

STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
1069 STATE OFFICE BUILDING
PORTLAND, OREGON 97201

October 4, 1966

Refer your File No. 38187
Azalea-Josephine Co. Line
Pacific Highway
Douglas County

Mr. G. E. Rohde, Chief Counsel
Oregon State Highway Department
Highway Building
Salem, Oregon

Attention: Frank McKinney

Dear Mr. Rohde:

This is in response to your telephone call of the first part of August and to the letter received by this Department from Mr. James R. Kuhn who contacted us on your behalf and concerns an investigation on Interstate 5 near Glendale Junction approximately one-half mile north of the Josephine County line.

You have requested that we examine this area to determine if the element selenium occurs, and if it does, if it occurs in quantities that would be harmful to the travelling public or to someone who might stop along the highway. This concern, as I understand it, arose from the possibility of an application by Mr. W. W. Wood to the State Land Board for the mining of land nearby for selenium, gold, and rhodium.

On August 30 Mr. Len Ramp, resident geologist in charge of our Grants Pass office, examined the area designated on the highway maps enclosed with your letter, in company with Mr. Carl Williams, Assistant Division Engineer, and Mr. Rolland Van Cleave, geologist, both with your Department. In the course of his examination, 17 samples were taken and 16 of these were analyzed in the Department's laboratories.

The results of our work indicate that selenium does not occur, gold was not found, silver was found in measurable amounts in three samples and trace amounts in four samples, and copper was analyzed on two samples where it occurred in trace amounts and in a percentage of .05.

Our research would indicate that the Highway Department should have no concern about the selenium contamination to its workmen, the travelling public, or anyone walking along the highway or digging into its banks. Our research also indicates that this particular section of the highway is not mineralized and does not contain any minerals that would warrant further prospecting. The platinum group metals (of which rhodium is one) were not detected.

You may be interested in knowing that the method we used for analysis of selenium is one developed by the U.S. Bureau of Mines to detect selenium in rocks and

soils and is sensitive to 15 parts per million or 0.0015 percent. Our analytical methods were perfected and checked by using standard samples of known selenium concentration. The detection of the precious metals, gold, silver and the platinum group, is accurate down to 1 part in 1.5 million or, as far as gold is concerned, 15 cents per ton.

In taking the samples, Mr. Ramp and your employees not only took channel and grab samples over wide areas but they also took channel and grab samples from quartz seams and veinlets. Geologically the area is one in which minerals could be expected to be found and Mr. Ramp, who holds a master's degree in geology and has 15 years experience in geology in southwestern Oregon examining mines, claims, and mapping geology, reports that the region is one of metasedimentary and metavolcanic rocks.

We were fortunate in the conduct of our investigation to be able to attend the first International Symposium on Selenium in Biomedicine conducted by the Nutrition Research Institute of Oregon State University on September 6 and 7, 1966, in Corvallis. Our chemist, spectroscopist, and geochemist attended lectures by the experts presenting papers at this symposium, summarized their presentations (see enclosed) and discussed analytical procedure and distribution of selenium with the scientists who presented the papers. Consequently I feel that we have not only drawn upon the expert knowledge within the Department but have also tapped the expert knowledge of known specialists in the field.

I would like to add some comments of my own on this investigation. I have been with the Department for 20 years, during which time many prospectors have reported selenides and tellurides to me but even after urging prospectors to bring samples into our office I have yet to see any minerals containing this radical. Near Gold Hill there is a mine called the Sylvanite which has produced museum specimens of tellurides. So the likelihood of selenides or tellurides being found in the area is not out of the question. I am convinced, however, that none occur within the region where these samples were taken.

You may be interested in knowing that the element selenium is generally obtained as a by-product from flue dust of certain metallurgical processes which use sulphide ores and from slimes of electrolytic refining processes. Selenium, because it belongs to the same family as sulphur and inasmuch as it has an ionic radii very close to sulphur, can be expected to be found in sulphide minerals. Consequently if it were to occur in the area examined, it would be concentrated in the sulphides more than in the soil. The analyses of the samples containing sulphides did not show its presence.

I believe that our investigation of this reported occurrence has been exhaustive and thorough and consequently I do not hesitate to report to you that your concern regarding contamination is not warranted.

As a further precaution, our spectroscopist discussed this with the State Board of Health and they prepared a memorandum for our use, a copy of which is enclosed. As you will note, they conclude that selenium is toxic only when

airborne and only when ingested in large quantities in foodstuffs. This should give you further confidence as far as the highway cuts being of any danger is concerned.

If there are any questions that come to mind on this, I would be pleased to have you contact us. Copies of all work done are enclosed with this letter.

Sincerely yours,

Hollis M. Dole

Hollis M. Dole
State Geologist

HMD:jr
Encl.
bc Len Ramp

S-SA 5/49

# *Office Memorandum* • OREGON STATE BOARD OF HEALTH

To : Tom Mathews

Date: September 16, 1966

From : Darrel D. Douglas

Subject: Toxicity of Selenium.

Selenium, an element with metalic properties, will, when heated, generate an obnoxious fume which if inhaled causes severe irritation to the respiratory system and an unpleasant garlic like taste in the mouth. In industry, Selenium is considered a toxic material and is handled with caution if the manufacturing process involves the generation of Selenium dust or fume.

In nature Selenium is chiefly present in trace amounts in such forms as Selenates of lead, copper, mercury, and silver. In certain areas of the country the Selenium content of the soil is great enough to cause toxicity problems in both humans and animals. The problem arises not from inhalation but from ingestion since foodstuffs grown on soils with high Selenium contents are found to have a high Selenium content also.

Summary

Selenium is a toxic material which when airborne, as is the case in some industrial processes, may produce illness in persons who breathe high concentrations. In nature Selenium occurs in materials unlikely to become airborne. It should be a problem to man only through the ingestion of Selenium bearing foodstuffs.

DDD/cjg