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WASHINGTON GEOLOGIC NEWSLETTER

Connecting the branch line to Zillah from the Toppenish main line

RATTLESNAKE HILLS GAS LINE CONSTRUCTION - OCTOBER 1932

Hand ditching just east of Toppenish on highway. Work was done by men instead of machines whenever possible

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COMMISSIONER OF PUBLIC LANDS

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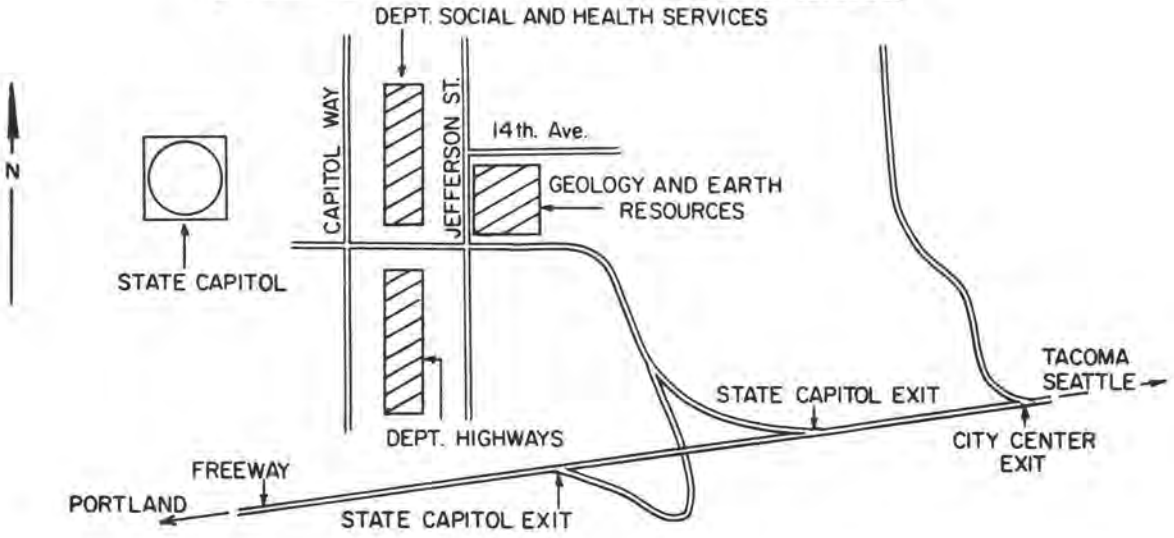
DEPARTMENT OF NATURAL RESOURCES

VAUGHN E. LIVINGSTON, JR., State Geologist
DIVISION OF GEOLOGY AND EARTH RESOURCES

LOCATION MAP: DIVISION OF GEOLOGY AND EARTH RESOURCES



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Surface Mined Land Reclamation Act

Oil and Gas Conservation Act

Geothermal Resources Act

HISTORY OF OIL AND GAS EXPLORATION IN THE STATE OF WASHINGTON

by

Carl McFarland

INTRODUCTION

Oil seeps in Washington were first reported about the year 1881 along the sea cliffs on the west side of the Olympic Peninsula. Natural gas seeps associated with mud cones and mounds were also reported in this same general area. Gas occurrences were reported in several wells in Whatcom County before the turn of the century.

John E. McManus drilled the first known oil test well in the state around the turn of the century near Stanwood, in Snohomish County.

As of June 1979, approximately 428 oil and gas exploratory wells and 76 gas storage wells have been drilled in Washington. Of the exploratory wells, 106 were drilled by major oil companies. In the last 20 years, there has been a marked difference in the drilling pattern compared to the years preceding 1958. For instance, in the last 20 years, of the 105 exploratory wells drilled, 64 were drilled by major companies and 41 by wildcatters, as compared to 42 drilled by major companies and 281 by wildcatters in the years preceding 1958. This tends to point out a trend, which started in the 1940's, that more and more exploratory wells are being located on the basis of scientific data. Two-thirds of the exploratory wells drilled in the last 20 years were in Grays Harbor and Lewis Counties in the west-central part of the state. They had a total of 64 wells as compared to 41 wells in 17 other counties. Only 11 wells were drilled east of the Cascades in the last 20 years as compared to 50 wells prior to 1958.

