

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 8 June 1986
(Date)

DRILLING DAY 1

WELL NAME CTAH-1

LOCATION Section 23, T8S, R8E, Oregon

PRESENT DEPTH ~15' FT. PROPOSED DEPTH 5000' FT.

DEPTH FROM _____ FT. TO _____ FT. AVE. DRILLING RATE _____ FT/HR.

CASING _____ AT _____ FT.

_____ AT _____ FT.

_____ AT _____ FT.

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY Glacial outwash

OTHER SIGNIFICANT DATA Drilling through boulders reached 35'

and attempted to run conductor pipe but hole was too deviated.

Rig was skidded 6' to the west and new hole started.

REPORTED BY Joe Josenko

- cc: W. L. D'Olier: Thermal Power Co.
- J. J. Hebein: Thermal Power Co.
- E. D. James: Chevron Resources Co.
- D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 10 June '86
(Date)

DRILLING DAY 4

WELL NAME CTGH-1

LOCATION SECTION 28, T8S, R2E, OREGON

PRESENT DEPTH 220 FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 35 FT. TO 220 FT. AVE. DRILLING RATE _____ FT/HR.

CASING _____ AT _____ FT.
_____ AT _____ FT.
_____ AT _____ FT.

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY BASALT / BASALTIC ANDESITE

OTHER SIGNIFICANT DATA FULL RETURNS, FLUID STANDING AT SURFACE

REPORTED BY Doug Goodwin @ 2200hrs / JLI

- cc: W. L. D'Olier: Thermal Power Co.
- J. J. Hebein: Thermal Power Co.
- E. D. James: Chevron Resources Co.
- D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 11 June '86
(Date)

DRILLING DAY 5

WELL NAME CTGH-1

LOCATION SECTION 28, T8S, R8E, OREGON

PRESENT DEPTH 480 FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM _____ FT. TO _____ FT. AVE. DRILLING RATE 40 FT/HR.

CASING _____ AT _____ FT.

_____ AT _____ FT.

_____ AT _____ FT.

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY BASALT/BASALTIC ANDRESITE (AS ABOVE (a/a)); DRILLING THROUGH A SERIES OF THIN FLOWS

OTHER SIGNIFICANT DATA ① LCZ @ 400' = 1000 gals, recovered

Full circulation; 400'-420' only very minor losses

② T_{in} = 68°F, T_{out} = 65°F

REPORTED BY Doug Goodwin @ 2230 hrs /JLI

- cc: W. L. D'Olier: Thermal Power Co.
- J. J. Hebeine: Thermal Power Co.
- E. D. James: Chevron Resources Co.
- D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 12 June 1986
(Date)

DRILLING DAY 6

WELL NAME CT6H-1

LOCATION SECTION 28, T8S, R8E, OREGON

PRESENT DEPTH 517 FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 480 FT. TO 517 FT. AVE. DRILLING RATE _____ FT/HR.

CASING _____ AT _____ FT.

_____ AT _____ FT.

_____ AT _____ FT.

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY As above

OTHER SIGNIFICANT DATA ① Lost circulated @ 517'

② LCZ @ 425' pumped 1000 gals + 3 (125 gal) stock tanks and regained circ

③ @ 490' T_{in} = 63°F, T_{out} = 61°F

Note: T of make-up water going into the sump is 71°F

REPORTED BY Doug Goodwin @ 2:30 hrs, 12 June / JLI

- cc: W. L. D'Olier: Thermal Power Co.
- J. J. Hebein: Thermal Power Co.
- E. D. James: Chevron Resources Co.
- D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 13 June 1986
(Date)

DRILLING DAY 7

WELL NAME CTGH-1

LOCATION SECTION 28, T8S, R8E, OREGON

PRESENT DEPTH 517 FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM _____ FT. TO _____ FT. AVE. DRILLING RATE _____ FT/HR.

CASING _____ AT _____ FT.

_____ AT _____ FT.

_____ AT _____ FT.

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY Glacier outwash / bedrock contact @ about 40'

OTHER SIGNIFICANT DATA Run geophysical logs from 0630 to 1215 as per program plus a deviation survey. Water level found @ 20' where T = 62°F, @ BH (517)' T = 48°F. Log and operation were reported as very good and successful, respectively. Scale during caliper run, electronically shifted and needs to be corrected on final copy along with depth correlating all the logs.

REPORTED BY Doug Goodwin @ 1500 hrs, 14 June / JCI

- cc: W. L. D'Olier: Thermal Power Co.
- J. J. Hebeins: Thermal Power Co.
- E. D. James: Chevron Resources Co. ✓
- D. Nielsen: University of Utah Research Institute ✓

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 22 June 1986
(Date)

DRILLING DAY 8-15

WELL NAME _____

LOCATION _____

PRESENT DEPTH _____ FT. PROPOSED DEPTH _____ FT.

DEPTH FROM _____ FT. TO _____ FT. AVE. DRILLING RATE _____ FT/HR.

CASING _____ AT _____ FT.

_____ AT _____ FT.

_____ AT _____ FT.

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY _____

OTHER SIGNIFICANT DATA Running casing, cement, test BOP, etc.

