### Core Data

- **Hole:** CTGH-1
- **Spud Date:** 6/7/86
- **Completion Date:**
- **County:** Marion
- **State:** Oregon
- **Total Depth:**
- **Total Vertical Depth:**
- **Bottom Hole Location:**
- **Contractor / Rig:** BOYLES BROS / 882
- **Geologist(s):** Goodwin / McDanel
- **Date:**

### Casing Profile

<table>
<thead>
<tr>
<th>Depth</th>
<th>Type</th>
<th>Temperature</th>
<th>Penetration Rate (ft/hr)</th>
<th>Water Level (Measured)</th>
<th>Lost Circulation Zones</th>
<th>Lithologic Description</th>
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<tbody>
<tr>
<td>10'/0'C</td>
<td>120'</td>
<td>0'</td>
<td>1000</td>
<td>100</td>
<td>120' VOLCANIC BRECCIA</td>
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<td>1280'</td>
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<td>1440' VOLCANIC BRECCIA</td>
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<td>1600'</td>
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<td>1600' VOLCANIC BRECCIA</td>
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- **Comments:**
  - Total fluid loss continues.
  - Pump rate varies daily average 16-10 hours.
  - 1280' VOLCANIC BRECCIA: Pumping 40 gpm.
  - 1440' VOLCANIC BRECCIA: Pumping 40 gpm.
  - 1600' VOLCANIC BRECCIA: Pumping 40 gpm.

- **Additional Notes:**
  - 1271'- 6½"-8. Same gauge as 6½-8. Can use 6½ or 8".
  - Texture: Interbedded sandstone and siltstone.
  - Lithologic description:
    - Volcanic breccia, angular and subangular clasts of volcanic and sedimentary origin.
    - Siltstone and mudstone, fine to medium grained.
    - Tuffaceous siltstone, fine to medium grained.
    - 40' - 6½"-8. Hard tuffaceous siltstone, fine to medium grained.

- **Directional Survey:**
  - 1630' to 1640' directional survey.
  - Measured +/- 1,500' below original hole location.

### Diagrams

- Illustrated diagrams showing the casing profile and core analysis with annotations for each stratum.

- Additional details include measurements, temperature variations, and penetration rates.

- Diagrams with labeled zones highlighting specific lithologic features and fluid loss conditions.
**Diamond Shamrock**
**Thermal Power Rock Company**

**HOLE** CTGH-1
**FIELD** CASCADE/CLACKAMAS
**SPUD DATE** 6/7/86
**LOCATION** SEC 28, T25S, R6E
**ELEVATION** ~3840'
**CONTRACTOR / RIG** BOYCE Bros. / 862
**STATE** OREGON
**COUNTY** MARION
**COMPLETION DATE**
**TOTAL DEPTH**
**TOTAL VERTICAL DEPTH**
**BOTTOM HOLE LOCATION**
**GEOLOGIST (S)** GOODWIN/MAIDAN

<table>
<thead>
<tr>
<th>CASING PROFILE</th>
<th>LITHOLOGY</th>
<th>DEPTH</th>
<th>DRILLING TEMPERATURE</th>
<th>PENETRATION RATE</th>
<th>WATER LEVEL</th>
<th>LOST CIRCULATION ZONES</th>
<th>LITHOLOGIC DESCRIPTION</th>
<th>COMMENTS</th>
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**TOTAL LOST CONTINUES, E.N.**

2240' VOLCANIC BRECCIA
- Dark red, red brown, brown, gray, green, black, yellow, white, orange, and red. Contains altered volcanic clasts. Inconsistent, in a matrix of altered volcanic breccia. Graded to blocky texture. Frequent variation of angularity.

2200' ANDESITE

2150' ANDESITE

2100' ANDESITE

2050' ANDESITE

2000' ANDESITE

1950' ANDESITE

1900' ANDESITE

1850' ANDESITE

1800' ANDESITE

1750' ANDESITE

1700' ANDESITE

1650' ANDESITE

1600' ANDESITE

1550' ANDESITE

1500' ANDESITE

1450' ANDESITE

1400' ANDESITE
### Diamond Shamrock

#### Thermal Power Company

<table>
<thead>
<tr>
<th>HOLE</th>
<th>CTGH-1</th>
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</thead>
<tbody>
<tr>
<td>FIELD</td>
<td>CASCADES/CLACKAMAS</td>
</tr>
<tr>
<td>LOCATION</td>
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<tr>
<td>CONTRACTOR / RIG</td>
<td>BOILES BROS / 882</td>
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<tr>
<td>ELEVATION</td>
<td>±3840'</td>
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<tr>
<td>GEOLOGIST(S)</td>
<td>MCDANIEL/GOODWIN</td>
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### Casing Profile