PAST GAS PRODUCTION

The state has had gas production in two areas in the past.

Whatcom County, in the northwest part of the state, had limited domestic production in the 1930's from a number of wells in Pleistocene sediments at depths less than 500 feet, and commonly at about 170 feet. The gas had a high methane content, suggesting that it originated from coal seams.

Benton County, in the south-central part of the state, had commercial gas production in the Rattlesnake Hills gas field. This field produced nearly 1.3 billion cubic feet of gas before production ceased in 1941. Production was from 16 wells at depths of 700 to 1,200 feet in volcanic rocks. The gas had a high methane content, suggesting that this gas originated from decomposition of vegetal material.

OIL SHOWS

The Ocean City area of Grays Harbor County, located on the west coast of the state, has had the most promising oil shows to date. The shows in the wells were from intervals between 3,600 to 4,400 feet. The first well drilled in the area, Union's Barnhisel No. 1,

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RATTLESNAKE HILLS GAS LINE PHOTOS

The two cover photos and the five photos in this article show construction crews installing lines in the 1930's for the distribution of gas from the Rattlesnake Hills gas field, which is located 18 miles northwest of Grandview in Benton County

located near the center of section 15 (18-12W), had very encouraging shows of oil and gas. The J. W. Tanner-Sunshine Mining Company et al., Medina No. 1, located in the same section, produced 12,000 barrels of oil before it was plugged and abandoned in 1962. From 1947, when the first well was drilled, to date (June 1979), 29 wells have been drilled in this area. All drilling in this area was reportedly based on the presence of a faulted anticline in strata that may represent the eastern limit of an offshore basin. In addition to the above wells, several other wells have produced 100 or more barrels of oil in this Ocean City area.

Many wells in the Ocean City area encountered pressures so high that extreme caution had to be used during drilling to avoid blowouts, but, to date, a reservoir of sufficient size has not been found to sustain production.

Three other areas in the state have had encouraging shows of oil and gas, but nothing approaching commercial production. These areas are Forks, in the northwest coastal area of the state; Black Diamond, in south King County; and central Lewis County.

Our Information Circular 67, which is a tabulation of all oil and gas wells drilled in the state from 1900 to 1979, is now available (see Recently Published Reports of the Division of Geology and Earth Resources elsewhere in this newsletter).

Crossing the Yakima River with 6-inch pipeline to Toppenish. Two lines are put across the river for safety

One of the distribution mains on a side street in Toppenish. It is placed on skids, welded, and ready to put in the ditch. A crew of about six men are working in the rear. The president of the Walla Walla Oil, Gas and Pipe Line Co. and a Toppenish citizen are being shown over the work

View of a 6-inch pipeline before being covered, near Grandview, in October 1932

Blowing a 6-inch pipeline to clear it of dust. City-gate of Toppenish. Line completed to Toppenish, October 30, 1932

Preparing a stub connection on a distribution line for service to a home in Toppenish. This is a part of about 22 miles of distribution pipelines, October 7, 1932

MANY THANKS TO YOU

The editorial staff of the division would like to say thanks to all of you who so kindly responded to our letters of inquiry for updating our mailing lists. Your prompt responses made our jobs much easier.

TWO MORE COASTAL ZONE ATLASES ADDED TO DIVISION LIBRARY

Two recent volumes of the "Coastal Zone Atlas of Washington" are now available for inspection in our division library: Island County, volume 4; and Snohomish County, volume 5. Volumes have already been released on Whatcom, Skagit, San Juan, Jefferson, and Clallam Counties. The atlases are published by the Washington Department of Ecology and include maps and text on geology, slope stability, coastal flooding and drift, sand and gravel/critical biological areas, and land cover/land use.

