ALCOVA CLAIMS (BENTONITE)

A field investigation of the Alcova claims was carried out on July 15, 1958. The most abundant mineral resource available within this group of claims is bentonite. Bentonite is a generally light-colored sedimentary clay derived from volcanic ash that consists chiefly of the minerals montmorillonite and beidellite.

This group of claims consists of ten quarter sections and one elongate fraction containing 3/16 of a section. The total area encompassed by the claims is approximately 1720 acres. The claims are situated southeast of Alcova Reservoir in Section 30-31, T. 30 N. R. 82 W. and Section 5-6-7-8, T. 29 N., R. 82 W. The area is located 32 miles southwest of Casper, Wyoming. Access to the claims is provided by the paved Kortes Road which traverses the northern part of the area. A graded unimproved road branches south from the paved road and provides easy access to the remainder of the area.

Previous geologic investigation has been carried out in this area in 1946 by Gabriel Dengo. His report is published as Geological Survey of Wyoming, Bulletin No. 37. Dengo investigated bentonite deposits in Section 25-36 of T. 30 N., R. 83 W. A syncline, asymmetric to the northeast, plunges southeasterly through this area. The dips on the north limb are too great to warrant exploitation while those on the south have greater commercial possibilities. Do dips have commercial possibilities?

The bentonite in the claims occurs as beds in the Mowry and

Frontier Formations and generally dips less than 10 degrees. One bed in the Mowry is very ~~consistent~~ persistent and averages 5 feet in thickness throughout the exposed outcrop. (outcrops must be exposed or they aren't outcrops!) This bed is poorly exposed due to soil and gravel cover and is covered by overburden ranging in thickness from 0 to 50 feet. (How can the bed be covered by something zero feet thick? picky, picky!) The overburden is often less than 25 feet thick. Two bentonite beds are located in the Frontier Formation. The upper of these is continuous along the top of a westward facing hogback in claims 8-9 for a total distance of 2 miles. The bed is 5 feet thick and is covered by very little overburden. The lower bentonite bed in the Frontier is not as well exposed as the upper and crops out sporadically. The lower bed is about 4 feet thick and the overburden varies considerably. In one area in claim 6, the bed lies on the surface in an area covering several acres.

All of the bentonite outcrops are found on topographic expressions? and are repeated in several places where erosion has cut through hogbacks etc.

According to Dengo, In hand specimens the bentonite is a light colored, usually cream to light gray-green, "fine grained rock" which often has a "subconchoidal fracture." It "varies in structure from massive to flaky or shaly." "When fresh" the bentonite "is soft" and possesses a "greasy feel." The more highly "weathered material is harder, darker, and generally "more highly fractured than the fresh specimens

Modified from Bell 37

because of successive absorption and loss of water" with a resultant volume change." The swelling properties may vary depending upon the amount of grit in the material but as a rule, nearly all appears to have excellent swelling properties. A specimen of bentonite from the Mowry was analyzed by Dengo and contained 85-90% montmorillonite with the remainder as mica, quartz, and feldspar." Many of the outcrops are characterized by an abundance of selenite crystals. These range in size from minute fibers to crystals several inches square." (Chemical analyses are of little value for determining the suitability of a bentonite for most commercial purposes.) Most uses depend upon the physical properties of the material. Included in this report is an analysis of the physical qualities of a bentonite sample from the Mowry Formation in the area as compared to the standard Black Hills Bentonite.

This analysis was conducted by the Natural Resources Research Institute in 1946.

" The column for per cent retained on 200-mesh indicates the percentage of the sample retained on a 200-mesh screen as ground for testing. The per cent grit column gives the percentage of the sample retained on a 325-mesh screen after the sample had been hydrated, or suspended in water, and screened wet. The percent colloidal material column gives the percentage of the sample remaining in colloidal suspension for 18 hours. The Stormer viscosity

column gives the viscosity, in centipoises, of 6% suspension. Gel strengths were determined by the Stormer viscosimeter and are given in grams. Wall building properties were determined with a test unit constructed in the University of Wyoming Natural Resources Research Institute laboratory similar to the Baroid low pressure wall-building tester. Water loss is given in cubic centimeters. The compressive strengths and dry compressive strengths, pertaining to the sand-binding properties, were determined according to standards of the American Foundryment Association, using 4 per cent bentonite by weight based on total weight of the batch. Strengths are given in pounds per square inch.

