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63D CONGRESS, 2d Session } HOUSE OF REPRESENTATIVES { DOCUMENT No. 876

REPORT ON COAL IN ALASKA FOR USE IN UNITED STATES NAVY

A LETTER FROM THE SECRETARY OF THE NAVY

TRANSMITTING

REPORT OF SURVEY AND INVESTIGATION BY EXPERIMENTAL TESTS OF COAL IN ALASKA FOR USE ON BOARD SHIPS UNITED STATES NAVY, AND UPON COAL AND COAL FIELDS AVAILABLE FOR SAID PURPOSE

APRIL 3, 1914.—Referred to the Committee on Naval Affairs and ordered to be printed, with illustrations

WASHINGTON
1914

LETTER OF SUBMITTAL.

NAVY DEPARTMENT,
Washington, March 23, 1914.

SIR: The naval appropriation act approved August 22, 1912, makes provision for the survey and investigation by experimental test of coal in Alaska for use on board ships of the United States Navy, and for report upon coal and coal fields available for the production of coal for the use of the ships of the United States Navy and any vessel of the United States.

In accordance with the foregoing I have the honor to submit herewith the report required by the above-mentioned act.

Very respectfully,

JOSEPHUS DANIELS,
Secretary of the Navy.

The SPEAKER, HOUSE OF REPRESENTATIVES,
Washington, D. C.

This report is divided into the following chapters:

(1) Reports of the geologists and mining engineer and a general statement by Dr. J. A. Holmes, director of the Bureau of Mines, under whose direction and supervision was placed all the technical matters pertaining to the geological and mining investigations of the field, as well as the securing of a tonnage of representative coal sufficient for test on board the armored cruiser *Maryland* and at the Engineering Experiment Station, Annapolis, Md.

(2) Brief description of the transporting of the test coal from Trout Creek (Bering River fields) to tidewater.

(3) Summary of the tests of this coal conducted by the U. S. S. *Maryland*.

(4) Tests of a portion of the same coal at the Engineering Experiment Station, Annapolis, Md.

(5) General conclusions and opinions of the Navy Department on the suitability of this coal for use of the ships of the United States Navy and any vessel of the United States.

REPORT OF THE NAVAL COAL EXAMINATION IN THE BERING RIVER FIELD, AUGUST TO NOVEMBER, 1912.

GENERAL STATEMENT.

By J. A. Holmes, Director Bureau of Mines.

ORGANIZATION AND PRELIMINARY WORK OF THE EXPEDITION.

The act making appropriations for the naval service for the fiscal year ending June 30, 1913, approved August 22, 1912, provided that of the total appropriation for depots for coal, etc., "$75,000, or so much thereof as may be necessary, may be used for the survey and investigation by experimental tests of coal in Alaska for use on board ships of the United States Navy and for report upon coal and coal fields available for the production of coal for the use of the ships of the United States Navy and any vessels of the United States."

With a view to carrying out this provision of the act, the Secretary of the Navy requested of the Secretary of the Interior that the Bureau of Mines take charge of all the technical operations in connection with this investigation. This request was acceded to by the Secretary of the Interior, and the necessary instructions were issued to the Director of the Bureau of Mines.

After a conference between the Director of the Bureau of Mines and the Chief of the Bureau of Steam Engineering, it was decided that the investigations to be carried on during the late summer and autumn of 1912 should be concentrated in the Bering River coal field, and that later, if circumstances permitted, plans would be inaugurated for a similar investigation in the Matanuska coal field.

In organizing the personnel of the expedition to carry out the purpose of the above act, the following selections were made:

Mr. R. Y. Williams, a mining engineer of the Bureau of Mines, who had been for some years the manager of coal-mining operations, and who was thoroughly experienced in the modern methods for safeguarding the lives of the miners, was placed in charge of the technical operations of the expedition. Mr. Sumner S. Smith, another of the mining engineers of the Bureau of Mines, who had also been a practical miner and a superintendent of a coal mine, as well as mine inspector in Alaska, was assigned as general assistant to Mr. Williams.

