHD 101 to back off below BOPE.

1200 - Crew change delayed; road blocked by fuel truck break-down.

1250 - Crew arrives, road open.

1320 - Back off CHD 101 / HQ. String shows 15,000 lb. rod weight, which is equivalent to approximately 2260' of pipe.

1330 - Start laying down CHD 101 and HQ rods. Will pick up used HQ casing rods, run back in hole, and try to screw into the stuck pipe.

2000 - Out of hole with backed-off pipe. Laid down 28 CHD 101 rods @ 19.7' each and 123 HQ rods at 10' each. Top of stuck HQ string is at 1781'. (left in hole = 331 HQ rods @ 10' and 25' BHA, consisting of 2 ea 10' core barrels, coupling, 2 reamer shells and bit.)

2100 - Sort and RIH used casing-quality HQ rods. Beveled bottom pin in to help stab into stuck HQ.

5 November 95

0400 - Generator goes down. Change generators.

0500 - Continue picking up HQ casing.

1000 - Stab into top of HQ drill pipe at 1781' and make up with pipe wrench. Pull up 2000 lb. over string weight to check connection. Back off HQ casing 20' below KB.

1030 - Change pipe-ram rubbers to fit NQ pipe and break down HQ kelly rod.

1130 - Start in hole with NQ coring tools.

1330 - Set down on tapered pin at 1781'. Drill through pin and ream with little weight. Circulate and continue in hole.

1730 - Start washing cement stringers at 4692'.

6 November 95

0000 - Cleaning out cement stringers at 4907'.

0800 - Pulling tube at 4997'. Still cleaning out cement. Low RPM and high torque.

0900 - Solid cement in tube.

1200 - Pulling tube at 5047'. Slug with Tork-ease

1300 - Torque down and rods turning high rotary speed (~380 rpm.)

1400 - Try to pull cement core at 5059'. Tube stuck.

1600 - Tube won't come loose and overshot won't release. Break wireline and POOH.

7 November 95

0600 - Back on bottom coring cement.

1130 - Long splice wireline at break so it will go through oil saver.

1330 - Finish splice, pull tube, and back to coring cement.

1630 - Drill through landing ring with no problems.

2130 - Drill through HQ bit with no problems.

8 November 95

0100 - Pressure up, bit gone. POOH

0500 - Out of hole. Make up 20' core barrel with #5 impreg bit.

0630 - Service rig.

0900 - Start in hole.

1000 - Set down at 1781' tapered pin. Redress pin by drilling through it. Pipe may be separated.

1330 - Set down on landing ring and ream.

1500 - Finally through landing ring again. Hard to drill through landing ring with new bit and reamer shell; ring may be turning. Bit outside gage may also be gone again.

1700 - Drill through bit and core cement to 5137'; tube blocked.

2200 - Pressured up. Pull tube at 5162'.

2300 - Dump mud and clean pits.

9 November 95

0130 - Finish mixing new mud and start trying to drilling new hole. Chuck bearings go out. Pull back 55' and work on chuck.

0400 - Start to circulate while waiting on chuck rebuild parts.

0830 - POOH to check tools and run log while waiting on rebuilt chuck.

1130 - Out of hole. Bit gone on outside gauge and has crushed area on OD.

1140 - Rig up and temperature log. Log in at 100 fpm to 4750' then 40 fpm to 5162'. BHT 338^{o}F.

1330 - Rig down logger and start in hole with new #2 bit.

2100 - Rebuilt chuck installed. Finish trip in hole.

2200 - Start coring ahead in new hole.

10 November 95

0000 - Coring ahead at 5170'.

0800 - Pulling core at 5192'. High torque and low RPM.

1000 - Pumped Tork-ease pill. Rotary speed up and torque down for about 16 minutes while pill went around, then torque back up

1130 - Pulling core at 5210'. Will run another 5 gal. pill.

1600 - Pull core at 5221', only got half of the inner barrel; broke at the coupling. POOH to remove tube and core.

2100 - Out of hole and recover core. Replace bit and reamer shells. Bit in good shape.

11 November 95

0500 - Redress landing ring and bit.

0700 - On bottom after reaming and drilling ~ 2' of cave.

0800 - Coring ahead at 5228'.

1000 - Broke wireline at overshot on the way out with core at 5238'. Build swage to fish overshot.

1200 - Set down on inner barrel but could not get over it. Pull swage and rework.

1300 - Out of hole with swage again. Latched onto core barrel but could not move it. It's ~ 500' off bottom and wedged in. POOH with NQ to recover tube and core.

1700 - Found over-torqued pin and box at ~ 4500'. Pin screwed through box.

1730 - Bit worn on outside gage and upper reamer shell missing one segment.

1800 - Replace bit and upper reamer shell.

12 November 95

0200 - Back on bottom. Did not touch landing ring or HQ bit. Washed in last 80'. Coring ahead.

0800 - Coring ahead with low RPM and high torque.

1100 - MRT = 350°F at 5274' while pulling tube. Make short trip to casing to check for cave. Didn't touch a thing.

1200 - Back on bottom trying to core. Pressure up, pull tube.

1330 - Tube clear, POOH for bit. Will remove top reamer shell/stabilizer.

1730 - Bit has outside gauge gone. Remove top stabilizer and run in hole with new bit.

2230 - On bottom coring ahead. with low torque and high RPM.

13 November 95

0010 - Blocked at 5287'.

0100 - Can't retrieve inner tube. Work stuck tube.

0500 - Give up and POOH to retrieve inner tube.

1030 - Out of hole. Bit good but core catcher case had backed off. Coupling also loose. Core undersized at start of run. Low RPM and torque caused vibrations. Once rotary speed came up, core cut at gage.

1100 - USFS shut down operation to clean up site and reline fuel sump.

1330 - Start back in hole after clean up. Re-run same bit.

1830 - On bottom getting ready to core ahead at 5287'.

1900 - Won't drill, pressuring up. Pull tube

2030 - Tighten loose tube connection and pump down. Coring ahead with low torque and high RPM

14 November 95

0000 - Coring ahead at 5308'

0300 - Try to core after dropping tube at 5326' but pressure up. Pull tube.

0400 - Tube OK. Core stuck in bit. Drop survey tool to try to clear bit.

0700 - Bit still plugged. POOH to clear bit.

1130 - Pipe out of the hole; bit was not plugged, but inner tube seems to be too long, causing pressure. Bit was almost gone, anyway. Lay down core barrel, piece on thread missing near coupling, pick up one new core barrel. Core barrel had over-torqued causing it to get

3/8" shorter and therefore making both inner tubes too long. Make up core barrel inner tubes with Halco weld to keep threads from moving. Pick up # 2 bit.

1330 - Starting back in hole.

1900 - Back on bottom circulating. Pump valves bad.

1955 - Coring ahead with high RPM and low torque.

2200 - Cored to 5336'. Left 5' of core.

15 November 95

0000 - Recover 1' of 5336' core.

0330 - Pull tube at 5351'. Inner tube failed at coupling. POOH

0700 - Out of hole and recover broken inner tube. Bit gone. Make up 10' core barrel to eliminate inner tube coupling. Also pick up #3 bit.

1410 - Back on bottom coring.

1600 - Pull tube after ~ 5'. No core in tube. Drop another tube. May have drilled on a mislatch.

1740 - Pressured up. POOH to see why.

2200 - Bit gone and inner tube latched. Change out drilling line on rig.

16 November 95

0000 - Start in hole with new #2 bit.

0630 - When running in hole, standard practice is to have a latch-head in place as a brake in case the pipe is dropped. Near the bottom of the hole, RIH with overshot to pick up latch head, and overshot fails at jar. Make up fishing tools.

0900 - Out with fishing tool but no fish. Rework tool and try again. This time will try to rotate while fishing.

1030 - Out of hole again with fishing tool, still no fish. Will POOH.

1400 - Out of hole, retrieve broken piece of overshot. Bit is in good shape (since it never got to bottom), will run it back in.

1830 - Split box on NQ going in. Weld strap to pin and lay down 2 rods.

2000 - Near bottom washing in.

2100 - On bottom coring. at 5356'

2200 - Pull core at 5359'. Tube blocked

2300 - Core recovered undersized. Try to drop survey camera but will not go down. Core dropped.

2330 - Pull camera out and try to shake core out. Drop tube.

17 November 95

0030 - Start trip out to clear core from drill pipe.

0400 - After pulling back 1000', core falls clear. Lower back to bottom and pull tube.

0500 - Survey hole at 5358', inclination = 9-1/4°, azimuth = 136° true, BHT = no data.

0700 - Pull core at 5359' and re-run MRT, no core and BHT = 352° F.

0930 - Dropped in new core tube, drilled 0.8', ROP dropped to almost nothing and pump pressure was up.

1030 - POOH

1300 - Drill string is out of hole; bit polished glass-smooth on crown (probably from carbide junk in hole), but inside and outside gauge in relatively good shape, segment missing out of reamer shell. Will call this hole TD = 5360'.

1330 - Rig up for SNL temperature log.

1515 - Completed temperature log to TD. Hole was clean to bottom, maximum temperature was at bottom = 347°F.

1530 - Lay down core barrel and pick up scrap joint of NQ drill rod with saw-tooth burned in end (this will help in cleaning out open hole if there is some cave in it.) Will RIH and turn hole over to water in preparation for injection test. Procedure is to RIH to bottom of HQ liner, flush that majority of the hole, then continue to TD and flush open hole section.

1900 - Have RIH with open-ended drill pipe to 5160'. Circulate mud out of hole.

2400 - Have RIH to 5360'; circulating out mud.

18 November 95

0530 - Out of hole with NQ pipe. Rigging up for injection test.

0800 - Pick up two joints of HQ and screw into liner. Plumb wireline pack-off and kelly hose into top of H. Try pumping into H-rod, hole will only take about 2 gpm without pressuring up above 300 psi, which is the limit for the magmeter. Some fluid coming back through return line, probably from bad HQ connection at 1781'. Close annular, returns stop, pressure increases. Stop pumping.

0900 - Rig up to pump into annulus outside HQ (open hole from 2748' to ~4800'.) Similar results, ~4 gpm gives >300 psi standpipe pressure. There is much more open hole outside the HQ pipe, but it is filled with mud which has been sitting there for several weeks, so effective permeability would not be expected to be high. Stop injecting and start rigging down instrumentation.

0930 - Back off HQ rods and POOH, laying down whatever rod has come free.

1100 - Out of hole with 550' of HQ rod.

1200 - RIH with NQ rod and mechanical cutter.

1415 - Cutter at 2700'.

1515 - Finish cutting HQ pipe at 2700'. POOH with cutter.

1800 - Pick up Bowen spear and bumper sub

2000 - Work Bowen into HQ and try to pull. Pull 45,000# and it won't come. Work pipe. Release spear and POOH. Will try to re-cut at 2200'.

2030 - Catch NQ sub on top of fishing tools on foot clamp and break NQ pin. Tools drop in hole. Spear, bumper sub and XO on top of HQ stub at 540'. Build tap to try to fish.

2130 - Tap sets down onto fish. Turn to the right with pipe wrench until spear is out of the HQ. POOH slowly. No fish, apparently tap is too big for ID of crossover at top of fish. Call for fisherman with smaller tools.

19 November 95

0800 - Waiting on fishing tools.

1715 - Fisherman arrives, will RIH with tap and try to screw into fish.

1900 - POOH after working tap at top of fish. First tap is too small, goes all the way into fish but won't pick it up. Pick up small Bowen spear and RIH.

2300 - Latch into fish, work fish free, and slowly POOH. Fish continues to periodically hang up all the way out oh the hole. Get all of fish except grapple from HQ spear. Don't want to run logging cable into hole if pieces of grapple might hang up.

20 November 95

0030 - Start in hole with open ended NQ to push junk to bottom and circulate hole clean.

0130 - Set down on junk at 538'. Work through top of HQ liner and push down hole. Make several passes into HQ liner with no apparent obstructions.

0500 - Set down on junk at 5320'. Wash and push to 5360'. Circulate bottoms up.

0800 - Start out of hole laying down NQ pipe in 10' lengths.

2100 - Out of hole. Fill hole with clear water and start to nipple down BOPE.

21 November 95

0700 - No crew from midnight to 0700. Continue nipple down and install flange with 2" valve.

1600 - Finished smoking turkey for shut-down dinner.

1900 - Sub-base lowered and rig rigged down. Load out most drilling equipment. Both crews working daylights.

22 November 95

0700 - Rigging down and loading out equipment.

1100 - Released rig. Rig still on sub-base and local mechanic repairing clutch and air on rig. Can not move off base. LY crews left. They will come back after Thanksgiving and get rig and sub-base. Rig up to temperature log.

1700 - Finish log and rig down. Move logging truck to rig 167 and all other equipment to CE yard off highway 97.

23 November 95

0630 - Leave both generators, flash tank trailer and pickup in yard. Drive Winnebago, pulling water trailer, and Smeal to Mammoth Lakes drill site.

APPENDIX B

The following appendix contains the daily drilling records, including detailed information about drilling fluids, drill bits, lithology, and other activities conducted each day. These reports were prepared and distributed each day to Sandia staff and management; because of proprietary data they were not distributed outside Sandia at the time. The reports were compiled primarily by the Sandia on-site project leaders, with valuable input from M-I Drilling Fluids and Boart-Longyear field engineers, as well as CECI contract drilling consultants.

DAILY DRILLING REPORT - 26 July 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 1600

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 1 | Depth today - 58' | Hole advance last 24 hr - 58' | Core recovered - NA '
Last casing - 11" conductor @ 22'

Bits -- Now drilling 9-1/2" hole | Rotary speed - 60 rpm; WOB - K lb; Rate of Penetration - avg ft/hr

Bit number	Type	Depth in, KB	Depth out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'			

Drilling Assembly: bit, 3-pt roller reamer, 30' 6" drill collars

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Surveys: **Depth** **Inclination** **Direction** **Bottom-hole Temperature**

Drilling fluid -
Flow rate - gal/min | Pressure - psi | Returns temp - ^{o}F max |
Wt - lb/gal | Vis - sec | PV - cP | YP - lb/100ft^2 | pH -
Lost circulation - intermittent

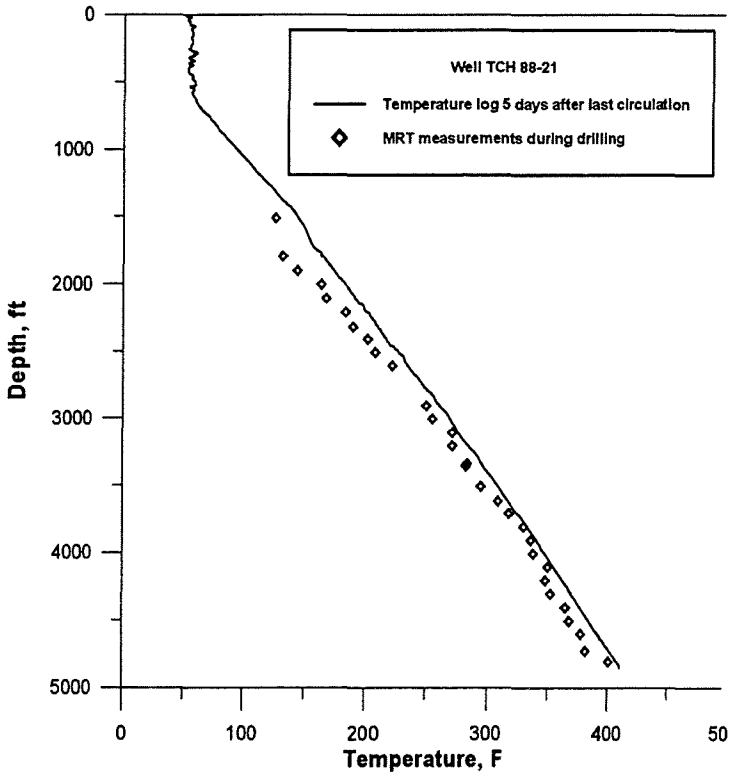
Lithology of past day's drilling:
N/A

Summary of events last 24 hours:

Spudded 12-1/4" hole with Longyear rig #602, drilled to 22' KB. Set 11" conductor and cement with Portland from surface. Drilled out with 9-1/2" bit. Encountered intermittent lost circulation but regained at least 80% returns. Drilled to 58', still losing some returns, placed cement plug. Will WOC until ~2400.

Logged first core hole (TCH88-21); bottomhole temperature = 410°F at 4833'.

Report by: John Finger/Ron Jacobson



DAILY DRILLING REPORT - 27 July 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 2 | Depth today - 103' | Hole advance last 16 hr - 45' | Core recovered - NA '
Last casing - 11" conductor @ 22'

Bits -- Now drilling 9-1/2" hole | Rotary speed - 60 rpm; WOB - K lb; Rate of Penetration - avg ft/hr

Bit number	Type	Depth in, KB	Depth out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'			

Drilling Assembly: bit, 3-pt roller reamer, 30' 6" drill collars, 60' 5-1/2" DC

Surveys: **Depth** **Inclination** **Direction** **Bottom-hole Temperature**

Drilling fluid -
Flow rate - gal/min | Pressure - psi | Returns temp - ^{o}F max |
Wt - lb/gal | Vis - sec | PV - cP | YP - lb/100ft^{2} | pH -
Lost circulation - intermittent

Lithology of past day's drilling:
N/A

Summary of events last 16 hours:

Waited on cement until approximately 2400. Drilled out with 9-1/2" bit, at about 6 ft/hr, losing no returns. Camp set-up is nearly complete. Still negotiating with BLM on their requirements for casing depth versus temperature limitation; this will determine the casing depth for the second (4-1/2") casing string. We hope to get approval for setting casing at approximately 2400' to allow for a bottomhole temperature of 550°F.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 28 July 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 3 | Depth today - 170' | Hole advance last 24 hr - 67' | Core recovered - NA '
Last casing - 11" conductor @ 22'

Bits -- Now drilling 9-1/2" hole | Rotary speed - 60 rpm; WOB - K lb; Rate of Penetration - avg ft/hr

Bit number	Type	Depth in, KB	Depth out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'			

Drilling Assembly: bit, 3-pt roller reamer (6.8'), 3 ea XO (5.69'), 118' 6" drill collars, 4-1/2" DC, CHD101 drill rods

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Surveys: **Depth** **Inclination** **Direction** **Bottom-hole Temperature**

Drilling fluid - water, bentonite, LCM (paper, Magma fiber, cottonseed hulls)
Flow rate - 68 gal/min | Pressure - ~0 psi | Returns temp - °F max |
Wt - 8.6 lb/gal | Vis - 40 sec | PV - cP | YP - lb/100ft^2 | pH -
Lost circulation - intermittent to complete

Lithology of past day's drilling:
N/A

Summary of events last 24 hours:

Drilled out cement. Drilled to 150', lost complete returns, but regained circulation. Drilled to 170' with steady loss, then lost complete returns. Pumped cement plug, got no fill, pumped another cement plug - in place at 0330. WOC at report time.

Received revised stipulation from BLM on casing depth; new requirements allow drilling to 550°F MRT temperature with 4-1/2" casing at approximately 2400'.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 29/30 July 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 1400

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 4/5 | Depth @ 0000 hrs - 174' | Hole advance last 24 hr - NA' | Core recovered - NA '
Last casing - 11" conductor @ 22'

Bits -- Now drilling 9-1/2" hole | Rotary speed - 60 rpm; WOB - K lb; Rate of Penetration - avg ft/hr

Bit number	Type	Depth in, KB	Depth out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'			

Drilling Assembly: bit, 3-pt roller reamer, 30' 6" drill collars, 60' 5-1/2" DC

Surveys: **Depth** **Inclination** **Direction** **Bottom-hole Temperature**

Drilling fluid - water, bentonite, LCM (paper, Magma fiber, cottonseed hulls)
Flow rate - 68 gal/min | Pressure - ~0 psi | Returns temp - ^{o}F max | Wt - 8.6 lb/gal | Vis - 40 sec | PV - cP | YP - lb/100ft^2 | pH - | Lost circulation - intermittent to complete

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Summary of events since 7/28 (Friday):

At approximately 1800 on 7/28, the Longyear drill crew was advised by the Forest Service to leave the drill site because of a nearby forest fire. The fire was approximately 1/2 - 3/4 mile away and covered over 100 acres. After holding the crew at a staging area for two hours, the Forest Service allowed them to re-enter the drill site and retrieve equipment. The Longyear crew pulled all trailers, mobile homes, and the Sandia Winnebago and Smeal derrick truck to a staging area about five miles from the drill site. Sandia personnel had been notified by then and returned to the staging area to secure the vehicles.

On Saturday morning, with the fire still in progress and covering approximately 160 acres, the remaining drilling equipment (leaving only the drill rig/substructure and the parts trailer) and the Sandia generators were moved to a closer staging area; Sandia instrumentation transducers and vehicles were retrieved to Bend. Forest Service permitted and supervised cutting a 100' firebreak in the heavily wooded area surrounding the drill site.

By Sunday morning the fire was under control, Forest Service allowed re-entry, crews had resumed drilling out the cement plug, and the Sandia vehicles were returned to the drill site. At report time, flow instrumentation is being reconnected and the Winnebago is being restored to field office condition.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 31 July 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 6 | Depth @ 0000 hrs - 264' | Hole advance last 24 hr - 90' | Core recovered - NA '
Last casing - 11" conductor @ 22'

Bits -- Now drilling 9-1/2" hole | Rotary speed - 60 rpm; WOB - K lb; Rate of Penetration - avg ft/hr

Bit number	Type	Depth in, KB	Depth out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'			

Drilling Assembly: bit, 3-pt roller reamer (6.8'), 3 ea XO (5.69'), 118' 6" drill collars, 4-1/2" DC, CHD101 drill rods

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Surveys: **Depth** **Inclination** **Direction** **Bottom-hole Temperature**

Drilling fluid - water, bentonite, LCM (paper, Magma fiber, cottonseed hulls)
Flow rate - ~120 gal/min | Pressure - ~0 psi | Returns temp - ^{O}F max | Wt - 8.6 lb/gal | Vis - 45 sec | PV - cP | YP - lb/100ft^2 | pH - | Lost circulation - intermittent to complete

---

Lithology of past day's drilling:
N/A

Summary of events last 24 hours:

Cleaned out cement to 174' and drilled new hole to 264' while losing about 50 gpm returns. Lost total returns at 264', POOH, RIH with OEDP and pump 85' cement plug. Attempt is to repair loss zones as we pass them, so that casing will get good cement job. WOC, fill hole with 18 bbl mud, RIH, and tag cement at 245' (<20' fill.) Cleaning out cement at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 1 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 7 | Depth @ 0000 hrs - 403' | Hole advance last 24 hr - 139' | Core recovered - NA '
Last casing - 11" conductor @ 22'

Bits -- Now drilling 9-1/2" hole | Rotary speed - 50 rpm; WOB - 10 K lb; Rate of Penetration - avg 6-7 ft/hr

Bit number	Type	Depth in, KB	Depth out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'			

Drilling Assembly: bit, 3-pt roller reamer (6.8'), 3 ea XO (5.69'), 118' 6" drill collars, 180' 4-1/2" DC, CHD101 drill rods

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Surveys: **Depth** **Inclination** **Direction** **Bottom-hole Temperature**

Drilling fluid - water, bentonite, LCM (paper, Magma fiber, Kwik-Seal, cottonseed hulls)
Flow rate - ~70-80 gal/min | Pressure - ~0 psi | Returns temp - ^{o}F max | Wt - 8.6 lb/gal | Vis - 45 sec | PV - cP | YP - lb/100ft^2 | pH - | Lost circulation - intermittent to complete

---

Lithology of past day's drilling:
N/A

Summary of events last 24 hours:

Drilled out cement plug to 264' and drilled new hole to 375', only losing about 3 gpm returns. Lost complete circulation at that point, pumped LCM pill and regained circulation. Drilled to 403' and lost circulation again. Water level is at ~245'. POOH and RIH with OEDP to 245'. Pump 40' cement plug. WOC, RIH, tag cement at 245', drill to 251' and lose circulation again. Preparing to RIH and cement again at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 2 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 8 | Depth @ 0000 hrs - 403' | Hole advance last 24 hr - 0' | Core recovered - NA '
Last casing - 11" conductor @ 22'

Bits -- Now drilling 9-1/2" hole | Rotary speed - 50 rpm; WOB - 10 K lb; Rate of Penetration - avg 6-7 ft/hr

Bit number	Type	Depth in, KB	Depth out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'			

Drilling Assembly: bit, 3-pt roller reamer (6.8'), 3 ea XO (5.69'), 118' 6" drill collars, 180' 4-1/2" DC, CHD101 drill rods

---

Surveys: **Depth** **Inclination** **Direction** **Bottom-hole Temperature**

Drilling fluid - water, bentonite, LCM (paper, Magma fiber, Kwik-Seal, cottonseed hulls)
Flow rate - ~70-80 gal/min | Pressure - ~20 psi | Returns temp - ^{o}F max | Wt - 8.6 lb/gal | Vis - 45 sec | PV - cP | YP - lb/100ft^2 | pH - | Lost circulation - intermittent to complete

---

Lithology of past day's drilling:
N/A

Summary of events last 24 hours:

After losing circulation while drilling out cement at 251', RIH and cement again with a 60' plug. WOC, RIH and tag cement at 172', and drill out to 263'. Lose returns again. POOH, mix and pump another 60' plug. WOC at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 3 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 9 | Depth @ 0000 hrs - 475' | Hole advance last 24 hr - 72' | Core recovered - NA '
Last casing - 11" conductor @ 22'

Bits -- Now drilling 9-1/2" hole | Rotary speed - 50 rpm; WOB - 17 K lb; Rate of Penetration - avg 6-7 ft/hr

Bit number	Type	Depth in, KB	Depth out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'			

Drilling Assembly: bit, 3-pt roller reamer (6.8'), 3 ea XO (5.69'), 118' 6" drill collars, 180' 4-1/2" DC, CHD101 drill rods

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Surveys: **Depth** **Inclination** **Direction** **Bottom-hole Temperature**

Drilling fluid - water, bentonite, LCM (paper, Magma fiber, Kwik-Seal, cottonseed hulls)
Flow rate - ~70-80 gal/min | Pressure - ~0 psi | Returns temp - ^{O}F max | Wt - 8.6 lb/gal | Vis - 45 sec | PV - cP | YP - lb/100ft^2 | pH - | Lost circulation - intermittent to complete

---

Lithology of past day's drilling:
N/A

Summary of events last 24 hours:

RIH and tag cement at 207'. Drill out cement to 308'; wash and rotate to bottom at 403'. Drill ahead in competent formation with almost no fluid loss. Drilling at 526' at report time; plan to set 7" casing at approximately 541'.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 4 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 10| Depth @ 0000 hrs - 544' * | Hole advance last 24 hr - 69' | Core recovered - NA '
Last casing - 11" conductor @ 22'

Bits -- Now drilling 9-1/2" hole | Rotary speed - 50 rpm; WOB - 17 K lb; Rate of Penetration - avg 6-7 ft/hr

Bit number	Type	Depth in, KB	Depth out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'			

Drilling Assembly: bit, 3-pt roller reamer (6.8'), 3 ea XO (5.69'), 118' 6" drill collars, 180' 4-1/2" DC, CHD101 drill rods

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Surveys: **Depth** **Inclination** **Direction** **Bottom-hole Temperature**

Drilling fluid - water, bentonite, LCM (paper, Magma fiber, Kwik-Seal, cottonseed hulls)
Flow rate - ~70-80 gal/min | Pressure - ~0 psi | Returns temp - ^{o}F max | Wt - 8.6 lb/gal | Vis - 45 sec | PV - cP | YP - lb/100ft^2 | pH - | Lost circulation - intermittent to complete

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Lithology of past day's drilling:
N/A

Summary of events last 24 hours:

Drill from 526' to 544' (casing point), circulate bottoms up, and try to POOH. Drilling assembly will not go past a zone at ~365', requires "drilling up" with reamer to get out of hole.