REPORTED BY JLI

- cc: W. L. D'Olier: Thermal Power Co.
- J. J. Hebeins: Thermal Power Co.
- E. D. James: Chevron Resources Co.
- D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 22 June 1986
(Date)

DRILLING DAY 16

WELL NAME CT44-1

LOCATION Section 28, T8S, R8E, OREGON

PRESENT DEPTH 539 1/2 FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 527 FT. TO 539 1/2 FT. AVE. DRILLING RATE _____ FT/HR.

CASING _____ AT _____ FT.

_____ AT _____ FT.

_____ AT _____ FT.

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY As above, slight porphyritic basalt/basaltic andesite;
minor vertical fracturing; slight occurrence of clay in fractures

OTHER SIGNIFICANT DATA ① 4" casing set @ 0240 22 June; ② made 3 core runs;
③ partial LC @ 534', Total LC @ 536'; ④ Fluid level ~ 20-30' but mud
is thick; ⑤ casing about 3-7' per run; ⑥ during circ T mud in = 48°F
T mud out = 55°F, MRT's = 55°F, make-up water = 51°F.

REPORTED BY Doug Goodwin @ 1930h 22 June 1986 /JLI

- cc: W. L. D'Olier: Thermal Power Co.
- J. J. Hebeins: Thermal Power Co.
- E. D. James: Chevron Resources Co.
- D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 25 June 1986
(Date)

DRILLING DAY 19

WELL NAME CTAH-1

LOCATION SECTION 28, T8S, R8E, OREGON

PRESENT DEPTH 806 FT. PROPOSED DEPTH 5000' FT.

DEPTH FROM 799 FT. TO 806 FT. AVE. ^{CORING} DRILLING RATE 8.75 FT/HR.

CASING 10 3/4 AT 35 FT.

7 AT 488 FT.

4.5 AT 526 FT. (temporary)

DIRECTIONAL SURVEY 733' = 2 1/2° S13°E

DETAILED LITHOLOGY same as before: brecciated ^{vesicular} flow boundaries, dense internal portions of flows. Internal flow portions not fractured. Clay found in flow tops.

OTHER SIGNIFICANT DATA ① Water level @ 28' (hydrostatic 1/2 hr) @ 799' core depth. ② MRT @ 690-700' = 75, 72, 73 °F 1st run, 70, 70, 69 2nd run; Trend in = 65 °F; ③ Core recovery 100% in dense internal portions of flows, 50-80% in flow tops on average. ④ Water pumped is to hole 11500 gals.

REPORTED BY Doug Anderson for 1030 h 25 June '86

- cc: W. L. D'Olier: Thermal Power Co.
- J. J. Hebein: Thermal Power Co.
- E. D. James: Chevron Resources Co.
- D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 26 June 1986
(Date)

DRILLING DAY 20

WELL NAME CTAH-1

LOCATION SECTION 28, T8S, R3E, OREGON

PRESENT DEPTH 866.5 FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 806 FT. TO 866.5 FT. AVE. ^{CORING} DRILLING RATE 5 FT/HR.

CASING 10 3/4" AT 35 FT.

7" AT 438 FT.

4.5" AT 526 FT. (temporary)

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY Lahan encountered @ 815' to ~ 846', gradational bottom into a regolith to ~ 854', 854-866' either dacite or andesite flow 864-866.5 distinct "sausage-like" fractures at 80° angle to core length (maybe platy type flow).

OTHER SIGNIFICANT DATA ① Water level @ 26'; ② MRT = 65, 67, 67°F @ ^{860'} 800-870';

③ T mud in = 61°F; ④ Core runs = 12, cut 60 feet; average recovery 70%;

⑤ utilized 7500 gals of water; ⑥ Very short core runs in highly fractured rock

REPORTED BY Doug Goodwin for 1130h 26 June '86

JCI

CC: W. L. D'Olier: Thermal Power Co.
J. J. Hebein: Thermal Power Co.
E. D. James: Chevron Resources Co.
D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 27 June '86
(Date)

DRILLING DAY 20-21

WELL NAME CT 4H-1

LOCATION SECTION 28, T8S, R3E, OREGON

PRESENT DEPTH 944.5 @ 1000h FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 806 FT. TO 944.5 FT. AVE. DRILLING RATE 87 FT/HR.

CASING 10 3/4" AT 35 FT. AVE. CORE RECOVERY 88%

7" AT 488 FT.

4.5" AT 526 FT. (temporary)

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY Dacite locally brecciated - may be an intrusive,
too early to define

OTHER SIGNIFICANT DATA ① Water level @ 944' = 26'

② MRT's @ 918' = 67, 67, 69°F

Temp in = 67°F

③ Water loss = 6250 gals

REPORTED BY Doug Goodwin @ 1200h, 27 June '86 / JLI

CC: W. L. D'Olier: Thermal Power Co.
J. J. Hebeine: Thermal Power Co.
E. D. James: Chevron Resources Co.
D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 28 June '86
(Date)

DRILLING DAY 21-22

WELL NAME CT 4H-1

LOCATION SECTION 28, T8S, R8E, OREGON

PRESENT DEPTH 977.5 @ 1000h FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 944.5 FT. TO 977.5 FT. AVE. ^{CORING} DRILLING RATE 7.1 FT/HR.

