STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES
BRIAN J. BOYLE, Commissioner of Public Lands
ART STEARNS, Supervisor

DIVISION OF GEOLOGY AND EARTH RESOURCES
RAYMOND LASMANIS, State Geologist

GEOLOGIC MAP GM-29

GEOLOGIC MAP OF THE YAKIMA QUADRANGLE, WASHINGTON

By

R. D. BENTLEY AND NEWELL P. CAMPBELL

Prepared in cooperation with
U.S. Department of Energy
Contract DE-AC06-81-RL10297

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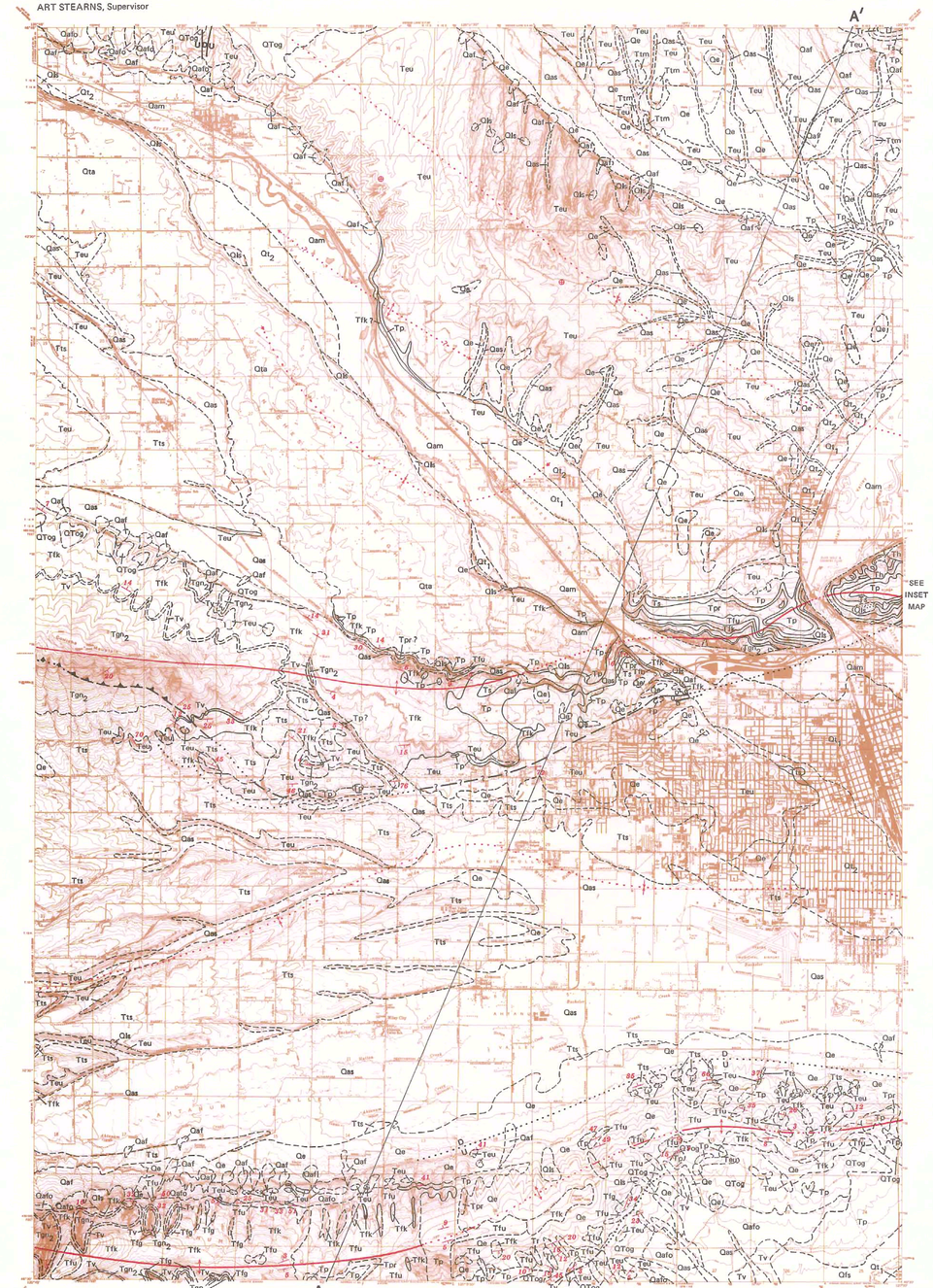


