5/11/62

DIATOMITE PROGRAM STATEMENT

John W. Hartwell 1/

OUTLOOK

Present production data indicate a slowdown of growth rates in production of diatomite. With anticipated expansion of uses in the chemical and processing industries together with decreasing uses in the building industry, future annual production is not expected to increase more than 3 to 5 percent during the next 5 years. Prices, however, should continue past trends and should be 10 percent higher by 1967.

There is a definite trend towards perlite as an important contender for part of the filter-aid market, displacing some of the diatomite used for this purpose. It is reasonable to expect that 10 percent or more of the diatomite filter-aid market will be lost to perlite in the next 5 years, as indicated by past increases in perlite filter-aid production of 2 percent in 1958 and 12 percent in 1960.

The widespread distribution of diatomite and its past trend of increasing prices will doubtless encourage exploration for new usable properties and may ultimately lead to the development of new sources. Beneficiation research may point the way to the use of presently undesirable ores.

Three major producers have extensive laboratory facilities and will continue to conduct most of the research into new uses and the improvement and standardization of product. Some additional basic

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1/ Physical scientist, Branch of Nonmetallic Minerals.

research may be conducted by the Federal and some Far Western States, Bureau of Mines, and by private industry. Any research done in the Eastern States is expected to be of the applied nature.

New resource or technologic developments which would upset the present outlook cannot be foretold except in a general manner.

PROBLEMS

The major problem confronting the diatomite industry is high transportation costs, because most of the current production of diatomite comes from the Western States and the principal markets are in the highly industralized Eastern and Central States. For example: Dry, disintegrated, and uncalcined diatomite has an apparent density of about 8 pounds per cubic foot, and a freight car or gondola load contains only about 10 to 15 tons. Material at the mine during the 1957-59 period had an average value of $45.73 per ton, while prices quoted at eastern ports during this same period on domestic bagged, purified grades, were about $65 per ton, or an average shipping cost of about $20 per ton.

The shortage of high-grade deposits in the Eastern and Central States, and lack of economical methods of upgrading the lower grade diatomite in the known deposits, are major obstacles to establishing diatomite production closer to the consuming industries.

An increased number of requests from State, Federal agencies, and private industry for information on eastern diatomite deposits and production of small quantities of diatomite during 1961 tends to prove a desire by industry to develop a source of diatomite in the East to overcome the increasing cost of this material from the Western United States.

A handicap to potential newcomers in the industry is the difficulty of obtaining technical information, as practically all research

conducted is sponsored by industry and the results obtained are confidential.

An adequate low-cost sampling method for the low-grade diatomite deposits in Eastern United States is a problem and information on methods of testing and beneficiation is also needed.

The industry has numerous processing problems which require the development of special processing methods; for example, the high ratio of water in some newly mined diatomite, the relative fragility of the material, and the complex specifications that the final product must meet.

Diatomite dust is a silica hazard which requires rigid precautions to prevent pneumoconiosis among workers, particularly in plant areas where dust from calcined diatomite may be present.

The paucity of basic data and information on the various types of diatomite for specific uses are a hindrance to determining the most efficient utilization of domestic deposits. Lack of detail on the diatomite use pattern and foreign trade seriously limits the analysis of market trends.

AVENUES OF ATTACK ON PROBLEMS

Prospecting for new diatomite deposits in Eastern and Central United States and delineation of known deposits should be carried out by present conventional methods such as drilling, surface sampling, and underground exploratory workings. Additional exploration could be made by any or a combination of the following methods: Gravimetric, seismic, magnetic, electrical, geochemical, miscellaneous geophysical (geoaconstical), and aerial photography.

A thorough exploration and evaluation of any deposits which are located relatively close to major markets would aid in their commercial development.

There is considerable difficulty in adequately sampling the low-grade eastern diatomite deposits. The recent and planned work now being done and proposed on statistical methods of applied sampling of various ore deposits may also be applicable to diatomite deposits.

With the investigations by Federal or State agencies on mining, beneficiation, and uses of diatomite, the technical data obtained would be available to individuals and companies whose lack of information now handicaps the development of new diatomite industries in areas now needing commercial deposits. Basic research should also assist in the solution of many industry problems concerning diatomite.

Research should be conducted to determine the harmful effects of diatomite dust on the health of miners, processors, and users of diatomite, and to devise protective measures to prevent or minimize these effects.

BUREAU OF MINES OBJECTIVES

1. Collection and dissemination of statistical and economic information for other Governmental agencies, private industry, and the general public. The statistical canvass should be improved by obtaining more detailed data on end uses and foreign trade.

2. Research to obtain general knowledge on mining, beneficiating, and uses of diatomite.

3. Study of undeveloped diatomite deposits particularly in Eastern and Central areas of the U.S. near present major markets.

4. More comprehensive research on mineral composition, thickness and overburden of beds, quality of diatomite, and possible new recovery methods. This research could also include studies on methods of mining, testing, processing, and performance characteristics of various diatoms, and uses. Utilize cooperative agreements with private industry where practicable.

5. Expansion of projects on statistical methods of sampling to include diatomite deposits.

6. Encourage and assist in developing specifications and standards for diatomite.

7. Initiation of a program to study the health hazards in the various diatomite installations preferably in cooperation with such agencies as the United States Public Health Service, California State Department of Public Health, Oregon State Board of Health, and Nevada State Department of Health, all of which conduct studies on the health hazards of diatomite mining and processing.

8. Assistance to industry in maintaining dust count limits, which have been tentatively established, pending completion of studies now in progress.

WESTERN MINING COUNCIL OF LINN COUNTY
P. O. BOX 631 SWEET HOME, OREGON 97386

JANUARY 3, 1971

HAPPY NEW YEAR
ALL MINING COUNCIL MEMBERS 1971

Our next meeting is this Friday night, 8:00 P.M. in rooms 24-25 at Sweet Home High School, 15th & 16 Long St. Our election of new officers for the year is on the agenda. Our nominating Comm. consists of Hap Fink, Wayne Garber, and Glenn Peck.

The 1971 memberships are coming in great. 35 have paid in so far and we have the month of January yet. National and local dues are still $4.00 per year. This is one expense that hasn't gone up.

Our speaker for Friday evening will be Cal Bush of Eugene, Oregon. Cal processess Oregon Wonder Earth (DIATOMACEOUS). This is an Oregon product, surface mined from Christmas Valley. Come out and hear Cal Bush Friday evening. Wolfgang Paul is shipping out 600 of his new publication this next week, MINING LORE and could not be with us until our February meeting.

