A PUBLICATION OF THE WASHINGTON STATE DIVISION OF GEOLOGY AND EARTH RESOURCES

WASHINGTON GEOLOGIC NEWSLETTER

JAN. 1974

BERT L. COLE
COMMISSIONER OF PUBLIC LANDS

VOLUME 2 - NUMBER 1

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WASHINGTON'S NONMETALLIC MINERALS

During the past 72 years, the production of nonmetallic minerals in Washington increased steadily, until it reached an all-time high in 1972 of about $97 million. This represents 89 percent of the total mineral production in Washington during 1972. Production figures released by the U.S. Bureau of Mines include cement; however, for this discussion, the value of cement will not be included in production figures, but rather the value of the limestone necessary for the production of cement will be used. Thus, excluding the dollar value of cement, the nonmetallic mineral production for Washington during 1972 was $74 million. Sand and gravel comprised $26 million of the total; stone, $23.9 million; and coal, several million dollars. Fifty years ago the production of sand and gravel in the state was reported as $1.3 million; stone, $5 million; and coal, $11 million. The increase in the production of sand and gravel and stone is due chiefly to construction projects within the state, whereas the decrease in the production of coal was brought about by the use of petroleum products in place of coal.

Although nonmetallic minerals have never been as glamorous to the general public as metals, such as gold and silver, they have always contributed significantly to the economy of the state. The exact amount of nonmetallic minerals produced in Washington is not known; however, incomplete records indicate that from 1890 through 1972, close to $3 billion in nonmetallic minerals has been produced. During this same time, the production of metallic minerals comes to about $400 million.

Unlike metallic minerals, which are mined mainly in the northern part of the state, nonmetallic minerals have been produced in every county. Although the most common minerals thus far produced in Washington include sand and gravel, stone, coal, and clay, rarer minerals such as beryl, strontianite, opal, and jade have also been produced in minor amounts.

Nonmetallic minerals that are found in Washington, are as follows:

Alum
Alunite
Andalusite and Kyanite
Asbestos
*Barite 1/
Beryl
Building stone (basalt, granite, limestone, marble, sandstone, slate) 2/
Coal
Clay and shale
Diatomite
Dolomite
*Epsom Salts
Feldspar
*Fluorite
Garnet
*Gem & ornamental stone
Graphite
*Grinding pebbles
*Gypsite
Limestone
Magnesite
*Mica
Mineral pigments
*Mineral water
*Opal
Olivine
Peat
Perlite
Pumice and pumicite
Quartz
*Quartzite
*Saline compounds
Sand and gravel
Silica sand
*Strontianite
Talc and soapstone
Zircon

1/ Minerals produced in amounts not exceeding $500,000 are indicated by asterisks.

2/ Minerals underlined indicate that total production to date exceeds $500,000.

In 1972, each of the state's 39 counties produced one or more nonmetallic minerals. Sand and gravel was produced commercially from 314 separate pits, in 31 counties. Stone, which was mined at 99 quarries in 29 counties, consisted mainly of basalt, limestone, sandstone, quartz, quartzite, and granitic rocks. Sand and gravel was used mainly as concrete, bituminous, and macadam aggregate, as well as for road-base material. Crushed stone was used chiefly for surfacing roads, as road-base material, as jetty and riprap rock, and in the manufacture of cement. Dimension stone, consisting mainly of sawed stone, rubble, and flagging, was used as building stone. Whereas, about 15 million tons of crushed stone was produced in Washington in 1972, the production of dimension stone was only about 4,000 tons.

Basalt, or trap as it is called in the stone industry, is the most common stone mined in the state and was produced in 25 counties. When crushed, it is used mainly to surface roads, as base material for roads, as jetty and riprap rock, as railroad ballast, or as concrete, bituminous, and macadam aggregate. Limestone mined in Washington is used mainly in the manufacture of cement and paper, as flu stone for smelters, as road-base material, and as agricultural lime. Whatcom and Pend Oreille Counties are the state's largest limestone producers, with the bulk of the limestone being used by cement plants.

King and Spokane Counties are the state's largest clay producers, and the clay is used mainly in the manufacture of common and refractory bricks. Clay mined in Snohomish, Lewis, and Clark Counties is used in the manufacture of common brick and tile.