RECENT USGS OPEN-FILE REPORTS ADDED TO OUR LIBRARY

The following reports are now available for inspection in our division library:

Selected sources of geologic, hydrologic, and related information for the Puget Sound region, Washington, by D. P. Dethier, G. C. Bortleson, and J. D. Scerra. USGS Open-File Report 78-252, 71 pages.

U.S. Geological Survey offshore program of resource and geo-environmental studies and topical investigations, Pacific-Arctic region, by D. W. Scholl. USGS Open-File Report 78-422, 109 p.

Point count data and sample locations for selected samples from Paleogene nonmarine sandstones, Washington, by V. A. Frizzell. USGS Open-File Report 79-293, 2 pls., 1 fig., 31 p.

Major oxide, trace element, and glass chemistry of Columbia River basalt samples collected between 1971 and 1977, by T. L. Wright, D. A. Swanson, R. T. Helz, and G. R. Byerley. USGS Open-File Report 79-711, 160 p.

Preliminary reconnaissance geologic maps of the Columbia River Basalt Group in parts of eastern Washington and northern Idaho, by D. A. Swanson, R. D. Bentley, G. R. Byerly, J. N. Gardner, and T. L. Wright. USGS Open-File Report 79-534, 9 plates, 44 p.

Makah Formation—A deep marginal basin sedimentary sequence of late Eocene and Oligocene age in the northwestern Olympic Peninsula, Washington, by P. D. Snavely, Jr., A. R. Niem, N. S. MacLeod, J. E. Pearl, and W. W. Rau. USGS Open-File Report 79-581, 75 p.

Principal facts for borehole gravity stations in wells DC-3, DC-5, and DC-7 at the Hanford site, Washington, and in well RSH No. 1 on Rattlesnake Hills, Washington, by S. L. Robbins, R. J. Martinez, and D. L. Smith. USGS Open-File Report 79-849, 29 p.

THESES AVAILABLE FOR REFERENCE IN DIVISION LIBRARY

The theses listed below were recently added to our division library and are available for reference work.

Amara, M. S., 1975, Mechanical analyses of stratigraphic layers from the Lind Coulee archaeological site in central Washington: Washington State University M.A. thesis (Anthropology), 129 p.

Blinman, Eric, 1978, Pollen analysis of Glacier Peak and Mazama volcanic ashes: Washington State University M.A. thesis (Anthropology), 49 p.

Burke, K. D., 1976, The differential extraction of radiogenic lead for use as a uranium pathfinder:

Eastern Washington State College M.S. thesis, 19 p.

Burr, Cynthia, 1978, Paleomagnetism and tectonic significance of the Goble Volcanics of southern Washington: Western Washington University M.S. thesis, 235 p.

Carson, Bobb, 1971, Stratigraphy and depositional history of Quaternary sediments in northern Cascadia basin and Juan de Fuca abyssal plain, northeast Pacific Ocean: University of Washington Ph. D. thesis, 249 p.

Cochran, B. D., 1978, Late Quaternary stratigraphy and chronology in Johnson Canyon, central Washington: Washington State University M.A. thesis (Anthropology), 81 p.

Deaver, F. K., Jr., 1973, Faunal utilization at archaeological site 45AD2, Adams County, Washington: Washington State University M.A. thesis (Anthropology), 40 p.

Dickinson, W. R., 1958, Geology of the Izee area, Grant County, Oregon: Stanford University Ph. D. thesis, 360 p.

Donnelly, A. T., 1976, The Refugian Stage of the California Tertiary—Foraminiferal zonation, geologic history, and correlations with the Pacific Northwest: University of California at Santa Barbara Ph. D. thesis, 316 p.

Foley, L. L., 1976, Slack water sediments in the Alpowa Creek drainage, Washington: Washington State University M.A. thesis (Anthropology), 55 p.