CASING 10 3/4" AT 35 FT. AVE. CORE RECOVERY = 92%

7" AT 428 FT. Footage Drilled: 33'

4.5" AT 526 FT. (temporary)

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY 944.5 to 977.5: dacite but it maybe a dioritic sub-volcanic intrusive

OTHER SIGNIFICANT DATA ① Water level @ 977 = 23'

② MRT's @ 968' = 67, 65, 68°F

Tmud in @ 968' = 67°F

③ Water use = 2000 gals

④ Sluff encountered @ 600' during core run, washed and pushed sluff to bottom

REPORTED BY Angela McDannel @ 2330h / JLI 24 June '86

- cc: W. L. D'Olier: Thermal Power Co.
- J. J. Hebein: Thermal Power Co.
- E. D. James: Chevron Resources Co.
- D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 29 June 1986
(Date)

DRILLING DAY 22-23

WELL NAME CT 4H-1

LOCATION SECTION 28, T8S, R3E, OREGON

PRESENT DEPTH 1151' @ 1000 hrs FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 977.5 FT. TO 1151 FT. AVE. DRILLING RATE 10.9 FT/HR.
CORING

CASING 10 3/4" AT 35 FT. AVE. CORE RECOVERY 100%

7" AT 488 FT. Footage drilled 173.5'

4.5" AT 526 FT. (temporary)

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY 977.5 to 1110': diorite; 1110' = contact w/ a debris flow,
no bake zone evident; 1138': basalt flow; drilled interval fractured

OTHER SIGNIFICANT DATA ① Water loss @ 1131' drilled = 35';

② MRT @ 1093' = 63, 63 and 65°F

T_{mid} in = 64°F

③ Water use = 4000 gals

REPORTED BY Angela McDaniel @ 2330 h / JLI 29 June '86

CC: W. L. D'Olier: Thermal Power Co.
J. J. Hebein: Thermal Power Co.
E. D. James: Chevron Resources Co.
D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR

30 June '86

(Date)

DRILLING DAY 23-24

WELL NAME CT 4H-1

LOCATION SECTION 28, T8S, R8E, OREGON

PRESENT DEPTH 1271' @ 1000h FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 1151 FT. TO 1271 FT. AVE. DRILLING RATE 3.2 FT/HR.

CASING 10 3/4" AT 35 FT. AVE CORE RECOVERY: 100%

7" AT 488 FT.

4.5" AT 526 FT. (temporary)

DIRECTIONAL SURVEY

DETAILED LITHOLOGY 1151-1230': basaltic andesite; 1230-1236.5'

lahar flow; 1236.5-1250: sediments; 1250-1271': lahar

Core is coming out rubble.

OTHER SIGNIFICANT DATA ① Water level: NO DATA BECAUSE OF BIT TRIP

② mRT's = 61, 61 (3rd bro Co)

• Tmud in = 60°F

③ Water use = 9000 gals

④ Bridge @ 660'

REPORTED BY Doug Goodwin @ 1150h / JLI 30 June '86

cc: W. L. D'Olier: Thermal Power Co.
J. J. Hebein: Thermal Power Co.
E. D. James: Chevron Resources Co.
D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 1 July '86
(Date)

DRILLING DAY 24-25

WELL NAME CT 4H-1

LOCATION SECTION 28, T8S, R8E, OREGON

PRESENT DEPTH 1366 @ 1000h FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 1271 FT. TO 1366 FT. AVE. ^{WORK} DRILLING RATE 14.8 FT/HR.

CASING 10 3/4" AT 35 FT. AVE WIRE RECOVERY: 96%

7" AT 488 FT. FORMER CORED: 95'

4.5" AT 526 FT. (temporary)

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY 1271-1297': loam; 1297-1300.5' = pebbly, silty silt; 1300.5-1366' = andesite but top 10' very weathered

OTHER SIGNIFICANT DATA ① Water level ~ 40' @ 1356' - may not be significantly different from previous measurement due to mechanical set-up

② MRT @ 1348': 67, 63, no reading T mud is ~ 63°F

③ Water use 5000 gals

REPORTED BY Doug Goodwin @ 1135h / JLI 1 July 1986

CC: W. L. D'Olier: Thermal Power Co.
J. J. Hebein: Thermal Power Co.
E. D. James: Chevron Resources Co.
D. Nielsen: University of Utah Research Institute ✓

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 2 July 1986
(Date)

DRILLING DAY 25-26

WELL NAME CTGH-1

LOCATION SECTION 28, T8S, R3E, OREGON

PRESENT DEPTH 1512 @ 1000 FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 1366 FT. TO 1512 FT. AVE. ^{CORINH} DRILLING RATE 12.1 FT/HR.

CASING 10 3/4" AT 35 FT. AVE. CORE RECOVERY = 99%

7" AT 488 FT. FOOTAGE CORED = 146'

4.5" AT 526 FT. (temporary)

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY 1366-1512': andesite

OTHER SIGNIFICANT DATA ① Water level ~ 45' @ 1481'.

② MRT's = 63, 64^{no}; T_{min} = 63°F

③ Water use 9000 gals

REPORTED BY Doug Woodwin @ 1200h / JLI 2 July 1986

CC: W. L. D'Olier: Thermal Power Co.
J. J. Hebeins: Thermal Power Co.
E. D. James: Chevron Resources Co.
D. Nielsen: University of Utah Research Institute

* Corrected Water level and MRT depth

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 2 July 1986
(Date)

DRILLING DAY 25-26

WELL NAME CT 4H-1

LOCATION SECTION 28, T8S, R8E, OREGON

PRESENT DEPTH 1512 @ 1000 FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 1366 FT. TO 1512 FT. AVE. ^{CORING} DRILLING RATE 1201 FT/HR.