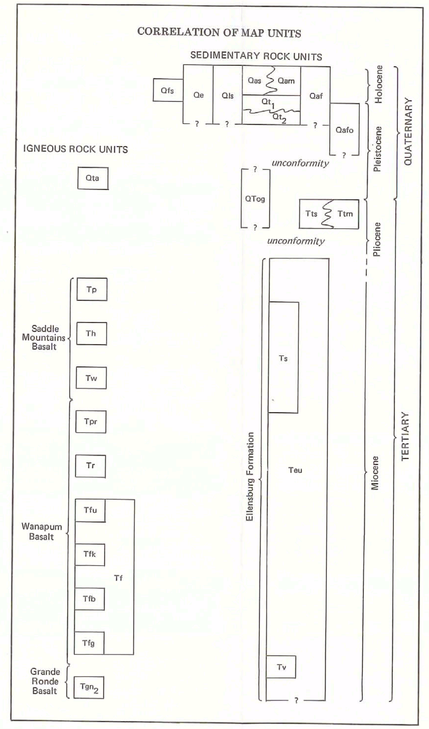
Base map from U.S. Geological Survey 7½-minute quadrangles: Yakima West, Selah, Naches, and Wiley City

SCALE 1:62,500
0 ½ 1 MILE

UTM GRID AND 1974 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

WASHINGTON
QUADRANGLE LOCATION

CORRELATION OF MAP UNITS



EXPLANATION

Contact
Dashed where approximately located; dotted where concealed

High-angle fault
Dotted where concealed; D, downthrown side; U, upthrown side

Normal fault
Dashed where approximately located; dotted where concealed; queried where uncertain; D, downthrown side; U, upthrown side

Thrust fault
Dashed where approximately located; dotted where concealed. Sawteeth on upper plate

Anticline
Showing trace of crestline and direction of plunge; dotted where concealed; queried where uncertain

Syncline
Showing trace of trough line and direction of plunge; dotted where concealed

Anticlinal bend or monoclinal flexure
Dotted where concealed; arrows on side with greater inclination

35 Inclined — ⊕ Horizontal
Strike and dip of beds

DESCRIPTION OF MAP UNITS

SURFICIAL DEPOSITS

Qas ALLUVIUM, sidestream facies — Stream deposits of silt, sand, and gravel dominantly of basaltic composition; largely confined to valley bottoms; may include local lacustrine, paludal, and eolian deposits in depressions deposited by tributaries of the Yakima River (sidestream facies of Waitt, 1979)

Qam ALLUVIUM, mainstream facies — Stream deposits of silt, sand, and gravel of mixed lithologies; largely confined to valley bottoms; may include local lacustrine, paludal, and eolian deposits in depressions; deposited directly by the Yakima River (mainstream facies of Waitt, 1979)

Qt_1 Qt_2 TERRACE DEPOSITS — Stream deposits of silt, sand, and gravel of diverse composition; largely confined to the Yakima River drainage system; poorly indurated and moderately to slightly weathered clasts; divided into Qt_2, middle level, and into Qt_1, lower level

Qaf ALLUVIAL FAN DEPOSITS — Sand and gravel of diverse composition with basalt clasts dominant in larger sizes; cone shaped with little or no caliche development; surface relatively undissected