Getsinger, J. S., 1978, A structural and petrologic study of the Chiwaukum schist on Nason Ridge, northeast of Stevens Pass, north Cascades, Washington: University of Washington M.S. thesis, 151 p.

Goetsch, S. A., 1978, The metamorphic and structural history of the Quartz Mountain-Lookout Mountain area, Kittitas County, central Cascades, Washington: University of Washington M.S. thesis, 86 p.

Green, G. S., 1975, Prehistoric utilization in the channeled scablands of eastern Washington: Washington State University Ph. D. thesis (Anthropology), 149 p.

Hammatt, H. H., 1976, Late Quaternary stratigraphy and archaeological chronology in the lower Granite Reservoir area, lower Snake River, Washington: Washington State University Ph. D. thesis (Anthropology), 272 p.

Hampton, G. L., 1978, Stratigraphy and archaeocyathans of Lower Cambrian strata of Old Douglas Mountain, Stevens County, Washington: Brigham Young University M.S. thesis, 86 p.

Harbour, J. L., 1978, The petrology and depositional setting of the middle dolomite unit, Metaline Formation, Metaline district, Washington: Eastern Washington University M.S. thesis, 67 p.

Hertlein, L. G., 1923, Revision of the Tertiary and Quaternary pectens of the Pacific coast: Stanford University M.S. Thesis, 149 p.

Hildreth, E. W., 1977, The magma chamber of the Bishop tuff; gradients in temperature, pressure, and composition: University of California at Berkeley Ph. D. thesis, 328 p.

Johnson, S. Y., 1978, Sedimentology, petrology, and structure of Mesozoic strata in the northwestern San Juan Islands, Washington: University of Washington M.S. thesis, 105 p.

Knapp, J. S., 1976, Velocity changes associated with the Ferndale earthquakes. University of Washington M.S. thesis, 93 p.

Manutani, M. A., 1969, Sediment-water relations in lakes of the lower Grand Coulee, Washington: Duke University Ph. D. thesis, 136 p.

Mayers, I. R., 1971, An analysis of continuous seismic profiles from the Strait of Juan de Fuca. University of Washington M.S. thesis, 123 p.

McCollom, R. L., 1972, An array study of upper mantle seismic velocity in Washington State: University of Washington M.S. thesis, 62 p.

Mogk, D. W., 1978, Contact metamorphism of carbonate rocks at Cave Ridge, Snoqualmie Pass, Washington: University of Washington M.S. thesis, 110 p.

Moody, U. L., 1978, Microstratigraphy, paleoecology, and tephrochronology of the Lind Coulee site, central Washington: Washington State University Ph. D. thesis (Anthropology), 273 p.

Moser, K. R., 1978, Structural analysis of Cambrian rocks in the Bowen Lake area, Stevens County, Washington: Washington State University M.S. thesis, 64 p.

Mullineaux, D. R., 1961, Geology of the Renton, Auburn, and Black Diamond quadrangles, Washington: University of Washington Ph. D. thesis, 202 p.

Myers, C. W., 1973, Yakima Basalt flows near Vantage, and from core holes in the Pasco Basin, Washington: University of California at Santa Cruz Ph. D. thesis, 147 p.

Nickmann, Rudy, 1979, The palynology of Williams Lake fen, Spokane County, Washington: Eastern Washington University M.S. thesis, 71 p.

Olmstead, D. L., 1972, Clay mineralogy of the Washington continental slope: University of Washington M.S. thesis, 40 p.

Olson, T. M., 1975, The geology and ground water resources of part of the Hangman and Marshall Creek drainage basins, Spokane County, Washington: Eastern Washington State College M.S. thesis, 70 p. (Also published as Washington Department of Ecology WRIS Technical bulletin 15.)

Pendleton, J. A., 1978, Geology and the conduct of local government; an urban geologist's viewpoint: University of Colorado Ph. D. thesis, 209 p.