We read in the Ore-Bin that Hollis M. Dole, Assistant Secretary of the Interior will speak at the banquet at the Pacific Metals and Minerals Conference to be held in Portland April 5, 6, and 7th 1971. Also participating will be a panel of experts on gold who will be coming from as far away as South Africa. Additional information may be obtained from Ralph S. Mason, 1069 State Office Building, Portland, Oregon 97201.

Our meeting last month was so very well attended with over 70 members and visitors out. Lets try to keep this up during the winter months if possible.

See you this Friday:

Secretary Linn County
Mining Council

Mabel Moore

P.S. ADD THESE NEW NAMES TO YOUR MEMBERSHIP LIST.
June Haven, 758 Long St. City, Robert F. Lyman 340 S. W. 5th, Corvallis, Ore. Norma Most 5340 S. Santiam Highway, Lebanon, Ore. Wm. C. Wisecup, 1032 Gibson Way, Albany, Ore. Calvin W. Kirk, 1317 Gooch Lane, City

Diatomaceous earth

November 15, 1957

Mr. H. E. Sovereign
7227 - 6th Avenue N.W.
Seattle 7, Washington

Dear Mr. Sovereign:

This is in reply to your letter of November 10.

We are unable to locate any record of diatomaceous beds or occurrences in Washington County, Oregon. I am not referring to commercial deposits of diatomite but just to mere occurrences. It would be our belief that diatomite beds or diatomaceous beds would not be unexpected in this area as there are many beaver dams, log jams, etc. that have resulted in small lakes and stoppages of water suitable for diatom growth.

Pitt River drains Goose Lake, the northern end of which comes into Oregon. Goose Lake is near Lakeview in southern Lake County. There are many diatomaceous deposits in the Klamath County - Lake County region.

The Coast Range of Oregon did have some glaciation in the higher peaks. Glaciation was quite restricted and evidence and signs of it are only found in a few places. To the best of my knowledge no glaciation took place in Washington County.

I am sorry that I cannot refer you to anyone in this area interested in diatomaceous earth.

Sincerely yours,

Hollis M. Dole
Director

HMD:jr

H. E. SOVEREIGN
7227 6TH AVENUE N. W.
SEATTLE 7, WASH.

November 10, 1957

Dept. of Geology and Mineral Industries,
1069 State Office Building,
Portland 1, Oregon.

Gentlemen:

Once again I trouble you with a matter in connection with my studies of the diatoms of the inland waters of the Pacific Northwest. Very little has been published about the diatoms of this area but one work "Diatomëes du Mond Entier" by Tempere & Peragallo, issued over the period from 1889 to 1907 does give the analysis of six collections. Of these there are three locations that have insufficient descriptions and one of these is as follows:

"Washington Co. (Etats-Unis)." Freshwater Fossil.

I know that there is a Washington County just west of Portland but have never heard of any fossil material being collected there. Your map of Mineral Deposits (1951) does not show any diatomite in this county but I presume that you would only show deposits which might be of commercial importance.

An inspection of the list of species given indicates that it was probably Post Glacial in age and the sample contains one species which has never been listed except as follows:

"Washington Co."
"Pitt River, (Oregon)"--whatever that means.
"Shasta Co. Cal."

From the above I presume the sample was collected somewhere between Washington and Northern California.

Have you ever heard of fossil diatom material being found in Washington Co., Ore., no matter how small a deposit? Do you know anyone in the Portland area who is interested in such matters. Your office put me in touch with Mrs. Edith McCleod who was of great assistance to me in securing collections of fossil material.

With many thanks for your reply to this and for past favors, I am,

Sincerely yours,

H E Sovereign

P.S. Were the hills in the western part of Washington Co., Ore. glaciated?

DIATOMITE

Berkshire Chemicals, Inc., 630 Third Avenue, New York, New York.

The Cary Co., 228 North La Salle Street, Chicago, Illinois.

Charles B. Chrystal Co., Inc. 53 Park Place, New York, New York.

E. I. du Pont de Nemours & Co., Inc., Industrial & Biochemicals Dept., Wilmington, Delaware.

The Eagle-Picher Co., American Building, Cincinnati, Ohio.

Great Lakes Carbon Corp., 333 North Michigan Ave., Chicago, Illinois.

Resources Americas Corporation, Box 945, Santa Monica, California.

L. A. Salomon & Bro., Inc. 216 Pearl Street, New York, New York.

Tamms Industries Co., Dept. O, 228 North La Salle St., Chicago, Illinois

Tar Residuals, Inc., 420 Lexington Ave., New York, New York.

Thompson-Hayward Chemical Co., 2915 S.W. Blvd., Kansas City, Missouri.

Charles A. Wagner Co., Inc. 4455 North 6th Street, Philadelphia, Penn.

(MINING WORLD, Director Number, 1962.)

October 8, 1975

Mr. David E. Thompson
c/o Hercules Construction Co., Inc.
94-163 Leowaena
Waipahu, Hawaii 96797

Dear Mr. Thompson:

Mr. Thor Johnson called me yesterday to ask about diatomite deposits in Oregon.

As you may know, there are a number of fresh-water deposits of diatomaceous earth in various areas of eastern Oregon, only one of which has ever produced any quantity. This is the so-called Terrebonne deposit which was mined by Great Lakes Carbon Company several years ago.

About two years ago I asked Mr. Norman S. Wagner, who was in charge of our Baker field office, to review what information we had on diatomite deposits in the State to see whether it would be desirable for the Department to prepare a bulletin which would update the report by B.N. Moore back in 1937 (U.S. Geological Survey Bulletin 875, "Nonmetallic Mineral Resources of Eastern Oregon"). I am enclosing a copy of Norm Wagner's rather rambling discourse summarizing his views on the information we have on the diatomite properties.

As you can tell from Norm's memorandum, he does feel that there are two or three areas in the State that probably warrant further work. He points out, however, that as we have never been able to find out precisely what kinds of diatoms the companies are looking for, it is difficult for us to make a completely valid evaluation of our Oregon diatomites.

If, after reading this memorandum, you have any questions concerning specific areas, please feel free to write or call me. I would also suggest that you obtain a copy of Moore's report because it does give an excellent description of all of the major diatomite areas in the State. Although the bulletin has been out of print for many years, I assume that a copy can be obtained at the University of Hawaii library.