Over 100 mines have produced coal in Washington; however, only four mines are currently operating. Washington Irrigation and Development Company produces 96 percent of the coal that is mined in the state. Coal from their Lewis County pit is used in the company's steam-electric plant near Centralia. Coal produced by other mines is used mainly for domestic heating, and in small industrial plants.

Silica sand which is mined in King and Stevens Counties is consumed by local glass

manufacturers, whereas silica sand mined in Chelan County is used by cement plants and smelters. Olivine, which is mined at two quarries in Skagit County, is processed locally and sold throughout the country as foundry sand. Diatomite, which is used mainly as an industrial filtration medium for liquids and in thermal and acoustic insulation, is produced from several pits in Grant County. Peat is mined in Snohomish, King, Pierce, Kitsap, Thurston, and Spokane Counties, and is used to improve soils.

Other nonmetallic minerals produced in Washington during 1972 include cinders, epsom salts, gypsum sand, jade, pumice, shale, and talc; however, production of these minerals was minor and the total did not exceed 50,000 tons.

The future production of nonmetallic minerals in Washington depends to a great extent on general economic conditions. The state has ample supplies of sand and gravel, trap rock, quartzite, limestone, dolomite, magnesite, olivine, and coal. Future production of sand and gravel, trap rock, and limestone will depend largely on construction projects. Because of impending power shortages, the production of coal for fuel might increase. Significant increases in the production of dolomite and quartzite may come about when Alcoa builds its new magnesium plant at Addy, in Stevens County. On the other hand, production of minor nonmetallic minerals such as peat, talc, epsom salts, gypsum, sand, and clay will decline as deposits are depleted.

Wayne S. Moen

DIVISION GEOLOGISTS AID PLANNERS

Increased urbanization and the second-home building explosion of recent years has steadily increased the demand upon land and natural resources. The only way these lands and resources can be fully and adequately utilized is through comprehensive land use planning. Local planning agencies, who realize that many of the answers concerning safe and effective land use can only be obtained by the use of geology, have called upon the Geology and Earth Resources Division to compile and present data useful for land use planning, resource development, and environmental protection.

Several investigations of geologic conditions affecting land use planning have been undertaken by Ernie Artim. In King County, reports and maps indicating relative slope stability and differential settlement hazards of the Kirkland area have been completed and submitted to the Kirkland planners. An engineering geology map for preplanning purposes of a small area near the Duwamish River was submitted to the Seattle Department of Community Development.

The Thurston Regional Planning Council, working on a comprehensive land use plan, requested and received a completed report and map of slope stability of Thurston County, and an economic geology map outlining areas of known and possible coal reserves and major surficial gravel deposits. Studies of differential settlement hazards and more detailed geologic maps are being completed.

The Douglas County Planning Commission had requested and received reports and maps indicating relative slope stability and areas of flash flood hazard in the southwestern portion of the county. A study outlining major deposits of sand and gravel is in the final stages of completion.

In addition, Allen Fiksdal has completed a landslide investigation of a portion of Cowlitz County.

These maps and reports, which indicate possible problem areas and provide a basic geologic framework to aid in understanding the capabilities and limitations of the land, can be seen in the planning offices of the counties for which they were done, and in the office of the Division of Geology and Earth Resources, in Olympia.

PAPERS PRESENTED AT NORTHWEST MINING ASSOCIATION'S 79TH ANNUAL CONVENTION

At the Northwest Mining Association's 79th Annual Convention held in Spokane on the 7th and 8th of December four papers were presented by Division of Geology and Earth Resources staff members.

Vaughn E. Livingston, Jr., supervisor for the division, reported on the division's current activities that included environmental education, geologic hazards in several areas of the state, and the mapping of road rock in Wahkiakum County. Livingston also discussed work that is currently in progress on economic geology projects in Okanogan and Stevens Counties; geology relating to land planning that is underway in King, Snohomish, Kitsap, Thurston, Douglas, Mason, Jefferson Cowlitz, and Pierce Counties. He also reported on geothermal investigations underway in the Southern Cascades, as well as the mapping of possible oil and gas structures in western Jefferson County.