Qls LANDSLIDE DEPOSITS — Clay, silt, sand, and gravel; unstratified and poorly sorted; surface often hummocky; deposited by rotational-translational slides and flows

Qe EOLIAN DEPOSITS — Silt and fine sand; pale orange to brown; locally contains multiple caliche and tephra beds; includes the Palouse Formation and all younger loess

Qafo OLDER ALLUVIAL FAN DEPOSITS — Sand and gravel; semiconsolidated fanglomerate; primarily basalt clasts cemented by iron-stained clays; surface of fans frequently dissected and capped by well-developed caliche

Qfs CATASTROPHIC FLOOD SLACKWATER SEDIMENTS — Silt, with minor amounts of sand and gravel; rhythmically bedded and graded; deposited by lower energy slackwater floods or surges of catastrophic floods; includes the Touchet beds; locally contains clastic dikes, tephra beds, and ice-rafted fragments

Qta TIETON ANDESITE — Hypersthene-augite, plagioclase, phyric andesite; single intracanyon flow confined to the lower Naches River drainage

QTog OLDER GRAVEL REMNANTS — Coarse sand and gravel; alluvial fan and terrace remnants; dominantly basalt clasts; slightly to moderately weathered with local fine sand and silt lenses; associated with steep slopes of anticlinal ridges of the Yakima fold belt; age uncertain but may be in part correlative with Thorp Gravel

Ttm Tts THORP GRAVEL — Coarse sand and gravel; moderately to highly weathered and poorly indurated stream terrace deposits related to the Yakima River drainage; locally divided into mainstream facies of mixed lithologies (Ttm); and into basalt-dominant sidestream facies (Tts); base of unit commonly unconformable near ridges and conformable in basins with underlying Ellensburg units

ELLENSBURG FORMATION

Teu ELLENSBURG FORMATION UNDIFFERENTIATED — Gravel, sand, silt, and clay — white to light reddish-brown; weakly to moderately indurated fluvial and laharic deposits; dominated by pumiceous dacitic, andesitic, and basaltic clasts; grades downward into thin units of fluvial sand and clay, locally pebbly sand, with mixed volcanic clasts and locally hyaloclastic units; base defined as the top of the lowermost flow of the Columbia River Basalt Group, but the unit includes all conformably underlying sediments of similar lithology beyond the lowermost Columbia River basalt flow pinchout; top of unit defined as below Thorp Gravel or other Pliocene(?)Pleistocene units; to the east intertongues with flows of the Yakima Basalt Subgroup

Ts Selah Member of Schmincke (1967) — Clay, silt, sand, and gravel; white to light reddish brown; weakly to moderately indurated fluvial and laharic deposits; dominated by dacitic, andesitic, and pumiceous clasts; stratigraphic position defined by overlying Pomona Member of the Saddle Mountains Basalt and next basalt stratigraphically below

Tv Vantage Member — Clay, silt, and coarse sand; white to tan; weakly to moderately indurated fluvial deposits; dominated by dacitic and andesitic grains and local pumiceous clasts; stratigraphic position defined by overlying Wanapum Basalt and underlying Grande Ronde Basalt; similar thin volcaniclastic layers occur between other basalt flows

COLUMBIA RIVER BASALT GROUP

YAKIMA BASALT SUBGROUP

SADDLE MOUNTAINS BASALT

Tp Pomona flow, Pomona Member — Fresh surfaces are gray to blue black, weathers gray, fine-grained; abundantly to slightly phyric with abundant white to colorless plagioclase microphenocrysts, sparse plagioclase glomerocrysts; sparse olivine phenocrysts; invasive contacts common into pumicite of Ellensburg Formation; well-developed entablature with fanning columns; Pomona chemical type (Wright and others, 1973); reversed magnetic polarity (Rietman, 1966; Choiniere and Swanson, 1979); K-Ar age about 12 m.y. (McKee and others, 1977); single flow in map area. This flow is the Wenas basalt of Smith (1903)

