OPEN-FILE REPORT 0-92-07
PRELIMINARY GEOLOGIC MAP OF THE
DOWNEY CANYON QUADRANGLE
MALHEUR COUNTY, OREGON

By M. L. Ferns, and N. S. MacLeod
Oregon Department of Geology and Mineral Industries

1992

This unpublished Open-File Report has not been reviewed and
may not meet all Oregon Department of Geology and Mineral
Industries' standards.

Field work conducted in 1990/1991
Map Scale: 1:24,000

Funding Statement: Funded jointly by the Oregon Department
of Geology and Mineral Industries, the Oregon State Lottery,
and the U. S. Geological Survey COGEOmap Program as part of
a cooperative effort to map the west half of the 1° by 2°
Boise sheet, eastern Oregon.
**Downey Canyon**

The tuff of Swisher Mountain (Ttsm) thickens southward into the Downey Canyon quadrangle. A fault contact separates Ttsm from a section of interbedded high-silica, lithophysal rhyolite (Ttlg) and airfall tuff (Tts). The rhyolites are planar sheets and may be rheomorphic ashflow tuffs emplaced as outflow sheets during formation of the Mahogany Mountain caldera.

Basalt flows (Tbt) cap a sedimentary section (Tsts) that unconformably overlies the rhyolites. The Tbt eruptive center is exposed at Table Mountain. Low ridges in the eastern part of the quadrangle are capped by unconsolidated gravel deposits.

Quaternary basalt flows (Qbrb) on the southern margin of the quadrangle flowed eastward from the Cow Lakes area, along the northern margin of the Antelope Valley Graben. Several areas of hydrothermal alteration in older rocks occur along the northern margin of the graben.
Fluvialite deposits (Holocene and Pleistocene). Mainly unconsolidated deposits of stream gravels and floodplain silts deposited along Cow Creek.

Landslides (Holocene and Pleistocene?) Unstratified accumulations of basalt blocks along the north side of Cow Creek. Characterized by hummocky topography.

Basalt of Rocky Butte (Quaternary) Dark gray diktytaxitic olivine basalt flows, with well preserved primary volcanic structures such as tumuli, pahoehoe surfaces, and collapse structures. In thin section, consists of olivine phenocrysts 3 mm in diameter and elongate plagioclase phenocrysts set in a subophitic groundmass of clinopyroxene, opaques, and glass. According to Hart (1982) the unit consists of alkali olivine basalt flows with a maximum age of 0.03 - 0.09 Ma.

Colluvial deposits (Holocene and Pleistocene) Mainly skree and talus deposits consisting of basalt blocks along the rim of Table Mountain. Includes talus and fan deposits along Downey Canyon.

Alluvial fan and pediment gravel deposits (Holocene and Pleistocene) Accumulation of poorly sorted and unconsolidated gravels, sands, and silts exposed on benches and ridges above the modern course of Cow Creek. Clasts are well rounded and consist mainly of rhyolite and rhyolite vitrophyre derived from the flanks of Mahogany Mountain to the north.

Fluvialite gravel deposits (Pleistocene? and Pliocene) Unconsolidated, poorly to moderately well-sorted deposits of rounded pebbles, cobbles, and boulders. Clasts are mostly of local rock types, mainly rhyolite and basalt, but include granitic and metamorphic clasts derived from older gravels and conglomerates in the Hooker Creek quadrangle to the east. Gravels are relicts of old Plio-Pleistocene drainage systems.

Vent complex (Pliocene?) Agglutinate, scoria, and orange palagonitic tuff and lapilli tuff. Hyaloclastites at the base of the complex suggest that the vent was initially a maar.

Olivine basalt (Pliocene?) Dark bluish black to black, grayish black aphyric basalt flows. Includes diktytaxitic olivine basalt flows capping Table Mountain. Locally very vesicular. Source for the flows is the vent complex (Tbtv) on Table Mountain. Includes alkali olivine basalts (Analyses, Table 1, in MacLeod (1991)).
Tuffaceous lacustrine and fluviatile sediments (Late Miocene?) Mainly white to pale yellow tuffaceous siltstones and fine-grained epiclastic sandstones. Locally includes thin lenses of diatomite and crossbedded micaceous epiclastic sandstones. Includes pebbly micaceous arkose sandstones. Equivalent in part to unit Ts of MacLeod (1990).

Dacite or andesite (Middle Miocene) Platy aphyric andesite and/or dacite flows. Generally strongly weathered and deuterically altered, forming talus slopes of rusty angular fragments. Stratigraphic position is uncertain. Presumed to be correlative with unit Td of MacLeod (1990).

Tuff of Swisher Mountain (Middle Miocene) Densely welded, dark purple to reddish-purple, crystal-lithic ashflow tuff. Interior of ashflow is devitrified. Flow top is locally marked by pumiceous carapace breccias containing blocks of black and banded red and black vitrophyre and reddish, vesicular, devitrified tuff. Contains about 15 - 20% broken plagioclase crystals as much as 1 cm in length, light green pigeonite crystals, and as much as 5% lithic fragments. Sanidine and orthopyroxene occur as accessory minerals in some thin sections. Chemically, a low-silica metaluminous rhyolite (Analyses, Table 1). Ashflow extends across the quadrangle northwestward through the McCain Creek, Jordan Craters North, and Diamond Butte quadrangles, where 200 foot exposures form the south wall of the Owyhee River Canyon. Petrographically and chemically similar to the tuff of Swisher Mountain as described by Ekren and others (1982) and herein considered to be a northern extension of the Swisher Mountain from the upper Owyhee Canyon where mapped and described by Evans (1990). The tuff of Swisher Mountain is considered to be about 13.9 Ma in age (Ekren, 1982).