CASING 10 3/4" AT 35 FT. AVE. CORE RECOVERY = 99%

7" AT 488 FT. FOOTAGE CORED = 146'

4.5" AT 526 FT. (temporary)

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY 1366-1512': andesite

OTHER SIGNIFICANT DATA ① Water level ~ 45' @ 1481' 1491

② MRT's = 63, 64 ^{No} @ 1471' _{min} ^{min} Tinned in = 63°F

③ Water use 9000 gals

REPORTED BY Doug Woodwin @ 1200h / JLI 2 July '86

- cc: W. L. D'Olier: Thermal Power Co.
- J. J. Hebein: Thermal Power Co.
- E. D. James: Chevron Resources Co.
- D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 3 July 1986
(Date)

DRILLING DAY 26-27

WELL NAME CTAH-1

LOCATION Section 28, T8S, R8E, OREGON

PRESENT DEPTH 1619 @ 1000 FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 1512 FT. TO 1619 FT. AVE. DRILLING RATE 9.6 FT/HR. ^{CORING}

CASING 10 3/4" AT 35' FT. AVE. CORE RECOVERY: 100%

7" AT 488 FT. FOOTAGE CORES: 107'

4.5" AT 526 FT. (temporary)

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY 1512'-1587': andesite fractured, 1587-1619':
volcanoclastic sediments principally conglomerates. Minor clay
in fractures, void spaces. Slight pyrite in volcanoclastic sediments.
No significant signs of hydrothermal alteration.

- OTHER SIGNIFICANT DATA
- ① Water level @ 1615' = 18' (Not sure if meaningful yet)
 - ② MRT's = 61, 61, 63°F @ 1615'; Tool bit = 60°F
 - ③ Water use 6500 gals.
 - ④ Conditioned hole w/ mud @ 1605' to reduce torque which decreased by 1/3.

REPORTED BY Doug Goodwin @ 1230h / JLS 3 July '86

- CO:
- W. L. D'Olier: Thermal Power Co.
 - J. J. Hebein: Thermal Power Co.
 - E. D. James: Chevron Resources Co.
 - D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 25 July '86
(Date)

DRILLING DAY 48-49

WELL NAME CTAH-1

LOCATION Section 28, T8S, R8E, OREGON

PRESENT DEPTH @ 2200 3451 FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 3350 FT. TO 3451 FT. AVE. ^{CORING} DRILLING RATE 9.7 FT/HR.

CASING 10 3/4" AT 35' FT. AVE. CORE RECOVERY: 100%

7" AT 488 FT.

4.5" AT 576 FT. (temporary)

FOOTAGE CORED: 101'

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY 2965.6-3451: basaltic andesite

Alteration: ① Slight increase in silica in small venticles, vesicles and voids

② minor brown ^{moderately pervasive} clay, blue-green clays (saladenite(?))

③ Minor to trace native copper (wires and plates) on clay; trace silver(?)

④ Minor ~~zps~~ gypsum

⑤ Common zeolite

OTHER SIGNIFICANT DATA ① Water level @ 3400' = 70'

② MRT's @ 3400' = 128.5°F, @ 3450' = 127°F

③ Water use = 9000 gals. Increase in water use due to rod chatter. No significant change in the permeability of the core section.

REPORTED BY Angela McDonnell @ 0930 26 July '86/JLT

CC: W. L. D'Olier: Thermal Power Co.
J. J. Hebeins: Thermal Power Co.
E. D. James: Chevron Resources Co.
D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 26 July '86
(Date)

DRILLING DAY 49-50

WELL NAME CTAH-1

LOCATION Section 28, T8S, R8E, OREGON

PRESENT DEPTH @ 2200h = 3552 FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 3451 FT. TO 3552 FT. AVE. ^{CORING} DRILLING RATE 8.5 FT/HR.

CASING 10 3/4" AT 35' FT. AVE. CORE RECOVERY: 100%

7" AT 488 FT.

FOOTAGE CORED: 101'

4.5" AT 526 FT. (temporary)

DIRECTIONAL SURVEY

DETAILED LITHOLOGY 2965.6 - 3552': basaltic andesite, as above

Alteration: clay films, green and white; slightly-modestly pervasive;
zeolites common, as above; trace copper (native);
minor silica in venalets and voids

OTHER SIGNIFICANT DATA ① Water level @ 3491' = 90', @ 3542' = 70'

② MRT's @ 3491' = 129.5, 129.5, 130°F, @ 3542' = 131, 131, 131.5°F

③ Water use = 7500 gals

Waibel's site review of cores indicates not much water movement below 1500-
2000'. No significant thermal signature evident in rocks.

REPORTED BY Angela McDonald @ 935 27 July '86 /SLI

- cc: W. L. D'Olier: Thermal Power Co.
- J. J. Hebeins: Thermal Power Co.
- E. D. James: Chevron Resources Co.
- D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 27 July '86
(Date)

DRILLING DAY 50-51

WELL NAME CTAH-1

LOCATION Section 28, T8S, R8E, OREGON

PRESENT DEPTH @ 2200h 3641 FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 3552 FT. TO 3641 FT. AVE. ^{CORING} DRILLING RATE 7.8 FT/HR.