The economic possibilities of a bentonite deposit are controlled mainly by ~~two~~ 3 factors, 1. attitude of beds, 2. amount of overburden, (3) Quality of bentonite. Some estimates consider a 1:3 ratio of bentonite to overburden as the maximum for commercial production. Much of the bentonite encompassed by these claims will meet the economic requirements. Reserve estimates as to the tonnage of bentonite within the claims is highly conjectural and could not be calculated accurately due to the presence of surface wash over a large portion of the outcrops.

The Mowry bentonite is deficient in colloids (about half Black Hills) and its uses are therefore limited.

A minimum figure, based on the exposed deposits, indicates an available tonnage of several million tons. This can be compared to the total state production in 1957 of 1,073,118 tons. This

estimate is approximate and is based on a specific gravity of 2.79 for bentonite. The estimate considers only material favorable for mining. Evaluation and development work would undoubtedly prove the existence of even larger reserves.

After observing the claim group in this area, it is concluded that they contain large amounts of easily accessible commercial bentonite. A slight amount of mapping, detailed measuring, and surface stripping, will be necessary to determine the best areas for development and the exact tonnage available.

Other minerals of economic significance located within the claims include beds of volcanic ash and gypsum deposits. The volcanic ash is unconsolidated and very fine grained. The beds are derived from consolidated ash and are trapped in a slight basin. Reserve estimates or analyses are not presently available. Samples of this material should be collected and analyzed as to its commercial potential.

The gypsum has been formed by thermal solutions acting upon limestone, the thermal waters upon evaporating at the surface, deposited the gypsum as a hard dense mass. Evidence of the hot springs and fumaroles still exists. Some of the gypsum is the very fine-grained, white, slightly translucent variety known as alabaster. This has been used locally for carving and sculpturing. Estimates as to the tonnage of this material could not be made owing

to soil cover and eratic distribution of the deposits.

Samples of the bentonite and gypsum were collected and are available for further analysis.

Ben Short
Geologist

PHYSICAL QUALITIES OF BENTONITE FROM THE ALCOVA AREA

SAMPLE	DRY COLOR	PER CENT RETAINED ON 200-MESH	PER CENT GRIT 325-MESH	PER CENT COLLOIDAL MATERIAL	STORMER VISCOSITY (CENTIPOISES)	GEL STRENGTH (IN GRAMS)		HALL-BUILDING PROPERTIES		SAND-BINDING PROPERTIES (POUNDS PER SQUARE INCH)	
						Initial	10 Min.	Water Loss (in cc.)	Cake Thickness	Green Compressive Strength	Dry Compressive Strength
Alcova	Light-gray	8.0	.20	80	4.0	4.56	8.88	20	3/32"	7.36	65.7
Standard Black Hills	Cream	8.6	2.20	96	18.0	25.00	28.00	12	3/32"	8.24	86.8

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SAMPLE	DRY COLOR	PER CENT RETAINED ON 200-MESH	PER CENT GRIT 325-MESH	PER CENT COLLOIDAL MATERIAL	STORMER VISCOSITY (CENTIPOISES)	GEL STRENGTH (IN GRAMS)		WALL-BUILDING PROPERTIES		SAND-BINDING PROPERTIES (POUNDS PER SQUARE INCH)	
						Initial	10 Min.	Water Loss (in cc.)	Cake Thickness	Green Compressive Strength	Dry Compressive Strength
Alcova	Light-gray	8.0	.10	58	4.0	4.58	8.58	29	2/32"	7.56	65.7
Standard Black Hills	Cream	5.5	2.20	96	16.0	26.00	35.00	18	3/32"	8.24	85.5

INDEX MAP
OF
ALCOVA CLAIMS
xxx - Bentonite Outc
1958

ALCOVA

KORTES ROAD

ALCOVA
RESERVOIR

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T. 30 N.
T. 29 N.

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10

11

R. 83 W.

R. 82 W.