Sanidine-phryic rhyolite flows and ash flow tuffs (Middle Miocene) Pale orange and tan, sanidine and quartz phryic rhyolitic ashflow tuffs. At least two units exposed. Basal rhyolite is 200 feet thick and contains horizontal bands of 1/4" - 2" diameter spherulites, some of which are filled with chalcedony. Chemically, a high-silica metaluminous rhyolite similar in major and trace element composition to densely-welded ashflow tuffs exposed in the Graveyard Point quadrangle (Ferns, 1989). Stratigraphic position uncertain. Possibly an outflow sheet of the Leslie Gulch Tuff.

Tuff and tuffaceous sediments (Middle Miocene) White to pale yellow airfall tuff and tuffaceous siltstones. Includes airfall deposits separating Trtf flows.
| LAB # | 1/4 1/4 Sec. | T. | Map Number | Unit | Ag | As | Au | Cu | Hg | Mo | Pb | Sn | Ti | Zn | Bi | Cd | Ga | Se | Te | Ba | Co | Cr | Fe | Li | Mn | Ni |
|-------|-------------|---|------------|------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| AZB-143 | SW | SW | 27 | 29 | 44 | Sanidine rhyolite | Trif | 77.1 | 11.4 | 0.20 | 1.44 | 0.0 | 0.07 | 4.51 | 4.11 | 0.98 | <0.05 | <0.05 | 0.4 | 108 | 128 | <10 | 84 | 503 | 43 | 170 | 31.5 |

<table>
<thead>
<tr>
<th>Laboratory</th>
<th>1/4 1/4 Sec.</th>
<th>T.</th>
<th>Map Number</th>
<th>Unit</th>
<th>Ag</th>
<th>As</th>
<th>Au</th>
<th>Cu</th>
<th>Hg</th>
<th>Mo</th>
<th>Pb</th>
<th>Sn</th>
<th>Ti</th>
<th>Zn</th>
<th>Bi</th>
<th>Cd</th>
<th>Ga</th>
<th>Se</th>
<th>Te</th>
<th>Ba</th>
<th>Co</th>
<th>Cr</th>
<th>Fe</th>
<th>Li</th>
<th>Mn</th>
<th>Ni</th>
</tr>
</thead>
<tbody>
<tr>
<td>AZB-304</td>
<td>SW</td>
<td>SW</td>
<td>28</td>
<td>29S</td>
<td>45E</td>
<td>Trif</td>
<td>1.25</td>
<td>36.5</td>
<td>16</td>
<td>7.23</td>
<td>6.46</td>
<td>9.47</td>
<td>3.93</td>
<td>9.98</td>
<td>&lt;0.5</td>
<td>9.57</td>
<td>&lt;0.25</td>
<td>&lt;0.1</td>
<td>0.85</td>
<td>&lt;1.0</td>
<td>&lt;0.5</td>
<td>247</td>
<td>&lt;1</td>
<td>271</td>
<td>0.58</td>
<td>53</td>
</tr>
<tr>
<td>AZB-007</td>
<td>NW</td>
<td>SW</td>
<td>18</td>
<td>29S</td>
<td>45E</td>
<td>Tets</td>
<td>1.16</td>
<td>&lt;1.0</td>
<td>4</td>
<td>2.30</td>
<td>&lt;1</td>
<td>2.01</td>
<td>2.22</td>
<td>&lt;0.5</td>
<td>12.0</td>
<td>&lt;0.25</td>
<td>&lt;0.1</td>
<td>0.855</td>
<td>&lt;1.0</td>
<td>&lt;0.5</td>
<td>710</td>
<td>&lt;4</td>
<td>134</td>
<td>0.41</td>
<td>8</td>
<td>141</td>
</tr>
<tr>
<td>AZB-008</td>
<td>NE</td>
<td>NW</td>
<td>31</td>
<td>29S</td>
<td>46E</td>
<td>Trif</td>
<td>1.09</td>
<td>70.0</td>
<td>2</td>
<td>5.49</td>
<td>0.18</td>
<td>16.1</td>
<td>8.92</td>
<td>2.72</td>
<td>&lt;0.5</td>
<td>24.5</td>
<td>&lt;0.25</td>
<td>&lt;0.1</td>
<td>&lt;0.5</td>
<td>&lt;1.0</td>
<td>&lt;0.5</td>
<td>101</td>
<td>&lt;4</td>
<td>154</td>
<td>0.51</td>
<td>53</td>
</tr>
</tbody>
</table>
REFERENCES


MAP SYMBOLS

Contact -- approximately located

Fault contact -- dashed where approximately
located, dotted where concealed. Ball and bar on
down throw side

\( \gamma \) Strike and dip of beds

\( \chi \) Location of whole rock sample analyzed in
Table 1

Location of mineralized sample analyzed in
Table 2