UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PRELIMINARY BEDROCK GEOLOGIC MAP
OF THE CHIWAUKUM 4 NW QUADRANGLE,
CHIWAUKUM GRABEN, WASHINGTON

By

John T. Whetten

Open-File Report 80-456

This report is preliminary and has not been edited or reviewed for conformity with Geological Survey standards or nomenclature.
INDEX TO GEOLOGIC MAPPING

Geologic mapping available on a scale of 1:24,000 in the Chiwaukum graben, Chelan County, Washington.
CORRELATION OF MAP UNITS

QUATERNARY

Miocene or Pliocene

TERTIARY

Eocene

PRE-TERTIARY
DESCRIPTION OF MAP UNITS

Qal ALLUVIUM - Gravel, sand, and silt in channels and underlying floodplains of the Wenatchee River and tributaries. Unit also includes colluvium near valley margins.

Qls LANDSLIDE DEPOSIT - Locally derived materials downslope from source-area scar. Arrow indicates general direction of movement.

Qg GLACIAL DEPOSIT - Mostly bouldery deposit occurring in small patches on ridges dividing the drainage areas of Chumstick Creek and the Wenatchee River. Boulders are rounded, lithologically heterogeneous, and up to 1 m in maximum diameter. Unit also includes sand and gravel deposit near mouth of Eagle Creek that is probably a remnant of a moraine.

Qcv COLLUVIUM OF VOLCANIC CLASTS - Derived from mass-wasting of unit Ts. Deposit consists primarily of rounded andesitic volcanic clasts with minor amounts of schist, gneiss, and silicic plutonic clasts. Found on ridge tops on SE side of Natapoc Mountain.

Ts SUMMIT CONGLOMERATE OF PAGE (1940) - Massive to well-bedded sand and gravel overlying unit Tsh with angular unconformity; deposit originally described by Hougland (1932) occurs on twin summits of Natapoc Mountain and consists mostly of rounded clasts of porphyrytic andesite underlain by schist, gneiss, granodiorite, and serpentinite. Unit was probably deposited by streams, but source of volcanic clasts is unknown. (See cover of Seattle telephone directory (Pacific Northwest Bell, 1979) for a photograph of SE side of Natapoc Mountain showing unit Ts on top of mountain, unconformably overlying unit Tsh).

Ti INTRUSIVE ROCK - Commonly basalt or basaltic andesite.

Tsh SANDY SHALE AND SANDSTONE - The Nahahum Canyon Member of the Chumstick Formation of Gresens, Naeser, and Whetten (in press), consisting of carbonaceous, micaceous, finely laminated fissile shale, interbedded with laminated sandstone and relatively rare pebble lenses. Crossbedding and sole markings present locally. The finer-grained parts of this unit are probably of lacustrine origin; the remainder may be fluviatile.

Tcs CONGLOMERATIC SANDSTONE - Main part of the Chumstick Formation of Gresens and others (in press), composed of thick-bedded, light colored sandstone beds, commonly channeled and cross-bedded with minor shale. Pebbles of dacite, Swakane Biotite Gneiss (pTsg), and rhyolite commonly occur near base of beds. Unit is thousands of meters thick. Mappable beds
of tuffaceous sandstone and tuff occur in this unit, generally as distinctive ridge-forming resistant beds 6 to 10 m thick. The tuffaceous materials commonly are altered to clinoptilolite, which causes the beds to weather in thin slabs subparallel to bedding. These units are shown by single lines on the map and are indicated as follows:

**Tsa, Tsb, Tsd, Tse - TUFFACEOUS SANDSTONE**

**Tt** TUFF - Coarse-grained, probably water-laid and reworked. Thickness ranges from 2 to 4 m. Fission-track (zircon) ages on three samples from the adjoining quadrangle to the east have been determined as 48.8 ± 7.2 m.y., 42.7 ± 5.1 m.y., and 41.9 ± 6.8 m.y. (Gresens and other, in press).

**Tf** FANGLOMERATE - Composed of angular clasts of Swakane Biotite Gneiss (pTsg) in a sandy matrix. Unit occurs adjacent to a small area of gneiss in core of Eagle Creek anticline.

**Tc** CONGLOMERATE - Boulders, cobbles, and pebbles interbedded with sandstone. Unit trends parallel with Leavenworth fault and generally coarsens toward the fault. Clasts derived from unit pTu, and include schist, granodiorite, and quartz, with minor amounts of volcanic and gneiss pebbles such as are found in unit Tcs. Unit probably deposited by streams and debris flows on fans grading eastward from a highland west of the Leavenworth fault. Contact is gradational between units Tc and Tcs.

**Td** DIAMICTITE - Unsorted monolithologic breccia consisting of angular clasts of quartz diorite and granodiorite. Largest clast is about 7 m in maximum diameter. Unit is well-cemented and may have been deposited by a landslide or debris flow from unit pTu on west side of Leavenworth fault.

**pTsg** SWAKANE BIOTITE GNEISS - Fine- to medium-grained biotite-plagioclase-quartz-gneiss. Unit is exposed only in small area in core of the Eagle Creek anticline and is extensively brecciated.

**pTu** PRE-TERTIARY ROCKS, UNDIFFERENTIATED - Includes schist, granodiorite, quartz diorite, and serpentinite, and occurs on the west side of the Leavenworth fault.

---

**Contact** - Dashed where inferred; dotted where concealed. Thin tuffaceous sandstone and tuff beds are shown by a single line.
Fault - Dashed where inferred; dotted where concealed. Ball and bar on downthrown side; arrows indicate inferred direction of movement on postulated strike-slip fault.

Anticline - Showing crestline; dashed where approximately located, dotted where concealed.

Syncline - Showing troughline; dashed where approximately located, dotted where concealed.

Strike and dip of beds.

Strike and dip of mineral foliation.

Brecciated rock along fault zone NE of Eagle Creek anticline.
SELECTED REFERENCES


Pacific Northwest Bell, 1979, Seattle (including Mercer Island) telephone directory 1979/80, 814 p.