Petrie, Gregg, 1978, A gravity survey and analysis of the Mount Stuart block of Washington State: Western Washington University M.S. thesis, 105 p.

Powers, D. L., 1924, Pre-Tertiary cherts of the Pacific Ocean border: Stanford University M.A. thesis, 134 p.

Powers, M. W., 1976, Sand and gravel deposits in parts of the Spokane SE. and SW. quadrangles, Washington: Eastern Washington State College M.S. thesis, 52 p.

Reinhart, P. W., 1933, Tertiary Arcidae of the Pacific slope of North America: Stanford University Ph. D. thesis, 293 p.

Robinson, C. F., 1966, Stratigraphy and structural geology of Ahtanum Ridge, Yakima, Washington. University of Washington M.S. thesis, 35 p.

Smiley, C. J., 1954, A preliminary report on the Ellensburg flora of Washington with special reference to the genus Paulownia: University of California at Berkeley M.A. thesis, 45 p.

Thompson, J. A., 1978, Molluscan biostratigraphy and physical stratigraphy of the Miocene Astoria(?) Formation in western Washington: University of Washington M.S. thesis, 59 p.

Wallace, W. K., 1976, Bedrock geology of the Ross Lake fault zone in the Skymo Creek area, North Cascades National Park, Washington: University of Washington M.S. thesis, 111 p.

Ward, A. W., Jr., 1976, Petrology and chemistry of the Huntzinger flow, Columbia River basalt, Washington: University of Washington M.S. thesis, 82 p.

West, B. J., 1976, Carbonate petrology and paleoenvironmental analysis of Pennsylvanian(?) and Permian limestone units in the Mission Argillite, Stevens County, Washington: Eastern Washington State College M.S. thesis, 46 p.

West, J. R., 1976, First Thought Mountain, Stevens County, Washington—A volcano within a caldera: Eastern Washington State College M.S. thesis, 30 p.

Wiedey, L. W., 1929, Oligocene and Miocene marine molluskan faunas of the Pacific Coast and their correlation: Stanford University Ph. D. thesis, 547 p.

Wiley, B. H., 1979, Foraminifera of the upper Eocene type Skookumchuck Formation and the Eocene-Oligocene Lincoln Creek Formation, Wabash Traverse, Centralia, Washington: University of Washington M.S. thesis, 151 p.

Wissman, Gerd, 1971, Marine geophysical studies offshore Cape Flattery, Washington, and the implications for regional tectonics: University of Washington M.S. thesis, 96 p.

Womack, B. R., 1977, An archaeological investigation and technological analysis of the Stockhoff basalt quarry, northeastern Oregon: Washington State University M.A. thesis (Anthropology), 160 p.

DIVISION OPEN-FILE REPORTS ADDED TO LIBRARY

The following reports, by division geologists, are now available for inspection at our division library:

An assessment of the uranium potential in the Ellensburg Formation, south-central Washington, by P. Clinton Milne. Open-File Report OF 79-2, 5 tables, 5 figs., 31 pages, accompanied by four maps (scale 1:250,000) [reproducible]:

Map 1 - Geologic map of south-central Washington

Map 2 - Radiometric survey of the Ellensburg Formation

Map 3 - Areas sampled for uranium analyses

Map 4 - Cross sections and outcrop locations of uraniferous ash fall tuff and probable source rock distribution for the Ellensburg Formation

Report OF 79-2 is also available for inspection at the following offices in Spokane: Northwest Mining Association, U.S. Bureau of Mines, and U.S. Geological Survey.

Strippable and underground coal resources on Washington Department of Natural Resources state-administered land, Pierce County, Washington, by Ellis Vonheeder. Open-File Report OF 79-4, 5 sheets [reproducible].