Sincerely yours,

Raymond E. Corcoran
State Geologist

REC:jr
Encl.
cc Thor Johnson
CE Minerals, 901 E. 8th Ave.,
King of Prussia, Penn. 19406

State Department of Geology and Mineral Industries

~~702 Woodlark Building~~
Portland 5, Oregon
1069 State Office Building

Report on diatomaceous earth samples submitted by Irving Hazeltine, Box 86, Canyon City, Oregon.

Sample #1

"Diatomite sample from west of gravel pit, lower Powder valley, 3 miles about southwest Keating."

Sample #2

"Diatomite sample from 80 acre tract 4 miles west of Keating, Baker County."

Note: From the above information it would appear that both samples came from the general vicinity of sec. 14, T. 8 S., R. 41 E., Baker County.

Sample #1 is composed mostly (70-80%) of fragments of Melosira granulata with lesser amounts of M. aff. distans, M. aff. granulata var. curvata, Epithemia aff. turgida.

Sample #2 is composed mostly (70-80%) of fragments of Melosira granulata and M. aff. granulata var. curvata. The remainder of the plants appear to be M. aff. granulata var. spiralus, Diploneis aff. crabro, Rhabdonema aff. biquadratum, and Cybella aff. prostrata. Both samples contain a fair amount (10-20% of total sample) of ash and volcanic glass.

According to Ken Hamblen (personal communication) the most desirable type of diatoms for filtering are those of the large Stephanodiscoid and Coscinodiscoid type. The tiny fragmented Melosira, so common to the fresh water diatomaceous deposits of eastern Oregon, are on the other hand the least desirable for such uses. For this reason the diatomite samples submitted by Mr. Hazeltine, because of their dominant plant type and admixed volcanic ash, do not appear to have commercial possibilities as filter aids. Its use as an insulant or as an admixture for concrete would presumably depend on "market conditions". As you are well aware, there are so many known good deposits of diatomaceous earth in Oregon (e.g., Harper Basin) as well as elsewhere in the western United States that competition eliminates all but the very highest quality or those situated close to cheap transportation. Only by careful and selective mining to keep costs down and quality of product up can eastern Oregon deposits compete in the market with diatomite from other more accessible areas.

Report by: R.E.C.
Date: 7-21-53

State Department of Geology and Mineral Industries

1069 State Office Building
Portland 1, Oregon

EVALUATION OF DIATOMITE DEPOSITS

See also: N.S. Wagner's letter of Aug. 7, 1962

The recent abandonment of two large diatomite quarries in Oregon and California has resulted in an increase in exploration for new deposits on the West Coast by Great Lakes Carbon Corporation and others to replace these mined out bodies. Oregon has a number of diatomite localities, mostly in the central or eastern areas of the State, some of which may be of future commercial importance.

Although most diatomite appears to be fairly pure in an outcrop or prospect pit, there is actually a large varieation from one deposit to another in the type and relative percentages of diatom species as well as the amount of clay-glass contamination. It is the amount and type of contaminant in the diatomite that usually determines whether a particular bed may have commercial application. The diatom species and the degree of fragmentation of the siliceous tests may also play an important part in evaluating a particular deposit or area. Lastly, distance from a railroad or major highway must be taken into consideration before the final decision to set up a mining program can be made.

The most important uses of diatomite are in industrial filtration, as a filler or extender, as insulation against sound and temperature change, as well as a number of other miscellaneous uses. Filter aids comprise almost 50 percent of the total diatomite demand.

In evaluating a deposit, a microscopic examination of the diatomite plus a few relatively simple physical tests, can give a reasonable indication of

whether a particular sample may be of economic grade. Characteristics that are desirable in a diatomaceous product were discussed with Mr. Armand R. Bollaert, a chemist who has spent several years on production and utilization of diatomite for Great Lakes Carbon Corporation and is now a private consultant. According to Mr. Bollaert, the following characteristics determine the general quality of a diatomite sample: (1) fusion temperature, (2) filterability coupled with flow rate, (3) natural and calcined color, (4) CaO content, (5) type of diatom, (6) average size of diatom fragments, (7) amount and type of contaminant. The filterability and flow rate are difficult to determine without using expensive apparatus, but the other tests can be carried out in a relatively short time.

For testing fusion temperature, the sample should be heated in a furnace at 1700° F. for one hour. To be of commercial quality the diatomite should show no incipient fusion at this temperature. At the same time, the calcined color can be noted. Any pinkish cast in the sample usually lowers its salability. For filtration purposes the most desired diatom types are the needlelike genera Synedra or Fragilaria. The highly fragmented Melosira or some of the thicker Coscinodiscoid types make poor filter aid materials. The clay fraction should not be more than 10-20 percent, but it is usually not considered as critical as the volcanic glass content. The latter sometimes lowers the fusion temperature to the point where the diatomite begins to melt during the calcining process and the permeability of the resulting product is greatly reduced.

Any diatomite sample collected in the field should first be examined under the microscope. Those that appear to be fairly "clean" can then be sent in to the Portland office for subsequent calcining and chemical tests.

Accessibility of the deposit to railroads or highways need not be taken into consideration at the present time as this is a decision that must be made by the company contemplating a mining operation in the State.

Report by: R. E. Corcoran
July 27, 1962

DIATOMITE INDUSTRY

Diatomite is mined and milled at the Atomite Corporation plant twelve miles northwest of Redmond, Oregon. It is marketed in three principal grades for definite uses. They are:

RED DOG: Which is an admixture for concrete. The use of this material in concrete construction is becoming very prominent and has been used by the U. S. government for the last three years in all their dams and concrete work. Its value to the trade is that it renders the concrete more workable, prevents segregation of the aggregate, gives a smoother surface, insures adhesion to reinforcing steel, and lubricates the mixture with a minimum amount of water. This also permits of more rapid drying and setting of the concrete and renders it nearly 100% water proof.

FILTRATION: This grade of material is used in the filtering process of yeast, vinegars, malt, extracts, cider, etc. All the sugar manufactured in this country is filtered through diatomite for its purification. Many other liquids are filtered through this material.

TEMPRITE: This grade of diatomite is used for insulation of heat and electricity. It was first used for this purpose in the insulation of high temperature furnace setting and annealing ovens. It is now used in bakery ovens, refrigerators, fruit express cars, pipe coverings, house insulation and many other cases where uniform temperature, conservation of fuel, and preservation of food stuffs is desired. It is also used as a sound insulation in telephone booths and in the walls of broadcasting stations.