CASING 10 3/4" AT 35' FT. AVE. CORE RECOVERY: 100%

7" AT 488 FT. FOOTAGE CORES: 89'

4.5" AT 526 FT. (temporary)

DIRECTIONAL SURVEY

DETAILED LITHOLOGY 2965.6 - 3641: basaltic - andesite, as above

Attention: Detecting slightly less clay last 2 days. Clay present as before (blue-green, brown and white); Silica, as before in voids and viallet, appears to be replacing clay; Rare copper.

OTHER SIGNIFICANT DATA ① Water level @ 3592.5' = 90'

② MRT's @ 3592.5' = 132, 132.5°F; 3641' = 138°F

③ Water use = 9800 gals

REPORTED BY Angela McDaniel @ 0930, 28 July '86 / SLI

- CC: W. L. D'Olier: Thermal Power Co.
- J. J. Hebein: Thermal Power Co.
- E. D. James: Chevron Resources Co.
- D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR

28 July 1986
(Date)

DRILLING DAY 51-52

WELL NAME CTAH-1

LOCATION Section 28, T8S, R8E, OREGON

PRESENT DEPTH 3711' at 2200 hrs FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 3641 FT. TO 3711 FT. AVE. DRILLING RATE 7.7 FT/HR. ^{CORING}

CASING 10 3/4" AT 35' FT. AVE. CORE RECOVERY: 100%

7" AT 488 FT. FOOTAGE CORES: 70'

4.5" AT 576 FT. (temporary)

DIRECTIONAL SURVEY

DETAILED LITHOLOGY Basaltic andesite - same as previous day.
Alteration same as previous day. Some clay-zeolite-
silica profiles, but no copper evident

OTHER SIGNIFICANT DATA Water levels: 3671' depth 105' below ground
3711 65' below ground

Water use: 4800 gals.

MRTs at 3671' depth 140.5 - 140.5 - 140

at 3711' " 137 - 137.5 - broken

REPORTED BY Angela 0920 hrs 29 July 86 / AVO

- CO: W. L. D'Olier: Thermal Power Co.
- J. J. Hebeins: Thermal Power Co.
- E. D. James: Chevron Resources Co.
- D. Nielsen: University of Utah Research Institute

Discussed possible SWANBERG and MARSHALL REED visits

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 29 July 1986
(Date)

DRILLING DAY 52-53

WELL NAME CTAH-1

LOCATION Section 28, T8S, R8E, OREGON

PRESENT DEPTH 3721' at 2200 hours FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM _____ FT. TO _____ FT. AVE. ^{COING} DRILLING RATE 6 FT/HR.

CASING 10 3/4" AT 35' FT. AVE. CORE RECOVERY: 100%

7" AT 488 FT. FOOTAGE CORES:

4.5" AT 526 FT. (temporary)

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY Basaltic andesite. No silica. Fractures about barren of secondary minerals!

OTHER SIGNIFICANT DATA Water level at 3721' hole depth* 50' below ground
* no rods in corehole

When pulling bit 6 for replacement, corehole was tight in 200-foot interval, 800-1000' depths

REPORTED BY Doug Godwin 1320 hrs 30 July 86 / DG

- CC: W. L. D'Olier: Thermal Power Co.
- J. J. Hebeins: Thermal Power Co.
- E. D. James: Chevron Resources Co.
- D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 7-30th
(Date)

DRILLING DAY 53-54

WELL NAME CTAH-1

LOCATION Section 28, T8S, R8E, OREGON

PRESENT DEPTH 3801' (2200 hrs) FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 3721' FT. TO 3801 FT. AVE. ^{CORING} DRILLING RATE 8.7 FT/HR.

CASING 10 1/4" AT 35' FT. AVE. CORE RECOVERY: 100%

7" AT 488 FT. FOOTAGE CORED: 80'

4.5" AT 526 FT. (temporary)

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY basaltic andesite; decrease in clay;
silica decreased; minor copper (trace); minor
zeolites; otherwise little alteration

OTHER SIGNIFICANT DATA water level @ 3721' - 50' @
@ 3763 - -80'

MRT @ 3763' - 145, 145, 146'

H₂O consumpt = ?

REPORTED BY Angela McDonnell (G.I.H.)

- CO: W. L. D'Olier; Thermal Power Co.
- J. J. Hebeine; Thermal Power Co.
- E. D. James; Chevron Resources Co.
- D. Nielsen; University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 31 July 1986
(Date)

CORING
DRILLING DAY 54-55

WELL NAME CTAH-1

LOCATION Section 28, T8S, R8E, OREGON

PRESENT DEPTH @ 2200h 3891 FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 3801 FT. TO 3891 FT. AVE. ^{CORING} DRILLING RATE 8.3 FT/HR.