*When drillstring is tripped out, rod tally shows that joints of drill rod have been miscounted and the hole is actually only 524' deep. Bit has one bad cone, so change bits and run back in hole: drilling at 540' at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 5 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 11 Depth @ 0000 hrs - 544' | Hole advance last 24 hr - 0' | Core recovered - NA '
Last casing - 7", 26# casing to 538'

Bits -- Now drilling " hole | Rotary speed - rpm; WOB - K lb; Rate of Penetration - avg ft/hr

Bit number	Type	Depth in, KB	Depth out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'			

Drilling Assembly: bit, 3-pt roller reamer (6.8'), 3 ea XO (5.69'), 118' 6" drill collars, 180' 4-1/2" DC, CHD101 drill rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
	524'	<1°	NA	79°F

Drilling fluid - water, bentonite, LCM (paper, Magma fiber, Kwik-Seal, cottonseed hulls)
Flow rate - ~70-80 gal/min | Pressure - ~0 psi | Returns temp - °F max | Wt - 8.6 lb/gal | Vis - 45 sec | PV - cP | YP - lb/100ft^2 | pH - | Lost circulation - intermittent to complete

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Lithology to date:
20 - 360' Predominantly basalt, with scoria
360 - 440' Basalt, with up to 25% rhyo-dacite; basalt/rhyo-dacite contact is approx. 5' thick (slow drilling)
440 - 500' Basalt/scoria

Summary of events last 24 hours:

Drill to 544' (casing point), circulate bottoms up, and POOH. Run 12 joints 7", 26# casing to 541'. Rig up Halliburton and cement, got good returns to surface. WOC. Cement falls back; drilling crews mix 88 sacks neat cement (101 cubic feet) and pump into annulus. Cement holds stable level, cut off 7" casing and weld on wellhead. Preparing to nipple up BOP at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 6 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 12 | Depth @ 0000 hrs - 544' | Hole advance last 24 hr - 0' | Core recovered - NA '
Last casing - 7", 26# casing to 538'

Bits -- Now drilling " hole | Rotary speed - rpm; WOB - K lb; Rate of Penetration - avg ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'	544'	522' rock, 171' cmt	54.5 rock, 18.5 cmt
3					

Drilling Assembly: bit, 3-pt roller reamer (6.8'), 3 ea XO (5.69'), 118' 6" drill collars, 180' 4-1/2" DC, CHD101 drill rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
	524'	<1°	NA	79°F

Drilling fluid - water, bentonite, LCM (paper, Magma fiber, Kwik-Seal, cottonseed hulls)
Flow rate - ~70-80 gal/min | Pressure - ~0 psi | Returns temp - °F max | Wt - 8.6 lb/gal | Vis - 45 sec | PV - cP | YP - lb/100ft^2 | pH - | Lost circulation - intermittent to complete

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Lithology to date:
20 - 360' Predominantly basalt, with scoria
360 - 440' Basalt, with up to 25% rhyo-dacite; basalt/rhyo-dacite contact is approx. 5' thick (slow drilling)
440 - 500' Basalt/scoria

Summary of events last 24 hours:

Nipple up BOP. BOP tested to 1000 psi (except 500 psi on annular preventer), witnessed by BLM representative Dennis Davis, test passed. RIH with 6-1/8" roller bit, clean out cement to top of insert float (top of first casing joint.)

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 7 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 13 | Depth @ 0000 hrs - 544' | Hole advance last 24 hr - 0' | Core recovered - NA '
Last casing - 7", 26# casing to 538'

Bits -- Now drilling " hole | Rotary speed - rpm; WOB - K lb; Rate of Penetration - avg ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'	544'	522' rock, 171' cmt	54.5 rock, 18.5 cmt
3					

Drilling Assembly: bit, 3-pt roller reamer (6.8'), 3 ea XO (5.69'), 118' 6" drill collars, 180' 4-1/2" DC, CHD101 drill rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
	524'	<1°	NA	79°F

Drilling fluid - water, bentonite, LCM (paper, Magma fiber, Kwik-Seal, cottonseed hulls)
Flow rate - ~70-80 gal/min | Pressure - ~0 psi | Returns temp - °F max | Wt - 8.6 lb/gal | Vis - 45 sec | PV - cP | YP - lb/100ft^2 | pH - | Lost circulation - intermittent to complete

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Lithology to date:
20 - 360' Predominantly basalt, with scoria
360 - 440' Basalt, with up to 25% rhyo-dacite; basalt/rhyo-dacite contact is approx. 5' thick (slow drilling)
440 - 500' Basalt/scoria

Summary of events last 24 hours:

Clean out cement to top of insert float (top of first casing joint.)

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 8 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 14 | Depth @ 0000 hrs - 583' | Hole advance last 24 hr - 39' | Core recovered - 29'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - rpm; WOB - K lb; Rate of Penetration - avg ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'	544'	522' rock, 171' cmt	54.5 rock, 18.5 cmt
3	#7 HQ impreg	494' cmt			

Drilling Assembly: HQ bit, 20' core barrel, HQ drill rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
	524'	<1°	NA	79°F

Drilling fluid - water, bentonite, LCM (paper, Magma fiber, Kwik-Seal, cottonseed hulls)
Flow rate - ~20 gal/min | Pressure - ~100 psi | Returns temp - 70°F max | Wt - 8.5 lb/gal | Vis - 38 sec | PV - 6 cP | YP - 4 lb/100ft^2 | pH - 12 | Lost circulation - intermittent to complete

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Lithology to date:

20 - 360' Predominantly basalt, with scoria
360 - 440' Basalt, with up to 25% rhyo-dacite; basalt/rhyo-dacite contact is approx. 5' thick (slow drilling)
440 - 500' Basalt/scoria

Summary of events last 24 hours:

Core through cement in the shoe joint and drill 5' into new formation. Because of problems with the 7" casing leak-off test at TCH 88-21, CECI and BLM had agreed on the following test after drilling out the 7" shoe: Drill 5' into new formation, fill hole with water, let it sit for 30 minutes, measure water level - if water level remains stable, this constitutes a "percolation test", which is essentially a pressure leak-off test at a gradient of 0.433 psi/ft. Hole passed this test, so this result allows us to drill to an unstabilized bottomhole temperature of 330°F before setting the next casing, which should be far more than we need based on temperature gradient of TCH 88-21. Run back in hole and continue drilling new formation, which becomes cinder-like with lost circulation by 570'. Lose returns at 575'. Mix and pump LCM pill, regain returns, drill to 583' with sloughing hole. POOH with drill string, POOH with HW flush-joint casing liner, pump 48 gallon (6.4 cu ft) cement plug from 583' to 505', WOC for one hour, close blind rams and squeeze cement. WOC at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 9 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 15 | Depth @ 0000 hrs - 600' | Hole advance last 24 hr - 17' | Core recovered - 17'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - rpm; WOB - K lb; Rate of Penetration - avg. ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'	544'	522' rock, 171' cmt	54.5 rock, 18.5 cmt
3	#7 HQ impreg	494' cmt			

Drilling Assembly: HQ bit, 10' core barrel, HQ drill rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
	524'	<1°	NA	79°F

Drilling fluid - water, bentonite, LCM (paper, Magma fiber, Kwik-Seal, cottonseed hulls)
Flow rate - ~20 gal/min | Pressure - ~ 100 psi | Returns temp - 70°F max | Wt - 8.5 lb/gal | Vis - 38 sec | PV - 7 cP | YP - 3 lb/100ft^2 | pH - 10.5 | Lost circulation - intermittent to complete

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Lithology 583' - 600':
583' - 594' Rubbly scoria/vesicular basalt
594' - 600' More coherent vesicular basalt

Summary of events last 24 hours:

WOC until 0900, clean out cement stringers down to insert float with 6-1/8" roller bit. RIH with HW casing sleeve. RIH with drill string, tag cement at 562' (i.e., about 20' fill from 78' cement plug), core out cement to 566', begin losing circulation, mix and circulate LCM, regain returns, core new rock from 583' to 604', lose all returns. There is a sandy/rubble zone down to 594', but fairly solid rock below that; there is concern that if we drill into another major loss zone below this relatively competent rock, the upper sands will come in the hole and stick the pipe. POOH with drill string and HW liner sleeve, mix and pump another 78' plug. WOC at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 10 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 16 | Depth @ 0000 hrs - 648' | Hole advance last 24 hr - 48' | Core recovered - 48'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'	544'	522' rock, 171' cmt	54.5 rock, 18.5 cmt
3	#7 HQ impreg	494' cmt			

Drilling Assembly: HQ bit, 10' core barrel, HQ drill rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
	524'	<1°	NA	79°F

Drilling fluid - water, bentonite, LCM (paper, Magma fiber, Kwik-Seal, cottonseed hulls)
Flow rate - ~40 gal/min | Pressure - ~ 100 psi | Returns temp - 70°F max | Wt - 8.5 lb/gal | Vis - 33 sec | PV - 5 cP | YP - 2 lb/100ft^2 | pH - 9.5 | Lost circulation - intermittent to complete

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Lithology 600' - 638':
600' - 638' Rhyodacite

Summary of events last 24 hours:

WOC until 0900, fill hole, clean out cement stringers down to insert float with 6-1/8" roller bit. RIH with HW casing sleeve. RIH with drill string, tag cement at 524', clean out cement to 604' with small loss. Cored ahead to 709' with good drilling and then lost complete returns. Pumped four LCM pills with almost no pump pressure (fluid level is far down in the hole). Preparing to cement at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 11 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 17 | Depth @ 0000 hrs - 709' | Hole advance last 24 hr - 61' | Core recovered - 61'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'	544'	522' rock, 171' cmt	54.5 rock, 18.5 cmt
3	#7 HQ impreg	494' cmt			

Drilling Assembly: HQ bit, 10' core barrel, HQ drill rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
	524'	<1°	NA	79°F

Drilling fluid - water, bentonite, LCM (paper, Magma fiber, Kwik-Seal, cottonseed hulls)
Flow rate - ~40 gal/min | Pressure - ~ 100 psi | Returns temp - 70°F max | Wt - 8.5 lb/gal | Vis - 33 sec | PV - 5 cP | YP - 2 lb/100ft^2 | pH - 9.5 | Lost circulation - intermittent to complete

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Lithology 638' - 709':
638' - 691' Vesicular basalt
691 - 709' Andesite

Summary of events last 24 hours:

Pump 15 sacks cement (228 linear feet) with OEDP at 709'. POOH with H-rods, pull up 2 stands of HW liner sleeve and rotate pipe while WOC for 8 hours. Set HW casing back on bottom at 501', RIH with HQ string to clean out cement, tag cement at 604', pull up and lay down one joint drill pipe, pipe stuck at bit. Work pipe, can't get free. Waiting on more HW pipe and washover bit at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 12 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 18 | Depth @ 0000 hrs - 709' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'	544'	522' rock, 171' cmt	54.5 rock, 18.5 cmt
3	#7 HQ impreg	494' cmt			

Drilling Assembly: HQ bit, 10' core barrel, HQ drill rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
	524'	<1°	NA	79°F

Drilling fluid - water, bentonite, LCM (paper, Magma fiber, Kwik-Seal, cottonseed hulls)
Flow rate - ~40 gal/min | Pressure - ~ 100 psi | Returns temp - 70°F max | Wt - 8.5 lb/gal | Vis - 33 sec | PV - 5 cP | YP - 2 lb/100ft^2 | pH - 9.5 | Lost circulation - intermittent to complete

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Lithology 709' - :

Summary of events last 24 hours:

Received additional HW pipe and casing-advance shoes (washover bits.) These bits have diamond-impregnated matrix, very similar to a core bit, and an outside diameter of approximately 4.7". They are attached to the bottom of the casing and then the casing is rotated to drill down the outside of the stuck core rods. Tripped in with washover string and drilled ahead, slowly. Rotary speed is about 200 rpm and flow rate 40 gpm. Drilling at 578' (rods are stuck at 602') at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 13 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 19 | Depth @ 0000 hrs - 709' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'	544'	522' rock, 171' cmt	54.5 rock, 18.5 cmt
3	#7 HQ impreg	494' cmt			

Drilling Assembly: HW washover bit, HW casing

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
	524'	<1°	NA	79°F

Drilling fluid - water, bentonite, LCM (paper, Magma fiber, Kwik-Seal, cottonseed hulls)
Flow rate - ~40 gal/min | Pressure - ~ 100 psi | Returns temp - 70°F max | Wt - 8.5 lb/gal | Vis - 33 sec | PV - 5 cP | YP - 2 lb/100ft^2 | pH - 9.5 | Lost circulation - intermittent to complete

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Lithology 709' - :

Summary of events last 24 hours:

Drilled with HW pipe and casing-advance shoes (washover bits) from 578' (rods stuck at 602') to 588', which is approximately the depth of the upper stabilizer on the HQ core barrel. Wore out the inside gauge on two bits trying to get past the stabilizer (which is diamond and tungsten-carbide matrix), waited on new bits, still drilling at this depth at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 14 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 20 | Depth @ 0000 hrs - 709' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'	544'	522' rock, 171' cmt	54.5 rock, 18.5 cmt
3	#7 HQ impreg	494' cmt			

Drilling Assembly: HW washover bit, HW casing

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
	524'	<1°	NA	79°F

Drilling fluid - water, bentonite, LCM (paper, Magma fiber, Kwik-Seal, cottonseed hulls)
Flow rate - ~40 gal/min | Pressure - ~ 200 psi | Returns temp - 70°F max | Wt - 8.4 lb/gal | Vis - 43 sec | PV - 7 cP | YP - 13 lb/100ft^2 | pH - 10 | Lost circulation - intermittent to complete

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Lithology 709' - :

Summary of events last 24 hours:

Drilled with HW pipe and casing-advance shoes (washover bits) at 588', which is approximately the depth of the upper stabilizer on the HQ core barrel. Wore out two bits getting past the stabilizer, which is diamond and tungsten-carbide matrix, similar in hardness to the bit. Drilled to 601' with fourth bit before it was worn out, POOH with casing, make connection with drillpipe, pull up on it, and it comes free. POOH with drillpipe, pump 146 linear ft. cement plug with OEDP at 602'. POOH and WOC.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 15 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 21 | Depth @ 0000 hrs - 709' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'	544'	522' rock, 171' cmt	54.5 rock, 18.5 cmt
3	#7 HQ impreg	494' cmt			

Drilling Assembly: HQ bit, 10' core barrel, HQ rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
	524'	<1°	NA	79°F

Drilling fluid - water, bentonite, LCM (paper, Magma fiber, Kwik-Seal, cottonseed hulls)
Flow rate - ~40 gal/min | Pressure - ~ 200 psi | Returns temp - 70°F max | Wt - 8.4 lb/gal | Vis - 43 sec | PV - 7 cP | YP - 13 lb/100ft^2 | pH - 10 | Lost circulation - intermittent to complete

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Lithology 709' - :

Summary of events last 24 hours:

Waited on first cement plug after retrieving HQ rods from hole. RIH with 6-1/8" bit to polish top of cement, found no firm cement down to 500'. POOH and RIH with open-ended HQ. Circulated out soft contaminated cement down to 550'. Pumped another 146 lin.ft. plug at 550'. POOH and WOC. RIH with 6-1/8" bit, tag good cement at 488', clean out cement to 500'. Running in hole with HW liner sleeve to set it on cement at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 16 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 22 | Depth @ 0000 hrs - 660' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'	544'	522' rock, 171' cmt	54.5 rock, 18.5 cmt
3	#7 HQ impreg	494' cmt			

Drilling Assembly: HQ bit, 10' core barrel, HQ rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
	524'	<1°	NA	79°F
	660'	1-1/2°	260°	69°F

Drilling fluid - water, bentonite, LCM (paper, Magma fiber, Kwik-Seal, cottonseed hulls)
Flow rate - ~40 gal/min | Pressure - ~ 200 psi | Returns temp - 70°F max | Wt - 8.4 lb/gal | Vis - 43 sec | PV - 7 cP | YP - 13 lb/100ft^2 | pH - 10 | Lost circulation - intermittent to complete

---

Lithology 709' - :

Summary of events last 24 hours:

RIH with HW liner sleeve to set it on cement at 500'. RIH with HQ core rods, core cement from 500' to 600' and begin seeing some formation in core (i.e., hole begins drifting out of the cement plug at the point where drill string was stuck.) Core ahead, completely into rock by 617', with some lost circulation. Survey indicates that hole is not seriously deviated now, so it may be that the stuck core string was deviating, which made it difficult to wash over. Coring ahead at 660' at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 17 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 23 | Depth @ 0000 hrs - 707' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'	544'	522' rock, 171' cmt	54.5 rock, 18.5 cmt
3	#7 HQ impreg	494' cmt			

Drilling Assembly: HQ bit, 10' core barrel, HQ rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
	524'	<1°	NA	79°F
	660'	1-1/2°	260°	69°F

Drilling fluid - water, bentonite, LCM (paper, Magma fiber, Kwik-Seal, cottonseed hulls)
Flow rate - ~38 gal/min | Pressure - ~ 200 psi | Returns temp - 70°F max | Wt - 8.4 lb/gal | Vis - 43 sec | PV - 10 cP | YP - 4 lb/100ft^2 | pH - 10 | Lost circulation - intermittent to complete

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Lithology 709' - :

Summary of events last 24 hours:

Cored from 660' to 701' in new rock (after hole trajectory departed original bore) and once again lost circulation at approximately the same depth as before. Pumped cement plug through OEDP at 700', POOH, and WOC. RIH with coring assembly, wash to 571', tag good cement, and core cement to 707'. Lost all returns. Mixing LCM to try and regain returns, we hope to drill farther before cementing again, possibly repairing more of the loss zones at one time. Heavy fog and light snow at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 18 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 24 | Depth @ 0000 hrs - 720' | Hole advance last 24 hr - 13' | Core recovered - 11'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'	544'	522' rock, 171' cmt	54.5 rock, 18.5 cmt
3	#7 HQ impreg	494' cmt			

Drilling Assembly: HQ bit, 10' core barrel, HQ rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
	524'	<1°	NA	79°F
	660'	1-1/2°	260°	69°F

Drilling fluid - water, bentonite, LCM (paper, Magma fiber, Kwik-Seal, cottonseed hulls)
Flow rate - ~38 gal/min | Pressure - ~ 200 psi | Returns temp - 70°F max | Wt - 8.4 lb/gal | Vis - 43 sec | PV - 7 cP | YP - 3 lb/100ft^2 | pH - 9.5 | Lost circulation - intermittent to complete

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Lithology 709' - :

Summary of events last 24 hours:

Mixed LCM to try and regain returns at 707', since it would be helpful to drill farther before cementing again, possibly repairing more of the loss zones at one time. Regained some returns (less than 20%) and drilled to 720'. Bit indicated that it was worn out at that point, so POOH and cement, 15 sacks. Wash in hole from 440', drilled cement with some lost circulation (adding LCM) from 590' to 648', regain full returns at 648', hit hard cement at 690', drill hard cement to 720', and broken, rubbly formation to 734' at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 19 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 25 | Depth @ 0000 hrs - 739' | Hole advance last 24 hr - 19' | Core recovered - 11'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'	544'	522' rock, 171' cmt	54.5 rock, 18.5 cmt
3	#7 HQ impreg, used	494' cmt	583'		
4	#7 HQ impreg, used	583'	709'		
used 5 HW casing shoes to wash over stuck pipe					
5	#7 HQ impreg	709'	739'		
6	#7 HQ impreg	739'			

Drilling Assembly: HQ bit, 5' core barrel, HQ rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
	524'	<1°	NA	79°F
	660'	1-1/2°	260°	69°F

Drilling fluid - water, bentonite, LCM (paper, Magma fiber, Kwik-Seal, cottonseed hulls)
Flow rate - ~38 gal/min | Pressure - ~ 200 psi | Returns temp - 70°F max | Wt - 8.4 lb/gal | Vis - 43 sec | PV - 7 cP | YP - 3 lb/100ft^2 | pH - 9.5 | Lost circulation - intermittent to complete

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Lithology 709' - :

Summary of events last 24 hours:

Drilled broken, rubbly formation to 739'. Hole was caving badly, so POOH to cement. WOC. RIH with HQ and core to 761'. Poor formation, with running sands, and extremely abrasive. POOH for new bit and reamer shell. Change to 5' core barrel.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 20 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 26 | Depth @ 0000 hrs - 780' | Hole advance last 24 hr - 41' | Core recovered - 26'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'	544'	522' rock, 171' cmt	54.5 rock, 18.5 cmt
3	#7 HQ impreg, used	494' cmt	583'		
4	#7 HQ impreg, used	583'	709'		
used 5 HW casing shoes to wash over stuck pipe					
5	#7 HQ impreg	709'	739'		
6	#7 HQ impreg	739'	761'		
7	#2 HQ impreg	761'			

Drilling Assembly: HQ bit, 5' core barrel, HQ rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
	524'	<1°	NA	79°F
	660'	1-1/2°	260°	69°F

Drilling fluid - water, bentonite, LCM (paper, Magma fiber, Kwik-Seal, cottonseed hulls)
Flow rate - ~20 gal/min | Pressure - ~ 200 psi | Returns temp - 70°F max | Wt - 8.5 lb/gal | Vis - 44 sec | PV - 8 cP | YP - 7 lb/100ft^2 | pH - 10 | Lost circulation - intermittent to complete

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Lithology 709' - :

Summary of events last 24 hours:

Change to 5' core barrel with new bit at 761'. Core ahead to 800', with hole sluffing and losing circulation almost continuously. Pump LCM pills and pull up drillstring to condition hole periodically; typically 5-6' fill in hole when drillstring is run back to bottom. Increase mud viscosity to 50 sec. Coring ahead at report time, will try to make ~100' new hole before cementing to stabilize wellbore.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 21 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 27 | Depth @ 0000 hrs - 838' | Hole advance last 24 hr - 58' | Core recovered - 52'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'	544'	522' rock, 171' cmt	54.5 rock, 18.5 cmt
3	#7 HQ impreg, used	494' cmt	583'	39' rock, 50' cmt	8 rock, 4 cmt
4	#7 HQ impreg, used	583'	709'	126' rock, 101' cmt	15 rock, 6 cmt
	used 5 HW casing shoes to wash over stuck pipe				
5	#7 HQ impreg	709'	739'	127' rock, 437' cmt	18 rock, 31 cmt
6	#7 HQ impreg	739'	761'	22' rock, 39' cmt	4 rock, 4 cmt
7	#2 HQ impreg	761'	838'		
8	#7 HQ impreg	838'			

Drilling Assembly: HQ bit, 5' core barrel, HQ rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
	524'	<1°	NA	79°F
	660'	1-1/2°	283° true	69°F
	804'	2-1/4°	288° true	66°F

Drilling fluid - water, bentonite, LCM (paper, Magma fiber, Kwik-Seal, cottonseed hulls)
Flow rate - ~27 gal/min | Pressure - ~ 200 psi | Returns temp - 70°F max | Wt - 8.4 lb/gal | Vis - 50 sec | PV - 12 cP | YP - 8 lb/100ft^2 | pH - 10 | Lost circulation - intermittent to complete

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Lithology 709' - 833':

709' - 790' Basalt
790' - 833' Debris flow with smectite/kaolinite matrix

Summary of events last 24 hours:

After cementing to stabilize wellbore, cored ahead, pumping LCM slugs every 10'. Cored to 838' with partial returns. POOH for cement (15 sacks = 225' linear feet). WOC. Washed through soft cement, losing circulation. Pumped LCM slugs, regained partial returns. Coring ahead in new formation at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 22 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 28 | Depth @ 0000 hrs - 922' | Hole advance last 24 hr - 84' | Core recovered - 72'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. 6 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'	544'	522' rock, 171' cmt	54.5 rock, 18.5 cmt
3	#7 HQ impreg, used	494' cmt	583'	39' rock, 50' cmt	8 rock, 4 cmt
4	#7 HQ impreg, used	583'	709'	126' rock, 101' cmt	15 rock, 6 cmt
	used 5 HW casing shoes to wash over stuck pipe				
5	#7 HQ impreg	709'	739'	127' rock, 437' cmt	18 rock, 31 cmt
6	#7 HQ impreg	739'	761'	22' rock, 39' cmt	4 rock, 4 cmt
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#7 HQ impreg	838'			

Drilling Assembly: HQ bit, 10' core barrel, HQ rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
	524'	<1°	NA	79°F
	660'	1-1/2°	283° true	69°F
	804'	2-1/4°	288° true	66°F
	902'	2-3/4°	288° true	70°F

Drilling fluid - water, bentonite, LCM (paper, Magma fiber, Kwik-Seal, cottonseed hulls)
Flow rate - ~27 gal/min | Pressure - ~ 200 psi | Returns temp - 70°F max | Wt - 8.5 lb/gal | Vis - 38 sec | PV - 10 cP | YP - 5 lb/100ft^2 | pH - 10.5 | Lost circulation - intermittent to complete