Diatomite is also used in cosmetics, face and talcum powders, metal polish, tooth paste, as an absorbant for chemicals, costics, and nitro-glycerin in the manufacture of dynamite. The uses of this material are becoming more numerous each year.

The Central Oregon deposit is very pure and accessable. The origin of this material is by water deposition of small plants called diatoms which grow in a still body of water and absorb the silica from the water, then die and settle down, leaving the minute skeletons of these plants in large beds. These diatoms, or remains, can be seen under the high powered microscope. They are very small, ranging from two to four million to the cubic inch of material. There are many deposits of diatomite on the Pacific Coast but most of them are mixed with clays, sands and vegetable matter to such an extent that they are not of any value. This deposit has the distinction of having one stratum that is the purest that has ever been opened up in the world. Visitors are welcome at the property at any time.

DIATOMITE

Eagle-Picher is producing at Oregon plant

By R.C. BRITTAIN
Eagle-Picher Industries Inc.

Eagle-Picher Industries Inc. has commenced production of diatomaceious-earth filter aids at a processing plant located seven miles west of Vale, Ore. Crude ore is hauled to the plant from mine sites located northwest of Juntura in Harney and Malheur Counties.

The capital investment for the project was $13.5 million, with the major part of financing provided by Industrial Development Revenue Bonds.

Eagle-Picher Industries Inc. is a diversified manufacturer of industrial products with shares listed on the New York Stock Exchange. The company was started in 1843 and until the 1940s was principally a lead and zinc mining and smelting firm. It has since diversified into manufacturing and no longer is producing lead and zinc.

A partial list of products produced by the various divisions includes construction equipment, agricultural chemicals, concrete pipe, porcelain enamel fruit, flexible packaging materials, diatomaceous earth products, tire molds, precision bearings, cleaning machinery, special purpose batteries, molded automotive components, vibration dampening assemblies, specialty rubber bonded parts, and high speed printing services.

The company's first diatomite plant began production in 1946 at Clark, Nev., and is still producing oil and grease absorbents and a variety of other products. In 1958 the company started production of filter aids at a plant located near Lovelock, Nev., and subsequently expanded the capacity of that plant to meet the demands of a growing market.

Products from the Nevada plants and the new plant at Vale are all marketed worldwide under the trade name of Celatom, and this name was selected as a name for the rail siding at the Vale site.

Diatomite, or diatomaceous earth, is a sedimentary material that is formed by the accumulation of microscopic siliceous skeletons of diatoms, which are single celled aquatic plants related to algae that live in large numbers in bodies of water where suitable conditions exist.

The diatom skeletons are intricate structures with many submicron sized pores and occur in a variety of sizes and shapes, with over 16,000 species having been identified.

Diatomite is normally white in color when exposed to oxidation and resembles chalk in color and texture. Because of a high ratio of voids to solids, it is light weight. When dry, a chunk of diatomite will float on water.

The chemical composition is amorphous silica, with impurities present in various amounts. Chemical impurtieis are primarily iron, calcium, aluminum, magnesium, and trace amounts of other elements. Physical impurities consisting of volcanic ash, clay minerals and detrital material are common.

As an industrial mineral, diatomite has been used in a variety of ways, includiang filter aid, filler, absorbent, abrasive, anticaking agent, insecticide carrier, catalyst support, and insulating material.

The most important use at the present time is for the production of filter aids that are used in the filtering of such liquids as corn syrup, beer, wine, raw sugar syrup, pharmaceuticals, edible oils, alginates, fruit and vegetable juices, dry cleaning solvents, jet fuel, swimming pools, and municipal water.

The diatomite deposits inhe Juntura and Otis Basins are fossil diatomites that formed in fresh water lakes during late Miocene and early Pliocene time. Because this was a period of intense volcanic activity, the lake waters had a high silica content, which was one of the required favorable conditions for the prolific diatom growth that developed and ultimately formed the deposits.

The bed rock underlying the sediments is an igneous complex of basalt flows and welded tuffs on which an irregular erosion surface developed prior to the deposition of the sediments. The deposits of economic interest are mostly under shallow overburden of gravel and soil. Erosion that followed extensive post-deposition faulting and uplift has removed any younger geologic units, such as the Drinkwater basalt and tuff members of the Drewsey Formation, that may have covered the diatomite at one time.

Beds of diatomite ranging in thickness from a few inches to 20 feet are separated by waste beds of volcanic ash, clay, or sandstone that are from a fraction of an inch to 10 feet thick. The dip of the beds is usually less than 15 percent but is locally steeper where disturbed by faulting or folding.

The thickness of the diatomite section is variable because of irregularity of the bed rock, varying conditions for diatom growth within the lakes, and post deposition erosion. Thicknesses of 300 feet have been observed in drill holes in some localities.

The deposits of commercial grade diatomite occur in several different locations on claims and leases covering 3,500 acres Reserves are adequate for over 40 years of operation.

The mining is by open pit methods using rubber tired scrapers and crawler bulldozers for the removal of overburden and stockpiling of ore.

The ore is mined and stockpiled at the mine site during the summer months and then hauled to the plant by trucks as required. The haulage distance is 70 miles from mine to plant.

The crude ore has a moisture content of 40 to 50 percent that may be reduced some during the mining process by planning the mining to take advantage of solar evaporation.

An emergency stockpile of ore will be maintained at Vines Hill, which is about seven miles west of the plant, so that the plant will have a ready supply of ore available in case adverse weather makes the mine roads temporarily impassable to the haulage trucks.

Some unusuable beds of clay volcanic ash, and impure diatomite must be selectively removed and placed in landfill areas or stockpiles for later use in reclamation. Careful control of ore grade through frequent sampling and close supervision is required.

At the plant, the crude ore is crushed in a hammer mill and stored in fine ore storage bins. As it is fed into the milling process from the bins, it is milled to a very fine consistency and simultaneously dried in an air system that also removes impurities and unmilled diatomite with specially designed classification equipment.

Soda ash is added to the cleaned diatomite as a fluxing agent, and the mixture is heated to incipient fusion in a rotary kiln at temperatures of 1,600 to 1,900 degrees F.

After being discharged from the kilm, the diatomite is in soft lumps and must be milled again. It is then classified in an air system to control particle size and filtration properties in the various grades of filter aides that are produced.