Th Huntzinger flow(s) of Mackin (1961), Asotin Member — Fresh exposures are blue-black, weathers gray; fine-grained, sparsely plagioclase-phyric flow of Asotin chemical type (Swanson and others, 1979); normal magnetic polarity; single intracanyon flow follows ancient river channel along Yakima Ridge

Tw Wahluke flow, Wilbur Creek Member — Fresh exposures are black to blue-black; weathers gray-black; fine-grained, aphyric with plagioclase microphenocrysts and rare phenocrysts; flow of Wilbur Creek chemical type (Swanson and others, 1979); normal magnetic polarity; single intracanyon flow follows ancient river channel along Yakima Ridge

WANAPUM BASALT

Tpr Priest Rapids flow, Priest Rapids Member — Fresh exposures are gray-black; weathers rusty brown; medium- to coarse-grained; aphyric, with rare plagioclase phenocrysts; diktytaxitic; well-developed colonnade with 0.5-1.5 m diameter columns; Rosalia chemical type (Swanson and others, 1979); reversed magnetic polarity; age approximately 13.6 m.y.; one flow in map area

Tr Roza flow, Roza Member — Fresh exposures are gray black; weathers reddish-brown; fine- to medium-grained, with plagioclase phenocrysts and glomerocrysts generally 0.5-1.0 cm.; phenocrysts commonly a few hundred per square meter surface area; well-developed colonnade with up to 1 m diameter columns; locally diktytaxitic; Frenchman Springs chemical type (Wright and others, 1973); normal magnetic polarity; laboratory results indicate transitional after demagnetization (Rietman, 1966); resembles plagioclase-phyric flows of Frenchman Springs Member, but phenocrysts generally more abundant, and smaller in average size; one flow in map area

Tf Frenchman Springs Member Undifferentiated — Fresh exposures are gray to black; gray to reddish-brown on weathered surfaces; medium- to coarse-grained; highly to very sparsely plagioclase phyric flows of Frenchman Springs chemical type (Wright and others, 1973); normal magnetic polarity (Rietman, 1966); thin sedimentary interbeds common; one to three flows in map area; lower flows commonly pillowed at base

Tfu Flows of Union Gap, Frenchman Springs Member — Fresh exposures are gray-black; weathers gray to reddish-gray; fine- to medium-grained; generally aphyric with rare plagioclase phenocrysts up to 2 cm; phenocrysts average 1 to 5 glomerocrysts per 10 square meters surface area; colonnade with 1.5-2.0 m diameter columns and locally pillowed base; some flows have hackly entablature; Frenchman Springs chemical type (Wright and others, 1973); normal magnetic polarity; one flow over most of map area, locally 3 or 4 flows on Ahtanum Ridge. This unit is probably equivalent to Mackin's (1961) Sand Hollow and Sentinel Gap flows, but exact correlation is uncertain

Tfk Flow of Kelley Hollow, Frenchman Springs Member — Fresh exposures are gray-black; weathers to reddish-gray; fine- to medium-grained; phyric with abundant plagioclase phenocrysts and glomerocrysts up to 2 cm; phenocryst abundance highly variable from 1 to 100 glomerocrysts per square meter surface area; thin entablature and well-developed colonnade with 0.5-1.5 m diameter columns; Frenchman Springs chemical type (Wright and others, 1973); normal magnetic polarity

Tfb Flow of Badger Gap, Frenchman Springs Member — Fresh exposures are gray-black; weathers gray to reddish-gray; fine- to medium-grained; generally aphyric with rare plagioclase phenocrysts up to 2 cm; phenocrysts average 1 to 5 glomerocrysts per 10 square meters surface area; colonnade with 1.5-2.0 m diameter columns and locally pillowed base; locally hackly entablature; Frenchman Springs chemical type (Wright and others, 1973); normal magnetic polarity. This flow is the Sand Hollow flow of Bentley (1977)