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Lithology 709' - 833':
709' - 790' Basalt
790' - 833' Debris flow with smectite/kaolinite matrix

Summary of events last 24 hours:

Cored ahead in new formation, pumping LCM slugs to control lost circulation. Changed back to 10' core barrel at 872'. Continued coring with ~50% returns. Coring at 970' at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 23 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 29 | Depth @ 0000 hrs - 1107' | Hole advance last 24 hr - 185' | Core recovered - 182'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. 10 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'	544'	522' rock, 171' cmt	54.5 rock, 18.5 cmt
3	#7 HQ impreg, used	494' cmt	583'	39' rock, 50' cmt	8 rock, 4 cmt
4	#7 HQ impreg, used	583'	709'	126' rock, 101' cmt	15 rock, 6 cmt
	used 5 HW casing shoes to wash over stuck pipe				
5	#7 HQ impreg	709'	739'	127' rock, 437' cmt	18 rock, 31 cmt
6	#7 HQ impreg	739'	761'	22' rock, 39' cmt	4 rock, 4 cmt
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'			

Drilling Assembly: HQ bit, 10' core barrel, HQ rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
	524'	<1°	NA	79°F
	660'	1-1/2°	283° true	69°F
	804'	2-1/4°	288° true	66°F
	902'	2-3/4°	276° true	70°F
	1008'	2-3/4°	298° true	75°F
	1107'	2-1/2°	346° true	76°F

Drilling fluid - water, bentonite, LCM (paper, Magma fiber, Kwik-Seal, cottonseed hulls)
Flow rate - ~27 gal/min | Pressure - ~ 200 psi | Returns temp - 70°F max | Wt - 8.5 lb/gal | Vis - 44 sec | PV - 11 cP | YP - 10 lb/100ft^2 | pH - 10.5 | Lost circulation - intermittent to complete

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Lithology 833' - 1000':

833' - 890' Debris flow with clay matrix and scoria
890' - 896' Vesicular basalt
896' - 916' Scoria/debris flow
916' - 918' Vesicular basalt
918' - 946' Scoria/cinders/debris flow
946 - 958' Vesicular basalt
958' - 1000' Scoria

Summary of events last 24 hours:
Cored from 970' @ 0800 yesterday to 1228' @ 1200 today with ~40% returns. Pumped LCM periodically through this interval.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 24 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 30 | Depth @ 0000 hrs - 1318' | Hole advance last 24 hr - 211' | Core recovered - 202'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. 10 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
1	12-1/4" tri-cone	11'	22'	11	
2	9-1/2" tri-cone	22'	544'	522' rock, 171' cmt	54.5 rock, 18.5 cmt
3	#7 HQ impreg, used	494' cmt	583'	39' rock, 50' cmt	8 rock, 4 cmt
4	#7 HQ impreg, used	583'	709'	126' rock, 101' cmt	15 rock, 6 cmt
used 5 HW casing shoes to wash over stuck pipe					
5	#7 HQ impreg	709'	739'	127' rock, 437' cmt	18 rock, 31 cmt
6	#7 HQ impreg	739'	761'	22' rock, 39' cmt	4 rock, 4 cmt
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'			

Drilling Assembly: HQ bit, 10' core barrel, HQ rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
	902'	2-3/4°	276° true	70°F
	1008'	2-3/4°	298° true	75°F
	1107'	2-1/2°	346° true	76°F
	1208'	2-3/4°	278° true	76°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~16 gal/min | Pressure - ~ 200 psi | Returns temp - 70°F max | Wt - 8.5 lb/gal | Vis - 90 sec | PV - 25 cP | YP - 40 lb/100ft^2 | pH - 9.5 | Lost circulation - intermittent to complete

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Lithology 1000' - 1226':

1000' - 1030' Scoria
1030' - 1070' Andesite porphyry
1070' - 1127' Scoria
1127' - 1226' Andesite porphyry

Summary of events last 24 hours:

Cored from 1228' @ 1200 yesterday to 1398' at report time. Pumped LCM pill with each core tube, maintaining partial returns. Current strategy is to drill to casing point (2400') without repairing loss zones, unless the hole dictates otherwise.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 25 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 31 | Depth @ 0000 hrs - 1448' | Hole advance last 24 hr - 130' | Core recovered - 130'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. 10 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'			

Drilling Assembly: HQ bit, 20' core barrel, HQ rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
	902'	2-3/4°	276° true	70°F
	1008'	2-3/4°	298° true	75°F
	1107'	2-1/2°	346° true	76°F
	1208'	2-3/4°	278° true	76°F
	1304'	2-1/4°	285° true	74°F
	1408'	2-1/2°	288° true	74°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~16 gal/min | Pressure - ~ 200 psi | Returns temp - 70°F max | Wt - 8.4 lb/gal | Vis - 52 sec | PV - 16 cP | YP - 20 lb/100ft^2 | pH - 9.0 | Lost circulation - intermittent to complete

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Lithology 1226' - 1366':

1226' - 1248'	Scoria/vesicular basalt	1248' - 1294'	Andesite
1294' - 1307'	Scoria	1307' - 1316'	Basalt
1316' - 1324'	Scoria	1324' - 1366'	Debris flow and scoria

Summary of events last 24 hours:

Cored from 1398' at report time yesterday to 1488' at report time today. POOH from 1448' yesterday afternoon for bit change and 20' core barrel. RIH to 1200' and got tight hole, pull back to 640' and wash to bottom. Resume coring at 1448' and ran into broken rock; have not had long core runs. Pumping down annulus to maintain fluid there, generally having partial returns. Current strategy is to drill to casing point (~2400') without repairing loss zones, unless the hole dictates otherwise.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 26 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 32 | Depth @ 0000 hrs - 1510' | Hole advance last 24 hr - 62' | Core recovered - 60'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. 10 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'			

Drilling Assembly: HQ bit, 10' core barrel, HQ rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
	902'	2-3/4°	276° true	70°F
	1008'	2-3/4°	298° true	75°F
	1107'	2-1/2°	346° true	76°F
	1208'	2-3/4°	278° true	76°F
	1304'	2-1/4°	285° true	74°F
	1408'	2-1/2°	288° true	74°F
	1518'	2-1/4°	288° true	72°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~16 gal/min | Pressure - ~ 200 psi | Returns temp - 70°F max | Wt - 8.4 lb/gal | Vis - 55 sec | PV - 17 cP | YP - 21 lb/100ft^2 | pH - 9.0 | Lost circulation - intermittent to complete

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Lithology 1226' - 1366':

1226' - 1248'	Scoria/vesicular basalt	1248' - 1294'	Andesite
1294' - 1307'	Scoria	1307' - 1316'	Basalt
1316' - 1324'	Scoria	1324' - 1366'	Debris flow and scoria

Summary of events last 24 hours:

Cored from 1488' at report time yesterday to 1548' at report time today. After POOH to exchange 20' for 10' core barrel, RIH and wash from 640' to 1489'. Cored ahead with generally short (2' - 4') runs and 40-50% returns. Coring ahead at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 27 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 33 | Depth @ 0000 hrs - 1591' | Hole advance last 24 hr - 81' | Core recovered - 81'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. 10 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'			

Drilling Assembly: HQ bit, 10' core barrel, HQ rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (26 August) for previous surveys				
	1208'	2-3/4°	278° true	76°F
	1304'	2-1/4°	285° true	74°F
	1408'	2-1/2°	288° true	74°F
	1518'	2-1/4°	288° true	72°F
	1608'	2-3/4°	282° true	71°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~16 gal/min | Pressure - ~ 200 psi | Returns temp - 70°F max | Wt - 8.4 lb/gal | Vis - 57 sec | PV - 17 cP | YP - 25 lb/100ft^2 | pH - 9.0 | Lost circulation - intermittent to complete

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Lithology 1226' - 1366':

1226' - 1248'	Scoria/vesicular basalt	1248' - 1294'	Andesite
1294' - 1307'	Scoria	1307' - 1316'	Basalt
1316' - 1324'	Scoria	1324' - 1366'	Debris flow and scoria

Summary of events last 24 hours:

Cored from 1548' at report time yesterday to 1608' at report time today. Cored with partial returns ranging from 20-70%. Wireline broke pulling core tube from 1582', POOH to inspect tools and retrieve line. Replace top reamer shell and RIH. Core to 1591', find that inner tube is stuck, POOH to release tube. RIH, pump LCM slug to regain circulation. Coring ahead at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 28 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 34 | Depth @ 0000 hrs - 1664' | Hole advance last 24 hr - 73' | Core recovered - 73'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. 6-7 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'			

Drilling Assembly: HQ bit, 10' core barrel, HQ rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (26 August) for previous surveys				
	1208'	2-3/4°	278° true	76°F
	1304'	2-1/4°	285° true	74°F
	1408'	2-1/2°	288° true	74°F
	1518'	2-1/4°	288° true	72°F
	1608'	2-3/4°	282° true	71°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~16 gal/min | Pressure - ~ 200 psi | Returns temp - 70°F max | Wt - 8.4 lb/gal | Vis - 53 sec | PV - 12 cP | YP - 20 lb/100ft^2 | pH - 9.5 | Lost circulation - intermittent to complete

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Lithology 1366' - 1646':

1366' - 1646' Andesite; mostly broken and fractured with high-angle fractures

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Summary of events last 24 hours:

Cored from 1608' at report time yesterday to 1695' at report time today. Pumped intermittent LCM slugs to maintain circulation, returns varied from 20-50%. Much of the rock is broken, causing short core runs.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 29 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 35 | Depth @ 0000 hrs - 1747' | Hole advance last 24 hr - 83' | Core recovered - 80'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. 6-7 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'			

Drilling Assembly: HQ bit, 10' core barrel, HQ rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (26 August) for previous surveys				
	1208'	2-3/4°	278° true	76°F
	1304'	2-1/4°	285° true	74°F
	1408'	2-1/2°	288° true	74°F
	1518'	2-1/4°	288° true	72°F
	1608'	2-3/4°	282° true	71°F
	1706'	2-3/4°	278° true	74°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~16 gal/min | Pressure - ~ 200 psi | Returns temp - 70°F max | Wt - 8.4 lb/gal | Vis - 55 sec | PV - 15 cP | YP - 23 lb/100ft^2 | pH - 8.5 | Lost circulation - intermittent to complete

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Lithology 1646' - 1747':
1646' - 1747' Andesite; mostly broken and fractured with high-angle fractures

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Summary of events last 24 hours:

Cored from 1695' at report time yesterday to 1751' at report time today. Have cored ahead, pumping LCM slugs to maintain partial returns, for most of the last 24 hours. Hole continues to follow fractured andesite, and may be in a fault, also suggested by the low temperature. MRT readings are not conclusive, though, because lost circulation means that we are continually pumping fresh, relatively cool mud down the hole. Trajectory is headed almost due west, however, which is away from the heat source beneath the caldera, so we will probably do directional drilling to point the hole back south-eastward.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 30 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 36 | Depth @ 0000 hrs - 1825' | Hole advance last 24 hr - 78' | Core recovered - 78'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. 4-5 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'	1751'	303' rock	67 rock
10	#7 HQ impreg	1751'			

Drilling Assembly: HQ bit, 10' core barrel, HQ rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (26 August) for previous surveys				
	1208'	2-3/4°	278° true	76°F
	1304'	2-1/4°	285° true	74°F
	1408'	2-1/2°	288° true	74°F
	1518'	2-1/4°	288° true	72°F
	1608'	2-3/4°	282° true	71°F
	1706'	2-3/4°	278° true	74°F
	1807'	3-1/4°	278° true	78°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~16 gal/min | Pressure - ~ 200 psi | Returns temp - 70°F max | Wt - 8.4 lb/gal | Vis - 53 sec | PV - 12 cP | YP - 20 lb/100ft^2 | pH - 9.0 | Lost circulation - intermittent to complete

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Lithology 1747' - 1823':

1747' - 1754' Andesite	1754' - 1760' Vesicular basalt
1760' - 1772' Debris flow	1772' - 1777' Vesicular basalt
1777' - 1820' Debris flow	1820' - 1823' Basalt breccia

Summary of events last 24 hours:

Cored from 1751' at report time yesterday to 1845' at report time today. Have cored ahead, pumping LCM slugs to maintain partial returns, for most of the last 24 hours. POOH at 1751' for bit change. Formation has changed from the andesite intrusive which we had been drilling for the last 400' back to basalt and debris flow, hole trajectory is about the same.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 31 August 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 37 | Depth @ 0000 hrs - 1911' | Hole advance last 24 hr - 86' | Core recovered - 79'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. 4-5 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'	1751'	303' rock	67 rock
10	#7 HQ impreg	1751'			

Drilling Assembly: HQ bit, 10' core barrel, HQ rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (26 August) for previous surveys				
	1208'	2-3/4°	278° true	76°F
	1304'	2-1/4°	285° true	74°F
	1408'	2-1/2°	288° true	74°F
	1518'	2-1/4°	288° true	72°F
	1608'	2-3/4°	282° true	71°F
	1706'	2-3/4°	278° true	74°F
	1807'	3-1/4°	278° true	78°F
	1907'	3-1/4°	274° true	78°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~16 gal/min | Pressure - ~ 200 psi | Returns temp - 70°F max | Wt - 8.4 lb/gal | Vis - 55 sec | PV - 20 cP | YP - 10 lb/100ft^2 | pH - 9.0 | Lost circulation - intermittent to complete

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Lithology 1747' - 1823':

1747' - 1754' Andesite	1754' - 1760' Vesicular basalt
1760' - 1772' Debris flow	1772' - 1777' Vesicular basalt
1777' - 1820' Debris flow	1820' - 1823' Basalt breccia

Summary of events last 24 hours:

Cored from 1845' at report time yesterday to 1926' at report time today. Drilling continues to be slow (4-5 ft/hr) in broken formation. Continue pumping LCM to maintain partial returns.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 1 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 38 | Depth @ 0000 hrs - 1975' | Hole advance last 24 hr - 64' | Core recovered - 64'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. 4-5 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'	1751'	303' rock	67 rock
10	#7 HQ impreg	1751'	1955'	204' rock	46 rock
11	#7 HQ impreg	1955'			

Drilling Assembly: HQ bit, 10' core barrel, HQ rods

Surveys: Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (26 August) for previous surveys			
1208'	2-3/4°	278° true	76°F
1304'	2-1/4°	285° true	74°F
1408'	2-1/2°	288° true	74°F
1518'	2-1/4°	288° true	72°F
1608'	2-3/4°	282° true	71°F
1706'	2-3/4°	278° true	74°F
1807'	3-1/4°	278° true	78°F
1907'	3-1/4°	274° true	78°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~16 gal/min | Pressure - ~ 200 psi | Returns temp - 70°F max | Wt - 8.4 lb/gal | Vis - 55 sec | PV - 20 cP | YP - 10 lb/100ft^2 | pH - 9.0 | Lost circulation - ~ 35% returns

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Lithology 1760' - 1900':

1760' - 1772' Debris flow	1772' - 1777' Vesicular Basalt
1777' - 1820' Debris flow	1820' - 1836' Basalt breccia
1836' - 1882' Andesite (highly fractured)	1882' - 1900' Basalt (decrease fracturing in Basalt)

Summary of events last 24 hours:

Cored from 1926' at report time yesterday to 1981' at report time today. Tripped for stuck tube caused by latch head bearing failure at 1955', replaced bit. POOH at 1975' for chuck repair. Pump LCM pill and regain returns.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 2 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 39 | Depth @ 0000 hrs - 2050' | Hole advance last 24 hr - 75' | Core recovered - 64'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. 4-5 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'	1751'	303' rock	67 rock
10	#7 HQ impreg	1751'	1955'	204' rock	46 rock
11	#7 HQ impreg	1955'			

Drilling Assembly: HQ bit, 10' core barrel, HQ rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (26 August) for previous surveys				
	1208'	2-3/4°	278° true	76°F
	1304'	2-1/4°	285° true	74°F
	1408'	2-1/2°	288° true	74°F
	1518'	2-1/4°	288° true	72°F
	1608'	2-3/4°	282° true	71°F
	1706'	2-3/4°	278° true	74°F
	1807'	3-1/4°	278° true	78°F
	1907'	3-1/4°	274° true	78°F
	2010'	3-1/2°	277° true	93°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~16 gal/min | Pressure - ~ 325 psi | Returns temp - 70°F max | Wt - 8.4 lb/gal | Vis - 44 sec | PV - 11 cP | YP - 11 lb/100ft^2 | pH - 9.0 | Lost circulation - ~ 35% returns

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Lithology 1836' - 2011':

1836' - 1882' Andesite (highly fractured) 1882' - 1900' Basalt (decrease fracturing in Basalt)
1900' - 2011' Basalt

Summary of events last 24 hours:

Cored from 1981' at report time yesterday to 2084' at report time today. Pumped LCM intermittently to maintain partial returns.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 3 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 40 | Depth @ 0000 hrs - 2163' | Hole advance last 24 hr -113' | Core recovered - 113'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. 5-6 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'	1751'	303' rock	67 rock
10	#7 HQ impreg	1751'	1955'	204' rock	46 rock
11	#7 HQ impreg	1955'			

Drilling Assembly: HQ bit, 10' core barrel, HQ rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (26 August) for previous surveys				
	1518'	2-1/4°	288° true	72°F
	1608'	2-3/4°	282° true	71°F
	1706'	2-3/4°	278° true	74°F
	1807'	3-1/4°	278° true	78°F
	1907'	3-1/4°	274° true	78°F
	2010'	3-1/2°	277° true	93°F
	2102'	3°	276° true	85°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~16 gal/min | Pressure - ~ 350 psi | Returns temp - 70°F max | Wt - 8.5 lb/gal | Vis - 58 sec | PV - 12 cP | YP - 24 lb/100ft^2 | pH - 9.0 | Lost circulation - ~ 25% returns

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Lithology 2011' - 2085':

2011' - 2014' Obsidian	2014' - 2018' Debris Flow
2018' - 2043' Vesicular Basalt	2043' - 2063' Debris Flow
2063' - 2065' Scoria	2065' - 2085' Basalt

Summary of events last 24 hours:

Cored from 2084' at report time yesterday to 2197 at report time today. Pumped LCM intermittently to maintain partial returns.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 4 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 41 | Depth @ 0000 hrs - 2282' | Hole advance last 24 hr -119' | Core recovered - 119'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. 5-6 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'	1751'	303' rock	67 rock
10	#7 HQ impreg	1751'	1955'	204' rock	46 rock
11	#7 HQ impreg	1955'			

Drilling Assembly: HQ bit, 10' core barrel, HQ rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (1 September) for previous surveys				
	1907'	3-1/4°	274° true	78°F
	2010'	3-1/2°	277° true	93°F
	2102'	3°	276° true	85°F
	2202'	3°	274° true	91°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~15 gal/min | Pressure - ~ 300 psi | Returns temp - 70°F max | Wt - 8.5 lb/gal | Vis - 58 sec | PV - 12 cP | YP - 24 lb/100ft^2 | pH - 9.0 | Lost circulation - ~ 65% returns

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Lithology 2011' - 2085':

2011' - 2014' Obsidian	2014' - 2018' Debris Flow
2018' - 2043' Vesicular Basalt	2043' - 2063' Debris Flow
2063' - 2065' Scoria	2065' - 2085' Basalt

Summary of events last 24 hours:

Cored from 2197' at report time yesterday to 2294 at report time today. Pumped LCM intermittently to maintain partial returns. Pulled back to casing shoe and prepared to leave site due to forest fire in the area. Received all clear and resumed drilling.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 5 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 42 | Depth @ 0000 hrs - 2381' | Hole advance last 24 hr - 99' | Core recovered - 99'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 400 rpm; WOB - K lb; Rate of Penetration - avg. 5-6 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'	1751'	303' rock	67 rock
10	#7 HQ impreg	1751'	1955'	204' rock	46 rock
11	#7 HQ impreg	1955'			

Drilling Assembly: HQ bit, 10' core barrel, HQ rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (1 September) for previous surveys				
	1907'	3-1/4°	274° true	78°F
	2010'	3-1/2°	277° true	93°F
	2102'	3°	276° true	85°F
	2202'	3°	274° true	91°F
	2304'	2-3/4°	274° true	95°F
	2400'	2-3/4°	274° true	98°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~15 gal/min | Pressure - ~ 300 psi | Returns temp - 70°F max | Wt - 8.5 lb/gal | Vis - 45 sec | PV - 10 cP | YP - 15 lb/100ft^2 | pH - 9.0 | Lost circulation - ~ 65% returns

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Lithology 2085' - 2225':
2085' - 2140' Basalt, moderately fractured
2140' - 2149' Debris flow
2149' - 2225' Basalt, highly fractured

Summary of events last 24 hours:
Cored from 2294' at report time yesterday to 2400' at report time today. This is nominal casing depth, but rock is fractured, meaning that casing set here would probably not get a good leak-off test after cementing and drilling out the casing shoe. Since the ability to drill to a high temperature (~550°F) is important for testing the hole, we will probably drill deeper in an effort to find more competent rock. The fractured rock may not be permeable, however, so another option is to set a packer where the core indicates competent wellbore near the bottom of the hole and pressure test the hole bottom to predict the results of a leak-off test.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 6 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 43 | Depth @ 0000 hrs - 2469' | Hole advance last 24 hr - 88' | Core recovered - 88'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 350 rpm; WOB - K lb; Rate of Penetration - avg. 5-6 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'	1751'	303' rock	67 rock
10	#7 HQ impreg	1751'	1955'	204' rock	46 rock
11	#7 HQ impreg	1955'	2416'	461' rock	86 rock
12	#7 HQ impreg	2416'			

Drilling Assembly: HQ bit, 10' core barrel, HQ rods

Surveys:	**Depth**	**Inclination**	**Direction**	**Bottom-hole Temperature**
see earlier reports (1, 5 September) for previous surveys				
	2304'	2-3/4°	274° true	95°F
	2400'	2-3/4°	274° true	98°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~15 gal/min | Pressure - ~ 300 psi | Returns temp - 70°F max | Wt - 8.5 lb/gal | Vis - 47 sec | PV - 10 cP | YP - 17 lb/100ft^2 | pH - 9.0 | Lost circulation - ~ 65% returns

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Lithology 2225' - 2360':

2225' - 2247'	Debris flow	2300' - 2306'	Obsidian
2247' - 2275'	Rhyolite	2306' - 2312'	Spherulitic rhyodacite
2275' - 2300'	Rhyodacite	2312' - 2360'	Flow-banded rhyodacite

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Summary of events last 24 hours:

Cored from 2400' at report time yesterday to 2486' at report time today. Rock is still fractured, although not as badly as higher in the hole, and geologist is still looking for a good continuous interval to set the casing shoe. We have approximately 2540' of casing on hand, but there will be time to order new casing while we are opening the hole from HQ to 6-1/8", or we can use some of Longyear's HW casing which is now in place as a bushing inside the 7" casing. Benefit of casing deeper is that a leak-off test at lower pressure gradient will allow drilling to the same temperature as higher gradient at shallower depth.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 7 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 44 | Depth @ 0000 hrs - 2593' | Hole advance last 24 hr - 124' | Core recovered - 124'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 350 rpm; WOB - K lb; Rate of Penetration - avg. 5-6 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'	1751'	303' rock	67 rock
10	#7 HQ impreg	1751'	1955'	204' rock	46 rock
11	#7 HQ impreg	1955'	2416'	461' rock	86 rock
12	#7 HQ impreg	2416'			

Drilling Assembly: HQ bit, 10' core barrel, HQ rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (1, 5 September) for previous surveys				
	2304'	2-3/4°	274° true	95°F
	2400'	2-3/4°	274° true	98°F
	2508'	2-3/4°	280° true	95°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~15 gal/min | Pressure - ~ 300 psi | Returns temp - 70°F max | Wt - 8.6 lb/gal | Vis - 44 sec | PV - 9 cP | YP - 15 lb/100ft^2 | pH - 8.5 | Lost circulation - ~ 65% returns

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Lithology 2360' - 2460':

2360' -2460' Rhyodacite, altered and fractured, easily broken

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Summary of events last 24 hours:

Cored from 2486' at report time yesterday to 2603' at report time today. Rock (andesite) is still heavily fractured, although many of the fractures show no signs of alteration. It is not clear why these relatively fresh fractures are so abundant, but this does not appear to be a good interval for setting casing. Will continue drilling in hopes of more competent rock.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 8 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 45 | Depth @ 0000 hrs - 2718' | Hole advance last 24 hr - 125' | Core recovered - 125'
Last casing - 7", 26# casing to 538'

Bits -- Now drilling 3.89" hole | Rotary speed - 350 rpm; WOB - K lb; Rate of Penetration - avg. 5-6 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'	1751'	303' rock	67 rock
10	#7 HQ impreg	1751'	1955'	204' rock	46 rock
11	#7 HQ impreg	1955'	2416'	461' rock	86 rock
12	#7 HQ impreg	2416'	2748'	332' rock	59 rock

Drilling Assembly: HQ bit, 10' core barrel, HQ rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (1, 5 September) for previous surveys				
	2304'	2-3/4°	274° true	95°F
	2400'	2-3/4°	274° true	98°F
	2508'	2-3/4°	280° true	95°F
	2603'	2°	276° true	95°F
	2718'	2-1/2°	280° true	111°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~15 gal/min | Pressure - ~ 300 psi | Returns temp - 70°F max | Wt - 8.6 lb/gal | Vis - 47 sec | PV - 11 cP | YP - 21 lb/100ft^2 | pH - 9.0 | Lost circulation - ~ 65% returns

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Lithology 2360' - 2460':

2360' -2460' Rhyodacite, altered and fractured, easily broken

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Summary of events last 24 hours:

Cored from 2603' at report time yesterday to 2748' at report time today. Last 30'-35' of core is competent rhyolite, so this will be the casing point for the 4-1/2" casing. POOH with HQ drillstring at report time. Next operations: pull HW casing that has been the bushing inside the 7" casing; pick up 6-1/8" bit, stabilizers, 4-3/4" drill collars, and CHD101 drill pipe; begin opening the core hole from 7" casing shoe at 538'.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 9 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 46 | Depth @ 0000 hrs - 2748' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 7", 26# casing to 538'