Mr. C. A. Fisher, a mining geologist of extended practical experience in the examination of coal deposits under the Geological Survey, and who had already made an exhaustive preliminary examination of a large part of the Bering River coal field, was added to the expedition, and to him was assigned the special duty of selecting the beds of coal to be tested in connection with the naval coal expedition. Mr. W. R.

Calvert, another mining geologist of considerable experience in the coal work of the Geological Survey, and subsequently in private practice, was appointed as Mr. Fisher's assistant for this preliminary examination of the Bering River field and for the selection of the special coal beds to be investigated.

Dr. J. O. Downey, passed assistant surgeon of the navy, was selected by the Navy Department to accompany the expedition as disbursing officer and physician, and Dr. Downey was also intrusted subsequently with the work of transporting from the coal field to navigable waters at Controller Bay the coal which was mined for the practical working test on board a naval ship.

These engineers and geologists were sent to the Pacific coast about the middle of August, with instructions to examine such of the coal deposits being worked in the State of Washington as resembled most closely the coal deposits in Alaska, as a preliminary to the beginning of the Alaskan investigations. Prior, also, to their departure for the Bering River field, these engineers and geologists, with the Director of the Bureau of Mines, made a careful examination of several previous reports of examinations of the Bering River coal field, including the examinations by the geologists of the Geological Survey, those made by the mining engineers (especially that of Mr. A. H. Storrs) sent into the field by private companies, and also the records of the examinations made by the Director of the Bureau of Mines and by three practical managers of coal mining operations who accompanied him in an examination of that field during August, 1911: Mr. T. H. O'Brien, general manager of the Stag Canon Fuel Co., Dawson, N. Mex., Mr. F. W. C. Whyte, manager of extensive coal mining interests in Montana, and Mr. L. T. Woole, the manager of extensive coal mining operations in Wyoming. Abstracts of this information were placed in the hands of this party, carried by its members into the Bering River field, and were doubtless of great value in connection with their later examinations.

During the latter half of August, Messrs. Fisher, Calvert, Williams, and Smith made a joint examination of practically all of the important openings or prospect holes in the Bering River coal field, and finally selected as the place most promising for the subsequent investigations the beds of coal exposed on Trout Creek in and about certain preliminary openings made on one of the Cunningham claims.

Meanwhile, as soon as possible after the passage of the act making appropriations for the Navy's coal expedition, a practical and experienced mine foreman, with 25 coal miners and other assistants, were selected from the coal mines in the State of Washington, where conditions most closely resembled those in Alaska; seven horses and a complete outfit of provisions and prospecting equipment and supplies were brought together and made ready for shipment from Seattle to Katalla, the point of landing and entrance to the Bering River coal field, and this main body of the expedition reached Controller Bay on September 6. While the men and horses of the expedition were landed safely, unfortunately a barge containing nearly all the supplies and equipment of the expedition was lost, and the work of the expedition was thereby seriously delayed and crippled. However, such equipment and supplies as could be purchased in the town of Katalla were immediately secured, and the expedition proceeded to Trout

Creek in the Bering River coal field, to the place selected for the detailed examination.

For several weeks following the arrival of the expedition more extended prospecting was done at a number of different points on Trout Creek with a view to determining more carefully the nature and the extent of the coal beds, and also with a view to deciding which particular bed or beds should receive the more extended subsequent examination. Meanwhile, also, a thorough survey of the Trout Creek region was made.

During the month of November the work of the expedition was devoted almost entirely to the extraction of the large sample of coal, estimated at something more than 800 tons, which was obtained for a more extended, practical, subsequent test under actual working conditions on board a naval ship. By the end of November this work had been completed, and the men of the expedition were transferred to Wingham Island, at the mouth of Bering River. From this point they sailed on December 13, and arrived at Seattle on December 20.

DETAILED EXAMINATIONS IN THE REGION SELECTED FOR TEST.