Ernest R. Artim discussed the role of geology in planning and development, stressing that land is one of our most fundamental natural resources and that careful planning should guide development of our land to ensure its maximum potential use as a resource. He pointed out that geologic conditions often limit the capacities of certain land areas for particular use. Geologic hazards, such as earthquakes and landslides, make engineering studies of buildings and building sites a necessity. Physical characteristics of geologic materials within an area, not the material's age, are the most important factors to be considered for planning purposes. Artim stated that errors in planning and development could easily be avoided if geologists are consulted for preplanning data.

Donald Ford, assistant supervisor for the division, discussed land reclamation laws of other states and Washington. Ford noted that 30 states now have laws requiring reclamation of land disturbed by mining. Many states have revised their initial reclamation laws, in some cases several times. The variations in the different reclamation laws suggest that some uniformity in the laws would be desirable. Congress appears to favor the establishment of federal guidelines, with the states handling the enforcement of the federal guidelines along with state laws. In the United States, only 16 percent of our land area has been disturbed by mining from 1930 to 1971. Nearly 40 percent of this land has been reclaimed. In Washington, only 8 percent of the land has been disturbed by mining, and 24 percent of the land disturbed since January 1, 1971, has been reclaimed. Ford brought out the fact that Pennsylvania has achieved 100 percent plus in reclaiming land disturbed by mining. A recent check of surface mining permits in Washington reveals that 680 surface mining operations are currently operating under permits. Commodities being mined include coal, clay, sand and gravel, stone, and uranium.

J. Eric Schuster's paper on "Geothermal Potential of Washington" was read by Ted Livingston. Schuster stressed the division's role in assessing Washington's potential geothermal resources. Accomplishments to date include (1) establishment of a data bank including all data on Washington's potential geothermal resources and many publications on geothermal prospecting and development in areas outside Washington, (2) geologic mapping of the Southern Cascade Mountains, (3) interpretation of chemical data from 43 springs in Washington, (4) heat-flow and geothermal-gradient measurements throughout Washington, and (5) ground-noise measurements studies in areas of geothermal significance.

Wayne S. Moen

DIVISION GEOLOGISTS ATTEND TRAINING PROGRAM

Donald M. Ford and Ralph H. Kimmel, who currently administer the State's Surface-Mined Land Reclamation Act, recently each attended a 4-week intergovernmental reclamation training program and tour of surface mining areas in the midwest and eastern

United States. The purpose of the trip was to gain additional knowledge and training in new methods of surface-mined land reclamation technology that would be beneficial in managing similar programs in Washington. This was an opportunity to observe at first-hand some federal, state, and private reclamation efforts from the planning state to actual onsite work. Reclamation research projects such as fly ash utilization on lands previously damaged from past mining practices, the administrative aspects of effective regulation of acid mine drainage abatement, erosion and subsidence control, and various mining and reclamation techniques, were considered.

While the program concentrated principally on large open-pit coal mining and reclamation activities in Pennsylvania, Ohio, Kentucky, West Virginia, and Illinois, it also covered the mining of other commodities, such as sand and gravel, limestone, clay, silica sand, and slate as well.

PIERCE COUNTY PLANNING

Residents of the picturesque Gig Harbor Peninsula of Pierce County recently became concerned with land-development practices in their area and called on the Pierce County Planning Commission for assistance in formulating a comprehensive plan for their peninsula. Realizing the need for consideration of natural data in planning for future land use, the Pierce County planners contacted the Geology and Earth Resources Division for help.

Investigations of geologic conditions affecting land-use planning were begun in July by Mackey Smith. A report and maps showing relative slope stability and potential geologic resources have now been completed and submitted to the planners. Studies of potential ground failure from earthquakes and geologic factors affecting waste disposal practices are in the final phases of completion.

The report and maps, which outline the geologic capacities and limitations of the land, can be seen in the Pierce County planning office in Tacoma and the Geology and Earth Resources office in Olympia

ERTS SATELLITE PHOTOS

Technical Services Division of the Department of Natural Resources has satellite imagery of Washington available for inspection in four bands that were taken at an altitude of 567 miles. These include the visible blue/green band, the visible red band, near infrared band, and false color infrared composite. Over 250 photos are on file that have been taken since ERTS was launched on July 23, 1972. The photos are 9" x 9" transparencies, which are at a scale of about 1:1,000,000. The photos should be of interest to exploration geologists in the analysis of lineaments and ore deposits. Technical Services also provides help in interpreting the photos for earth features other than geological.