Bits -- Now reaming 6-1/8" hole | Rotary speed - rpm; WOB - K lb; Rate of Penetration - avg. ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'	1751'	303' rock	67 rock
10	#7 HQ impreg	1751'	1955'	204' rock	46 rock
11	#7 HQ impreg	1955'	2416'	461' rock	86 rock
12	#7 HQ impreg	2416'	2748'	332' rock	59 rock
13	Varel 6-1/8" tri-cone	500' (in csg)			

Drilling Assembly: bit, stabilizer, xo, 2 ea 4-3/4" drill collars, stab, DC, xo, CHD101 drill rods

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Surveys:	**Depth**	**Inclination**	**Direction**	**Bottom-hole Temperature**
see earlier reports (1, 5 September) for previous surveys				
	2304'	2-3/4°	274° true	95°F
	2400'	2-3/4°	274° true	98°F
	2508'	2-3/4°	280° true	95°F
	2603'	2°	276° true	95°F
	2718'	2-1/2°	280° true	111°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~15 gal/min | Pressure - ~ 300 psi | Returns temp - 70°F max | Wt - 8.6 lb/gal | Vis - 47 sec | PV - 11 cP | YP - 21 lb/100ft^2 | pH - 9.0 | Lost circulation - ~ 65% returns

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Lithology :

2460' - 2475'	Rhyodacite, altered, fractured	2534' - 2636'	Rhyolite, devitrified and fractured
2475' - 2483'	Vesicular andesite	2636' - 2748'	Rhyolite, decreased fracturing below 2700'
2483' - 2534'	Rhyodacite, fractured		core mostly intact 2700' - 2748'

Summary of events last 24 hours:

Cored to 2748' at report time yesterday. Sufficient competent rock to set casing, so begin operations to open hole. POOH with HQ tools, POOH and lay down HW casing that has been the bushing inside 7" casing. Pick up bit, stabilizers, drill collars, and CHD101 drillpipe for reaming core hole to 6-1/8" diameter. Cleaning out casing at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 10 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 47 | Depth @ 0000 hrs - 2748' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 7", 26# casing to 538'

Bits -- Now reaming 6-1/8" hole | Rotary speed - 100 rpm; WOB - K lb; Rate of Penetration - ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'	1751'	303' rock	67 rock
10	#7 HQ impreg	1751'	1955'	204' rock	46 rock
11	#7 HQ impreg	1955'	2416'	461' rock	86 rock
12	#7 HQ impreg	2416'	2748'	332' rock	59 rock
13	Varel 6-1/8" insert tri-cone	500' (in csg)			

Drilling Assembly: bit, stabilizer, xo, 2 ea 4-3/4" drill collars, stabilizer, approx. 400' of 4-3/4"DC, xo, CHD101 drill rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (1, 5 September) for previous surveys				
	2304'	2-3/4°	274° true	95°F
	2400'	2-3/4°	274° true	98°F
	2508'	2-3/4°	280° true	95°F
	2603'	2°	276° true	95°F
	2718'	2-1/2°	280° true	111°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~15 gal/min | Pressure - ~ 300 psi | Returns temp - 70°F max | Wt - 8.6 lb/gal | Vis - 42 sec | PV - 10 cP | YP - 14 lb/100ft^2 | pH - 9.0 | Lost circulation - ~ 65% returns

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Lithology :

Summary of events last 24 hours:

Have opened the 3.9" core hole to 6-1/8" diameter from 500' (bottom of the HW bushing inside the 7" casing) to approximately 700' at report time. Drilling is relatively slow, but so far there have been no major lost circulation problems. Will continue opening hole.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 11 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 48 | Depth @ 0000 hrs - 2748' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 7", 26# casing to 538'

Bits -- Now reaming 6-1/8" hole | Rotary speed - 130 rpm; WOB - K lb; Rate of Penetration - 10 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'	1751'	303' rock	67 rock
10	#7 HQ impreg	1751'	1955'	204' rock	46 rock
11	#7 HQ impreg	1955'	2416'	461' rock	86 rock
12	#7 HQ impreg	2416'	2748'	332' rock	59 rock
13	Varel 6-1/8" insert tri-cone	500' (in csg)			

Drilling Assembly: bit, stabilizer, xo, 2 ea 4-3/4" drill collars, stabilizer, approx. 400' of 4-3/4"DC, xo, CHD101 drill rods

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Surveys:	**Depth**	**Inclination**	**Direction**	**Bottom-hole Temperature**
see earlier reports (1, 5 September) for previous surveys				
	2304'	2-3/4°	274° true	95°F
	2400'	2-3/4°	274° true	98°F
	2508'	2-3/4°	280° true	95°F
	2603'	2°	276° true	95°F
	2718'	2-1/2°	280° true	111°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~40 gal/min | Pressure - ~ 50 psi | Returns temp - 70°F max | Wt - 8.7 lb/gal | Vis - 41 sec | PV - 10 cP | YP - 13 lb/100ft^2 | pH - 8.5 | Lost circulation - ~ 80% returns

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Lithology :

Summary of events last 24 hours:

Have opened the 3.9" core hole to 6-1/8" diameter from approximately 700' to 1020' with good returns.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 12 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 49 | Depth @ 0000 hrs - 2748' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 7", 26# casing to 538'

Bits -- Now reaming 6-1/8" hole | Rotary speed - 130 rpm; WOB - K lb; Rate of Penetration - 10 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'	1751'	303' rock	67 rock
10	#7 HQ impreg	1751'	1955'	204' rock	46 rock
11	#7 HQ impreg	1955'	2416'	461' rock	86 rock
12	#7 HQ impreg	2416'	2748'	332' rock	59 rock
13	Varel 6-1/8" insert tri-cone	500' (in csg)	1072'	572'	37
14	Varel 6-1/8" insert tri-cone	1072'			

Drilling Assembly: bit, stabilizer, xo, 2 ea 4-3/4" drill collars, stabilizer, approx. 400' of 4-3/4"DC, xo, CHD101 drill rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (1, 5 September) for previous surveys				
	2304'	2-3/4°	274° true	95°F
	2400'	2-3/4°	274° true	98°F
	2508'	2-3/4°	280° true	95°F
	2603'	2°	276° true	95°F
	2718'	2-1/2°	280° true	111°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~40 gal/min | Pressure - ~ 50 psi | Returns temp - 70°F max | Wt - 8.7 lb/gal | Vis - 42 sec | PV - 13 cP | YP - 7 lb/100ft^2 | pH - 9.5 | Lost circulation - ~ 80% returns

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Lithology :

Summary of events last 24 hours:

Opened the 3.9" core hole to 6-1/8" diameter from approximately 1020' to 1072', but started losing some returns at 1040'. Circulated hole clean, POOH with drillstring, RIH with HQ rods, and pump 20 sacks cement at 1072'. POOH with HQ rods, fill hole with mud, and squeeze with 50 psi at surface. WOC, RIH with drillstring, tag top of cement at 971', cleaning out cement at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 13 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 50 | Depth @ 0000 hrs - 2748' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 7", 26# casing to 538'

Bits -- Now reaming 6-1/8" hole | Rotary speed - 130 rpm; WOB - K lb; Rate of Penetration - 10 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'	1751'	303' rock	67 rock
10	#7 HQ impreg	1751'	1955'	204' rock	46 rock
11	#7 HQ impreg	1955'	2416'	461' rock	86 rock
12	#7 HQ impreg	2416'	2748'	332' rock	59 rock
13	Varel 6-1/8" insert tri-cone	500' (in csg)	1072'	572'	37
14	Varel 6-1/8" insert tri-cone	1072'			

Drilling Assembly: bit, stabilizer, xo, 2 ea 4-3/4" drill collars, stabilizer, approx. 400' of 4-3/4"DC, xo, CHD101 drill rods

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Surveys:	**Depth**	**Inclination**	**Direction**	**Bottom-hole Temperature**
see earlier reports (1, 5 September) for previous surveys				
	2304'	2-3/4°	274° true	95°F
	2400'	2-3/4°	274° true	98°F
	2508'	2-3/4°	280° true	95°F
	2603'	2°	276° true	95°F
	2718'	2-1/2°	280° true	111°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~50 gal/min | Pressure - ~ 50 psi | Returns temp - 70°F max | Wt - 8.7 lb/gal | Vis - 40 sec | PV - 10 cP | YP - 12 lb/100ft^2 | pH - 12 (from drilling cement) | Lost circulation - better than 80% returns

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Lithology :

Summary of events last 24 hours:

Cleaned out cement from 971' to 1072' and drilled ahead, reaming the core hole. Drilling is fairly slow and often rough, with considerable vibration, but there is little lost circulation. Have opened hole to 1328' at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 14 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 51 | Depth @ 0000 hrs - 2748' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 7", 26# casing to 538'

Bits -- Now reaming 6-1/8" hole | Rotary speed - 130 rpm; WOB - K lb; Rate of Penetration - 10 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'	1751'	303' rock	67 rock
10	#7 HQ impreg	1751'	1955'	204' rock	46 rock
11	#7 HQ impreg	1955'	2416'	461' rock	86 rock
12	#7 HQ impreg	2416'	2748'	332' rock	59 rock
13	Varel 6-1/8" insert tri-cone	500' (in csg)	1072'	572'	37
14	Varel 6-1/8" insert tri-cone	1072'			

Drilling Assembly: bit, stabilizer, xo, 2 ea 4-3/4" drill collars, stabilizer, approx. 400' of 4-3/4"DC, xo, CHD101 drill rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (1, 5 September) for previous surveys				
	2304'	2-3/4°	274° true	95°F
	2400'	2-3/4°	274° true	98°F
	2508'	2-3/4°	280° true	95°F
	2603'	2°	276° true	95°F
	2718'	2-1/2°	280° true	111°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~50 gal/min | Pressure - ~ 50 psi | Returns temp - 70°F max | Wt - 8.6 lb/gal | Vis - 39 sec | PV - 11 cP | YP - 9 lb/100ft^2 | pH - | Lost circulation - better than 80% returns

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Lithology :

Summary of events last 24 hours:

Opened hole from 1328' at report time yesterday to 1650' at report time today. Drilling is somewhat faster since midnight and there has been only very minor lost circulation since the cement plug two days ago. Will continue opening hole.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 15 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 52 | Depth @ 0000 hrs - 2748' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 7", 26# casing to 538'

Bits -- Now reaming 6-1/8" hole | Rotary speed - 130 rpm; WOB - K lb; Rate of Penetration - 10 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'	1751'	303' rock	67 rock
10	#7 HQ impreg	1751'	1955'	204' rock	46 rock
11	#7 HQ impreg	1955'	2416'	461' rock	86 rock
12	#7 HQ impreg	2416'	2748'	332' rock	59 rock
13	Varel 6-1/8" insert tri-cone	500' (in csg)	1072'	572'	37
14	Varel 6-1/8" insert tri-cone	1072'	1694'	622'	50
15	Varel 6-1/8" insert tri-cone	1694'			

Drilling Assembly: bit, stabilizer, xo, 2 ea 4-3/4" drill collars, stabilizer, approx. 400' of 4-3/4"DC, xo, CHD101 drill rods

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Surveys:	**Depth**	**Inclination**	**Direction**	**Bottom-hole Temperature**
see earlier reports (1, 5 September) for previous surveys				
	2304'	2-3/4°	274° true	95°F
	2400'	2-3/4°	274° true	98°F
	2508'	2-3/4°	280° true	95°F
	2603'	2°	276° true	95°F
	2718'	2-1/2°	280° true	111°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~50 gal/min | Pressure - ~ 50 psi | Returns temp - 70°F max | Wt - 8.9 lb/gal | Vis - 37 sec | PV - 10 cP | YP - 5 lb/100ft^2 | pH - 9.0 | Lost circulation - better than 80% returns

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Lithology :

Summary of events last 24 hours:

Opened hole from 1650' at report time yesterday to 1900' at report time today. POOH yesterday to check bit after approximately 50 hours; several buttons broken off heel rows and shirt-tails thin, so pick up new bit and RIH. Otherwise, it has been continuous reaming with good returns.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 16 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 53 | Depth @ 0000 hrs - 2748' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 7", 26# casing to 538'

Bits -- Now reaming 6-1/8" hole | Rotary speed - 130 rpm; WOB - K lb; Rate of Penetration - 10 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'	1751'	303' rock	67 rock
10	#7 HQ impreg	1751'	1955'	204' rock	46 rock
11	#7 HQ impreg	1955'	2416'	461' rock	86 rock
12	#7 HQ impreg	2416'	2748'	332' rock	59 rock
13	Varel 6-1/8" insert tri-cone	500' (in csg)	1072'	572'	37
14	Varel 6-1/8" insert tri-cone	1072'	1694'	622'	50
15	Varel 6-1/8" insert tri-cone	1694'			

Drilling Assembly: bit, stabilizer, xo, 2 ea 4-3/4" drill collars, stabilizer, approx. 400' of 4-3/4"DC, xo, CHD101 drill rods

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Surveys:	**Depth**	**Inclination**	**Direction**	**Bottom-hole Temperature**
see earlier reports (1, 5 September) for previous surveys				
	2304'	2-3/4°	274° true	95°F
	2400'	2-3/4°	274° true	98°F
	2508'	2-3/4°	280° true	95°F
	2603'	2°	276° true	95°F
	2718'	2-1/2°	280° true	111°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~50 gal/min | Pressure - ~ 50 psi | Returns temp - 70°F max | Wt - 8.9 lb/gal | Vis - 67 sec | PV - 24 cP | YP - 19 lb/100ft^2 | pH - 10.0 | Lost circulation - better than 80% returns

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Lithology :

Summary of events last 24 hours:

Opened hole from 1900' at report time yesterday to 2150' at report time today. Drilling is slightly slower than yesterday, so we are still maintaining good returns

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Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 17 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 54 | Depth @ 0000 hrs - 2748' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 7", 26# casing to 538'

Bits -- Now reaming 6-1/8" hole | Rotary speed - 130 rpm; WOB - K lb; Rate of Penetration - 10 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'	1751'	303' rock	67 rock
10	#7 HQ impreg	1751'	1955'	204' rock	46 rock
11	#7 HQ impreg	1955'	2416'	461' rock	86 rock
12	#7 HQ impreg	2416'	2748'	332' rock	59 rock
13	Varel 6-1/8" insert tri-cone	500' (in csg)	1072'	572'	37
14	Varel 6-1/8" insert tri-cone	1072'	1694'	622'	50
15	Varel 6-1/8" insert tri-cone	1694'	2187'	493'	40
16	Varel 6-1/8" insert tri-cone	2187'			

Drilling Assembly: bit, stabilizer, xo, 2 ea 4-3/4" drill collars, stabilizer, ~ 500' of 4-3/4"DC, xo, CHD101 rods

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Surveys:	**Depth**	**Inclination**	**Direction**	**Bottom-hole Temperature**
see earlier reports (1, 5 September) for previous surveys				
	2304'	2-3/4°	274° true	95°F
	2400'	2-3/4°	274° true	98°F
	2508'	2-3/4°	280° true	95°F
	2603'	2°	276° true	95°F
	2718'	2-1/2°	280° true	111°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~50 gal/min | Pressure - ~ 50 psi | Returns temp - 70°F max | Wt - 8.9 lb/gal | Vis - 67 sec | PV - 24 cP | YP - 19 lb/100ft^2 | pH - 10.0 | Lost circulation - better than 80% returns

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Lithology :

Summary of events last 24 hours:

Opened hole from 2150' at report time yesterday to 2293' at report time today. POOH at mid-day yesterday to change bits; old bit can still be used if needed to finish the hole. RIH and took survey, inclination is the same as in the core hole at the same depth. This is reassurance that the hole trajectory is staying with the core hole, not falling out of it. Drilling has continued to maintain full returns after one cement plug in the opened hole.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 18 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 55 | Depth @ 0000 hrs - 2748' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 7", 26# casing to 538'

Bits -- Now reaming 6-1/8" hole | Rotary speed - 130 rpm; WOB - K lb; Rate of Penetration - 10 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'	1751'	303' rock	67 rock
10	#7 HQ impreg	1751'	1955'	204' rock	46 rock
11	#7 HQ impreg	1955'	2416'	461' rock	86 rock
12	#7 HQ impreg	2416'	2748'	332' rock	59 rock
13	Varel 6-1/8" insert tri-cone	500' (in csg)	1072'	572'	37
14	Varel 6-1/8" insert tri-cone	1072'	1694'	622'	50
15	Varel 6-1/8" insert tri-cone	1694'	2187'	493'	40
16	Varel 6-1/8" insert tri-cone	2187'			

Drilling Assembly: bit, stabilizer, xo, 2 ea 4-3/4" drill collars, stabilizer, ~ 500' of 4-3/4"DC, xo, CHD101 rods

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Surveys:	**Depth**	**Inclination**	**Direction**	**Bottom-hole Temperature**
see earlier reports (1, 5 September) for previous surveys				
	2304'	2-3/4°	274° true	95°F
	2400'	2-3/4°	274° true	98°F
	2508'	2-3/4°	280° true	95°F
	2603'	2°	276° true	95°F
	2718'	2-1/2°	280° true	111°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~50 gal/min | Pressure - ~ 50 psi | Returns temp - 70°F max | Wt - 9.2 lb/gal | Vis - 56 sec | PV - 26 cP | YP - 13 lb/100ft^2 | pH - 10.0 | Lost circulation - better than 80% returns

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Lithology :

Summary of events last 24 hours:

Opened hole from 2293' at report time yesterday to 2638' at report time today. Drilling is going well, still maintaining full returns. If the bit lasts, we should finish opening the hole to casing point by evening.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 19 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 56 | Depth @ 0000 hrs - 2748' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 7", 26# casing to 538'

Bits -- Now reaming 6-1/8" hole | Rotary speed - 130 rpm; WOB - K lb; Rate of Penetration - 10 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'	1751'	303' rock	67 rock
10	#7 HQ impreg	1751'	1955'	204' rock	46 rock
11	#7 HQ impreg	1955'	2416'	461' rock	86 rock
12	#7 HQ impreg	2416'	2748'	332' rock	59 rock
13	Varel 6-1/8" insert tri-cone	500' (in csg)	1072'	572'	37
14	Varel 6-1/8" insert tri-cone	1072'	1694'	622'	50
15	Varel 6-1/8" insert tri-cone	1694'	2187'	493'	40
16	Varel 6-1/8" insert tri-cone	2187'	2748'	561'	

Drilling Assembly: bit, stabilizer, xo, 2 ea 4-3/4" drill collars, stabilizer, ~ 500' of 4-3/4"DC, xo, CHD101 rods

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Surveys:	**Depth**	**Inclination**	**Direction**	**Bottom-hole Temperature**
see earlier reports (1, 5 September) for previous surveys				
	2304'	2-3/4°	274° true	95°F
	2400'	2-3/4°	274° true	98°F
	2508'	2-3/4°	280° true	95°F
	2603'	2°	276° true	95°F
	2718'	2-1/2°	280° true	111°F

Drilling fluid - water, bentonite, LCM (paper, Kwik-Seal, cottonseed hulls)
Flow rate - ~50 gal/min | Pressure - ~ 50 psi | Returns temp - 70°F max | Wt - 9.5 lb/gal | Vis - 53 sec | PV - 28 cP | YP - 13 lb/100ft^2 | pH - 9.5 | Lost circulation - better than 80% returns

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Lithology :

Summary of events last 24 hours:

Opened hole from 2638' at report time yesterday to casing point at 2748'. Circulate hole for one hour and POOH. RIH for wiper trip, had to wash to bottom. Begin POOH with CHD101 rods and laying them down, got three joints out and main-line on rig broke. Rotating and circulating while waiting for parts at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 20 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 57 | Depth @ 0000 hrs - 2748' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 4.5", 11.6# casing to 2748'

Bits --

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'	1751'	303' rock	67 rock
10	#7 HQ impreg	1751'	1955'	204' rock	46 rock
11	#7 HQ impreg	1955'	2416'	461' rock	86 rock
12	#7 HQ impreg	2416'	2748'	332' rock	59 rock
13	Varel 6-1/8" insert tri-cone	500' (in csg)	1072'	572'	37
14	Varel 6-1/8" insert tri-cone	1072'	1694'	622'	50
15	Varel 6-1/8" insert tri-cone	1694'	2187'	493'	40
16	Varel 6-1/8" insert tri-cone	2187'	2748'	561'	

Drilling Assembly: cementing

Surveys:	**Depth**	**Inclination**	**Direction**	**Bottom-hole Temperature**
see earlier reports (1, 5 September) for previous surveys				
	2304'	2-3/4°	274° true	95°F
	2400'	2-3/4°	274° true	98°F
	2508'	2-3/4°	280° true	95°F
	2603'	2°	276° true	95°F
	2718'	2-1/2°	280° true	111°F

Drilling fluid -

Lithology :

Summary of events last 24 hours:

Repair rig and lay down DP, collars and BHA. Rig up and run 78 joints of 4.5", 11.6# casing to 2748'. Rig up Halliburton and cement. Got good returns to surface throughout job. CIP at 0330 hours. WOC

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 21 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 58 | Depth @ 0000 hrs - 2748' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 4.5", 11.6# casing to 2748'

Bits --

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'	1751'	303' rock	67 rock
10	#7 HQ impreg	1751'	1955'	204' rock	46 rock
11	#7 HQ impreg	1955'	2416'	461' rock	86 rock
12	#7 HQ impreg	2416'	2748'	332' rock	59 rock
13	Varel 6-1/8" insert tri-cone	500' (in csg)	1072'	572'	37
14	Varel 6-1/8" insert tri-cone	1072'	1694'	622'	50
15	Varel 6-1/8" insert tri-cone	1694'	2187'	493'	40
16	Varel 6-1/8" insert tri-cone	2187'	2748'	561'	

Drilling Assembly: WOC

Surveys:	**Depth**	**Inclination**	**Direction**	**Bottom-hole Temperature**
see earlier reports (1, 5 September) for previous surveys				
	2304'	2-3/4°	274° true	95°F
	2400'	2-3/4°	274° true	98°F
	2508'	2-3/4°	280° true	95°F
	2603'	2°	276° true	95°F
	2718'	2-1/2°	280° true	111°F

Drilling fluid -

Lithology :

Summary of events last 24 hours:

WOC. Mix and pump cement for top job. Hole took 10 barrels to fill. This is enough cement to fill the annulus between to 7" and 4.5" in casings. Nipple down BOPE and install new 4.5" wellhead. Start to nipple up BOP but missing API ring for wellhead. Waiting on parts at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 22 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 59 | Depth @ 0000 hrs - 2748' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now drilling 3.89" hole | Rotary speed - 300 rpm; WOB - K lb; Rate of Penetration - avg. 10+ ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'	1751'	303' rock	67 rock
10	#7 HQ impreg	1751'	1955'	204' rock	46 rock
11	#7 HQ impreg	1955'	2416'	461' rock	86 rock
12	#7 HQ impreg	2416'	2748'	332' rock	59 rock
13	Varel 6-1/8" insert tri-cone	500' (in csg)	1072'	572'	37
14	Varel 6-1/8" insert tri-cone	1072'	1694'	622'	50
15	Varel 6-1/8" insert tri-cone	1694'	2187'	493'	40
16	Varel 6-1/8" insert tri-cone	2187'	2748'	561'	
12rr	#7 HQ impreg	2512			

Drilling Assembly: HQ bit, 10' core barrel, HQ rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (1, 5 September) for previous surveys				
	2304'	2-3/4°	274° true	95°F
	2400'	2-3/4°	274° true	98°F
	2508'	2-3/4°	280° true	95°F
	2603'	2°	276° true	95°F
	2718'	2-1/2°	280° true	111°F

Drilling fluid - water, bentonite
Flow rate - ~21 gal/min | Pressure - ~ 300 psi | Returns temp - 71°F max | Wt - 8.7 lb/gal | Vis - 35 sec | PV - cP | YP - lb/100ft^2 | pH - 12 | Lost circulation -none

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Lithology : Cement

Summary of events last 24 hours:

Install missing API ring and test BOPE. Test blind and pipe rams to 1000 psig and Hydril to 500 psig. Test witnessed by Dennis Davis (BLM) and Dan Wermiel (DOGAMI). Pick up coring tools and RIH. Tag cement at 2438'. Wash cement to 2512 then core solid cement to 2628 at report time. Top plug was at 2575', this is 115' above insert float.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 23 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 60 | Depth @ 0000 hrs - 2751' | Hole advance last 24 hr - 3' | Core recovered - 3'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now drilling 3.89" hole | Rotary speed - 300 rpm; WOB - K lb; Rate of Penetration - avg. 8 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 August 95)				
7	#2 HQ impreg	761'	838'	77' rock	12 rock
8	#2 HQ impreg	838'	1448'	610' rock, 195' cmt	64 rock, 7 cmt
9	#7 HQ impreg	1448'	1751'	303' rock	67 rock
10	#7 HQ impreg	1751'	1955'	204' rock	46 rock
11	#7 HQ impreg	1955'	2416'	461' rock	86 rock
12	#7 HQ impreg	2416'	2748'	332' rock	59 rock
13	Varel 6-1/8" insert tri-cone	500' (in csg)	1072'	572'	37
14	Varel 6-1/8" insert tri-cone	1072'	1694'	622'	50
15	Varel 6-1/8" insert tri-cone	1694'	2187'	493'	40
16	Varel 6-1/8" insert tri-cone	2187'	2748'	561'	
12rr	#7 HQ impreg	2512			

Drilling Assembly: HQ bit, 10' core barrel, HQ rods

Surveys:	**Depth**	**Inclination**	**Direction**	**Bottom-hole Temperature**
see earlier reports (1, 5 September) for previous surveys				
	2304'	2-3/4°	274° true	95°F
	2400'	2-3/4°	274° true	98°F
	2508'	2-3/4°	280° true	95°F
	2603'	2°	276° true	95°F
	2718'	2-1/2°	280° true	111°F

Drilling fluid - water, bentonite
Flow rate - ~21 gal/min | Pressure - ~ 220 psi | Returns temp - 69°F max | Wt - 8.7 lb/gal | Vis - 35 sec | PV - cP | YP - lb/100ft^2 | pH - 12 | Lost circulation -none

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Lithology : Rhyolite

Summary of events last 24 hours:

Core out hard cement at 10 ft/hr to casing shoe then 3 ft of new hole. Ran shoe leakoff test at 665 psi surface pressure for a 0.7 psi/ft gradient. Test witnessed by Dennis Davis (BLM) and Dan Wermiel (DOGAMI). Changed out mud and resumed coring. Coring ahead at 2775' at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 24 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 61 | Depth @ 0000 hrs - 2848' | Hole advance last 24 hr - 97' | Core recovered - 97'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now drilling 3.782" hole | Rotary speed - mud motor; WOB - K lb; Rate of Penetration - avg. ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 September 95)				
16	Varel 6-1/8" insert tri-cone	2187'	2748'	561'	
12rr	#7 HQ impreg	2512'	2848'	332'+100' rock, 236'cmt	80 rock, 28 cmt
17	HQ surface set plug	2848'			

Drilling Assembly: HQ plug bit, sub, mud motor, bent sub, monel, sub, HQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (1, 5 September) for previous surveys				
	2304'	2-3/4°	274° true	95°F
	2400'	2-3/4°	274° true	98°F
	2508'	2-3/4°	280° true	95°F
	2603'	2°	276° true	95°F
	2718'	2-1/2°	280° true	111°F
	2848'	2-1/4°	267° true	134°F

Drilling fluid - water, bentonite
Flow rate - ~21 gal/min | Pressure - ~ 220 psi | Returns temp - 69°F max | Wt - 8.5 lb/gal | Vis - 32 sec | PV - 5 cP | YP - 4 lb/100ft^2 | pH - 11.5 | Lost circulation -none

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Lithology : Rhyolite

Summary of events last 24 hours:

Core ahead to 2848' and POOH. Pick up mud motor and prepare to kick off hole to the SE.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 25 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 62 | Depth @ 0000 hrs - 2848' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now drilling 3.895" hole | Rotary speed - mud motor; WOB - K lb; Rate of Penetration - avg. ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 September 95)				
16	Varel 6-1/8" insert tri-cone	2187'	2748'	561'	
12rr	#7 HQ impreg	2512'	2848'	332'+100' rock, 236'cmt	80 rock, 28 cmt
17	HQ surface set plug	2848'	2849'	1'	8
12rr	#7 HQ impreg	2849'			

Drilling Assembly: HQ bit, 10' core barrel, HQ rods

Surveys:	**Depth**	**Inclination**	**Direction**	**Bottom-hole Temperature**
see earlier reports (1, 5 September) for previous surveys				
	2304'	2-3/4°	274° true	95°F
	2400'	2-3/4°	274° true	98°F
	2508'	2-3/4°	280° true	95°F
	2603'	2°	276° true	95°F
	2718'	2-1/2°	280° true	111°F
	2848'	2-1/4°	267° true	134°F

Drilling fluid - water, bentonite
Flow rate - ~75 gal/min | Pressure - ~ 1500 psi | Returns temp - 81°F max | Wt - 8.7 lb/gal | Vis - 35 sec | PV - 6 cP | YP - 4 lb/100ft^2 | pH - 10 | Lost circulation -none

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Lithology :

Summary of events last 24 hours:

Try to mud motor with rig pumps but motor stalled when on bottom, rig could pump 50 gpm at 1000 psi. Rigged up Halliburton pump truck but motor still would not drill. Pick up another motor and it also stalled on bottom. POOH with motor and RIH with coring tools. Will core ahead and look for other directional equipment.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 26 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 63 | Depth @ 0000 hrs - 2941' | Hole advance last 24 hr - 93' | Core recovered - 93'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now drilling 3.895" hole | Rotary speed - 300 rpm; WOB - 3000 K lb; Rate of Penetration - avg. 6 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 September 95)				
16	Varel 6-1/8" insert tri-cone	2187'	2748'	561'	
12rr	#7 HQ impreg	2512'	2848'	332'+100' rock, 236'cmt	80 rock, 28 cmt
17	HQ surface set plug	2848'	2849'	1'	8
12rr	#7 HQ impreg	2849'			

Drilling Assembly: HQ bit, 10' core barrel, HQ rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (1, 5 September) for previous surveys				
	2304'	2-3/4°	274° true	95°F
	2400'	2-3/4°	274° true	98°F
	2508'	2-3/4°	280° true	95°F
	2603'	2°	276° true	95°F
	2718'	2-1/2°	280° true	111°F
	2848'	2-1/4°	267° true	134°F
	2941'	2-1/4°	251° true	140°F

Drilling fluid - Low-solids nondispersed
Flow rate - ~20 gal/min | Pressure - ~ 400 psi | Returns temp - 67°F max | Wt - 8.7 lb/gal | Vis - 40 sec | PV - 10 cP | YP - 5 lb/100ft^2 | pH - 10 | Lost circulation -none

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Lithology : Flow banded Rhyolite with local clay filled brecciated zones

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Summary of events last 24 hours:

RIH with coring tools and at report time coring ahead at 2975' with full 10' runs. Minerals type directional tools are on the way and should arrive tonight. Making NQ rods up in 20's for the mud motor.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 27 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 64 | Depth @ 0000 hrs - 3076' | Hole advance last 24 hr - 135' | Core recovered - 135'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now drilling 3.895" hole | Rotary speed - 300 rpm; WOB - 3000 K lb; Rate of Penetration - avg. 6 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 September 95)				
16	Varel 6-1/8" insert tri-cone	2187'	2748'	561'	
12rr	#7 HQ impreg	2512'	2848'	332'+100' rock, 236'cmt	80 rock, 28 cmt
17	HQ surface set plug	2848'	2849'	1'	8
12rr	#7 HQ impreg	2849'			

Drilling Assembly: HQ bit, 10' core barrel, HQ rods

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (26 September) for previous surveys				
	2938	2.25°	251°true	141°F
	3026'	2°	269° true	150°F
	3106'	2°	251° true	158°F

Drilling fluid - Low-solids nondispersed
Flow rate - ~20 gal/min | Pressure - ~ 400 psi | Returns temp - 67°F max | Wt - 8.7 lb/gal | Vis - 40 sec | PV - 10 cP | YP - 5 lb/100ft^2 | pH - 10 | Lost circulation -none

---

Lithology : Flow banded Rhyolite

Summary of events last 24 hours:

Core ahead to 3106' with full runs and recovery. POOH laying down 500' of HQ to make room for NQ rods to be used for motor run. Preparing to pick up directional tools and NQ rods.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 28 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 65 | Depth @ 0000 hrs - 3112' | Hole advance last 24 hr - 36' | Core recovered - 30'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now drilling 3.725" hole | Rotary speed - motor ; WOB - 5000 K lb; Rate of Penetration - avg. 2 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 September 95)				
16	Varel 6-1/8" insert tri-cone	2187'	2748'	561'	
12rr	#7 HQ impreg	2512'	2848'	332'+100' rock, 236'cmt	80 rock, 28 cmt
17	HQ surface set bull nose	2848'	2849'	1'	8
12rr	#7 HQ impreg	2849'	3106'	689' rock, 236' cmt	148 rock, 28 cmt
17rr	HQ surface set bull nose	3106'			

Drilling Assembly: Surface set bull nose bit, 2 7/8" non magnetic motor, 30' NQ non magnetic core pipe, NQ rods

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Surveys:	**Depth**	**Inclination**	**Direction**	**Bottom-hole Temperature**
see earlier reports (26 September) for previous surveys				
	2938	2.25°	251°true	141°F
	3026'	2°	252° true	150°F
	3106'	2°	251° true	158°F

Drilling fluid - Low-solids non dispersed
Flow rate - ~40 gal/min | Pressure - ~ 400 psi | Returns temp - 67°F max | Wt - 8.7 lb/gal | Vis - 35 sec | PV - 9 cP | YP - 3 lb/100ft^2 | pH - 9.5 | Lost circulation -none

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Lithology : Flow banded Rhyolite

Summary of events last 24 hours:

RIH with directional tools and orient. Motor drill for 11 hours when ROP and pressure drops. POOH to check tools at 3118'.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 29 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 66 | Depth @ 0000 hrs - 3135' | Hole advance last 24 hr - 23' | Core recovered -
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now drilling 3.75" hole | Rotary speed - motor ; WOB - 3000 K lb; Rate of Penetration - avg. 3 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 September 95)				
16	Varel 6-1/8" insert tri-cone	2187'	2748'	561'	
12rr	#7 HQ impreg	2512'	2848'	332'+100' rock, 236'cmt	80 rock, 28 cmt
17	HQ surface set bull nose	2848'	2849'	1'	8
12rr	#7 HQ impreg	2849'	3106'	689' rock, 236' cmt	148 rock, 28 cmt
17rr	HQ surface set bull nose	3106'	3118'	12.4'	9
18	HX Side-track impreg	3118'			

Drilling Assembly: HX side-track impreg plug bit, 2 7/8" non magnetic motor, 30' NX non magnetic core pipe, NQ rods

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Surveys:	**Depth**	**Inclination**	**Direction**	**Bottom-hole Temperature**
see earlier reports (26 September) for previous surveys				
	2938	2.25°	251°true	141°F
	3026'	2°	252° true	150°F
	3106'	2°	251° true	158°F
	3136	2°	242° true	

Drilling fluid - Low-solids non dispersed
Flow rate - ~45 gal/min | Pressure - ~ 400 psi | Returns temp - 84°F max | Wt - 8.7 lb/gal | Vis - 35 sec | PV - 9 cP | YP - 3 lb/100ft^2 | pH - 9.5 | Lost circulation -none

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Lithology : No core

Summary of events last 24 hours:

POOH with mud motor, change to impreg plug bit, inspect motor and RIH. New bit is drilling better and hole is turning.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 30 September 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 67 | Depth @ 0000 hrs - 3191' | Hole advance last 24 hr - 56' | Core recovered -
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now drilling 3.75" hole | Rotary speed - motor ; WOB - 3000 K lb; Rate of Penetration - avg. 3 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 September 95)				
16	Varel 6-1/8" insert tri-cone	2187'	2748'	561'	
12rr	#7 HQ impreg	2512'	2848'	332'+100' rock, 236'cmt	80 rock, 28 cmt
17	HQ surface set bull nose	2848'	2849'	1'	8
12rr	#7 HQ impreg	2849'	3106'	689' rock, 236' cmt	148 rock, 28 cmt
17rr	HQ surface set bull nose	3106'	3118'	12.4'	9
18	HX Side-track impreg	3118'			

Drilling Assembly: HX side-track impreg plug bit, 2 7/8" non magnetic motor, 30' NX non magnetic core pipe, NQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (26 September) for previous surveys				
	3026'	2°	252° true	150°F
	3106'	2°	251° true	158°F
	3118'	2°	242° true	
	3138'	1 1/2°	87° true	135°F
	3158'	1/2°	87° true	
	3178'	1 1/2°	90° true	

Drilling fluid - Low-solids non dispersed
Flow rate - ~45 gal/min | Pressure - ~ 400 psi | Returns temp - 86°F max | Wt - 8.7 lb/gal | Vis - 38 sec | PV - 9 cP | YP - 6 lb/100ft^2 | pH - 9.5 | Lost circulation - 5 to 10%

Lithology : Flow banded Rhyolite cuttings

Summary of events last 24 hours:

Drilling ahead with mud motor at 3212' at report time. Hole is turning toward the SE target direction. MRT temperature dropped due to higher pump rates and greater distance off bottom. Planning to POOH and ream directionally drilled section with surface set core w/o near bit reamer shell and then core 10' of new hole before continuing directional drilling.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 1 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 68 | Depth @ 0000 hrs - 3222' | Hole advance last 24 hr - 31' | Core recovered -
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now drilling 3.895" hole | Rotary speed - motor ; WOB - 3000 K lb; Rate of Penetration - avg. 3 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 24 September 95)				
16	Varel 6-1/8" insert tri-cone	2187'	2748'	561'	
12rr	#7 HQ impreg	2512'	2848'	332'+100' rock, 236'cmt	80 rock, 28 cmt
17	HQ surface set bull nose	2848'	2849'	1'	8
12rr	#7 HQ impreg	2849'	3106'	689' rock, 236' cmt	148 rock, 28 cmt
17rr	HQ surface set bull nose	3106'	3118'	12'	9
18	HX Side-track impreg	3118'	3222'	104'	38
19	HQ surface set	2848'	3238'	106' reaming, 16' coring	12

Drilling Assembly: HQ surface set core bit, blank reamer shell, 10' core barrel, reamer shell, HQ rods

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Surveys:	**Depth**	**Inclination**	**Direction**	**Bottom-hole Temperature**
see earlier reports (26 September) for previous surveys				
	3026'	2°	252° true	150°F
	3106'	2°	251° true	158°F
	3118'	2°	242° true	
	3138'	1 1/2°	87° true	135°F
	3158'	1/2°	87° true	
	3178'	1 1/2°	90° true	
	3198'	2 3/4°	82° true	

Drilling fluid - Low-solids non dispersed
Flow rate - ~18 gal/min | Pressure - ~ 350 psi | Returns temp - 68°F max | Wt - 8.8 lb/gal | Vis - 43 sec | PV - 6 cP | YP - 1 lb/100ft^2 | pH - 9.5 | Lost circulation - none

---

Lithology : Flow banded Rhyolite cuttings

Summary of events last 24 hours:

Pulling core at 3238 at report time. POOH with mud motor and pick up HQ core barrel with surface set steeped bit. Reamed motored hole and cut 16' of core. Will POOH and pick up directional tools.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 2 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 69 | Depth @ 0000 hrs - 3256' | Hole advance last 24 hr - 34' | Core recovered -16
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now drilling 3.75" hole | Rotary speed - motor ; WOB - 3000 K lb; Rate of Penetration - avg. 3 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
Record of previous bits available on earlier reports (see 28 September 95)					
17rr	HQ surface set bull nose	3106'	3118'	12'	9
18	HX Side-track impreg	3118'	3222'	104'	38
19	HQ surface set	2848'	3238'	106' reaming, 16' coring	12
20	HX Side-track impreg	3238'			

Drilling Assembly: HX side-track impreg plug bit, 2 7/8" non magnetic motor, 30' NX non magnetic core pipe, NQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (30 September) for previous surveys				
Motor	3198'	2 3/4°	82° true	
Core	3238'	3 1/2°	88° true	170°F
Motor	3238'	4 1/4°	89° true	

Drilling fluid - Low-solids non dispersed
Flow rate - ~50 gal/min | Pressure - ~ 450 psi | Returns temp - 85°F max | Wt - 8.8 lb/gal | Vis - 38 sec | PV - 9 cP | YP - 3 lb/100ft^2 | pH - 9 | Lost circulation - none

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Lithology : Flow banded Rhyolite to 3166'
Faintly banded Rhyodacite 3166' to 3238'+

Summary of events last 24 hours:

POOH with coring tools and laying down 500' of HQ. Pick up mud motor with new bit and RIH on NQ rods. Orient tools and continue directional drilling to 3279' at report time. Core shows formation change and coring MRT indicates temperature still on 10° per 100' gradient

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Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 3 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 70 | Depth @ 0000 hrs - 3329' | Hole advance last 24 hr - 73' | Core recovered -
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now drilling 3.75" hole | Rotary speed - motor ; WOB - 3000 K lb; Rate of Penetration - avg. 4 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 28 September 95)				
17rr	HQ surface set bull nose	3106'	3118'	12'	9
18	HX Side-track impreg	3118'	3222'	104'	38
19	HQ surface set	2848'	3238'	106' reaming, 16' coring	12
20	HX Side-track impreg	3238'			

Drilling Assembly: HX side-track impreg plug bit, 2 7/8" non magnetic motor, 30' NX non magnetic core pipe, NQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (30 September) for previous surveys				
Motor	3198'	2 3/4°	82° true	
Core	3238'	3 1/2°	88° true	170°F
Motor	3238'	4 1/4°	89° true	
Motor	3258'	4 1/2°	91° true	
Motor	3278'	5 1/2°	94° true	
Motor	3298'	6°	100° true	
Motor	3328'	6 1/4°	112° true	

Drilling fluid - Low-solids non dispersed
Flow rate - ~50 gal/min | Pressure - ~ 450 psi | Returns temp - 87°F max | Wt - 8.8 lb/gal | Vis - 35 sec | PV - 10 cP | YP - 4 lb/100ft^2 | pH - 9 | Lost circulation - none

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Lithology : Flow banded Rhyolite to 3166'
Faintly banded Rhyodacite 3166' to 3238'+

Summary of events last 24 hours:

Motor drilling to turn hole to 6° SE. Directional drilling at 3354' at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 4 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 71 | Depth @ 0000 hrs - 3388' | Hole advance last 24 hr - 59' | Core recovered -
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now drilling 3.895" hole | Rotary speed - ; WOB - 3000 K lb; Rate of Penetration - avg. 4 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 28 September 95)				
17rr	HQ surface set bull nose	3106'	3118'	12'	9
18	HX Side-track impreg	3118'	3222'	104'	38
19	HQ surface set	2848'	3238'	106' reaming, 16' coring	12
20	HX Side-track impreg	3238'	3388'	150'	42
19rr	HQ surface set	3238'			

Drilling Assembly: HQ surface set core bit, blank reamer shell, 10' core barrel, reamer shell, HQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (3 October) for previous surveys				
Motor	3328'	6 1/4°	112° true	
Motor	3348'	6 1/2°	119° true	
Motor	3368'	7 1/4°	125° true	150° F

Drilling fluid - Low-solids non dispersed
Flow rate - ~50 gal/min | Pressure - ~ 350 psi | Returns temp - 89°F max | Wt - 8.8 lb/gal | Vis - 38 sec | PV - 9 cP | YP - 3 lb/100ft^2 | pH - 9 | Lost circulation - none

---

Lithology : Gray cryptocrystalline Rhyodacite cuttings

Summary of events last 24 hours:

Finish motor run at 3388'. POOH laying down NQ core pipe and mud motor. Pick up core barrel with stepped surface set bit to ream motor hole and core ahead. Tripping in hole with HQ to ream lower motored section at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 5 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 72 | Depth @ 0000 hrs - 3388' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 300; WOB - 3000 K lb; Rate of Penetration - avg. 4 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 28 September 95)				
17rr	HQ surface set bull nose	3106'	3118'	12'	9
18	HX Side-track impreg	3118'	3222'	104'	38
19	HQ surface set	2848'	3238'	106' reaming, 16' coring	12
20	HX Side-track impreg	3238'	3388'	150'	42
19rr	HQ surface set	3238'			

Drilling Assembly: HQ surface set core bit, blank reamer shell, 10' core barrel, reamer shell, HQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (3 October) for previous surveys				
Motor	3328'	6 1/4°	112° true	
Motor	3348'	6 1/2°	119° true	
Motor	3368'	7 1/4°	125° true	150° F
Core	3395'	6 3/4°	123° true	176° F

Drilling fluid - Low-solids non dispersed
Flow rate - ~15 gal/min | Pressure - ~ 380 psi | Returns temp - 64°F max | Wt - 8.70 lb/gal | Vis - 33 sec | PV - 7 cP | YP - 2 lb/100ft^2 | pH - 8.6 | Lost circulation - none

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Lithology : Gray cryptocrystalline Rhyodacite cuttings

Summary of events last 24 hours:
Run in hole to top of motor run. Unable to circulate. Pull back to casing and wash to top of motor run and ream to bottom. Core 7' and survey. Coring ahead at report time with full returns. Torque and circulation pressure up.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 6 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 73 | Depth @ 0000 hrs - 3473' | Hole advance last 24 hr - 85' | Core recovered - 85'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 300; WOB - 3000 K lb; Rate of Penetration - avg. 5 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 28 September 95)				
17rr	HQ surface set bull nose	3106'	3118'	12'	9
18	HX Side-track impreg	3118'	3222'	104'	38
19	HQ surface set	2848'	3238'	106' reaming, 16' coring	12
20	HX Side-track impreg	3238'	3388'	150'	42
19rr	HQ surface set	3238'			

Drilling Assembly: HQ surface set core bit, blank reamer shell, 10' core barrel, reamer shell, HQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (3 October) for previous surveys				
Motor	3328'	6 1/4°	112° true	
Motor	3348'	6 1/2°	119° true	
Motor	3368'	7 1/4°	125° true	150° F
Core	3395'	6 3/4°	123° true	176° F
Core	3420'	7°	127° true	177° F

Drilling fluid - Low-solids non dispersed
Flow rate - ~15 gal/min | Pressure - ~ 380 psi | Returns temp - 65°F max | Wt - 8.70 lb/gal | Vis - 45 sec | PV - 11 cP | YP - 8 lb/100ft^2 | pH - 8.6 | Lost circulation - none

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Lithology :

Summary of events last 24 hours:
Core ahead to 3508' at report time. Having some hole sticking problems after core retrieval.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 7 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 74 | Depth @ 0000 hrs - 3508' | Hole advance last 24 hr - 35' | Core recovered - 35'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 300; WOB - 3000 K lb; Rate of Penetration - avg. 4 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 28 September 95)				
17rr	HQ surface set bull nose	3106'	3118'	12'	9
18	HX Side-track impreg	3118'	3222'	104'	38
19	HQ surface set	2848'	3238'	106' reaming, 16' coring	12
20	HX Side-track impreg	3238'	3388'	150'	42
19rr	HQ surface set	3238'	3508'	254' reaming 136'corirg	52
21	#7 HQ impreg	3508'			

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (3 October) for previous surveys				
Motor	3328'	6 1/4°	112° true	
Motor	3348'	6 1/2°	119° true	
Motor	3368'	7 1/4°	125° true	150° F
Core	3395'	6 3/4°	123° true	176° F
Core	3420'	7°	127° true	177° F

Drilling fluid - Low-solids non dispersed
Flow rate - ~22 gal/min | Pressure - ~ 250 psi | Returns temp - 64°F max | Wt - 8.60 lb/gal | Vis - 40 sec | Filtrate 10.0 cm^3/30 min | PV - 7 cP | YP - 4 lb/100ft^2 | pH - 9 | Lost circulation - none

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Lithology : Predominately white massive aphanitic 5-10% porphyritic rhyolite (felsite).

Summary of events last 24 hours:
POOH and change BHA to 20' core barrel with top and bottom reamers. Change out mud. RIH to casing top and circulate out old mud. Wash to 3106', top of motor run. Ream to 3300' at report time. Will continue to ream to bottom and resume coring.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 8 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 75 | Depth @ 0000 hrs - 3562' | Hole advance last 24 hr - 54' | Core recovered - 54'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 300; WOB - 4000 K lb; Rate of Penetration - avg. 5 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
Record of previous bits available on earlier reports (see 28 September 95)					
17rr	HQ surface set bull nose	3106'	3118'	12'	9
18	HX Side-track impreg	3118'	3222'	104'	38
19	HQ surface set	2848'	3238'	106' reaming, 16' coring	12
20	HX Side-track impreg	3238'	3388'	150'	42
19rr	HQ surface set	3238'	3508'	254' reaming 136'corirg	52
21	#7 HQ impreg	3508'			

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

---

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (3 October) for previous surveys				
Motor	3328'	6 1/4°	112° true	
Motor	3348'	6 1/2°	119° true	
Motor	3368'	7 1/4°	125° true	150° F
Core	3395'	6 3/4°	123° true	176° F
Core	3420'	7°	127° true	177° F
Core	3508'	8°	132° true	185° F

Drilling fluid - Low-solids non dispersed
Flow rate - ~12 gal/min | Pressure - ~ 300 psi | Returns temp - 65°F max | Wt - 8.60 lb/gal | Vis - 39 sec | Filtrate 8.0 cm^3/30 min | PV - 7 cP | YP - 3 lb/100ft^2 | pH - 8 | Lost circulation - none

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Lithology : Felsite to 3468'. Debris flow from 3468'.

Summary of events last 24 hours:
Ream to bottom and survey. . Having core slipping problems caused by OD washing of core. Core ahead to 3594' and trying to work stuck core inner tube loose at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 9 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 76 | Depth @ 0000 hrs - 3599' | Hole advance last 24 hr - 37' | Core recovered - 37'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 300; WOB - 4000 K lb; Rate of Penetration - avg. 5 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 28 September 95)				
17rr	HQ surface set bull nose	3106'	3118'	12'	9
18	HX Side-track impreg	3118'	3222'	104'	38
19	HQ surface set	2848'	3238'	106' reaming, 16' coring	12
20	HX Side-track impreg	3238'	3388'	150'	42
19rr	HQ surface set	3238'	3508'	254' reaming 136'corirg	52
21	#7 HQ impreg	3508'			

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	**Depth**	**Inclination**	**Direction**	**Bottom-hole Temperature**
see earlier reports (8 October) for previous surveys				
	3420'	7°	127° true	177° F
	3508'	8°	132° true	185° F
	3619'	7 1/2°	139° true	200° F

Drilling fluid - Polymer
Flow rate - ~12 gal/min | Pressure - ~ 400 psi | Returns temp - 65°F max | Wt - 8.60 lb/gal | Vis - 36 sec | Filtrate 6.8 cm^3/30 min | PV - 5 cP | YP - 3 lb/100ft^2 | pH - 9 | Lost circulation - none

---

Lithology : Felsite to 3468'. Debris flow from 3468'.