The finished products are packaged in bags for shipment or may be loaded directly into rail cars, or trucks in bulk form.

Waste materials removed from the diatomite are hauled back to the mine site for disposal in planned landfill sites or use in reclamation.

The plant is equipped with baghouses to remove dust particles from air that is discharged to the atmosphere and is designed to meet or exceed Oregon Department of Environmental Quality standards for air and water pollution.

Editor's Note: This article was originally published in Oregon Geology.

SOURCE: THE WALLACE (ID) MINER

DATE: SEPTEMBER 18, 1986

COMMODITY SECTION: INDUSTRIAL

STATE ARTICLE CONCERNS: OREGON 9/26

Malheur site chosen for new mineral plant

By JOHN HAYES
of The Oregonian staff

SALEM — Eagle-Picher Industries Inc., a Cincinnati industrial products company, announced Wednesday that it would build a $13 million diatomite processing plant seven miles west of Vale in Eastern Oregon's Malheur County.

The plant, which eventually will employ 35 workers year round, will be built to process diatomite that will be mined from public and private lands in Malheur and Harney counties, said Thomas E. Petry, president and chief executive officer.

"The welcome is certainly warm," Petry said in a news conference opened by Gov. Vic Atiyeh. "We don't make a $13 million investment lightly. We are looking at a long-term — 20-, 30- or 40-year — commitment."

Eagle-Picher, a diversified manufacturer of machinery, automotive products and general industrial products, is one of the nation's two largest producers of diatomite.

Diatomite, a chalky white mineral, is the fossilized remains of one-cell plants that flourished millions of years ago in inland seas covering much of the West, including portions of Eastern Oregon.

It is used industrially as a filter material in the food and beverage industries, a filler in paints, paper and polishes, as an oil absorbent and as a carrier for agricultural chemicals.

Atiyeh said he was "delighted" that the company chose to locate in Oregon and noted that the creation of 35 jobs in Malheur County would have a major effect on unemployment there.

He said the company's officers had assured him they would meet all state environmental standards.

Eagle-Picher already operates diatomite mines and processing plants in two Nevada locations and has negotiated for mineral rights in Oregon over a 20-year period, said Roger E. Malone, president of the company's minerals division.

Malone said the diatomite, or diatomaceous earth, would be mined by the use of "bulldozers equipped with rippers" from deposits on land owned by the state Land Board, the U.S. Bureau of Land Management and by private landowners.

A reclamation plan, required by state law before mining may occur, has not been filed with the state, but was currently being drafted, Petry said.

Construction of the processing plant was expected to begin in late 1984, but not until a firm financing arrangement has been completed, Petry said.

Petry said the plant would be financed through Oregon industrial revenue bonds and a federal Urban Development Action Grant to the city of Vale that would be repaid by Eagle-Picher.

Petry and Malone declined to answer questions on how much land would be disturbed during surface mining over the life of the diatomite operation in Oregon. And Petry said it was too early to tell how large the payroll would be once the processing plant was operating.

Corporate officials have met with state environmental regulatory officials and have agreed to install pollution control equipment worth about $2 million on the processing plant. But Petry said the company had not received any guarantees that the final environmental permits would be issued by the Oregon agencies.

Atiyeh, however, said enough was known about the company and its operations to be relatively certain that the plant would qualify for the environmental permits.

"We don't see any real bumps out there in the road," he said.

Petry praised Oregon for having a "business-like" way of dealing with prospective investors and said his company did not mind tough environmental laws if they were fair.

"In fact we prefer that, if they are well thought out, well-engineered and they hold up over a long period of time," he added.

For fiscal year 1983, Eagle-Picher reported sales of $532.7 million compared with $531.5 million in 1982. Net income increased to $15.3 million or $1.58 a share, from $11.4 million or $1.17 a share in 1982.

Just as the economic recession harmed the company, the recovery has begun to strengthen both sales and net income for Eagle-Picher.

The company has been a co-defendant in a substantial number of lawsuits alleging injuries relating to exposure from dust from asbestos-containing insulation products.

Settling some of these suits out of court cost the company $9.7 million in 1982 and $9 million in 1981. The company estimated that settlement costs would total $6 million in 1983.

SOURCE: THE (PORTLAND) OREGONIAN

DATE: JANUARY 19, 1984

COMMODITY SECTION: INDUSTRIAL 2/3

STATE ARTICLE CONCERNS: OREGON

E-P executives answer questions about plant-site

EAGLE-PICHER DIATOMITE PLANT (PROPOSED) VALE, OREGON

The tallest point on the plant will be 80 feet and the plant is a dry plant. These are two of the question that were answered when Eagle-Picher Industries executives were in Vale last week.

Roger Malone and Bob Piekarz met with the community at an informal reception Tuesday evening then met with some of the neighbors on Wednesday morning. Both times they showed slides of their Nevada operations and talked about their plans for the Vale plant.

Piekarz said the plant would be a dry plant. "We do not use water in the processing. It is a dry plant". The only water needed will be for drinking and sanitary purposes he said.

The tallest point in the plant will be 80 feet he said, contradicting the word being spread that tall stacks would arise from the plant. He talked about the "state of the art" dust collecting system that are to be used and pointed out the many ways the plant will be handling the diato to minimize the loss of their product through dust.

He said that all of the hauling will be done during daylight hours. It will take 16 singles or eight double loads to run the plant each day. A bin is filled each evening to run through the night. Trucks will be tarped to prevent product loss on the way to the plant.

Large stock piling is not anticipated. "If we do stockpile we will do something, perhaps sprinkle" to keep the dust down, Piekarz said.

The product will be shipped by rail, by bulk rail and by truck. The rail cars are especially designed to minimize product loss, Piekarz said.

The milling process is a drying process. Gas is used to heat, dry and drive off the moisture. The local ore is expected to contain as much as 50 percent water. Soda ash (baking soda) is used to tie up the iron present in the ore and produce a snowy white product. If the soda is not added the product is pink.

Asked about the potential for the plant, the two men commented that it was based on selling the product. There is enough ore to operate the plant for 40 years they said. The mine site is in the Otis Valley area near Drewsey.

The product to be made at the Vale plant is a filter aid. Among the customers is Amalgamated Sugar Co. The product is used extensively in food processing and in beverage making. Products that have clear, sparkling qualities are filtered through a diato filter aid. "We sell our product all over the country and over much of the world", Malone said.