Individuals interested in ERTS imagery and flight indexes should contact:

Bob Scott
Department of Natural Resources
Technical Services Division
Olympia, WA 98304

Phone (206) 753-5338

"Greater even than the greatest discovery is it to keep open the way to future discovery."

John Jacob Abel In Science

STAFF PROFILES

ERNEST ARTIM

Ernie joined our staff in September 1972, in response to our extensive search for an ur-

ban geologist with the necessary qualifications in engineering geology. He obtained his master's degree in the physical sciences in 1971, at California State University at San Diego. He worked for the San Diego office of Woodward-Clyde consultants, specializing in engineering problems related to land use before coming to Olympia. While with the firm, he served on the geologic field mapping and fault evaluation expertise lists for the firm's 16 offices.

Ernie has been particularly helpful to planning agencies, as well as the general public, in supplying land use information. His work in urban geology is concerned with earth processes, earth resources, engineering properties of earth materials, and human needs. As such, it involves the development and management of resources, evaluation and mapping of rocks and minerals, and the overall long-range physical planning for the most efficient and beneficial use of the land.

Ernie and his wife Patti have two young sons, David and Tommy. Our Puget Sound country appeals to them very much, and they have adapted to it quickly. When the weather permits, and sometimes when it doesn't, Ernie and Patti love to go out on the Sound and fish. Ernie's other hobbies include vegetable gardening, landscaping, hunting, and promoting interest in the gourmet qualities of other fish in the Sound besides salmon and trout.

MACKEY SMITH

Mackey joined our division in July 1972. His educational background consists of a B.S. in geology, and a teaching certificate, from the University of Puget Sound; his master's degree was obtained from Western Washington State College. He formerly worked as a teaching assistant and photographer at UPS and WWSC.

Mackey's first project at the division was the compilation and mapping of old coal mine workings in the state so that data are available for the interpretation of potential subsidence hazards. He has since completed environmental geologic studies in Mason and Pierce Counties. He has also been working in the Puget Lowland area in urban environmental geology and land use planning assignments. His speciality is Pleistocene geology which relates to sediments deposited by glaciers during the last ice age. The occurrence of these sediments is studied and interpreted to evaluate slope stability, land surface subsidence, and sand and gravel resources. He interprets the geology of an area so that the best utilization can be made of our land and mineral resources.

Mackey and his wife Renee live in Tacoma and have just purchased a new home,

which they are attempting to furnish with antiques. Mackey is a connoisseur on Mexican food and vies with our draftsman in seeing who can consume the most pungent hot peppers. He also enjoys reading, photography, automobile racing, building racing engines, and playing Bluegrass, old blues, and ragtime tunes on his guitar. And, Mackey's wry humor is a delight to us all.

WILLIAM H. REICHERT

Bill became a staff member of our division in October 1958 and assumed the task of establishing a useful technical reference library. He has fulfilled this task very well. The library now serves as a repository for more than 15,000 publications and is used extensively

for reference work and for keeping abreast of new developments in the geologic fields. Bill answers many inquiries from all over the state, and from other states as well, pertaining to the availability of material on Washington geology. He is currently compiling a comprehensive annotated bibliography of published and unpublished material relative to the Puget Sound studies program. He is the author of Bulletin 46, "Bibliography and index of the geology and mineral resources of Washington, 1937-1956," and of Bulletin 59, "Bibliography and index of the geology and mineral resources of Washington, 1957-1962." He is working on the next bibliography, continuing on from 1962, at the present time.

Bill obtained his B.S. in geology and his master's degree in librarianship from the University of Washington.

Acquiring antique clocks and putting them in working order is Bill's hobby. He is also interested in antique reed organs and has restored several of them to playing condition, including two that he has in his home.