Summary of events last 24 hours:
POOH for stuck inner core tube. Bearing failed locking tubes together. TIH to 3100' and wash / ream through clay squeeze. Kicked off of hole at 3589' (5' off bottom) and cored to 3639'. Water pressure up due to squeezing clay.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT -10 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 77 | Depth @ 0000 hrs - 3732' | Hole advance last 24 hr - 133' | Core recovered - 133'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 280; WOB - 4000 K lb; Rate of Penetration - avg. 10 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
Record of previous bits available on earlier reports (see 28 September 95)					
17rr	HQ surface set bull nose	3106'	3118'	12'	9
18	HX Side-track impreg	3118'	3222'	104'	38
19	HQ surface set	2848'	3238'	106' reaming, 16' coring	12
20	HX Side-track impreg	3238'	3388'	150'	42
19rr	HQ surface set	3238'	3508'	254' reaming 136'corirg	52
21	#7 HQ impreg	3508'			

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	**Depth**	**Inclination**	**Direction**	**Bottom-hole Temperature**
see earlier reports (8 October) for previous surveys				
	3420'	7°	127° true	177° F
	3508'	8°	132° true	185° F
	3619'	7 1/2°	139° true	200° F
	3719'	8°	144° true	226° F

Drilling fluid - Polymer
Flow rate - ~12 gal/min | Pressure - ~ 500 psi | Returns temp - 65°F max | Wt - 8.7 lb/gal | Vis - 38 sec | Filtrate 5.2 cm^3/30 min | PV - 8 cP | YP - 2 $lb/100ft^2$ | pH - 8.9 | Lost circulation - none

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Lithology :
3468' to 3560' Debris Flow
3560' to 3564' Andesite Intrusive
3564' to 3590' Debris Flow

Summary of events last 24 hours:
Core ahead with one short 240' wiper trip. Water pressure is still high but holding. Rock is soft.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT -11 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 78 | Depth @ 0000 hrs - 3879' | Hole advance last 24 hr - 147' | Core recovered - 147'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 280; WOB - 4000 K lb; Rate of Penetration - avg. 10 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 28 September 95)				
17rr	HQ surface set bull nose	3106'	3118'	12'	9
18	HX Side-track impreg	3118'	3222'	104'	38
19	HQ surface set	2848'	3238'	106' reaming, 16' coring	12
20	HX Side-track impreg	3238'	3388'	150'	42
19rr	HQ surface set	3238'	3508'	254' reaming 136'corirg	52
21	#7 HQ impreg	3508'			

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (8 October) for previous surveys				
	3420'	7°	127° true	177° F
	3508'	8°	132° true	185° F
	3619'	7 1/2°	139° true	200° F
	3719'	8°	144° true	226° F
	3819'	8-1/2°	146° true	239° F
	3919'	9-1/4°	140° true	247° F

Drilling fluid - Polymer
Flow rate - ~13 gal/min | Pressure - ~ 400 psi | Returns temp - 65°F max | Wt - 8.6 lb/gal | Vis - 40 sec | Filtrate 4.8 cm^3/30 min | PV - 9 cP | YP - 2 $lb/100ft^2$ | pH - 9 | Lost circulation - none

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Lithology :

3590' to 3597'	Basalt
3597' to 3676'	Debris Flow
3676' to 3682'	Basalt
3682' to 3776'	Debris Flow

Summary of events last 24 hours:
Core ahead to 3919' with full core recovery and fluid returns. Water pressure lower in Basalt but still high in soft formations.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT -12 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 79 | Depth @ 0000 hrs - ' | Hole advance last 24 hr - ' | Core recovered - '
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 280; WOB - 4000 K lb; Rate of Penetration - avg. 10 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 28 September 95)				
17rr	HQ surface set bull nose	3106'	3118'	12'	9
18	HX Side-track impreg	3118'	3222'	104'	38
19	HQ surface set	2848'	3238'	106' reaming, 16' coring	12
20	HX Side-track impreg	3238'	3388'	150'	42
19rr	HQ surface set	3238'	3508'	254' reaming 136'coririg	52
21	#7 HQ impreg	3508'			

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	**Depth**	**Inclination**	**Direction**	**Bottom-hole Temperature**
see earlier reports (8 October) for previous surveys				
	3420'	7°	127° true	177° F
	3508'	8°	132° true	185° F
	3619'	7 1/2°	139° true	200° F
	3719'	8°	144° true	226° F
	3819'	8-1/2°	146° true	239° F
	3919'	9-1/4°	140° true	247° F

Drilling fluid - Polymer
Flow rate - ~13 gal/min | Pressure - ~ 400 psi | Returns temp - 65°F max | Wt - 8.6 lb/gal | Vis - 40 sec | Filtrate 4.8 cm^3/30 min | PV - 9 cP | YP - 2 lb/100ft^2 | pH - 9 | Lost circulation - none

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Lithology :

3590' to 3597' Basalt
3597' to 3676' Debris Flow
3676' to 3682' Basalt
3682' to 3776' Debris Flow

Summary of events last 24 hours:
Core ahead to 3919' with full core recovery and fluid returns. Water pressure lower in Basalt but still high in soft formations.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT -13 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 80 | Depth @ 0000 hrs - 4190' | Hole advance last 24 hr - 138' | Core recovered - 138'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 280; WOB - 4000 K lb; Rate of Penetration - avg. 10 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 28 September 95)				
17rr	HQ surface set bull nose	3106'	3118'	12'	9
18	HX Side-track impreg	3118'	3222'	104'	38
19	HQ surface set	2848'	3238'	106' reaming, 16' coring	12
20	HX Side-track impreg	3238'	3388'	150'	42
19rr	HQ surface set	3238'	3508'	254' reaming 136'coririg	52
21	#7 HQ impreg	3508'			

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (11 October) for previous surveys				
	3919'	9-1/4°	140° true	247° F
	4019'	9-1/4°	147° true	253° F
	4127'	9-3/4°	149° true	255° F
	4229'	10°	147° true	264° F

Drilling fluid - Polymer
Flow rate - ~17 gal/min | Pressure - ~ 350 psi | Returns temp - 55°F max | Wt - 8.8 lb/gal | Vis - 38 sec | Filtrate 5.6 cm^3/30 min | PV - 5 cP | YP - 2 $lb/100ft^2$ | pH - 9 | Lost circulation - none

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Lithology :

3682' to 3806'	Debris Flow
3806' to 3847'	Basalt
3847' to 3865'	Mafic Debris Flow
3865' to 3886'	Vesicular Basalt
3886' to 3905'	Debris Flow , 90% Altered Clay
3905' to 3915'	Amygd Basalt, Calc Amygds
3915' to 3927'	Debris Flow (Mudstone), 99% Clay
3927' to 3935'	Tuff, altered clay
3935' to 3970'	Debris Flow, 99% Clay

Summary of events last 24 hours:
Core ahead to 4229'. Having to periodically dump mud due to native clay contamination.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT -14 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 81| Depth @ 0000 hrs - 4329' | Hole advance last 24 hr - 139' | Core recovered - 139'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 280; WOB - 4000 K lb; Rate of Penetration - avg. 10 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 28 September 95)				
17rr	HQ surface set bull nose	3106'	3118'	12'	9
18	HX Side-track impreg	3118'	3222'	104'	38
19	HQ surface set	2848'	3238'	106' reaming, 16' coring	12
20	HX Side-track impreg	3238'	3388'	150'	42
19rr	HQ surface set	3238'	3508'	254' reaming 136'corirg	52
21	#7 HQ impreg	3508'			

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (11 October) for previous surveys				
	3919'	9-1/4°	140° true	247° F
	4019'	9-1/4°	147° true	253° F
	4127'	9-3/4°	149° true	255° F
	4229'	10°	147° true	264° F
	4349'	10-1/4°	146° true	264° F

Drilling fluid - Polymer
Flow rate - ~15 gal/min | Pressure - ~ 420 psi | Returns temp - 64°F max | Wt - 8.8 lb/gal | Vis - 36 sec | Filtrate 5.8 cm^3/30 min | PV - 4 cP | YP - 5 $lb/100ft^2$ | pH - 9 | Lost circulation - none

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Lithology :

3682' to 3806'	Debris Flow
3806' to 3847'	Basalt
3847' to 3865'	Mafic Debris Flow
3865' to 3886'	Vesicular Basalt
3886' to 3905'	Debris Flow , 90% Altered Clay
3905' to 3915'	Amygd Basalt, Calc Amygds
3915' to 3927'	Debris Flow (Mudstone), 99% Clay
3927' to 3935'	Tuff, altered clay
3935' to 3970'	Debris Flow, 99% Clay

Summary of events last 24 hours:
Core ahead to 4349'. Repeat 4329' survey due to bad picture. 231° BHT at 4329' survey. Still dumping mud due to high native clay contamination. Making wiper trip to casing in preparation for temperature and BHTV logs.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT -15 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 82| Depth @ 0000 hrs - 4349' | Hole advance last 24 hr - 20' | Core recovered - 20'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 280; WOB - 4000 K lb; Rate of Penetration - avg. 10 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
Record of previous bits available on earlier reports (see 14 October 95)					
19rr	HQ surface set	3238'	3508'	254' reaming 136'coririg	52
21	#7 HQ impreg	3508'	4347'	839' + 5' kick off	119
22	#7 HQ impreg	4347'			

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (15 October) for previous surveys				
	4229'	10°	147° true	264° F
	4349'	10-1/4°	146° true	261° F

Drilling fluid - Polymer
Flow rate - ~15 gal/min | Pressure - ~ 420 psi | Returns temp - 66°F max | Wt - 8.9 lb/gal | Vis - 38 sec | Filtrate 5.6 cm^3/30 min | PV - 6 cP | YP - 2 $lb/100ft^2$ | pH - 8.5 | Lost circulation - none

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Lithology :

3682' to 3806'	Debris Flow
3806' to 3847'	Basalt
3847' to 3865'	Mafic Debris Flow
3865' to 3886'	Vesicular Basalt
3886' to 3905'	Debris Flow , 90% Altered Clay
3905' to 3915'	Amygd Basalt, Calc Amygds
3915' to 3927'	Debris Flow (Mudstone), 99% Clay
3927' to 3935'	Tuff, altered clay
3935' to 3970'	Debris Flow, 99% Clay

Summary of events last 24 hours:
POOH for logs. Ran temperature log to bridge at 4225', max temp 260° F. Ran in hole with BHTV to ~ 3300' when tool failed after working through motor run dog leg. Worked on BHTV. It will work on the surface test cable but not on logging cable. Ran second temp log 7 hours after first log to 4225', max temp 267° F. Trip in hole with new bit and wash to solid bridge at 4245'. Drill and wash to bottom.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT -16 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud - 83| Depth @ 0000 hrs - 4439' | Hole advance last 24 hr - 90' | Core recovered - 90'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 280; WOB - 3000 K lb; Rate of Penetration - avg. 8 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
Record of previous bits available on earlier reports (see 14 October 95)					
19rr	HQ surface set	3238'	3508'	254' reaming 136'corirg	52
21	#7 HQ impreg	3508'	4347'	839' + 5' kick off	119
22	#7 HQ impreg	4347'			

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (15 October) for previous surveys				
	4229'	10°	147° true	264° F
	4349'	10-1/4°	146° true	261° F
	4446'	10-1/2°	147° true	268° F

Drilling fluid - Polymer
Flow rate - ~15 gal/min | Pressure - ~ 560 psi | Returns temp - 66°F max | Wt - 8.5 lb/gal | Vis - 37 sec | Filtrate 7.2 cm^3/30 min | PV - 7 cP | YP - 2 $lb/100ft^2$ | pH - 9 | Lost circulation - none

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Lithology :

3916' to 4025'	Lithic Tuff
4025' to 4093'	Debris Flow
4093' to 4112'	Tuff
4112' to 4158'	Mafic Debris Flow
4158' to 4202'	Clay Zone
4158' to 4172'	Tuff
4172' to 4200'	Lithic Tuff
4200' to 4220'	Debris Flow

Summary of events last 24 hours:
Cored 9' of new hole to 4358'. Clay coming in on rods. Work loose and drill back out. Pull 4 stands and ream back to bottom. Coring ahead to 4466' at report time. Pulling back above 4340' after each core run to condition hole.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 17 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 84 | Days since 4500' - 1 | Depth @ 0000 hrs - 4581' | Hole advance last 24 hr - 142' | Core recovered - 142'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 280; WOB - 3000 K lb; Rate of Penetration - avg. 7 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
Record of previous bits available on earlier reports (see 14 October 95)					
19rr	HQ surface set	3238'	3508'	254' reaming 136'coririg	52
21	#7 HQ impreg	3508'	4347'	839' + 5' kick off	119
22	#7 HQ impreg	4347'			

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (15 October) for previous surveys				
	4229'	10°	147° true	264° F
	4349'	10-1/4°	146° true	261° F
	4446'	10-1/2°	147° true	268° F
	4544'	10°	142° true	284° F

Drilling fluid - Polymer
Flow rate - ~18 gal/min | Pressure - ~ 500 psi | Returns temp - 66°F max | Wt - 8.8 lb/gal | Vis - 42 sec | Filtrate 6 cm^3/30 min | PV - 10 cP | YP - 5 $lb/100ft^2$ | pH - 9 | Lost circulation - none

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Lithology :

3916' to 4025'	Lithic Tuff
4025' to 4093'	Debris Flow
4093' to 4112'	Tuff
4112' to 4158'	Mafic Debris Flow
4158' to 4202'	Clay Zone
4158' to 4172'	Tuff
4172' to 4200'	Lithic Tuff
4200' to 4220'	Debris Flow

Summary of events last 24 hours:
Changing rig over to run CHD 101 rods on top of 4560' of HQ. Depth at report time 4608'. At 4500' hole costs are 100 % SNL expense. CE started a new AFE and well at 4500'.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 18 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud - 85 | SNL 100% days - 2 | Depth @ 0000 hrs - 4716' | Hole advance last 24 hr - 135' | Core recovered - 135'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 280; WOB - 3000 K lb; Rate of Penetration - avg. 7 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
Record of previous bits available on earlier reports (see 14 October 95)					
19rr	HQ surface set	3238'	3508'	254' reaming 136'corirg	52
21	#7 HQ impreg	3508'	4347'	839' + 5' kick off	119
22	#7 HQ impreg	4347'			

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (15 October) for previous surveys				
	4229'	10°	147° true	264° F
	4349'	10-1/4°	146° true	261° F
	4446'	10-1/2°	147° true	268° F
	4544'	10°	142° true	284° F
	4658'	10-1/4°	141° true	290° F

Drilling fluid - Polymer
Flow rate - ~18 gal/min | Pressure - ~ 500 psi | Returns temp - 66°F max | Wt - 8.8 lb/gal | Vis - 42 sec | Filtrate 6 cm^3/30 min | PV - 10 cP | YP - 5 $lb/100ft^2$ | pH - 9 | Lost circulation - none

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Lithology :

4222' to 4254'	Basalt / Andesite
4254' to 4304'	Debris Flow
4304' to 4375'	Welded Tuff
4375' to 4446'	Debris Flow
4446' to 4448'	Rhyolite
4448' to 4512'	Debris Flow
4512' to 4581+	Flow Banded Rhyolite

Summary of events last 24 hours:
Cored ahead to 4756' and stuck at report time. Made 450' wiper trip at 4716' and didn't touch a thing. After pulling core at 4756' pipe would not move. Appears to be differentially stuck. Preparing to spot mineral oil and Pipe Lax.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 19 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 86 / 3 | Depth @ 0000 hrs - 4756' | Hole advance last 24 hr -0' | Core recovered - 0'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 0; WOB - 0 K lb; Rate of Penetration - avg. 0 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
Record of previous bits available on earlier reports (see 14 October 95)					
19rr	HQ surface set	3238'	3508'	254' reaming 136'corirg	52
21	#7 HQ impreg	3508'	4347'	839' + 5' kick off	119
22	#7 HQ impreg	4347'			

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (15 October) for previous surveys				
	4229'	10°	147° true	264° F
	4349'	10-1/4°	146° true	261° F
	4446'	10-1/2°	147° true	268° F
	4544'	10°	142° true	284° F
	4658'	10-1/4°	141° true	290° F

Drilling fluid - Polymer
Flow rate - 12 gal/hour | Pressure - ~ psi | Returns temp - 44°F max | Wt - 8.8 lb/gal | Vis - 44 sec | Filtrate 5.6 cm^3/30 min | PV - 8 cP | YP - 4 $lb/100ft^2$ | pH - 9 | Lost circulation - none

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Lithology :

4512' to 4542'	Rhyolite / Felsite
4542' to 4546'	Andesite
4546' to 4610'	Rhyolite / Felsite
4610' to 4670+	Faintly banded mostly devitrified Obsidian, gradational with above

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Summary of events last 24 hours:
Mix and spot 10 BBL of mineral oil and Pipe Lax. Work stuck pipe every 15 minutes and move fluid 6 gallons every 30 minutes. Will continue this for 24 hours or until pipe comes free.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 20 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud / 4500' - 87 / 4 | Depth @ 0000 hrs - 4756' | Hole advance last 24 hr -0' | Core recovered - 0'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 0; WOB - 0 K lb; Rate of Penetration - avg. 0 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 14 October 95)				
19rr	HQ surface set	3238'	3508'	254' reaming 136'corirg	52
21	#7 HQ impreg	3508'	4347'	839' + 5' kick off	119
22	#7 HQ impreg	4347'			

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (15 October) for previous surveys				
	4229'	10°	147° true	264° F
	4349'	10-1/4°	146° true	261° F
	4446'	10-1/2°	147° true	268° F
	4544'	10°	142° true	284° F
	4658'	10-1/4°	141° true	290° F

Drilling fluid - Polymer
Flow rate - ~21 gal/min | Pressure - ~ 350 psi | Returns temp - 65°F max | Wt - 8.7 lb/gal | Vis - 40 sec | Filtrate 3.8 cm^3/30 min | PV - 9 cP | YP - 2 $lb/100ft^2$ | pH - 8.8 | Lost circulation - none

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Lithology :

4512' to 4542'	Rhyolite / Felsite
4542' to 4546'	Andesite
4546' to 4610'	Rhyolite / Felsite
4610' to 4670+	Faintly banded mostly devitrified Obsidian, gradational with above

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Summary of events last 24 hours:
Work stuck pipe free at 1100 hours. Circulate spotting fluid out of hole and condition mud. POOH and check BHA, all OK. Rig up oil saver to allow for circulation during core retrieval. Will also setup to allow for pipe rotation during core retrieval. This along with conditioning of the mud should help prevent further differential sticking problems. Reaming back in hole and pushing cave from 4150' at report time. Will make several wiper trips to condition hole.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 21 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 88 / 5 | Depth @ 0000 hrs - 4813' | Hole advance last 24 hr -57' | Core recovered - 57'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 280; WOB - 3000 K lb; Rate of Penetration - avg. 5 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 14 October 95)				
19rr	HQ surface set	3238'	3508'	254' reaming 136'corirg	52
21	#7 HQ impreg	3508'	4347'	839' + 5' kick off	119
22	#7 HQ impreg	4347'			

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (15 October) for previous surveys				
	4229'	10°	147° true	264° F
	4349'	10-1/4°	146° true	261° F
	4446'	10-1/2°	147° true	268° F
	4544'	10°	142° true	284° F
	4658'	10-1/4°	141° true	290° F

Drilling fluid - Polymer
Flow rate - ~ 13 gal/min | Pressure - ~ 650 psi | Returns temp - 64°F max | Wt - 8.8 lb/gal | Vis - 40 sec | Filtrate 4.4 cm^3/30 min | PV - 9 cP | YP - 3 $lb/100ft^2$ | pH - 8.3 | Lost circulation - 10%

Lithology :

4612' to 4668'	Mostly devitrified Obsidian
4668' to 4699'	Opalized / Silicified flow banded in part, Xenolith rich Rhyolite
4699' to 4706'	Andesite
4706' to 4750'	Strongly Opalized Devitrified Rhyolite with abundant Xenoliths
4750' to 4753'	Andesite

Summary of events last 24 hours:
Ream to bottom and core ahead. Circulating pressure too high. Make several wiper trips. Preparing to change mud and wipe back to casing.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 22 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 89 / 6 | Depth @ 0000 hrs - 4855' | Hole advance last 24 hr -42' | Core recovered - 42'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 280; WOB - 3000 K lb; Rate of Penetration - avg. 5 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 14 October 95)				
19rr	HQ surface set	3238'	3508'	254' reaming 136'corirg	52
21	#7 HQ impreg	3508'	4347'	839' + 5' kick off	119
22	#7 HQ impreg	4347'			

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (15 October) for previous surveys				
	4229'	10°	147° true	264° F
	4349'	10-1/4°	146° true	261° F
	4446'	10-1/2°	147° true	268° F
	4544'	10°	142° true	284° F
	4658'	10-1/4°	141° true	290° F

Drilling fluid - Polymer
Flow rate - ~ 13 gal/min | Pressure - ~ 650 psi | Returns temp - 64°F max | Wt - 8.8 lb/gal | Vis - 40 sec | Filtrate 4.4 cm^3/30 min | PV - 9 cP | YP - 3 $lb/100ft^2$ | pH - 8.3 | Lost circulation - 10%

Lithology :		
	4612' to 4668'	Mostly devitrified Obsidian
	4668' to 4699'	Opalized / Silicified flow banded in part, Xenolith rich Rhyolite
	4699' to 4706'	Andesite
	4706' to 4750'	Strongly Opalized Devitrified Rhyolite with abundant Xenoliths
	4750' to 4753'	Andesite

Summary of events last 24 hours:
Pipe stuck at 1900 hours after pulling core from 4855'. Bit 13.7' off bottom. Mix and spot 10 bbl of mineral oil and Pipe Lax. Pipe free at 0600. Turn hole over to fresh mud and start wiper trip at report time. Getting ready to temperature and BHTV log. BHT on core retrieval at 4855' was 302° F.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 23 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 90 / 7 | Depth @ 0000 hrs - 4855' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 200; WOB - 3000 K lb; Rate of Penetration - avg. ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
Record of previous bits available on earlier reports (see 14 October 95)					
19rr	HQ surface set	3238'	3508'	254' reaming 136'coririg	52
21	#7 HQ impreg	3508'	4347'	839' + 5' kick off	119
22	#7 HQ impreg	4347'	4855'	508'	
23	# 7 HQ impreg	4855'			

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (15 October) for previous surveys				
	4229'	10°	147° true	264° F
	4349'	10-1/4°	146° true	261° F
	4446'	10-1/2°	147° true	268° F
	4544'	10°	142° true	284° F
	4658'	10-1/4°	141° true	290° F

Drilling fluid - Polymer
Flow rate - ~ 22 gal/min | Pressure - ~ 400 psi | Returns temp - 64°F max | Wt - 8.6 lb/gal | Vis - 40 sec | Filtrate 5.6 cm^3/30 min | PV - 8 cP | YP - 5 $lb/100ft^2$ | pH - 9 | Lost circulation - 10%

Lithology :		
	4751' to 4753'	Amygdaloidal Basalt
	4753' to 4765'	Welded Tuff
	4765' to 4799'	Scoria with firm clay matrix
	4799' to 4806'	Amygdaloidal Basalt
	4806' to	Amygdaloidal Basalt & intra-flow volcaniclastic rocks

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Summary of events last 24 hours:
Wipe hole to casing and back to 4835'. POOH to Baker lock BHA and lower 200' of HQ. This will make it safer to reduce if rods stick for good. While out of hole ran BHTV and temperature logs. Hole bridged at 3642'. BHTV logged from bridge to casing with several repeat sections. Back on bottom at report time and preparing to core ahead.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 24 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud / 4500' - 91 / 8 | Depth @ 0000 hrs - 4905' | Hole advance last 24 hr - 50' | Core recovered - 50'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 200; WOB - 3000 K lb; Rate of Penetration - avg. ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 14 October 95)				
19rr	HQ surface set	3238'	3508'	254' reaming 136'corirg	52
21	#7 HQ impreg	3508'	4347'	839' + 5' kick off	119
22	#7 HQ impreg	4347'	4855'	508'	
23	# 7 HQ impreg	4855'			

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (15 October) for previous surveys				
	4229'	10°	147° true	264° F
	4349'	10-1/4°	146° true	261° F
	4446'	10-1/2°	147° true	268° F
	4544'	10°	142° true	284° F
	4658'	10-1/4°	141° true	290° F

Drilling fluid - Polymer
Flow rate - ~ 14 gal/min | Pressure - ~ 400 psi | Returns temp - 61°F max | Wt - 8.6 lb/gal | Vis - 40 sec | Filtrate 4.0 cm^3/30 min | PV - 8 cP | YP - 2 $lb/100ft^2$ | pH - 9 | Lost circulation - 10%

Lithology :		
	4751' to 4753'	Amygdaloidal Basalt
	4753' to 4765'	Welded Tuff
	4765' to 4799'	Scoria with firm clay matrix
	4799' to 4806'	Amygdaloidal Basalt
	4806' to	Amygdaloidal Basalt & intra-flow volcaniclastic rocks

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Summary of events last 24 hours:
Core ahead to 4905' at 2000 hours. Pulling core above the head. This allows for rotation while lowering the overshot and working the pipe while retrieving the tube. Also pumping down the backside. All this to cut down on the chances of more differential sticking. Vibrations down hole, undersize core and high circulation pressure causing problems. Trip for bit inspection and condition hole.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 25 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 92 / 9 | Depth @ 0000 hrs - 4966' | Hole advance last 24 hr - 61' | Core recovered - 48'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 90; WOB - 3000 K lb; Rate of Penetration - avg. 4.5 ft/hr

Bit number	Type	In, KB	Out, KB	Footage	Hours
	Record of previous bits available on earlier reports (see 14 October 95)				
19rr	HQ surface set	3238'	3508'	254' reaming 136'corirg	52
21	#7 HQ impreg	3508'	4347'	839' + 5' kick off	119
22	#7 HQ impreg	4347'	4855'	508'	
23	# 7 HQ impreg	4855'	4905'	50'	
24	# 7 HQ impreg	4905'			

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (15 October) for previous surveys				
	4229'	10°	147° true	264° F
	4349'	10-1/4°	146° true	261° F
	4446'	10-1/2°	147° true	268° F
	4544'	10°	142° true	284° F
	4658'	10-1/4°	141° true	290° F

Drilling fluid - Polymer
Flow rate - ~ 18 gal/min | Pressure - ~ 550 psi | Returns temp - 65°F max | Wt - 8.7 lb/gal | Vis - 41 sec | Filtrate 5.6 cm^3/30 min | PV - 8 cP | YP - 2 $lb/100ft^2$ | pH - 8.5 | Lost circulation - 10%

Lithology :		
	4805' to 4811'	Intra Flow Clastics
	4811' to 4823'	Amygdaloidal Basalt
	4823' to 4830'	Scoria
	4830' to 4835'	Opalized Debris Flow
	4835' to 4838'	Amygdaloidal Basalt
	4838' to 4843'	Opalized Debris Flow Hematite replaced Lapilli
	4843' to +	Flow Banded Rhyolite

Summary of events last 24 hours:
Changed bit although not very bad. RIH and core ahead to 4975' at 0400 hours. Drop undersize core. POOH to clear core barrel. Vibrations causing bit to cut undersize core. Unstabilized BHT at 3933' = 299° F.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 26 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 93 / 10 | Depth @ 0000 hrs - 4975' | Hole advance last 24 hr - 9' | Core recovered - 5'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 90; WOB - 3000 K lb; Rate of Penetration - avg. 4.5 ft/hr