CASING 10 3/4" AT 35' FT. AVE. CORE RECOVERY: 100%

7" AT 488 FT. FOOTAGE CORES: 90

4.5" AT 526 FT. (temporary)

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY 2965.5 - 3981': basaltic andesite

Attention: slight increase in clay and silica content
in zones of intense fracturing; minor zeolites

OTHER SIGNIFICANT DATA ① Water level @ 3841' = 85', @ 3891' = 80'

② MRT's @ 3841' = 148, 149.5, 150°F;
@ 3891 = 151*, 154.5, 155°F

③ Water use = 5700 gals

Water use for day 53-54 = 5600 gals

REPORTED BY Angela McDaniel @ 0945 1 Aug / JLT

* Mercury separated

- cc: W. L. D'Olier: Thermal Power Co.
- J. J. Hebein: Thermal Power Co.
- E. D. James: Chevron Resources Co.
- D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 1 Aug '86
(Date)

CORING
DRILLING DAY SS-56

WELL NAME CTAH-1

LOCATION Section 28, T8S, R8E, OREGON

PRESENT DEPTH @ 2200h 3972' FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 3891 FT. TO 3972 FT. AVE. DRILLING RATE 8.7 FT/HR.
CORING

CASING 10 3/4" AT 35' FT. AVE. CORE RECOVERY: 100%

7" AT 488 FT. FOOTAGE CORES: 81'

4.5" AT 576 FT. (temporary)

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY basaltic andesite as above

Alteration: common clay, predominantly green/green-blue type (celadonite?);
two types of zeolites present, require XRD for identification; silica
common in dense portions of flows occurs as vug filling, in small
fractures and occasionally replacing clay; trace foliated
clear mineral (possibly anhydrite/gypsum)

OTHER SIGNIFICANT DATA (1) Water level @ 3931.5 = 75', @ 3972' = 75'

(2) MRT's @ 3931.5 = 153, 154, 155°F, @ 3972' = 159, 162, 162°F

(3) Water use = 6800 gals

REPORTED BY Angela McDaniel @ 0915h 2 Aug / JLI

- CG: W. L. D'Olier: Thermal Power Co.
- J. J. Hebeins: Thermal Power Co.
- E. D. James: Chevron Resources Co.
- D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 2 Aug '86
(Date)

CORING
DRILLING DAY 56-57

WELL NAME CTAH-1

LOCATION Section 28, T8S, R8E, OREGON

PRESENT DEPTH @ 2200h 4052 FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 3972 FT. TO 4052 FT. AVE. ^{CORING} DRILLING RATE 7.8 FT/HR.

CASING 10 3/4" AT 35' FT. AVE. CORE RECOVERY: 100%

7" AT 488 FT.

4.5" AT 526 FT. (temporary)

FOOTAGE CORES: 80'

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY Same as previous day

- OTHER SIGNIFICANT DATA
- ① Water level @ 4012 = 50', @ 4052 = 70'
 - ② MPT's @ 4012' = 156, 165, 166°F, @ 4052 = 162, 163.5, 163°F
 - ③ Water use = 4400 gals

REPORTED BY Angela McDaniel @ 0920h, 3 Aug / JLI

cc: W. L. D'Olier: Thermal Power Co.
J. J. Hebein: Thermal Power Co.
E. D. James: Chevron Resources Co.
D. Nielsen: University of Utah Research Institute

WELL NAME CTAH-1

LOCATION Section 28, T8S, R8E, OREGON

PRESENT DEPTH @ 2200h 4133 FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 4052 FT. TO 4133 FT. AVE. ^{CORING} DRILLING RATE 7.8 FT/HR.

CASING 10 3/4" AT 35' FT. AVE. CORE RECOVERY: 100%

7" AT 488 FT. FOOTAGE CORES: 81'

4.5" AT 526 FT. (temporary)

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY Same lithology as before: basaltic andesite. Finding that
with depth the dense portions of the flows are becoming thicker while the
interflow horizons are thinning. Intercept drilling through flank of a poleo-volcano.
Alteration: dense flows generally more fractured than intra-flow horizon
and contain predominantly clay (green/blue-green) + silica, zeolite ±
whence, the interflow breccia contain abundant zeolite, minor clay ± silica
Clay found to slightly effervesce with HCl. Clay identification is suspect.

OTHER SIGNIFICANT DATA _____

① Water level @ 4093' = 70' ; 4133' = 75'

② MRT's @ 4093' = 163, 166 , @ 4133' = 165[°], 167.5[°]F

③ Water use = 6000 gals

REPORTED BY Angela McDonald @ 0430h 4 Aug / JLI

cc: W. L. D'Olier: Thermal Power Co.
J. J. Hebeins: Thermal Power Co.
E. D. James: Chevron Resources Co.
D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR

4 Aug '86
(Date)

CORING
DRILLING DAY 58-59

WELL NAME CTAH-1

LOCATION Section 28, T8S, R8E, OREGON

PRESENT DEPTH @ 2200 h 4203 FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 4133 FT. TO 4203 FT. AVE. ^{CORING} DRILLING RATE 6.8 FT/HR.

CASING 10 3/4" AT 35' FT. AVE. CORE RECOVERY: 100%

7" AT 488 FT. FOOTAGE CORES: 70'

4.5" AT 576 FT. (temporary)

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY Rock type and alteration the same as

yesterday

OTHER SIGNIFICANT DATA ① Water level @ 4175' = 60'

② MRT's @ 4173 = 165*, 171°F

③ Water consumption = 7000 gals

REPORTED BY Angela McDonnell @ 0930 5 Aug / JLI

* MRT not functioning properly.

CC: W. L. D'Olier: Thermal Power Co.
J. J. Hebeins: Thermal Power Co.
E. D. James: Chevron Resources Co.
D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 5 Aug - 2 Aug 1964
(Date)

^{CORING}
DRILLING DAY 60-61 to 63-64

WELL NAME CTAH-1

LOCATION Section 28, T8S, R8E, OREGON

PRESENT DEPTH 4206 FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 4203 FT. TO 4206 FT. ^{CORING} AVE. DRILLING RATE _____ FT/HR.