The engineers and geologists, for guidance in their field explorations, were given the following general specifications as indicating the nature of the coal desired by the Navy Department:

(1) Coal with a fair proportion of lump, free from slate, and low in sulphur;

(2) With a volatile matter not lower than 12 nor higher than 22 per cent, and preferably between 14 and 18 per cent;

(3) With ash not higher than 8 per cent; and

(4) With high fixed carbon and a high heating value—i. e., above 14,000 British thermal units.

After a study of the chemical analyses of samples collected from the different localities, and the preliminary explorations described above, the engineers and geologists agreed upon three locations as those most likely to yield coal of the character just described. One of these was on Trout Creek, one on Carbon Creek, and one on the east slope of Kushtaka Ridge. The location on Trout Creek, known as the "Tenino" claim of the Cunningham group, was finally selected as that one of the three giving the best promise of satisfactory results. Mr. Fisher describes this particular location as follows:

> This claim is traversed from north to south by Trout Creek, thus affording easy access to the coal, as there is a readily available passageway to and from tidewater. Moreover, there appeared to be at this locality the greatest quantity of available coal of the physical and chemical character required for Navy use. Opposite the Cunningham cabin on Trout Creek an 8-foot bed of hard coal had been opened, and about 850 feet farther downstream a 30-foot bed of similar coal had likewise been developed by a prospect entry. Nowhere else in the field could beds of such thickness, combined with the desired physical character, be found.

As the actual detailed examination of this region proceeded in connection with the extraction of the large sample of coal for subsequent ship test it was found that all of these beds upon which excavations were made proved to be lenticular or otherwise irregular in shape, and the coal proved to vary from high grade and fairly lumpy coal at certain places to a crushed coal, which at some points was high-grade and at other points a decidedly low-grade material.

EXTRACTION OF LARGE SAMPLE OF COAL FOR SHIP TESTS.

From the three most promising beds of coal at the location selected a sample, estimated at about 850 tons, was taken, and this coal was stored in sacks in the immediate vicinity of the openings, to be subsequently transported to tidewater and there placed on board ship for test under working conditions. The relation of these beds is shown on the accompanying sketch map.

From bed or tunnel No. 4 the larger portion (estimated at 674 tons) of this sample was extracted in a distance along the bed of about 120 feet, as it seemed to represent the best average conditions in that part of the Bering River field. This seam varied in thickness from 16 feet to 29 feet. It has an average dip of about 35° to the northwest. The character of a cross section of this bed is illustrated by the figures given in the three following cross-cuts or sections located about 30 feet apart along the length of the tunnel following the course of the bed.

Complete sections of seam opened in Tunnel No. 4.

Location.	First crosscut.	Second crosscut.	Third crosscut.
	Ft. in.	Ft. in.	Ft. in.
Hanging wall	(1)	(1)	(1)
Shale, soft	3 4	5 7	3 0
Coal	16 9	2 3	4 6
Shale	1 7	0 7	0 6
Coal	1 2	2 6	5 4
Shale	0 7	3 2	0 2
Coal	0 9	1 10	1 6
Shale	3 0	1 0	5 3
Coal	2 0	6 0	4 0
Footwall	(2)	(2)	(2)
Total thickness of seam	29 2	22 11	24 3
Total thickness of coal	20 8	12 7	16 4

Shale. Sandstone.

From bed or tunnel No. 5 (see map) a portion (estimated at 154 tons) of this sample was taken because of the excellent quality of the coal and because it was desired to prospect further in order, if possible, to determine the cause of the unusual hardness of this coal over a distance of 130 feet from this opening. This tunnel contained 591 feet of entry and several crosscuts, one of which followed the coal for 69 feet. The coal sacked in this tunnel was taken from two crosscuts, one 84 feet and the other 52 feet from the drift mouth, each driven to the left of the entry. The sections measured as follows:

From crosscut 84 feet from drift mouth.

Roof, shale:	Ft. in.
Coal	2 8
Shale and dirt	8
Coal	2 7

Roof, shale:	In.
Shale	9
"Charcoal"	10
Floor, coal.	

From crosscut 52 feet from drift mouth.

Roof, coal:	Ft. in.
Coal	4 0
Coal and dirt	1 7

Roof, coal:	Ft. in.
Coal	1 3
Floor, coal.	