PROJECTS OF THE DIVISION OF GEOLOGY AND EARTH RESOURCES DURING 1973

Completed During 1973

Geology of Cispus Environmental Center - Eric Schuster
Slope stability and settlement maps of City of Kirkland, King County - Ernie Artim
Sources of road rock in Wahkiakum County - Christine Carlson
Geologic hazards of Douglas County from Rock Island to Orondo - Ernie Artim
Geology of the beach along west coast of Olympic Peninsula - Weldon Rau
Slope stability, ground failure due to earthquake, construction material, and geologic factors influencing waste disposal maps of the Allyn and Potlatch quadrangles, Mason County - Robert Carson and Mackey Smith
Geology of Gillette Mountain quadrangle - Eric Schuster
Report on the Conconully mining district - Wayne Moen
Directory of Washington Mining Operations - Eric Schuster
Report on Geology and Land Use Planning - Ernie Artim
Co-op aeromagnetometer survey of part of northeast Washington with the USGS
Slope stability of Thurston County - Ernie Artim
Geologic hazards of area around Kelso and Longview, Cowlitz County - Allen Fiksdal
Geologic hazards of Gig Harbor Peninsula - Mackey Smith
Landsides in the Seattle area - Don Tubbs

Projects Still in Progress

Report on Washington's energy resources - Geology and Earth Resources staff
Genesis of certain lead-zinc deposits in Stevens County - Joseph Mills
Geology of Aeneas Valley and Mt. Bonaparte quadrangles, Okanogan County; cooperative with USGS - Ken Fox and Dean Rinehart
Silver commodity report - Wayne Moen
Geology of the west shore of Hood Canal - Robert Carson
Environmental geology study of a part of Snohomish County - Graduate students, Don Videgar, Jerry Capps, and John Simmons under supervision of Dr. Donald J. Easterbrook
Study of King County landslides - Don Tubbs
Geology of Echo Valley quadrangle - Eric Schuster
Evaluation of potential accelerograph sites - Kurt Othberg
Depth to bedrock study in Puget Lowland - Kurt Othberg and John Hall
Coal mine subsidence study - Jerry Thorsen
Geology of the Forks quadrangle - Weldon Rau
Geology of the Taholah and Destruction Island quadrangle - Weldon Rau
Geology of the Southern Cascades - Paul Hammond
Geologic hazards of Island County - Jerry Thorsen
Thermal and mineral spring water sampling - Eric Schuster
Geothermal gradient studies - Eric Schuster
Active fault survey - Kurt Othberg

EARTHQUAKE INFORMATION SERVICE NOW PART OF USGS

The National Earthquake Information Service, formerly in the National Oceanic and Atmospheric Administration (NOAA), has been moved to the U.S. Geological Survey in an effort to consolidate the federal program in solid-earth physics.

The major function of the service is to provide scientists, the public, and disaster-relief agencies with earthquake data from all over the world, which is transmitted to the service from hundreds of USGS-managed and independent stations. An alarm system alerts their seismologists when an earthquake of Richter magnitude 5 or greater is detected in the U.S., and 6.5 or greater elsewhere in the world.

Their address and phone number is as follows:

National Earthquake Information Service
U.S. Geological Survey
RIO/S
Boulder, CO 80302
Area Code 303 444-1139

USGS OPEN-FILE MAP

The Division of Geology and Earth Resources Library has a copy, which is available for inspection, of this recently released U.S. Geological Survey map:

Strait of Juan de Fuca and Olympic Mountains, by Tau Rho Alpha. 1 sheet, scale 1:1 million. [Material from which copy can be made at private expense is available in the Spokane and the Los Angeles offices, as well as in the USGS Library, Menlo Park.]

NEW USGS MAPS NOW AVAILABLE

Map I-853-A, "Map showing spawning areas of anadromous fish in southern Hood Canal," by John D. Findlay, Bureau of Sport Fisheries and Wildlife. This map is one of a series prepared in cooperation with other agencies to present basic environmental data to assist land use planning in the Puget Sound area.

Map I-854-A, "Map showing percolation rates of earth material in western Whatcom County, Washington," has recently been released by the U.S. Geological Survey. It

was prepared by Donald J. Easterbrook, who teaches at Western Washington State College, and was based on the relationship between the physical characteristics of geologic units and the results of actual percolation tests.