Bit number	Type	In, KB	Out, KB	Footage
	Record of previous bits available on earlier reports (see 14 October 95)			
19rr	HQ surface set	3238'	3508'	254' reaming 136'corirg
21	#7 HQ impreg	3508'	4347'	839' + 5' kick off
22	#7 HQ impreg	4347'	4855'	508'
23	# 7 HQ impreg	4855'	4905'	50
24	# 7 HQ impreg	4905'	4975'	70
25	# 2 HQ impreg	4975'		

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (25 October) for previous surveys				
	4658'	10-1/4°	141° true	290° F

Drilling fluid - Polymer
Flow rate - ~ 18 gal/min | Pressure - ~ 550 psi | Returns temp - 65°F max | Wt - 8.8 lb/gal | Vis - 41 sec | Filtrate 4.7 cm^3/30 min | PV - 8 cP | YP - 2 $lb/100ft^2$ | pH - 8 | Lost circulation - 10%

Lithology : 4843' to + Flow Banded Rhyolite

Summary of events last 24 hours:
Clear core barrel and change out bit. Drilled all of the crown off bit. Pick up series 2 bit which will drill better at low RPM. Run bit in to 4335' and sat down on bridge. Unable to circulate, plugged core barrel. Unable to pull inner core tube to clear plug. POOH and clear plugged BHA. At report time washing back in hole at 3500'.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 27 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 94 / 11 | Depth @ 0000 hrs - 4975' | Hole advance last 24 hr - 0' | Core recovered - '
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - NA; WOB - NA lb; Rate of Penetration - avg. 0 ft/hr

Bit number	Type	In, KB	Out, KB	Footage
	Record of previous bits available on earlier reports (see 14 October 95)			
19rr	HQ surface set	3238'	3508'	254' reaming 136'corirg
21	#7 HQ impreg	3508'	4347'	839' + 5' kick off
22	#7 HQ impreg	4347'	4855'	508'
23	# 7 HQ impreg	4855'	4905'	50
24	# 7 HQ impreg	4905'	4975'	70
25	# 2 HQ impreg	4975'		

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (25 October) for previous surveys				
	4658'	10-1/4°	141° true	290° F

Drilling fluid - Polymer
Flow rate - ~ 24 gal/min | Pressure - ~ 550 psi | Returns temp - 65°F max | Wt - 8.8 lb/gal | Vis - 40 sec | Filtrate 5.2 cm^3/30 min | PV - 7.5 cP | YP - 2 $lb/100ft^2$ | pH - 9.5 | Lost circulation - 10%

Lithology :

4843' to 4883'	Flow Banded Rhyolite / Felsite
4883' to 4887'	Debris Flow
4887' to 4891'	Felsite
4891' to 4929'	Debris Flow
4929' to 4941'	Amygdaloidal Andesite
4941' to 4954'	Debris Flow
4954' to 4964'	Rhyodacite
4964' to +	Amygdaloidal Andesite

Summary of events last 24 hours:
Wash and ream from 3500 to TD. Pull tube with cave pushed to bottom. Drop new tube and it pressured up. Pull and drop another. Start coring at 0300. Core ahead to 4992' and pull tube. Tube failed at latch head. POOH to remove inner core barrel.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 28 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 95 / 12 | Depth @ 0000 hrs - 4992' | Hole advance last 24 hr - 17' | Core recovered - 17'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 190; WOB - 3000 lb; Rate of Penetration - avg. 8 ft/hr

Bit number	Type	In, KB	Out, KB	Footage
Record of previous bits available on earlier reports (see 24 October 95)				
24	# 7 HQ impreg	4905'	4975'	70'
25	# 2 HQ impreg	4975'	4992'	1475'reaming 17' coring
26	# 2 HQ impreg	4992'		

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (24 October) for previous surveys				
	4658'	10-1/4^{o}	141^{o} true	290^{o} F

Drilling fluid - Polymer
Flow rate - ~ 24 gal/min | Pressure - ~ 400 psi | Returns temp - 65^{o}F max | Wt - 8.7 lb/gal | Vis - 38 sec | Filtrate 5.6 cm^{3}/30 min | PV - 8 cP | YP - 1 lb/100ft^{2} | pH - 9 | Lost circulation - none

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Lithology :

4843' to 4883'	Flow Banded Rhyolite / Felsite
4883' to 4887'	Debris Flow
4887' to 4891'	Felsite
4891' to 4929'	Debris Flow
4929' to 4941'	Amygdaloidal Andesite
4941' to 4954'	Debris Flow
4954' to 4964'	Rhyodacite
4964' to +	Amygdaloidal Andesite

Summary of events last 24 hours:
Picked up new bit after trip out for failed inner tube, wet pull. Bit outer gage worn from drilling cave. Hit cave at 4100' and redrill to 4350 at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 29 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 96 / 13 | Depth @ 0000 hrs - 5014' | Hole advance last 24 hr - 22' | Core recovered - 16'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 200; WOB - 1000 lb; Rate of Penetration - avg. 3 ft/hr

Bit number	Type	In, KB	Out, KB	Footage
Record of previous bits available on earlier reports (see 24 October 95)				
24	# 7 HQ impreg	4905'	4975'	70'
25	# 2 HQ impreg	4975'	4992'	1475'reaming 17' coring
26	# 2 HQ impreg	4992'		

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	**Depth**	**Inclination**	**Direction**	**Bottom-hole Temperature**
see earlier reports (24 October) for previous surveys				
	4658'	10-1/4°	141° true	290° F

Drilling fluid - Polymer
Flow rate - ~ 14 gal/min | Pressure - ~ 600 psi | Returns temp - 67°F max | Wt - 8.7 lb/gal | Vis - 41 sec | Filtrate 5.8 cm^3/30 min | PV - 8 cP | YP - 3 $lb/100ft^2$ | pH - 8.5 | Lost circulation - < 10%

Lithology :		
	4964' to 4980'	Amygdaloidal Andesite
	4980' to +	Flow banded & altered Rhyolite

Summary of events last 24 hours:
Washed and reamed to TD at 1600 hours. Cored ahead all night with high water pressure. Rock fractured and blocky. On bottom and starting core run at 5040' at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 30 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 97 / 14 | Depth @ 0000 hrs - 5044' | Hole advance last 24 hr - 30' | Core recovered - 30'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 170; WOB - 1000 lb; Rate of Penetration - avg. 3 ft/hr

Bit number	Type	In, KB	Out, KB	Footage
Record of previous bits available on earlier reports (see 24 October 95)				
24	# 7 HQ impreg	4905'	4975'	70'
25	# 2 HQ impreg	4975'	4992'	1475'reaming 17' coring
26	# 2 HQ impreg	4992'	5044'	1475'reaming 52' coring
27	# 7 HQ impreg	5044'		

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (24 October) for previous surveys				
	4658'	10-1/4°	141° true	290° F

Drilling fluid - Polymer
Flow rate - ~ 14 gal/min | Pressure - ~ 750 psi | Returns temp - 67°F max | Wt - 8.8 lb/gal | Vis - 41 sec | Filtrate 5.8 cm^3/30 min | PV - 9 cP | YP - 2 $lb/100ft^2$ | pH - 8 | Lost circulation - < 10%

Lithology : 4980' to + Flow banded Rhyolite

Summary of events last 24 hours:
Pressured up at 5044'. POOH for bit change. Bit had totally lost outside gage and reamer shell was cracked. Bit was probably wore out by reaming in after wet pull. Halco weld on new bit and shell and run in hole. Wash to bottom and core ahead to 5052'. Pulling core at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 31 October 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 98 / 15 | Depth @ 0000 hrs - 5103' Hole advance last 24 hr - 59' | Core recovered - 55'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 155; WOB - 4000 lb; Rate of Penetration - avg. 3 ft/hr

Bit number	Type	In, KB	Out, KB	Footage
	Record of previous bits available on earlier reports (see 24 October 95)			
24	# 7 HQ impreg	4905'	4975'	70'
25	# 2 HQ impreg	4975'	4992'	1475'reaming 17' coring
26	# 2 HQ impreg	4992'	5044'	1475'reaming 52' coring
27	# 7 HQ impreg	5044'	5111'	67'

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (24 October) for previous surveys				
	4658'	10-1/4°	141° true	290° F
	5090'	9-1/4°	143° true	336° F

Drilling fluid - Polymer
Flow rate - ~ 18 gal/min | Pressure - ~ 550 psi | Returns temp - 65°F max | Wt - 8.7 lb/gal | Vis - 43 sec | Filtrate 4.2 cm^3/30 min | PV - 8 cP | YP - 2 $lb/100ft^2$ | pH - 8.5 | Lost circulation - < 10%

Lithology : 4980' to + Flow banded Rhyolite

Summary of events last 24 hours:
Core ahead until 0400 when bit went at 5111'. Survey and POOH for bit change. Rock highly fractured.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 1 November 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 99 / 16 | Depth @ 0000 hrs - 5124' Hole advance last 24 hr - 21' | Core recovered - 16'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 355; WOB - 3000 lb; Rate of Penetration - avg. 12 ft/hr

Bit number	Type	In, KB	Out, KB	Footage
	Record of previous bits available on earlier reports (see 24 October 95)			
24	# 7 HQ impreg	4905'	4975'	70'
25	# 2 HQ impreg	4975'	4992'	1475'reaming 17' coring
26	# 2 HQ impreg	4992'	5044'	1475'reaming 52' coring
27	# 7 HQ impreg	5044'	5111'	67'
28	# 7 HQ impreg	5111'		

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (24 October) for previous surveys				
	4658'	10-1/4°	141° true	290° F
	5090'	9-1/4°	143° true	336° F

Drilling fluid - Polymer
Flow rate - ~ 18 gal/min | Pressure - ~ 550 psi | Returns temp - 60°F max | Wt - 8.5 lb/gal | Vis - 40 sec | Filtrate 6.4 cm^3/30 min | PV - 10 cP | YP - 3 $lb/100ft^2$ | pH - 9 | Lost circulation - < 10%

Lithology : 4980' to + Flow banded Rhyolite

Summary of events last 24 hours:
Bit outside gage gone, upper reamer shell missing segments, vibrations? Trip back in and wash from 4000' to TD and resume coring. Torque down and RPM up for awhile. Pulling core at 5150' at report time with higher torque and low RPM.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 2 November 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 100 / 17 | Depth @ 0000 hrs - 5162' | Hole advance last 24 hr - 38' | Core recovered - 37'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 355; WOB - 3000 lb; Rate of Penetration - avg. 3 ft/hr

Bit number	Type	In, KB	Out, KB	Footage
	Record of previous bits available on earlier reports (see 24 October 95)			
24	# 7 HQ impreg	4905'	4975'	70'
25	# 2 HQ impreg	4975'	4992'	1475'reaming 17' coring
26	# 2 HQ impreg	4992'	5044'	1475'reaming 52' coring
27	# 7 HQ impreg	5044'	5111'	67'
28	# 7 HQ impreg	5111'		

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	**Depth**	**Inclination**	**Direction**	**Bottom-hole Temperature**
see earlier reports (24 October) for previous surveys				
	4658'	10-1/4°	141° true	290° F
	5090'	9-1/4°	143° true	336° F

Drilling fluid - Polymer
Flow rate - ~ 18 gal/min | Pressure - ~ 350 psi | Returns temp - 60°F max | Wt - 8.7 lb/gal | Vis - 41 sec | Filtrate 6.0 cm^3/30 min | PV - 8 cP | YP - 2 $lb/100ft^2$ | pH - 7.5 | Lost circulation - < 10%

Lithology :		
	4980' to 5023'	Banded Rhyolite
	5023' to 5030'	Amygdaloidal Andesite
	5030' to 5079'	Banded Rhyolite
	5079' to 5081'	Basalt
	5081' to 5085'	Banded Rhyolite
	5085' to 5091'	Amygdaloidal Andesite
	5091' to +	Banded Rhyolite

Summary of events last 24 hours:
After pulling core at 5150' cave tried to stick pipe. Pulled back to above cave at 5110' and reamed back to bottom. Cored to 5162' and blocked. Tried to pull back to above 5110' to pull tube but got stuck with bit at 5113'. Could move down a little but could not move up or rotate. Pulled inner tube then hooked back up and worked pipe. No movement. Spotted mineral oil and Pipe Lax at 1800 hours.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 3 November 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 101 / 18 | Depth @ 0000 hrs - 5162' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 3.895" hole | Rotary speed - 0; WOB - 0 lb; Rate of Penetration - avg. 0 ft/hr

Bit number	Type	In, KB	Out, KB	Footage
	Record of previous bits available on earlier reports (see 24 October 95)			
24	# 7 HQ impreg	4905'	4975'	70'
25	# 2 HQ impreg	4975'	4992'	1475'reaming 17' coring
26	# 2 HQ impreg	4992'	5044'	1475'reaming 52' coring
27	# 7 HQ impreg	5044'	5111'	67'
28	# 7 HQ impreg	5111'		

Drilling Assembly: HQ impreg core bit, reamer shell, 20' core barrel, reamer shell, HQ rods

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Surveys:	**Depth**	**Inclination**	**Direction**	**Bottom-hole Temperature**
see earlier reports (24 October) for previous surveys				
	4658'	10-1/4°	141° true	290° F
	5090'	9-1/4°	143° true	336° F

Drilling fluid - Polymer
Flow rate - ~ 18 gal/min | Pressure - ~ 350 psi | Returns temp - 60°F max | Wt - 8.7 lb/gal | Vis - 41 sec | Filtrate 6.0 cm^3/30 min | PV - 8 cP | YP - 2 $lb/100ft^2$ | pH - 7.5 | Lost circulation - < 10%

Lithology :

4980' to 5023'	Banded Rhyolite
5023' to 5030'	Amygdaloidal Andesite
5030' to 5079'	Banded Rhyolite
5079' to 5081'	Basalt
5081' to 5085'	Banded Rhyolite
5085' to 5091'	Amygdaloidal Andesite
5091' to +	Banded Rhyolite

Summary of events last 24 hours:
Worked pipe and moved Pipe Lax with mineral oil until 0600. Worked pipe hard with full pump volume but would not work free. Backed off HQ just below foot clamp and picking up 100' BQ stinger and NQ core pipe to cement open hole below stuck pipe. Will squeeze cement up the backside of the HQ. Setting up to reduce hole to NQ coring.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 4 November 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 102 / 19 | Depth @ 0000 hrs - 5162' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 2.980" hole | Rotary speed - 0; WOB - 0 lb; Rate of Penetration - avg. 0 ft/hr

Bit number	Type	In, KB	Out, KB	Footage
Record of previous bits available on earlier reports (see 24 October 95)				
25	# 2 HQ impreg	4975'	4992'	1475'reaming 17' coring
26	# 2 HQ impreg	4992'	5044'	1475'reaming 52' coring
27	# 7 HQ impreg	5044'	5111'	67'
28	# 7 HQ impreg	5111'		51'

Drilling Assembly: NQ impreg core bit, reamer shell, 20' core barrel, reamer shell, NQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (24 October) for previous surveys				
	4658'	10-1/4°	141° true	290° F
	5090'	9-1/4°	143° true	336° F

Drilling fluid - Polymer
Flow rate - ~ 12 gal/min | Pressure - ~ 350 psi | Returns temp - 60°F max | Wt - 8.7 lb/gal | Vis - 41 sec | Filtrate 6.0 cm^3/30 min | PV - 8 cP | YP - 2 $lb/100ft^2$ | pH - 7.5 | Lost circulation - < 10%

Lithology :
5091' to 5138' Flow Banded Rhyolite
5138' to 5162' Fine Grained Diorite

Summary of events last 24 hours:
Cemented stuck pipe in place with 120 gal. of type G cement and 40 % silica flour. Bit at 5117'. Filled void between bit and TD with cement and lifted cement ~ 350' up the backside of the HQ. POOH with NQ pipe and BQ stinger.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 5 November 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 103 / 20 | Depth @ 0000 hrs - 5162' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 4.5", 11.6# casing to 2748'

Bits -- Now coring 2.980" hole | Rotary speed - 0; WOB - 0 lb; Rate of Penetration - avg. 0 ft/hr

Bit number	Type	In, KB	Out, KB	Footage
	Record of previous bits available on earlier reports (see 24 October 95)			
25	# 2 HQ impreg	4975'	4992'	1475'reaming 17' coring
26	# 2 HQ impreg	4992'	5044'	1475'reaming 52' coring
27	# 7 HQ impreg	5044'	5111'	67'
28	# 7 HQ impreg	5111'		51'

Drilling Assembly: NQ impreg core bit, reamer shell, 20' core barrel, reamer shell, NQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (24 October) for previous surveys				
	4658'	10-1/4°	141° true	290° F
	5090'	9-1/4°	143° true	336° F

Drilling fluid - Polymer
Flow rate - ~ 12 gal/min | Pressure - ~ 350 psi | Returns temp - 60°F max | Wt - 8.7 lb/gal | Vis - 41 sec | Filtrate 6.0 cm^3/30 min | PV - 8 cP | YP - 2 $lb/100ft^2$ | pH - 7.5 | Lost circulation - < 10%

Lithology :

Summary of events last 24 hours:
Tried to back off CHD 101 and HQ shallow but they backed off deep. Had 15,000 string weight. POOH laying down backed off pipe. Pipe backed off at 1781'. Picked up used casing grade HQ with tapered pin on bottom to stab back into stuck HQ. Getting ready to stab in at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 6 November 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 104 / 21 | Depth @ 0000 hrs - 5162' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 4.5", 11.6# casing to 2748' | HQ liner from 20' to 5117'

Bits -- Now coring 2.980" hole | Rotary speed - 150; WOB - 5000 lb; Rate of Penetration - avg. 15 ft/hr

Bit number	Type	In, KB	Out, KB	Footage
	Record of previous bits available on earlier reports (see 24 October 95)			
25	# 2 HQ impreg	4975'	4992'	1475'reaming 17' coring
26	# 2 HQ impreg	4992'	5044'	1475'reaming 52' coring
27	# 7 HQ impreg	5044'	5111'	67'
28	# 7 HQ impreg	5111'	5162'	left in hole 51'
29	#6 NQ-3 rerun	4797'		

Drilling Assembly: NQ-3 impreg core bit, reamer shell, 10' core barrel, reamer shell, NQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (24 October) for previous surveys				
	4658'	10-1/4°	141° true	290° F
	5090'	9-1/4°	143° true	336° F

Drilling fluid - Polymer
Flow rate - ~ 20 gal/min | Pressure - ~ 400 psi | Returns temp - 60°F max | Wt - 8.7 lb/gal | Vis - 33 sec | Filtrate 6.0 cm^3/30 min | PV - 5 cP | YP - 3 lb/100ft^2 | pH - 9 | Lost circulation - none

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Lithology : Cement

Summary of events last 24 hours:
Stab into backed off HQ rods and make up. Back off roped connection 20' below KB. RIH with used NQ-3 bit to clean out tapered pin, cement and drill through landing ring and bit. Clean out cement stringers from 4792' to 4997'. Pulling tube at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 7 November 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 105 / 22 | Depth @ 0000 hrs - 5162' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 4.5", 11.6# casing to 2748' | HQ liner from 20' to 5117'

Bits -- Now coring 2.980" hole | Rotary speed - 150; WOB - 5000 lb; Rate of Penetration - avg. 15 ft/hr

Bit number	Type	In, KB	Out, KB	Footage
	Record of previous bits available on earlier reports (see 24 October 95)			
25	# 2 HQ impreg	4975'	4992'	1475'reaming 17' coring
26	# 2 HQ impreg	4992'	5044'	1475'reaming 52' coring
27	# 7 HQ impreg	5044'	5111'	67'
28	# 7 HQ impreg	5111'	5162'	left in hole 51'
29	#6 NQ-3 rerun	4797'		

Drilling Assembly: NQ-3 impreg core bit, reamer shell, 10' core barrel, reamer shell, NQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (24 October) for previous surveys				
	4658'	10-1/4°	141° true	290° F
	5090'	9-1/4°	143° true	336° F

Drilling fluid - Polymer
Flow rate - ~ 20 gal/min | Pressure - ~ 400 psi | Returns temp - 60°F max | Wt - 8.7 lb/gal | Vis - 33 sec | Filtrate 6.0 cm^3/30 min | PV - 5 cP | YP - 3 $lb/100ft^2$ | pH - 9 | Lost circulation - none

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Lithology : Cement

Summary of events last 24 hours:
Drill cement from 4997' to 5059'. Try to pull inner tube but it would not release. Broke cable while trying to work wireline release down. POOH to clear stuck tube and repair wireline. Back on bottom drilling cement at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 8 November 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 106 / 23 | Depth @ 0000 hrs - 5162' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 4.5", 11.6# casing to 2748' | HQ liner from 20' to 5116'

Bits -- Now coring 2.980" hole | Rotary speed - 150; WOB - 5000 lb; Rate of Penetration - avg. 15 ft/hr

Bit number	Type	In, KB	Out, KB	Footage
Record of previous bits available on earlier reports (see 31 October 95)				
28	# 7 HQ impreg	5111'	5162'	left in hole 51'
29rr	# 6 NQ-3 rerun	4797'	5125'	128' cement
30	# 5 NQ impreg	5125'		

Drilling Assembly: NQ impreg core bit, reamer shell, 20' core barrel, reamer shell, NQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (24 October) for previous surveys				
	4658'	10-1/4°	141° true	290° F
	5090'	9-1/4°	143° true	336° F

Drilling fluid - Polymer
Flow rate - ~ 18 gal/min | Pressure - ~ 320 psi | Returns temp - 60°F max | Wt - 8.7 lb/gal | Vis - 40 sec | Filtrate 6.0 cm^3/30 min | PV - 5 cP | YP - 3 $lb/100ft^2$ | pH - 10.5 | Lost circulation - none

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Lithology : Cement

Summary of events last 24 hours:
Drill through landing ring and bit with no problems. Good cement through core barrel and in open hole. Pressure up, bit gone an 5125'. POOH and make up 20' core barrel with series 5 bit and new top and bottom reamers. Starting in hole at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 9 November 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 107 / 24 | Depth @ 0000 hrs - 5162' | Hole advance last 24 hr - 0' | Core recovered - 0'
Last casing - 4.5", 11.6# casing to 2748' | HQ liner from 20' to 5116'

Bits -- Now coring 2.980" hole | Rotary speed - 150; WOB - 5000 lb; Rate of Penetration - avg. 15 ft/hr

Bit number	Type	In, KB	Out, KB	Footage
	Record of previous bits available on earlier reports (see 31 October 95)			
28	# 7 HQ impreg	5111'	5162'	left in hole 51'
29rr	# 6 NQ-3 rerun	4797'	5125'	128' cement
30	# 5 NQ impreg	5125'		

Drilling Assembly: NQ impreg core bit, reamer shell, 20' core barrel, reamer shell, NQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (24 October) for previous surveys				
	4658'	10-1/4°	141° true	290° F
	5090'	9-1/4°	143° true	336° F

Drilling fluid - Polymer
Flow rate - ~ 18 gal/min | Pressure - ~ 320 psi | Returns temp - 60°F max | Wt - 8.7 lb/gal | Vis - 40 sec | Filtrate 6.0 cm^3/30 min | PV - 5 cP | YP - 3 $lb/100ft^2$ | pH - 10.5 | Lost circulation - none

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Lithology : Cement

Summary of events last 24 hours:
RIH with new BHA and redress tapered pin at 1581', landing ring and bit. Had problems with landing ring spinning. Cored hard cement to 5162'. Pulled tube containing 0.2' of cave and cement at TD. Dumped pits and mixed new mud . Started coring new hole. Cut ~ one foot when chuck bearings went at 2 AM. Pull back into HQ casing and work on chuck. Wait on parts. Start out of hole at report time to check tools and temperature log. Hope to have rebuilt chuck by late this afternoon.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 10 November 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 108 / 25 | Depth @ 0000 hrs - 5170' | Hole advance last 24 hr - 8' | Core recovered - 8'
Last casing - 4.5", 11.6# casing to 2748' | HQ liner from 20' to 5116'

Bits -- Now coring 2.980" hole | Rotary speed - 325; WOB - 3000 lb; Rate of Penetration - avg. 4 ft/hr

Bit number	Type	In, KB	Out, KB	Footage
	Record of previous bits available on earlier reports (see 31 October 95)			
28	# 7 HQ impreg	5111'	5162'	left in hole 51'
29rr	# 6 NQ-3 rerun	4797'	5125'	128' cement
30	# 5 NQ impreg	5125'	5162'	37' cement
31	# 2 NQ impreg	5162'		

Drilling Assembly: NQ impreg core bit, reamer shell, 20' core barrel, reamer shell, NQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (24 October) for previous surveys				
	4658'	10-1/4°	141° true	290° F
	5090'	9-1/4°	143° true	336° F

Drilling fluid - Polymer
Flow rate - ~ 17 gal/min | Pressure - ~ 360 psi | Returns temp - 57°F max | Wt - 8.6 lb/gal | Vis - 39 sec | Filtrate 7.6 cm^3/30 min | PV - 6 cP | YP - 4 $lb/100ft^2$ | pH - 9 | Lost circulation - none

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Lithology :

Summary of events last 24 hours:
Bit has outside gage gone from reaming landing ring and bit. Ran temperature log. Max temperature 338° F. RIH with new bit and wait on rebuilt chuck until 8:00 PM. Install and start core drilling at 10:00 PM. At report time pulling core at 5194'. Core highly fractured.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 11 November 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 109 / 26 | Depth @ 0000 hrs - 5221' | Hole advance last 24 hr - 51' | Core recovered - 51'
Last casing - 4.5", 11.6# casing to 2748' | HQ liner from 20' to 5116'

Bits -- Now coring 2.980" hole | Rotary speed - 330; WOB - 3000 lb; Rate of Penetration - avg. 8 ft/hr

Bit number	Type	In, KB	Out, KB	Footage
	Record of previous bits available on earlier reports (see 31 October 95)			
28	# 7 HQ impreg	5111'	5162'	left in hole 51'
29rr	# 6 NQ-3 rerun	4797'	5125'	128' cement
30	# 5 NQ impreg	5125'	5162'	37' cement
31	# 2 NQ impreg	5162'	5221'	59'
32	# 2 NQ impreg	5221'		

Drilling Assembly: NQ impreg core bit, reamer shell, 20' core barrel, reamer shell, NQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (24 October) for previous surveys				
	4658'	10-1/4°	141° true	290° F
	5090'	9-1/4°	143° true	336° F