Both men stressed that it was an all natural product. The ore is mined and the only thing added is soda ash, itself a natural product. The discarded waste, which is also natural, will be trucked back to the mine site and used in the reclamation of the land.

"We will be strip mining but we plan to reclaim the mine area", Malone said.

The company have yet to determine exactly where on the site they will put the plant. They are planning a buffer zone around the area and will plant a windbreak of trees around the entire operation. They are planning to pave their plant area. They will be doing some drilling to locate the footings in the coming weeks.

"We are enthusiastic about becoming a part of this community", Malone told the neighbors.

The operation is expected to employ 30-35 people. The company will be sending 3-4 people to manage the plant. The remainder will be hired locally. "Our wages will be competitive for the area", the E-P executives said.

The decision whether the company will haul the ore or contract has yet to be made. We do it both ways in Nevada, they said.

The company has still some hurtles to cross. The county must adopt a land use plan and submit it to LCDC before the building moratorium can be lifted. The land is presently zoned farm use and this must be dealt with. The planning office and county court have been trying to determine the best way to handle the situation. Mining and milling of ore are conditional uses in a farm zone and this is one way to handle the situation. Another is to request a zone change from farm to industrial.

The county court will set the hearing date for the comprehensive plan that has been ammended when they meet today (Wednesday). It is expected this will be February 23 with the adoption on Feb. 29. Submission to LCDC will follow immediately and Jim Ross, LCDC head had said he will immediately lift the moratorium.

Another hurtle is the financing. The company is planning to use Oregon Revenue Bonds for their primary financing. UDAG funds, which come to the city of Vale as a grant for economic development then are lent to the company, will be the

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EAGLE-PICHER DIATOMITE PLANT (PROPOSED) VALE, OREGON

Vale, Oregon
Malheur Enterprise
(Cir.W.1,970)

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GARY AND RITA McGraw were among the more than 125 people who dropped in to visit with E-P executives last Tuesday evening. Minerals Division president Roger Malone is pictured with the McGraws. The Chamber of Commerce Development Committee hosted the get together. Slides of the company plants in Nevada were shown and they were shown when the officials met with the neighbors the following morning.

Enterprise photo

Dust, noise offset plant's benefit, neighbors say

By DICK COCKLE
Correspondent, The Oregonian

VALE — When Eagle Picher Industries Inc.'s new $13 million diatomaceous earth plant was dedicated in mid-August, it was hailed as an economic windfall for southeastern Oregon's Malheur County.

But unhappy neighbors now claim the facility regularly violates state environmental regulations by using noisy equipment and expelling plumes of abrasive silicon dust that billow over the surrounding farmland.

Eagle Picher General Works Manager Anthony T. Stroebel responds that the noise will be muffled and accidental dust emissions are on the decline.

Financed in part by a federal low-interest loan, the plant — in a rolling, agricultural area 7 miles west of here — manufactures filter aids including powders used to cleanse swimming pools, and has brought 43 new jobs to the area.

The plumes of suspected silicon dust that have erupted into the sky over the plant since last summer, look "like an atomic bomb," said William C. Schneder, 57, a cattle and hay farmer who lives about 1,800 feet north of the plant. His farm is one of about 20 in the area.

The emissions worry Schneder and his wife, Joani, 52, who moved here from Portland to retire in 1980. Long-term exposure to silicon particles has been linked to fatal silicosis by the Oregon Department of Environmental Quality and U.S. Public Health Service.

Schneder recalled rising from his bed at 12:30 a.m. recently with a "very raw" throat from what he believes was breathing airborne dust.

"I went to the window, and in (Eagle Picher's) lights, for 300 to 400 feet in the air, I could see the dust coming over our house," he said.

Schneder has videotaped similar daylight dust plumes and sent the film to state officials, he said.

"I'm scared to death of that," admitted Joani Schneder of the billowing dust. "I'm scared not just for myself, but for my neighbors, too."

Jack and Susan Torrey, operators of a 50-cow dairy on 267 acres a half mile east of the plant, say they have been bothered by scratchy throats since last summer.

"I can't honestly say it's Eagle Picher dust, but it sure makes you wonder," said Susan Torrey, 33. "We go out to milk at 5:30 (a.m.) or a quarter to 6, and sometimes it just scares you to death, the clouds coming out of that," she said.

"There are times," said Jack Torrey, 39, "when you can hardly see the plant from here. You can hardly make it out, (the dust) is of such density."

The Torreys are especially concerned because Kelli, Susan Torrey's 9-year-old daughter by an earlier marriage, is at risk of contracting a genetically transmitted lung disease. Physicians have warned that she must never smoke tobacco and should avoid anyone who does, they said.

"So now I have this in my backyard," said Susan Torrey.

According to an air quality permit issued by the state in August 1984, Eagle Picher legally may discharge 57 tons of particulate matter into the atmosphere annually, said DEQ environmental analyst David W. Nichol of Pendleton.

Whether the company is exceeding those emission limits has not been documented by the DEQ, he said.

Stroebel claims Eagle Picher is in compliance, but acknowledged that there have been occasional plumes of "fugitive dust" duie toequipment plug-ups in the plant.

"These occurrences are in fact getting less and less, and they are under control," he said.

Some of the dust plumes actually may have been steam, which the plant also discharges, said Nichol. And, on at least one occasion, a "dust emission" videotaped by Schneder turned out to be smoke, he said. A contractor for Eagle Picher was cited by DEQ for unauthorized open burning in that incident, he added.

DEQ doesn't yet know if Eagle

SOURCE: THE (PORTLAND) OREGONIAN
DATE: NOVEMBER 7, 1986
COMMODITY SECTION: INDUSTRIAL
STATE ARTICLE CONCERNS: OREGON
11/14
(MORE)

Picher's silicon dust, which is mined near Juntura and Drewsey, is of a type that can be a major contributor to health problems in humans, said Nichol.

The Torreys and Schneders claim the substance — actually the fossil skeletons of tiny prehistoric creatures — is a natural abrasive sometimes used as a "non-chemical" insecticide that kills bugs by lacerating them.

"If you look at them under a microscope, they're like pieces of cut glass — sharp," said Torrey. "That's what you breathe in."

"Our medical advice tells us completely to the contrary," said Stroebel.

While advising that it "is not a dust to be taken lightly," Stroebel said there is a crystalline variety of greater potential significance to human health that Torrey may be referring to.