INTERESTING GEOLOGICAL HIGHWAY MAP RELEASED

The American Association of Petroleum Geologists, with the cooperation of the U.S. Geological Survey, has published No. 6 in their series of geological highway maps. The title is "Geological Highway Map; Pacific Northwest Region; Washington—Oregon (Idaho in part)."

It consists of one sheet and has a geologic map (approx. 18 by 16 in.); cross sections; landform, tectonic, and structural-framework maps; land and sea changes through the ages; a time and rock unit chart, and a gemstone map. It also lists places of geologic interest and selected fossil localities.

While the scale of 1 inch= 30 miles on the geologic map is too small for detailed study, the map, nevertheless, should prove to be very enjoyable and useful to students and the general public, as well as scientists. It contains a great deal of information, presented in color, about the geology of Washington and Oregon.

This geological highway map can be purchased for $2 (folded) or for $2.50 (rolled), plus 50 cents handling charge per order, from this address:

American Association of Petroleum Geologists
P. O. Box 979
Tulsa, OK 74101

DIRECTOR OF IDAHO BUREAU OF MINES AND GEOLOGY POSITION OPEN

The University of Idaho has announced that there is an opening for Dean, College of Mines, at the University of Idaho. The Dean is also Director of the Idaho Bureau of Mines and Geology. The College of Mines has programs in Geological, Metallurgical, and Mining Engineering, as well as Geography, Geology, and Hydrology. An M.S. program is offered in all disciplines, and the PH.D. is offered in Geology and Mining Engineering-Metallurgy. Closing date for applications is February 15, 1974. Anyone interested may contact Dr. John H. Ehrenreich, Chairman, College of Mines Search Comm., College of Forestry, Wildlife & Range Science, University of Idaho, Moscow, ID 83843.

DR. ALLEN F. AGNEW GOES TO WASHINGTON D.C.

Dr. Allen F. Agnew, director of the State of Washington Water Research Center, at Washington State University in Pullman, has accepted the newly created position of Senior Specialist for mining in the Congressional Research Service of the Library of Congress. He will be leaving for Washington D.C. in mid-January. A search committee has been formed for Dr. Agnew's replacement. Harvey R. Doerksen, with the assistance of Dr. John F. Orsborn, will serve as acting director of the Water Research Center.

All his many friends in Washington State wish Dr. Agnew well in his new job.

RECENT USCE GEOLOGIC ACTIVITIES

Richard W. Galster, Chief of the geology section, of the U.S. Corps of Engineers in the Seattle District, reports on their work as follows: ". . .our territory covers the Washington coast, the Puget Sound basin, eastern Washington, northern Idaho, and all of western Montana. Thus we get into a great variety of geologic problems, varying from water supply to landslides to foundation conditions for civil works structures. Within Washington, we have recently been working in the following areas:

1. Geotechnical studies relating to raising Chief Joseph Dam and extending the powerhouse to its full capacity are in progress.

2. We have been conducting studies relating to the stability of the ancient Bridgeport landslide just upstream from Chief Joseph Dam. We have done some drilling on this feature and will be formalizing an in-house report shortly.

3. The geology in the vicinity of Mud Mountain Dam has claimed much of my attention for some time. In connection with this work we have recognized a thick section of materials deposited during Olympia Interglacial time and several earlier and later mudflows. The Radiocarbon Laboratory at Western Washington College has done some carbon-14 dating for us.

4. We were involved in the report to Congress recommending stabilization measures at Ediz Hook near Port Angeles and expect to have more input, especially regarding the conduct of a beach nourishment program upon authorization of the project.

5. We are presently engaged (through contract with a local engineering firm) in a waste water management study in the Spokane urban area.

6. We are also responsible for administering the National Dam Safety Program in Washington and Montana.

The above indicates a few of our recent activities in addition to our continued deep involvement in the Libby Project in northwestern Montana."

YOUR STATE GEOLOGIST REPORTS

I attended the Mining and Land Use Law session of the Northwest Mining Association meeting in December 1973, and I must admit that I came away with a somewhat less than enthusiastic outlook with regard to the proposed federal land use regulations. Several bills were discussed and none of them could really be termed as beneficial to industry. In fact, they are all environmental bills masquerading under the title of "land use" or "land reclamation."