CASING 10 3/4" AT 35' FT. AVE. CORE RECOVERY:

7" AT 488 FT. FOOTAGE CORES:

4.5" AT 576 FT. (temporary)

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY _____

OTHER SIGNIFICANT DATA Big down due to break in 1 1/2 core rods. @ 4203' when casing rods twisted off; upon retrieval of inner core barrel found 3' of core; ∴ depth is 4206'.

REPORTED BY Angela McDonald 20915 12 Aug / JTB

- CC: W. L. D'Olier: Thermal Power Co.
- J. J. Hebeins: Thermal Power Co.
- E. D. James: Chevron Resources Co.
- D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 10 August '86
(Date)

COALIN 6
DRILLING DAY 64-65

WELL NAME CTAH-1

LOCATION Section 28, T8S, R8E, OREGON

PRESENT DEPTH @2200 4226 FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 4206 FT. TO 4226 FT. AVE. ^{COALIN 6} DRILLING RATE 7.1 FT/HR.

CASING 10 3/4" AT 35' FT. AVE. CORE RECOVERY: 100%

7" AT 488 FT. FOOTAGE CORES: 20

4.5" AT 526 FT. (temporary)

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY still basaltic - andesite; alteration ? mineralogy
also remains the same

- OTHER SIGNIFICANT DATA
- ① Water level - full returns
 - ② MRT's @ 4216 = 177, 177, 180°F, * (Build-up after 40 min)
 - ③ Water use = 0 : No water lost, complete returns

at W.M monitor every 30' and with full returns T read out/in
will be recorded.

REPORTED BY Angela McDonnell @ 0915h / 11 Aug - JLT

- CC:
- W. L. D'Olier: Thermal Power Co.
 - J. J. Hebein: Thermal Power Co.
 - E. D. James: Chevron Resources Co.
 - D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 11 August '86
(Date)

CORING
DRILLING DAY 65-66

WELL NAME CTAH-1

LOCATION Section 28, T8S, R8E, OREGON

PRESENT DEPTH @2200h 4266 FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 4226 FT. TO 4266 FT. AVE. ^{CORING} ~~DRILLING~~ RATE 9.7 FT/HR.

CASING 10 3/4" AT 35' FT. AVE. CORE RECOVERY: 100%

7" AT 488 FT. FOOTAGE CORES: 40'

4.5" AT 526 FT. (temporary)

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY 2965.5 - 4266': basaltic - andesite; intra-flow breccia does not sustain fracturing; alteration mineralogy same except found trace pyrite @ 4256' occurs in a vesicles on zeolite, slightly oxidized

Fracturing = light to medium intensity

OTHER SIGNIFICANT DATA ① Water level @ 4256 = 60' *

② MRT's @ 4256 = 176, 176, 176 °F

③ Water use = 4000 gals

* @ 4226 - lost circulation

REPORTED BY Angela McDonald @ 0915 12 Aug / JLI

cc: W. L. D'Olier: Thermal Power Co.
J. J. Hebein: Thermal Power Co.
E. D. James: Chevron Resources Co.
D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 12 Aug 86
(Date)

CORING
DRILLING DAY 66-67

WELL NAME CTAH-1

LOCATION Section 28, T8S, R8E, OREGON

PRESENT DEPTH 2200 4363 FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 4266 FT. TO 4363 FT. AVE. ^{CORING} DRILLING RATE 8.3 FT/HR.

CASING 10 3/4" AT 35' FT. AVE. CORE RECOVERY: 100%

7" AT 488 FT.

FOOTAGE CORES: 97'

4.5" AT 526 FT. (temporary)

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY same as before; 0-trace pyrophyllite - possibly;
observe the slightly magnetic mineral which is oxidizing; however, it
is rare and small; not sure if it is a primary mineralogical feature

OTHER SIGNIFICANT DATA ① Water level @ 4325' = 60', 4353' = 55'
② mRi's @ 4325' = 179, 179, 204*; 4353' = 179, 179, 179
③ Water use = 8000 gals

REPORTED BY Angela McDaniel @ 0925 13 Aug 86 / JLI

* Probable error

cc: W. L. D'Olier: Thermal Power Co.
J. J. Hebeins: Thermal Power Co.
E. D. James: Chevron Resources Co.
D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 13 Aug '86 @ 1000 h
(Date)

CORING
DRILLING DAY 67-69 (36 h report)

WELL NAME CTAH-1

LOCATION Section 28, T8S, R8E, OREGON

PRESENT DEPTH 4430 FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 4363 FT. TO 4430 FT. AVE. ^{CORING} DRILLING RATE 6.7 FT/HR.