Tfg Ginkgo flows, Frenchman Springs Member — Fresh exposures are gray-black; weathers to reddish-gray; fine- to medium-grained; phyric with abundant plagioclase phenocrysts and glomerocrysts up to 2 cm; 100 to 200 glomerocrysts per square meter surface area; thin entablature and well-developed colonnade with 0.5-1.5 m diameter columns and pillowed base; Frenchman Springs chemical type (Wright and others, 1973); normal magnetic polarity; laboratory results indicate a south excursion inclination with normal polarity (Sheriff and Bentley, in press); one to two flows in the map area

GRANDE RONDE BASALT

Tgn$_2$ Unnamed basalt flows, nonporphyritic to very sparsely plagioclase-phyric, generally fine-grained and petrographically nondistinct; chemical composition varies within a broad field named Grande Ronde chemical type (formerly called Yakima chemical type by Wright and others, 1973); divided into two chemical types — high MgO and low MgO (Swanson and others, 1979); also divided into magnetostratigraphic units on the basis of dominant magnetic polarity

Flows of normal magnetic polarity — N_2 of Swanson and others (1979) —
Upper part of unit contains four or five flows of high MgO Grande Ronde chemical type (Swanson and others, 1979); this unit is the Sentinel Bluffs sequence of Myers and others (1979); fresh exposures are gray-black; weathers reddish-brown and gray; flows are commonly moderately microphyric with 1 to 3 mm long, equant plagioclase phenocrysts in a fine- to medium-grained basalt; many flows are multitiered flows; four flows form this unit in the map area; the lowest flow is the McCoy chemical subtype (Long and others, 1980)
Lower part of the N_2 contains flows of low MgO Grande Ronde chemical type. Two to four flows are fine-grained, dense, black, aphyric basalt with thick, massive, black, hackly entablatures over colonnades. Sedimentary interbeds are common at the top and bottom of this unit, but invasive relations (Byerly and Swanson, 1978) obscure their continuity and none are shown on the map. The upper flow in this unit is the Umtanum flow (Umtanum chemical subtype of Myers and others, 1979)

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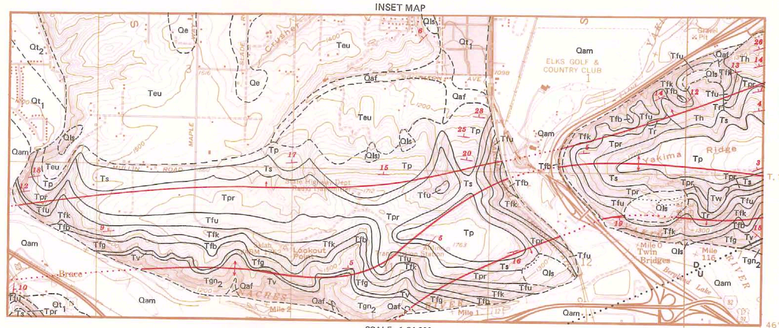
INSET MAP



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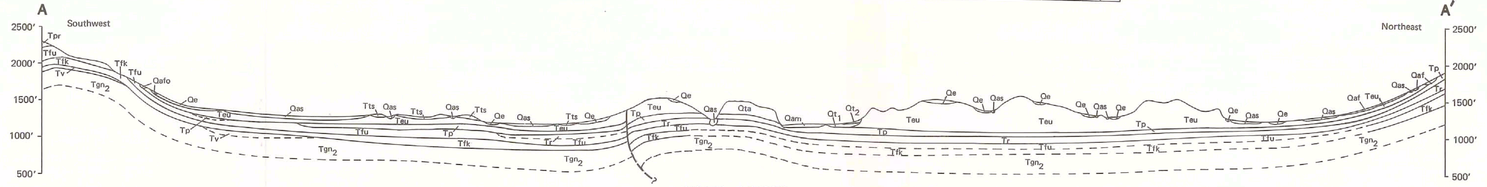

Horizontal scale 1:62,500
Vertical scale 1:12,000

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