<table>
<thead>
<tr>
<th>Lithology</th>
<th>Depth (ft)</th>
<th>Drilling Temperature (°F)</th>
<th>Penetration Rate (ft/hr)</th>
<th>Water Level (Measured)</th>
<th>Lost Circulation Zones</th>
<th>Lithologic Description</th>
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**Total Depth:**

**Total Vertical Depth:**

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**Notes:**

- Total loss continuous.
- 1-1/2 gpm.

**Lithologic Description:**

- Basaltic andesite:
  - Dark-gray, brownish-gray, with thin layers of andesite.
  - Contains small amounts of pyroxene, olivine, and hornblende.
  - Used in the foundation of the building.

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**Other Notes:**

- Drilling temperature varied from 70°F to 90°F.
- Penetration rate averaged 10 to 15 ft/hr.
- Water level measured at ±3840' MSL.

---

**Date:**

PAGE 7 of 9
FORM 4
**Diamond Shamrock Thermal Power Company**

**HOLE** CTHG-1

**FIELD** CASCADAS/CLACKAMAS

**SPUD DATE** 6/7/86

**LOCATION** SEC. 28, T8S, R8E

**ELEVATION** ~3540'

**COMPLETION DATE**

**STATE** OREGON

**TOTAL DEPTH**

**TOTAL VERTICAL DEPTH**

**CONTRACTOR / RIG** FOSTER PROS / BP2

**ELEVATION**

**GEOLOGIST (S)** GOODWIN/MCDANIEL

**DATE**

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**CASING PROFILE**

**LITHOLOGY**

<table>
<thead>
<tr>
<th>DEPTH</th>
<th>DRILLING TEMPERATURE</th>
<th>PENETRATION RATE</th>
<th>WATER LEVEL</th>
<th>LOST CIRCULATION ZONES</th>
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<td>4240'</td>
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<td>4400'</td>
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**MRT**

- 60' 10' 20'

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**TOTAL CIRCULATION LOSS RESUMED, 7/14/86

4226'-4226' Full returns.

4226'-4226' Total circulation loss resumed, 7/14/86

4226' Drilled off @ 825' below ground level. Expanded holes w/NA to remove inner core barrel. Returned into H-waist w/NA, added a bit #60 (Contrast in gray from 0-725'). Drilled out to bit #64, proceeded drilling to 4226'.

4226' Tripped out of hole. Rill w/alg #4 (some open as #6).
**Diamond Shamrock**

**Thermal Power Rock Company**

**HOLE** CTGH-1  **SPUD DATE** 6/3/86  **COMPLETION DATE**  
**FIELD** CASCADES/CLACKAMAS  **COUNTY** MARION  **STATE** OREGON  
**LOCATION** SEC 28, T86, R6E  **ELEVATION** ~3840'  
**CONTRACTOR / RIG** ROYLES PROS/882  **TOTAL DEPTH**  
**TOTAL VERTICAL DEPTH**  
**BOTTOM HOLE LOCATION**  
**ELEVATION** ~3840'  
**KB of**  
**GL**  
**BOTTOM HOLE LOCATION**  
**DATE**  

**CASING PROFILE**  

**LITHOLOGY**  

**DEPTH** 4480'  

**DRILLING TEMPERATURE**  

**Penetration Rate**  

**WATER LEVEL** (Measured)  

**LOST CIRCULATION ZONES**  

**LITHOLOGIC DESCRIPTION**  

**COMMENTS**  

- **4480'** pump rate increased 10-15 gpm due to high tension.  
- **4640'**  
- **4800'**  
- **4960'** 

- **BASALTIC ANDESITE** (as above)  
- Dense flows of gray to green-gray pumiceous, sparry, andesite. Minor patches of vesicular basaltic andesite (low-Ba) are common as well. Rarely occurs as large, irregular masses along fractures. Most are typical of these features. They are typically massive and locally cored. Rarely are they fractured. Rarely are they fractured. Rarely are they fractured. Rarely are they fractured. Rarely are they fractured.