RECENTLY PUBLISHED DIVISION REPORTS ARE NOW AVAILABLE

The following reports may now be purchased from the Division of Geology and Earth Resources:

Information Circular 66
Compilation of earthquake hypocenters in western Washington-1977, by Robert S. Crosson and Linda J. Noson (University of Washington), 3 figs., 12 p. Price 50 cents.

Information Circular 67
Oil and gas exploration in Washington, 1900-1978, by Carl R. McFarland, 43 oil and gas test well maps, 119 p. Price $2.00.

Information Circular 68
Index to published geologic mapping in Washington, 1854-1970, by William H. Reichert, 104 map sheets, 233 p. Price $3.00.

Geologic Map GM-23
Geologic map of the Marblemount quadrangle, Washington, by Peter Misch (University of Washington), scale 1:48,000. Price $4.00.

REMINDER FOR MINING CLAIM OWNERS

This is a reminder to prospectors and miners that the new federal regulations pertaining to recordation of mining claims is in effect. The final date for recording claims staked before October 21, 1976, with the Bureau of Land Management is on or before October 22, 1979—only about 3 months away. Another significant change is that the filing of proof of labor must be made with the BLM on or before December 30 of each year after the claim has been recorded. It is important to get claims properly recorded and the proof of assessment filed yearly because under the new regulations a claim is declared abandoned if no proof of labor is filed (except under some special circumstances). Those interested in obtaining a copy of the new regulations should write to the Bureau of Land Management office, P.O. Box 2965, Portland, Oregon 97208, and ask for a copy of 43CFR 3833, Regulations Pertaining to Recordation of Unpatented Mining Claims.

FRIENDS OF MINERALOGY'S ANNUAL SYMPOSIUM TO BE HELD IN BELLEVUE

The Friends of Mineralogy, Northwest Chapter, will hold its 5th Annual Symposium on September 28-30, 1979, at the Bellevue Holiday Inn on Interstate 405, just across the floating bridge from Seattle. Lectures will be centered about the theme, "Sulfides and Sulfosalts."

Additional information can be obtained from Mike Groben, Rt. 1, Box 16, Coos Bay, OR, 97420; phone (503) 269-9032.

U.S. GEOLOGICAL SURVEY 7½-MINUTE TOPOGRAPHIC QUADRANGLES
(Maps received in the division library May 1, 1979)

Name	New edition	Photo revised	Latitude (indicates southeast corner)	Longitude	County
Anacortes South	1978		48°22'30"	122°30'00"	Skagit; Island
Badger Mountain	1965	1978	46°07'30"	119°15'00"	Benton
College Place, Washington - Oregon	1966	1978	46°00'00"	118°22'30"	Walla Walla
Disque	1950	1978	48°07'30"	123°45'00"	Clallam
Ellensburg North	1958	1978	47°00'00"	120°30'00"	Kittitas
Elwha	1950	1978	48°00'00"	123°30'00"	Clallam
Grandview	1978		46°15'00"	119°52'30"	Yakima
Humorist	1964	1978	46°07'30"	118°52'30"	Walla Walla; Benton; Franklin
Juniper, Washington-Oregon	1962	1978	45°52'30"	119°00'00"	Benton
Lake Crescent	1950	1978	48°00'00"	123°45'00"	Clallam
Lake Sutherland	1950	1979	48°00'00"	123°37'30"	Clallam
Mount Muller	1950	1978	48°00'00"	123°52'30"	Clallam
Smith Island	1978		48°15'00"	122°45'00"	Island; San Juan; Jefferson
Thorp	1958	1978	47°00'00"	120°37'30"	Kittitas
Vancouver, Washington-Oregon	1961	1978	45°37'30"	122°37'30"	Clark
Vantage	1965	1978	46°52'30"	119°52'30"	Grant; Kittitas
Warden	1954	1978	46°52'30"	119°00'00"	Grant; Adams
Winchester SW	1966	1978	47°00'00"	119°37'30"	Grant
Wooded Island	1978		46°22'30"	119°15'00"	Benton; Franklin

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July '79

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