Drilling fluid - Polymer
Flow rate - ~ 13 gal/min | Pressure - ~ 500 psi | Returns temp - 52°F max | Wt - 8.6 lb/gal | Vis - 40 sec | Filtrate 9.0 cm^3/30 min | PV - 7 cP | YP - 3 $lb/100ft^2$ | pH - 9 | Lost circulation - none

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Lithology :

Summary of events last 24 hours:
Core ahead to 5221'. Inner tube broke at coupling. POOH to remove core and core tube. Bit in good shape but change anyway. Also picked up 2 new reamer shells. Redrill landing ring and HQ bit. Ream to bottom and core 2' of cave. Coring ahead at 5228' at report with low torque and high RPM.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 12 November 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 110 / 27 | Depth @ 0000 hrs - 5238 Hole advance last 24 hr - 17' Core recovered - 17'
Last casing - 4.5", 11.6# casing to 2748' | HQ liner from 20' to 5116'

Bits -- Now coring 2.980" hole | Rotary speed - 330; WOB - 3000 lb; Rate of Penetration - avg. 8 ft/hr

Bit number	Type	In, KB	Out, KB	Footage
	Record of previous bits available on earlier reports (see 31 October 95)			
28	# 7 HQ impreg	5111'	5162'	left in hole 51'
29rr	# 6 NQ-3 rerun	4797'	5125'	128' cement
30	# 5 NQ impreg	5125'	5162'	37' cement
31	# 2 NQ impreg	5162'	5221'	59'
32	# 2 NQ impreg	5221'	5228'	17'
33	# 5 NQ impreg	5228'		

Drilling Assembly: NQ impreg core bit, reamer shell, 20' core barrel, reamer shell, NQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (24 October) for previous surveys				
	4658'	10-1/4°	141° true	290° F
	5090'	9-1/4°	143° true	336° F

Drilling fluid - Polymer
Flow rate - ~ 13 gal/min | Pressure - ~ 300 psi | Returns temp - 56°F max | Wt - 8.7 lb/gal | Vis - 40 sec | Filtrate 8.0 cm^3/30 min | PV - 6 cP | YP - 1 $lb/100ft^2$ | pH - 9 | Lost circulation - ~ 20 %

Lithology : 5155' to 5195' Banded Rhyolite
5195' to 5204+ Welded Tuff

Summary of events last 24 hours:
While pulling core at 5238' wireline broke at overshot and dropped tube. Try to fish but no luck. POOH to recover overshot, inner core barrel and core. Found belled pin and box at ~ 4500'. Inner tube would not fit through and wireline broke. Bit not to bad but changed anyway. Top reamer shell missing segment, changed out. Back on bottom at report time coring ahead at 5256' with vibrations and low RPM.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 13 November 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 111 / 28 | Depth @ 0000 hrs - 5284' Hole advance last 24 hr - 46' Core recovered - 41'
Last casing - 4.5", 11.6# casing to 2748' | HQ liner from 20' to 5116'

Bits -- Now coring 2.980" hole | Rotary speed - 120; WOB - 3000 lb; Rate of Penetration - avg. 5 ft/hr

Bit number	Type	In, KB	Out, KB	Footage
	Record of previous bits available on earlier reports (see 31 October 95)			
28	# 7 HQ impreg	5111'	5162'	left in hole 51'
29rr	# 6 NQ-3 rerun	4797'	5125'	128' cement
30	# 5 NQ impreg	5125'	5162'	37' cement
31	# 2 NQ impreg	5162'	5221'	59'
32	# 2 NQ impreg	5221'	5228'	17'
33	# 5 NQ impreg	5228'	5274'	46'
34	# 5 NQ impreg	5274'		

Drilling Assembly: NQ impreg core bit, reamer shell, 20' core barrel, blank shell, NQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (24 October) for previous surveys				
	4658'	10-1/4°	141° true	290° F
	5090'	9-1/4°	143° true	336° F

Drilling fluid - Polymer
Flow rate - ~ 13 gal/min | Pressure - ~ 300 psi | Returns temp - 56°F max | Wt - 8.6 lb/gal | Vis - 40 sec | Filtrate 6.0 cm^3/30 min | PV - 9 cP | YP - 4 $lb/100ft^2$ | pH - 9 | Lost circulation - ~ 20 %

Lithology : 5195' to 5214' Welded Tuff
5214' to + Debris Flow & Scoria

Summary of events last 24 hours:
Core ahead to 5274' and make a short trip to casing. Try to core ahead and bit pressures up. POOH to change bit. MRT at 5274' read 350° F. Down hole pressure may be causing high readings. Bit outside gage gone. Remove top reamer shell and make up new bit. RIH and start coring ahead with low torque and high RPM. Drill 10' and rechuck and block. Push block 3' and try to pull tube, tube stuck at 5287'. Work stuck tube 4 hours then POOH. Almost out at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 14 November 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 112 / 29 | Depth @ 0000 hrs - 5308' Hole advance last 24 hr - 24' Core recovered - 22'
Last casing - 4.5", 11.6# casing to 2748' | HQ liner from 20' to 5116'

Bits -- Now coring 2.980" hole | Rotary speed - 120 | WOB - 3000 lb | Rate of Penetration - avg. 5 ft/hr

Bit number	Type	In, KB	Out, KB	Footage
	Record of previous bits available on earlier reports (see 31 October 95)			
28	# 7 HQ impreg	5111'	5162'	left in hole 51'
29rr	# 6 NQ-3 rerun	4797'	5125'	128' cement
30	# 5 NQ impreg	5125'	5162'	37' cement
31	# 2 NQ impreg	5162'	5221'	59'
32	# 2 NQ impreg	5221'	5228'	17'
33	# 5 NQ impreg	5228'	5274'	46'
34	# 5 NQ impreg	5274'		

Drilling Assembly: NQ impreg core bit, reamer shell, 20' core barrel, blank shell, NQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (24 October) for previous surveys				
	4658'	10-1/4°	141° true	290° F
	5090'	9-1/4°	143° true	336° F

Drilling fluid - Polymer
Flow rate - ~ 17 gal/min | Pressure - ~ 500 psi | Returns temp - 58°F max | Wt - 8.6 lb/gal | Vis - 41 sec | Filtrate 5.0 cm^3/30 min | PV - 8 cP | YP - 2 $lb/100ft^2$ | pH - 9 | Lost circulation - ~ 10 %

Lithology : 5195' to 5214' Welded Tuff
5214' to + Debris Flow & Scoria

Summary of events last 24 hours:

Finished POOH for stuck inner tube; core-catcher case had backed off and jammed tube. Bit still in good condition. Stopped work at USFS orders to clean up site. RIH and try to drill, but get high pressure. Pull inner tube and tighten loose connection, drop tube and core ahead at 5287' with low pressure and high rotary speed. Cored ahead to 5326', dropped tube for new core run and couldn't drill. Worked inner tube but bit apparently has a piece of core stuck in it. POOH at report time to clear bit.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 17 November 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 115/32 | Depth @ 0000 hrs - 5359' | Hole advance last 24 hr - 3' | Core recovered - 2'
Last casing - 4.5", 11.6# casing to 2748'; HQ liner from 20' to 5116'

Bits -- Now coring 2.980" hole | Rotary speed - 250 | WOB - 1000 lb | Rate of Penetration - avg. 2 ft/hr

Bit number	Type	In, KB	Out, KB	Footage
	Record of previous bits available on earlier reports (see 8 November 95)			
31	# 2 NQ impreg	5162'	5221'	59'
32	# 2 NQ impreg	5221'	5228'	17'
33	# 5 NQ impreg	5228'	5274'	46'
34	# 5 NQ impreg	5274'	5326'	52'
35	# 2 NQ impreg	5326'	5351'	25'
36	# 3 NQ impreg	5351'	5356'	5'
37	# 2 NQ impreg	5356'		

Drilling Assembly: NQ impreg core bit, reamer shell, 10' core barrel, stabilizer, NQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (24 October) for previous surveys				
	4658'	10-1/4°	141° true	290° F
	5090'	9-1/4°	143° true	336° F
	5358'	8-3/4°	137° true	352° F

Drilling fluid - Polymer
Flow rate - ~ 16 gal/min | Pressure - ~ 500 psi | Returns temp - 58°F max | Wt - 8.6 lb/gal | Vis - 39 sec | Filtrate 6.5 cm^3/30 min | PV - 6 cP | YP - 3 $lb/100ft^2$ | pH - 8.5 | Lost circulation - ~ 10 %

Lithology : 5313' to + Andesite

Summary of events last 24 hours:
POOH and remove broken overshot. RIH with same bit and core ahead to 5359'. Drop 1 ft of core in core pipe. Try to run survey camera but could not get it through dropped core. Try to shake core out but no luck. Drop tube and pull out 500' at a time to clear core pipe. Pipe cleared at 1000'. Lower to bottom, pull tube, and survey. Drop tube and core 1'; core blocks. Pull tube, no core. Trying to core ahead at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 18 November 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 116/33 | Depth @ 0000 hrs - 5360' | Hole advance last 24 hr - 1' | Core recovered - 0'
Last casing - 4.5", 11.6# casing to 2748'; HQ liner from 20' to 5116'

Bits -- Completed coring 2.980" hole

Bit number	Type	In, KB	Out, KB	Footage
	Record of previous bits available on earlier reports (see 8 November 95)			
31	# 2 NQ impreg	5162'	5221'	59'
32	# 2 NQ impreg	5221'	5228'	17'
33	# 5 NQ impreg	5228'	5274'	46'
34	# 5 NQ impreg	5274'	5326'	52'
35	# 2 NQ impreg	5326'	5351'	25'
36	# 3 NQ impreg	5351'	5356'	5'
37	# 2 NQ impreg	5356'	5360'	4'

Drilling Assembly: N/A

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (24 October) for previous surveys				
	4658'	10-1/4°	141° true	290° F
	5090'	9-1/4°	143° true	336° F
	5358'	8-3/4°	137° true	352° F

Drilling fluid - N/A

Lithology : 5313' to + Andesite

Summary of events last 24 hours:

Tried to core, but ROP dropped to almost nothing and pump pressure was up. POOH. When drill string was out of hole, the bit was found to be polished glass-smooth on crown (probably from carbide junk in hole), although inside and outside gauge were in relatively good shape. There was also a segment missing out of reamer shell. Called this TD for TCH 76-15 @ 5360'. Rigged up for SNL temperature log. Hole was clean to bottom, maximum temperature was at bottom = 347°F. RIH with open-ended NQ rod to 5160', circulated mud out of hole. RIH to 5360', circulated remaining mud out of hole. POOH with NQ rods, stand them back in derrick. Rig up for injection test. Screw into HQ liner and use kelly hose to pump into the H-rod. Open hole (198') will only take <2 gpm without going over 300 psi, which is the pressure limit for instrumentation. Consult with Cal Energy, they agree that downhole shut-in test will be useless. Switch kelly hose to pump into annulus outside H-rod (open hole from 2748' to ~4800'.) Similar results, ~4 gpm gives >300 psi standpipe pressure. There is much more open hole outside the HQ pipe, but it is filled with mud which has been sitting there for several weeks, so effective permeability would not be expected to be high. Start rigging down SNL instrumentation.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 19 November 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud / 4500' - 117/34 | Depth @ 0000 hrs - 5360'; which is TD for this hole
Last casing - 4.5", 11.6# casing to 2748'; HQ liner from xx' to 5116'

Bits -- Completed coring 2.980" hole

Bit number	Type	In, KB	Out, KB	Footage
Record of previous bits available on earlier reports (see 8 November 95)				
31	# 2 NQ impreg	5162'	5221'	59'
32	# 2 NQ impreg	5221'	5228'	17'
33	# 5 NQ impreg	5228'	5274'	46'
34	# 5 NQ impreg	5274'	5326'	52'
35	# 2 NQ impreg	5326'	5351'	25'
36	# 3 NQ impreg	5351'	5356'	5'
37	# 2 NQ impreg	5356'	5360'	4'

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (24 October) for previous surveys				
	4658'	10-1/4°	141° true	290° F
	5090'	9-1/4°	143° true	336° F
	5358'	8-3/4°	137° true	352° F

Drilling fluid - N/A

Lithology :

5313' to 5326'	Amygdaloidal Andesite
5326' to 5330'	Debris flow / flow breccia
5330' to 5341'	Amygdaloidal Andesite
5341' to 5344'	Flow breccia, open in part
5344' to 5358	Amygdaloidal Andesite, many open vesicles

Summary of events last 24 hours:

After attempts to inject, rigged down injection plumbing and backed off HQ rods. POOH and laid down 550' HQ rod. RIH to 2708' with NQ drill pipe and mechanical cutter; cut HQ rod. POOH with cutter and RIH with spear and bumper sub to retrieve HQ rod down to cut. Cannot pull HQ rods with 45,000 lb force, back off spear and POOH. When spear gets up to rig floor, sub on top of spear hits foot clamp and NQ pin breaks, dropping spear and bumper sub into hole. Make up tap and try to screw into tools, tap won't go into broken connection. Waiting for more fishing tools at report time.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 20 November 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level
Days since spud / 4500' - 118/35 | Depth @ 0000 hrs - 5360'; which is TD for this hole
Last casing - 4.5", 11.6# casing to 2748'; HQ liner from 550' to 5116'

Bits -- Completed coring 2.980" hole

Bit number	Type	In, KB	Out, KB	Footage
	Record of previous bits available on earlier reports (see 8 November 95)			
31	# 2 NQ impreg	5162'	5221'	59'
32	# 2 NQ impreg	5221'	5228'	17'
33	# 5 NQ impreg	5228'	5274'	46'
34	# 5 NQ impreg	5274'	5326'	52'
35	# 2 NQ impreg	5326'	5351'	25'
36	# 3 NQ impreg	5351'	5356'	5'
37	# 2 NQ impreg	5356'	5360'	4'

Surveys:	**Depth**	**Inclination**	**Direction**	**Bottom-hole Temperature**
see earlier reports (24 October) for previous surveys				
	4658'	10-1/4°	141° true	290° F
	5090'	9-1/4°	143° true	336° F
	5358'	8-3/4°	137° true	352° F

Drilling fluid - N/A

Lithology :

5313' to 5326'	Amygdaloidal Andesite
5326' to 5330'	Debris flow / flow breccia
5330' to 5341'	Amygdaloidal Andesite
5341' to 5344'	Flow breccia, open in part
5344' to 5358	Amygdaloidal Andesite, many open vesicles

Summary of events last 24 hours:

Fisherman arrives approximately 1700 hours. RIH with tap, it is too small, POOH and pick up small Bowen spear. Latch into fish, work it up and down until free, and slowly POOH. Fish periodically hangs up all the way out of the hole. Get all of fish except grapple from HQ spear. Don't want to run logging cable into hole if there is junk that might hang up cable, so RIH with NQ rods to TD (pushing some junk ahead all the way to bottom). Circulate hole clean. Since there is no replacement here for the broken grapple on the HQ spear, and since the HQ rods appear to be stuck anyway, decision is to leave them in the hole and not attempt further salvage. POOH laying down NQ core pipe. Will release rig within next 24 hours and will get another temperature log before leaving location.

This is the final Daily Drilling Report from the Newberry Exploratory Slimhole.

Report by: John Finger/Ron Jacobson

APPENDIX C - MODELING OF FLOW IN TCH 76-15

Introduction: A foundation of slimhole drilling for geothermal exploration is the concept that flow in the wellbore can be accurately modeled, thus allowing prediction of a large well's productivity from production tests in a slimhole. Computer simulation of wellbore flow has been done by industry, academia, and national laboratories. We have investigated several different flow models (see Reference 3 for a more detailed summary) and have found generally good agreement among themselves and with field data.

As a way of assessing the effect of wellbore geometry on a potential production test in the Newberry slimhole, the wellbore simulator named GEM[4] was used to compare three possible configurations for a 6000' well . Each scenario assumed the existing 4.5" casing to 2748'; case 1 assumes an HQ-size (3.85") hole from the casing shoe to 6000', case 2 assumes an HQ core-rod liner (ID 3.06") from the casing shoe to 4800' and an NQ-size (3.03") hole from 4800' to 6000', case 3 assumes HQ core-rod from surface to 4800', then NQ hole to 6000 feet. Each of these cases was modeled as adiabatic (no heat loss to the formation) and the first two cases were also modeled as transient problems. A number of other assumptions are built into the calculations:

- The feedzone is at the bottom of the well,
- Formation temperature at 6000' is 401°F (based on the temperature profile shown in Section II, Figure 3, with a continuation of the 8°F/100' gradient from 5300' to 6000'),
- Bottomhole pressure is approximately 2132 psia (based on measured water level of 815' and integrating water density with temperature from there to TD),
- The Hughmark slip correlation is used for two-phase flow, and
- Permeability is high enough that pressure drawdown with flow is negligible at the feedzone. (This is clearly **not** true for TCH 76-15, since injection testing after drilling showed the permeability to be unmeasurably small.)

These assumptions may not be sufficiently realistic for flow-rate predictions, but by being consistent among scenarios they allow comparison of the potential performance in the different wellbore geometries.

Adiabatic: This is a highly idealized situation in which there is no heat transfer to or from the formation. It is possible that a real, high-volume flow might asymptotically approach this condition after very long time but, again, it is a method of comparing well geometries. Curves 1 and 2 in Figure C-1 show a relatively small difference between the performance of the two well geometries in this flow condition, but Curve 3 shows significant decrease in performance. This decrease is apparently related to the greatly increased frictional effects of two-phase flow, which begins at approximately 1000' depth. This result indicates that having the two-phase flow occur in the larger ID of the casing (4") instead of the HQ rods (3.06") is important for optimizing well performance. Another benefit is that reducing the amount of HQ rod left in the hole lowers the cost of well completion.

Transient: A more interesting, and realistic, simulation is one which models heat transfer to the wellbore at temperatures representative of the actual formation. When the

static wellbore temperatures are taken to be those shown by actual temperature logs, the transient solutions for cases 1 and 2 indicate that the well will not spontaneously flow with the feedzone conditions specified above. There are two possible ways to overcome this; assume that the well has been forced to flow long enough to significantly heat the formation, or assume that the fluid enters the wellbore at a higher temperature than that in the original cases. In the forced-flow situation, iteration of the solution-time length for a transient solution showed that both wells would sustain flow after being pumped or air-lifted for a period of 20 to 50 hours. Their performances in this condition, shown in Curves 4 and 5, are much lower than in the adiabatic case, which is to be expected, but are little different from each other.

When feedzone temperatures are incremented (formation temperatures are held constant) until spontaneous flow begins, it is found that the case 1 requires a fluid temperature of 592°F and case 2 requires 608°F. Once again, the difference between these two well configurations is relatively small.

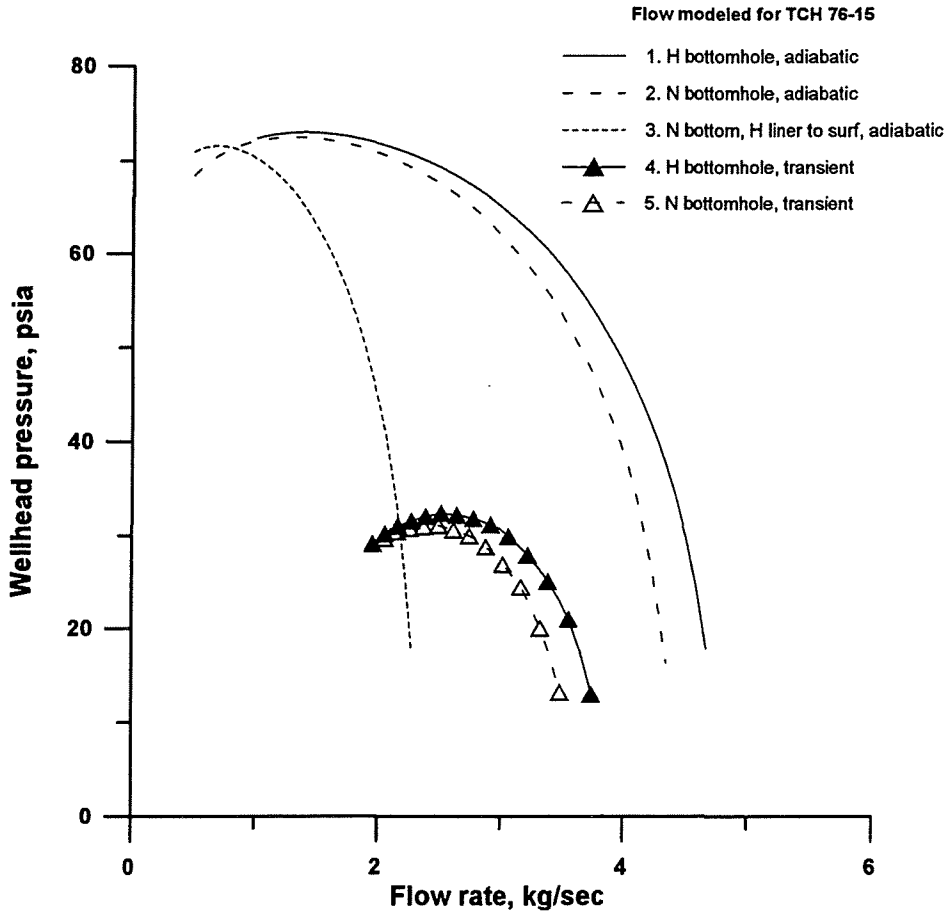

Figure C-1: Modeled flow rates in TCH 76-15

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DAILY DRILLING REPORT - 15 November 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 113 / 30 | Depth @ 0000 hrs - 5336' Hole advance last 24 hr - 28' Core recovered - 20.5'
Last casing - 4.5", 11.6# casing to 2748' | HQ liner from 20' to 5116'

Bits -- Now coring 2.980" hole | Rotary speed - 300 | WOB - 3000 lb | Rate of Penetration - avg. 5 ft/hr

Bit number	Type	In, KB	Out, KB	Footage
	Record of previous bits available on earlier reports (see 31 October 95)			
28	# 7 HQ impreg	5111'	5162'	left in hole 51'
29rr	# 6 NQ-3 rerun	4797'	5125'	128' cement
30	# 5 NQ impreg	5125'	5162'	37' cement
31	# 2 NQ impreg	5162'	5221'	59'
32	# 2 NQ impreg	5221'	5228'	17'
33	# 5 NQ impreg	5228'	5274'	46'
34	# 5 NQ impreg	5274'	5326'	52'
35	# 2 NQ impreg	5326'	5351	25'

Drilling Assembly: NQ impreg core bit, reamer shell, 20' core barrel, blank shell, NQ rods

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Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (24 October) for previous surveys				
	4658'	10-1/4°	141° true	290° F
	5090'	9-1/4°	143° true	336° F

Drilling fluid - Polymer
Flow rate - ~ 17 gal/min | Pressure - ~ 500 psi | Returns temp - 58°F max | Wt - 8.6 lb/gal | Vis - 40 sec | Filtrate 5.2 cm^3/30 min | PV - 8 cP | YP - 2 $lb/100ft^2$ | pH - 9 | Lost circulation - ~ 10 %

Lithology :

5195' to 5214'	Welded Tuff
5214' to +	Debris Flow & Scoria

Summary of events last 24 hours:

Trip in hole with new core barrel and bit. Core ahead with good ROP and high RPM. Core inner tube failed while pulling core at 5351'. POOH. Out of hole making up 10' core barrel at report time. Hope that shorter core barrel will reduce inner tube failures.

Report by: John Finger/Ron Jacobson

DAILY DRILLING REPORT - 16 November 95
NEWBERRY EXPLORATORY SLIMHOLE
Time of report - 0800

Well number - TCH 76-15 | **Location** - Section 15, T21S, R12E, Deschutes County, OR

All depth measurements refer to KB; KB = 11' above ground level

Days since spud / 4500' - 114/31 | Depth @ 0000 hrs - 5356' | Hole advance last 24 hr - 20' | Core recovered - 11'
Last casing - 4.5", 11.6# casing to 2748'; HQ liner from 20' to 5116'

Bits -- Now coring 2.980" hole | Rotary speed - 300 | WOB - 3000 lb | Rate of Penetration - avg. 5 ft/hr

Bit number	Type	In, KB	Out, KB	Footage
	Record of previous bits available on earlier reports (see 8 November 95)			
31	# 2 NQ impreg	5162'	5221'	59'
32	# 2 NQ impreg	5221'	5228'	17'
33	# 5 NQ impreg	5228'	5274'	46'
34	# 5 NQ impreg	5274'	5326'	52'
35	# 2 NQ impreg	5326'	5351'	25'
36	# 3 NQ impreg	5351'		

Drilling Assembly: NQ impreg core bit, reamer shell, 10' core barrel, stabilizer, NQ rods

---

Surveys:	Depth	Inclination	Direction	Bottom-hole Temperature
see earlier reports (24 October) for previous surveys				
	4658'	10-1/4°	141° true	290° F
	5090'	9-1/4°	143° true	336° F

Drilling fluid - Polymer
Flow rate - ~ 16 gal/min | Pressure - ~ 500 psi | Returns temp - 58°F max | Wt - 8.6 lb/gal | Vis - 42 sec | Filtrate 6.4 cm^3/30 min | PV - 7 cP | YP - 2 $lb/100ft^2$ | pH - 8.5 | Lost circulation - ~ 10 %

Lithology :

5214' to 5241'	Debris Flow
5241' to 5245'	Andesite Porphyry
5245' to 5251'	Debris Flow
5251' to 5256'	Amygdaloidal Basalt
5256' to 5278'	Welded Tuff
5278' to 5300'	Amygdaloidal & Massive Andesite
5300' to 5313'	Welded Tuff
5313' to +	Andesite

Summary of events last 24 hours:

Trip in hole with 10' core barrel and bit. Core ahead 5' and block. Pull tube, no core. Drop second tube and pressure up. POOH, bit gone and no core. Replace drilling line. Pick up new #2 bit and RIH. When running in hole, standard practice is to have a latch-head in place as a brake in case the pipe is dropped. Near the bottom of the hole, RIH with overshot to pick up latch head, and overshot fails at jar. Fish for broken overshot. Preparing logging tools for injection test at report time

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Report by: John Finger/Ron Jacobson

Org.	Bldg.	Name	Rec'd by	Org.	Bldg.	Name	Rec'd by

Sandia National Laboratories