CASING 10 3/4" AT 35' FT. AVE. CORE RECOVERY: 100%

7" AT 488 FT. FOOTAGE CORED: 117'

4.5" AT 526 FT. (temporary)

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY Same as before, secondary minerals = slight and consist of zeolite, clay and silica; brecciated intervals (interflow breccias) are 0 to slightly fractured; dense flows are slightly fractured:

OTHER SIGNIFICANT DATA ① Water level @ 4383' = 60', 4470' = 70'
② mRT's @ 4383' = 182°F, @ 4470' = 183, 183, 183.5°F
③ Water use = 12000 gals

REPORTED BY Doag Goodwin @ 1145, 14 Aug '86/SLI

cc: W. L. D'Olier: Thermal Power Co.
J. J. Hebeins: Thermal Power Co.
E. D. James: Chevron Resources Co.
D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 15 Aug '86 1000h
(Date)

CORING
DRILLING DAY 69-70

WELL NAME CTAH-1

LOCATION Section 28, T8S, R8E, OREGON

PRESENT DEPTH 4750 FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 4480 FT. TO 4570 FT. AVE. ^{CORING} DRILLING RATE 7.5 FT/HR.

CASING 10 3/4" AT 35' FT. AVE. CORE RECOVERY: 100%

7" AT 488 FT. FOOTAGE CORES: 90

4.5" AT 526 FT. (temporary)

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY Same, alteration mineralogy? clay, zeolite, silica;

~~Observe~~ Observe that silica portion of alteration mineralogy is increasing with depth but its confined to larger vesicles and cavities, matrix not altered.

OTHER SIGNIFICANT DATA ① Water level @ 4540' = 20' = 4570'

② MRT's @ 4540' 182, others busted, 4570' = 183.5, 183.5, 184°F

③ Water used = 10,000 yds

To reduce torque, thicken mud and increased pumped rate.

REPORTED BY Doug Goodwin @ 1135, 15 Aug '86 / DJE

cc: W. L. D'Olier: Thermal Power Co.
J. J. Hebeins: Thermal Power Co.
E. D. James: Chevron Resources Co.
D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 15 August 1986
(Date) 2200 hrs

DRILLING DAY 69-70

WELL NAME CTAH-1

LOCATION Section 28, T8S, R8E, OREGON

PRESENT DEPTH _____ FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 4570 FT. TO 4610 FT. AVE. ^{CORING} DRILLING RATE 6.8 FT/HR.

CASING 10 3/4" AT 35' FT. AVE. CORE RECOVERY: 100%

7" AT 488 FT. FOOTAGE CORES: 40

4.5" AT 526 FT. (temporary)

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY Basaltic andesite; same
low level alteration

OTHER SIGNIFICANT DATA Water levels at 4600' depth 60' below surface
Water consumption 5000 gals
3 MRTs at 4600' 184.5, 184.5, 184°F

REPORTED BY _____

- CO: W. L. D'Olier: Thermal Power Co.
- J. J. Hebeine: Thermal Power Co.
- E. D. James: Chevron Resources Co.
- D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR 16 Aug 86 2200 hrs
(Date)

DRILLING DAY 70-71

WELL NAME CT&H-1

LOCATION Section 28, T8S, R8E, OREGON

PRESENT DEPTH 4690 FT. PROPOSED DEPTH 5000 FT.

DEPTH FROM 4610 FT. TO 4690 FT. AVE. ^{CORING} DRILLING RATE 6.4 FT/HR.

CASING 10 3/4" AT 35' FT. AVE. CORE RECOVERY: 100% recovered

7" AT 488 FT. FOOTAGE CORES: 80

4.5" AT 526 FT. (temporary)

DIRECTIONAL SURVEY _____

DETAILED LITHOLOGY Basaltic andesite and minor alteration, as before

OTHER SIGNIFICANT DATA Water level at 4690' depth: 25' below surface

Water used: 10,000 gallons

MRTs 4630' 184, 184.5, 184.5°F

" 4660 187.5, 187.5, (210°F off)

" 4690 190°, 191°, 191°F

REPORTED BY _____

- CC: W. L. D'Olier: Thermal Power Co.
- J. J. Hebeins: Thermal Power Co.
- E. D. James: Chevron Resources Co.
- D. Nielsen: University of Utah Research Institute

THERMAL POWER COMPANY

DAILY GEOLOGIC REPORT FOR

18 Aug 86

(Date)

DRILLING DAY

71-72-73 36 hour interval ending 1000 hrs, 18 Aug

WELL NAME

CTAH-1

LOCATION

Section 28, T8S, R8E, OREGON

PRESENT DEPTH

4790

FT.

PROPOSED DEPTH

5000

FT.

DEPTH FROM

4690

FT. TO

4790

FT.

AVE. DRILLING RATE

6.4

FT/HR.

CASING

10 3/4"

AT

35'

FT.

AVE. CORE RECOVERY:

100%

7"

AT

488

FT.

FOOTAGE CORES:

100'

4.5"

AT

526

FT.

(temporary)

DIRECTIONAL SURVEY

DETAILED LITHOLOGY

Basaltic andesite; interbedded lava and breccia. Some dense lava flows 20-25' thick w/ brittle fractures - probably taking fluid. Minimal secondary minerals; minor silice, iron oxides and clays, all more evident in the breccias.

OTHER SIGNIFICANT DATA

Water used in last 24 hrs: 4000 gallons

Water levels and MRTs { 4720' cred 25' depth 194.5, 194.5 + 194.0 F; 4750' " 25' depth 195, 195.5 + 195.5 F; 4790' " 30' depth 197, 197 + 196.5 F

REPORTED BY

Greg Goodwin 11:30 hrs 18 Aug 86

- CO: W. L. D'Olier: Thermal Power Co. J. J. Hebeins: Thermal Power Co. E. D. James: Chevron Resources Co. D. Nielsen: University of Utah Research Institute