DEQ hopes to settle that debate with a laboratory study, currently under way by DEQ toxicologist Janet Fekete of Portland, said Nichol. The agency also plans a "source study" this month to determine if the dust emission limits are being exceeded, he said.

The Torreys and Schneders also complain that they are kept awake at night by noise from the plant. The noise levels often reach a sustained 53 to 56 decibels at the Torreys' home, and 55 to 57 decibels inside the Schneders' bedroom, they said.

William Schneder, who purchased a device to measure sound emissions, said he has been unable to get a full night's sleep since the plant went into operation.

Stroebel said most of the noise comes from large fans, and a consultant for the company soon will submit recommendations to remedy the problem. Those suggestions probably will include reducing the speed of the fans and installing rotors of different configurations, he said.

"I can assure you we are working our way toward compliance in every sense of the word," Stroebel said.

The Schneders and Torreys say their outspokenness has won them little sympathy in Malheur County. Eagle Picher is popular for the jobs it provides.

As for the Schneders, someone poisoned one of their dogs and vandalised a tractor, and on at least two occasions something was dropped into their well, causing them to become ill, said William Schneder.

He thinks the plant should have been built in a more sparcely populated corner of the county.

"This is not New Jersey," and land is abundant. "You have millions of acres out here where you can put that plant, where it won't hurt anybody.

"We can't pack up and move," he continued. "How can we leave everything we've got invested here?"

SOURCE: THE (PORTLAND) OREGONIAN

DATE: NOVEMBER 7, 1986

(END)

oise offset plant's benefit, neighbors say

BARBARA REYNOLDS

William Schneder (right) tells neighbors Jack and Susan Torrey about noise and dust problems he says he has had with the new Eagle Pitcher diatomaceous earth plant.

*Oregon WONDER Earth

(DIATOMACEOUS)

Nature's Natural All-Purpose Inorganic-Inert Substance of Many Uses

Technical Reports on Diatomaceous Earth available from U. S. Bureau of Mines and Oregon State Department of Geology and Mineral Industries.

* Registered Trade Name

Oregon Wonder Earth

Oregon Wonder Earth consists chiefly of Opaline Silica formed by small water organisms known as diatoms, and the skeletal remains built up islands in an ancient sea that occupied a large part of northern Lake County, Oregon. The mineral rich, soupy like material they lived in accounts for the twelve mineral elements present in this diatomaceous earth.

Oregon Wonder Earth is trucked to our plant one mile north of Irving, at the old flax plant, located on Prairie road four miles north of Eugene. Here the material is crushed and screened to particle sizes suitable for many varied uses.

ABSORBENT POULTRY LITTER AND NESTS

Oregon Wonder Earth will absorb several times its own weight, and as it acts quickly it is a wonderful help in keeping poultry litter dry, and when used in nests and as litter, the results are more clean eggs and less work.

When shavings are used as a litter, use the fine particle size Wonder Earth spread evenly over the shavings, and allow the birds to work it into the shavings. After your litter is once dried out then add only enough to keep in dry condition. When the litter is in proper condition a handful of litter can be picked up off the floor and you will find it clean and dry.

When the nest-sized Wonder Earth is used in the nests without other material the eggs will run 90 per cent clean eggs.

Oregon Wonder Earth is now being used at Oregon State College experimental pens along with other nest material and the staff is well pleased with the results. A special particle size is produced called Chick Bed. It Keeps chicks dry, and as it reflects the brooder heat less fuel is required. This material can be used from chicks to laying.

It may pay you to contact the Poultry Division and find out what they think of this material. (After all you are helping maintain this division through taxes.)

If you are using lime, and compare the costs of Oregon Wonder Earth with lime, and if you consider the fertilizer value of chicken guano, then this material costs nothing. Here's why: Lime frees the nitrogen and it escapes as ammonia, while Oregon Wonder Earth absorbs the nitrogen and retains it for plant food.

Oregon Wonder Earth used to dry the droppings when birds are kept on wire, keeps down odors and helps prevent flies.

This material will not irritate or cause sneezing, like lime, and it will not burn combs or breasts of birds, and is harmless if picked up or eaten.

The Oregon Egg Producers tested this material in their Portland laboratory, and from the results of this test, have for distribution to their members all the different particle sizes.

DUSTING AND SOIL RESTORER

Oregon Wonder Earth used as a dusting on vegetables, flowers, etc. will dry up

spittle bugs, aphis, and slugs, and helps prevent damage from various insects.

Oregon Wonder Earth in the pellet size makes excellent mulch, and the moisture retaining feature adapts this product for use in soil that packs. Use pellet size around shrubbery, flowers, etc. The fine sized material is excellent as a lawn conditioner, as it contains elements necessary for a balanced fertile soil.

BARBECUE ROCK

Barbecue broilers filled about four inches deep with the Bar-B-Que size, and packaged especially for this use, keeps the bottom of the broiler cool, and Oregon Wonder Earth absorbs the drippings and reflects the heat so much that only one-half the usual amount of charcoal is required. The absorption of the drippings eliminates the rancid odors that at times permeate the foods being broiled. When the broiler needs cleaning use the fine material left in the bottom of the bag to dry it. This can be easily removed leaving your broiler clean and dry.

INSULATION

Oregon Wonder Earth, when used in walls and between ceiling joists is without comparison in insulation value. A piece three inches thick as it comes from the deposit can be held in hand while propane burner heat turns other side red hot. The only other products comparing is asbestos.

Oregon Wonder Earth will not sweat in walls like some other so called insulation does. It is made up of minute air cells that

breathe. In using as insulation between ceiling joists and between rafters over the outside studding no insulation in walls is necessary in the Willamette Valley climate.

Do not make the mistake of cramming walls full of composition insulation and then having to remove siding to eliminate sweating. Oregon Wonder Earth is the greatest known absorbent, comparing in this feature with a sponge. When used as insulation no insects or rodents will use it, and it is one of the few elements that termites avoid. The absorbency of this material keeps odors to a minimum. Its acoustical value is great, making a practically sound proof barrier.

Oregon Wonder Earth will not burn under 2000 degrees of heat.

ABSORBENT

Oregon Wonder Earth will absorb three times its own weight of liquid, and will release moisture by natural evaporation. When used around leaky roofs, or other moisture conditions, the material will absorb up to five feet distance from point of contamination. The material will dry out by natural evaporation and be ready for recycling.