We need to be concerned about the environment in the United States, of course, but we have to look at the total environment rather than just at the natural environment alone. Economic benefits need to be weighed very carefully against environmental degradation and if the benefits to be accrued to the nation are greater for economic development than for environmental preservation, then development should be allowed with the proper safeguards.

At no place in the land use legislation was the mining industry mentioned per se. Instead, inferences such as "extractive industries" "nonrenewable resources" or "natural resources" were used. The bill was set up in such a way that the states will have to enforce the federal statutes or lose federal funds appropriated to highway and airport development.

The reclamation legislation is aimed primarily at coal at the present time; however, one bill directs that a study be made to determine whether surface mining or below surface mining of all mineral resources in the United States can be carried out with minimal damage to the environment. The study is to be completed within 18 months after the enactment of the bill and it doesn't take any great amount of foresight to see that unless there is a drastic change in the attitude of Congress, all mining would be regulated within a very short time.

I would encourage everyone to get copies of Senate Bill 425, House Resolution 10294 and 11500 and go over them carefully. Let your elected representatives in Washington, D.C., know what you think about the proposed legislation. If the only letters these people get support the bills, they will believe the bills represent the consensus of public opinion, and it is their job to represent the public. My own thought is that a land use bill that does not recognize mineral

development as a land use is going to have a profound effect on the mining industry, and I suspect that most of it will be adverse.

Ted Livingston

BUFFALO OIL?

Occasionally, the division gets a letter that is especially enjoyed by us. Here is one from a geologist, whom we all know well, and who is now District Exploration Manager for a large oil company. He attached the letter below that he had received from an individual interested in oil (The spelling remains the same, because it is part of its charm.)

Dear Sir:

I am sending you a volcano blows top—are you going to let this oil go to wast? There is a mountian in mexaco called Partuctian. For 7 years it worked, until the oil was gone. They have drilled all over Pugit Sound in Wash. for oil. The brainlless folls could see Mount Raineer, there could be no oil. I stoped in at Olyimpa and the geologist there said 3,000 bufflo fell over a cliff and that made the oil. I told him he was crazy. I went to the university. The teacher there said they just teach what they learned from books. So you have book learned. Geologist all he can do is guess. If you want to save this oil, I can tell you where to drill. The oil is going to wast every day.

Yours,

The geologist's response to us is as follows:

Dear Ted:

It is evident from the attached letter that your Department is responsible for putting out false and misleading information on the origin of hydrocarbons. As Oil and Gas Supervisor, it should be your responsibility to keep your people informed on the currently accepted theories in order not to confuse the public, which has a tough enough time understanding our business anyway.

The author of the letter states that he was told that 3,000 buffalo fell over a cliff and that was what made the oil. Anyone up on the literature knows it wasn't 3,000 buffalo but 3,500 dinosaurs —and, they just didn't fall, they were pushed. No wonder he thought you were crazy!

If he comes in again, you might try and find out where he thinks we ought to drill. With the energy crisis and all, we hate to see all that oil going to wast (sic).

Very truly yours,

We are unable to locate anyone on our staff who will admit to the 3,000 buffalo story. Our biostratigrapher says that buffalo microfossils are rare indeed; our geothermal expert is hastily looking around for the volcano that is blowing its top; our draftsman is trying to locate that high cliff on a map; the Humane Society is searching for the pusher of the dinosaurs, and the university will have to speak for itself on the book learning.

U.S. GEOLOGICAL SURVEY 7½-MINUTE TOPOGRAPHIC QUADRANGLES
(New maps received in Division of Geology and Earth Resources Library since October 1, 1973)

Name	Latitude (indicates southeast corner)	Longitude	County
East Canyon Ridge	46°15'00"	121°37'30"	Skamania
Lewiston Orchards South	46°15'00"	116°52'30"	Asotin
Lost Horse Plateau	46°15'00"	121°00'00"	Yakima
Outlet Falls	46°00'00"	121°07'30"	Yakima, Klickitat
Point Roberts	48°52'30"	123°00'00"	Whatcom
Rufus	45°37'30"	120°37'30"	Klickitat
Signal Peak	46°07'30"	121°07'30"	Yakima

Department of Natural Resources
Division of Geology and Earth Resources
Olympia, WA 98504