FLOOR SWEEP

The absorbency feature is the reason for the large amount used as floor sweep in service stations, machine shops, garages, and other places where oil or other liquids require absorbing and removal.

When used as a floor sweep it immediately absorbs the contamination, and should be swept up and removed. The material absorbs three times its own weight of oil and if

walked on it will pack. If you wish something just to allow walking on to keep out of the oil, like some floor sweeps, then use sand.

Use around grease racks to absorb oils. We know of nothing that will absorb grease, but with the use of Oregon Wonder Earth the grease may be removed with a small square-pointed snow or sand shovel. If you use a detergent to remove grease, follow up with Oregon Wonder Earth and the floor will be clean and white.

CLEANING

Oregon Wonder Earth in the fine particle size, when used on dirty wash basins, toilets, etc. will clean as well as the expen sive detergent products. In cleaning silverware, chromium, and bugs from your car no other element will compare, and the polish and lustre is beyond belief. Many tons of this material is used as the base of expensive polish.

MANY OTHER USES

There are many other uses for Oregon Wonder Earth, and our laboratory and technical department, with the cooperation of the Oregon State Department of Geology and Mineral Industries, and the United States Bureau of Mines, may be able to save you money and time.

Our plant number is Diamond 3-1725, and of evenings Diamond 4-7092. Our P.O. Box is 3307, Eugene, Oregon.

Diatoms, prolific and plentiful, fill many needs

5018

By WALTER YOUNGQUIST

The most common but least-known fossils in Oregon are diatoms. Untold trillions of them are contained in rocklike deposits called diatomite.

Time travel

Diatomite occurs in a number of places in Oregon east of the Cascades and in many other areas of the world. Although the individual diatoms are very hard, the rock they make is fairly soft and is composed of numerous shell-like structures more properly called frustules. The leftover "houses" of algalike microscopic plants, these frustules are made of silica, the same material as glass or common sand.

Diatoms are with us today and have existed for millions of years. They live in both fresh and saltwater. In fact, almost every pond and puddle has

Diatomite's chief application is to filter solids from liquids.

them by the millions. Most diatoms just drift with the currents. A few, however, unlike other plants, can swim weakly.

Most of the diatomite deposits in Oregon are in ancient lake beds that were formed at a time when the climate in the area was more moist. Large lakes existed then and the diatoms flourished.

Diatoms needed a lot of silica to make their frustules, and the region offered a plentiful source in volcanic ash. During times past, volcanoes dumped ash all over Eastern and Central Oregon.

Diatoms can divide into two in as little as every eight hours. It is possible for one diatom to have 1 billion descendants within a month under ideal conditions — but ideal conditions probably never existed.

Still, diatoms form huge deposits measured in cubic miles in some places, such as near Lompoc, Calif. Because there may be as many as 50 million diatoms in a cubic inch of diatomite, the number of diatoms in the cubic miles of the Lompoc deposit must be a remarkable figure indeed.

Machines have been invented that can sort out various sizes and shapes of the fossilized diatoms. There are more than 10,000 species.

Material made from diatoms is very light because the diatom skeletons are full of holes, yet it is also rigid. The weight of the processed material may be no more than 13 pounds per cubic foot, but the surface area in a pound of this material may be as much as 100,000 square feet.

Consider some of the uses for diatomite. It makes an ideal insulation because it is light, highly porous, bug-proof, rot-proof and fireproof, with a melting point of about 2,900 degrees Fahrenheit. It can soak up as much as 300 percent of its own weight in water, so it is used for cat box filler. But its chief application is as a filtering agent, removing solids from liquids.

It can clean harmful bacteria out of drinking water and out of swimming pools. It is used widely in sugar refining and in some oil-refining operations. The so-called "miracle drugs," such as the antibiotics that have become so important to us, are products that would be extremely difficult and expensive to produce without the aid of filtration

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It can clean harmful bacteria out of drinking water and out of swimming pools. It is used widely in sugar refining and in some oil-refining operations. The so-called "miracle drugs," such as the antibiotics that have become so important to us, are products that would be extremely difficult and expensive to produce without the aid of filtration through the diatoms. Thousands of tons of diatomite are used each year for this purpose.

The silica of diatoms is relatively inert chemically, so it does not readily enter into any chemical or biological process. It is also resistant to weathering, and diatomite is added to paints; in this form it is known as an inert extender. Diatoms add durability and high quality to many paints, varnishes and lacquers. They are also used for filtration during the manufacturing process. Because the little glass exoskeletons reflect light, pavement stripes and street signs of diatom-containing paints show up much more clearly at night than do ordinary paints.

Part of the newspaper

In paper making, diatoms assist in a more uniform dispersion and arrangement of the wet fibers as they flow onto the wire mesh that carries the wet pulp. Because diatoms are hollow, the drainage of water is enhanced as it proceeds along the mesh to become paper, and thus your morning newspaper owes its production, in part, to diatoms.

And there is more. Diatomite adds bulk and provides a mild abrasive action in polishes and cleansers. It serves to dilute and distribute toxic powders in insecticides more evenly. Diatomite is put into fertilizers such as ammonium nitrate to keep it from caking and becoming a solid mass in the bag.

We have a lot of it in Oregon. Some of the first diatomite deposits to be discovered in the United States were found in Oregon by W.J. Bailey, who came west with the Fremont expedition in 1843. More recently, William A. Abbott wrote a 1970 master's thesis at Louisiana State University on diatoms in an area northwest of Harper along the Harper-Westfall road in Malheur County. Diatomite may underlie an area of as much as 50 square miles, Abbott suggests.

In Oregon, diatomite is now being mined at two sites in Harney and Malheur counties northwest of Juntura and near Drewsey. In past years, several other diatomite deposits have been mined in Oregon, especially in the vicinity of Redmond.

Beds along U.S. 20

As you travel east of the Cascades you pass many diatomite beds. There are some excellent exposures of diatomite along U.S. 20 between Burns and Vale, for about a mile east of its junction with the road to Drewsey.

The diatomite looks something like volcanic ash, but upon examining it closely you will see it is generally much finer-grained and whiter. It also floats; volcanic ash sinks either immediately or within minutes.

Next time you go by that outcrop, think of all the many things those little diatoms can do for us in the future, and how much their cousins in other deposits now being mined in Oregon and elsewhere are doing for us right now.

Walter Youngquist is a consulting geologist and former professor of geology-paleontology at the University of Oregon. He can be contacted at P.O.