

GEOLOGICAL SURVEY OF WYOMING

UNIVERSITY OF WYOMING

LARAMIE

Report on field examination of

Allanite Deposits,

Natrona County, Wyoming

by

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Field Examination Report

A deposit of allanite in the Big Horn Mountains, Wyoming, was mapped between August 4 and 8, 1948. The deposit is located in sections 12 and 13 T. 39 N. R. 88 W. and sections 7 and 13 T. 39 N. R. 89 W. The road to the deposit leaves U. S. highway 20 at Waltman and continues north through Armito. A detailed road log from Casper to the deposit is given in Appendix 1. If the area is opened up for mining, a road could be built from Badwater Creek up to the deposit, a distance of about 2 miles. This would make the area accessible the whole year.

The five days available for the inspection made it impractical to do detailed geological mapping. The data herein presented is of a reconnaissance nature and is subject to revision when more information is available.

The deposit consists of 23 claims, Allie No's. 1-23, (see map). The owners are Claude Adams, Glendo, Wyoming; Frank Bandy, Broadus, Montana; Alfred Herman, Guernsey, Wyoming; Oran Lichty, Lost Cabin, Wyoming; and Ralph Perlatt, Casper, Wyoming. When the area was visited the claims had been staked and discovery work was scheduled to begin the next week. It is quite possible that further prospecting with a Geiger counter will result in the group locating more claims.

Geologically the area is part of the pre-Cambrian core of the Big Horn Mountains. The country rock is a gneiss which varies in composition from hornblendite to granite pegmatite. The lighter portions of the

gneiss appear to be replacing the portions of the gneiss that are darker. In places "drag folds" have contorted the gneiss into intricate folds and swirls. The uncontorted gneiss layers generally strike northeast and dip southeast.

Lenses of granite pegmatite have replaced or intruded the gneiss. In general these lenses are conformable with the bands of enclosing gneiss but in detail the pegmatite may cross out the gneiss. In all cases where both sides of the pegmatite are exposed, one side has a steep or vertical dip and the other contact dips about 30° (see cross section of pegmatite on claim 1). Detailed geologic mapping of the gneiss might reveal a definite structural control of the pegmatites.

The ore mineral appears to be allanite, a member of the epidote group, which contains several of the rare earth elements. No analyses have been made on samples collected from this area. Specimens collected have an index of refraction of 1.581, are dark greenish-gray and isotropic. These properties, especially the low index of refraction, seem to fit allanite better than the uranium minerals. A list of 40 analyses of allanite in Dana's System of Mineralogy include thorium, cerium, dididium, lanthanum, yttrium, and erbium for a total of 15 to 20 per cent of the minerals composition.

The allanite is restricted to the pegmatite and to the contact of gneiss and pegmatite. If there is any allanite in the dark gneiss it is too fine-grained to be easily detected. Much of the allanite appears to be concentrated either along the contact of gneiss and pegmatite or a short distance within the pegmatite and parallel to the contact. The allanite grains vary

in size from 1/4 inch to 3 inches in length. Most of them are irregular but a few have rough crystal faces. Some grains are diamond shaped in cross section.

The ore reserve estimates are given in table 1. These figures are guesses at best and were obtained in the following manner. Tonnage figures are based on length and width of surface exposure times an assumed depth of one half the length. No tonnage was computed for possible extension of pegmatite under talus cover. Ore grade, percent of allanite, is split into two categories, 0.5% for pegmatite in which the actual ore mineral was seen and 0.1% for pegmatites that were reported to have excited a Geiger counter. The lack of drilling or other prospecting eliminates the cataloging of measured ore. Indicated ore totals about 4,700,000 tons of all grades. Inferred ore, lateral extension of exposed pegmatites, pegmatites that might be discovered by drilling based on structural control, and ore in gneiss might easily add another 5,000,000 tons to the total reserves.

Four pegmatites were sampled (see sketch maps). The sampling procedure consisted of marking stations on 10 foot centers along a line of good exposures approximately perpendicular to the strike of the lens. Chip samples were collected from each station where bed rock was exposed. Geiger counter readings were obtained at each station and at stations along traverses on either side of the sample traverse. The counter had a normal rate of 9 clicks per minute in air. Readings were taken by

placing the pick-up unit horizontal 1-2 inches above the ground and slowly moving it over an area of 1 square foot for 1 minute. If the pick up unit had been held 2 to 3 feet above the ground the readings would have increased by 200 to 300 percent.

Recommendations

1. The samples that were collected should be analysed to determine the grade of the ore and the valuable elements present.
2. The geology should be mapped in detail to determine to what extent structure controls the localization of the pegmatites.
3. A study should be made to find out how much allanite is in the gneiss.
4. The area should be drilled to determine the size and grade of the ore bodies.
5. This report should be forwarded to the appropriate Federal agency to expedite these recommendations and to comply with any regulations concerning the reporting of radio-active mineral deposits.

Robert T. Russell

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Table 1
Ore Reserves

| <u>Location of ore body</u> | <u>Grade and tonnage</u> | |
|-----------------------------|--------------------------|----------------|
| | <u>0.5%</u> | <u>0.1%</u> |
| Claim #1 | 100,000 | |
| Claim #1 and 2 | | 83,000 |
| Claim #2 and 3 | 125,000 | 71,000 |
| Claim #3 | | |
| Claim #4 | 140,600 | |
| Claim #4 | | 100,000 |
| Claim #5 | | 1,300,000 |
| Claim #6 | 580,000 | |
| Claim #9 | 666,000 | 208,000 |
| Claim #13 and 8 | | |
| Claim #19 | 23,400 | |
| Claim #9, 10, 14, 15 | 225,000 | |
| Claim #15 | 167,000 | |
| Claim #16 and 17 | 310,000 | |
| Claim #21 | | 42,000 |
| Claim #23 | 281,250 | |
| Claim #23 | 281,250 | |
| Total for grades | 2,899,500 tons | 1,804,000 tons |
| Total ore | 4,703,500 tons | |

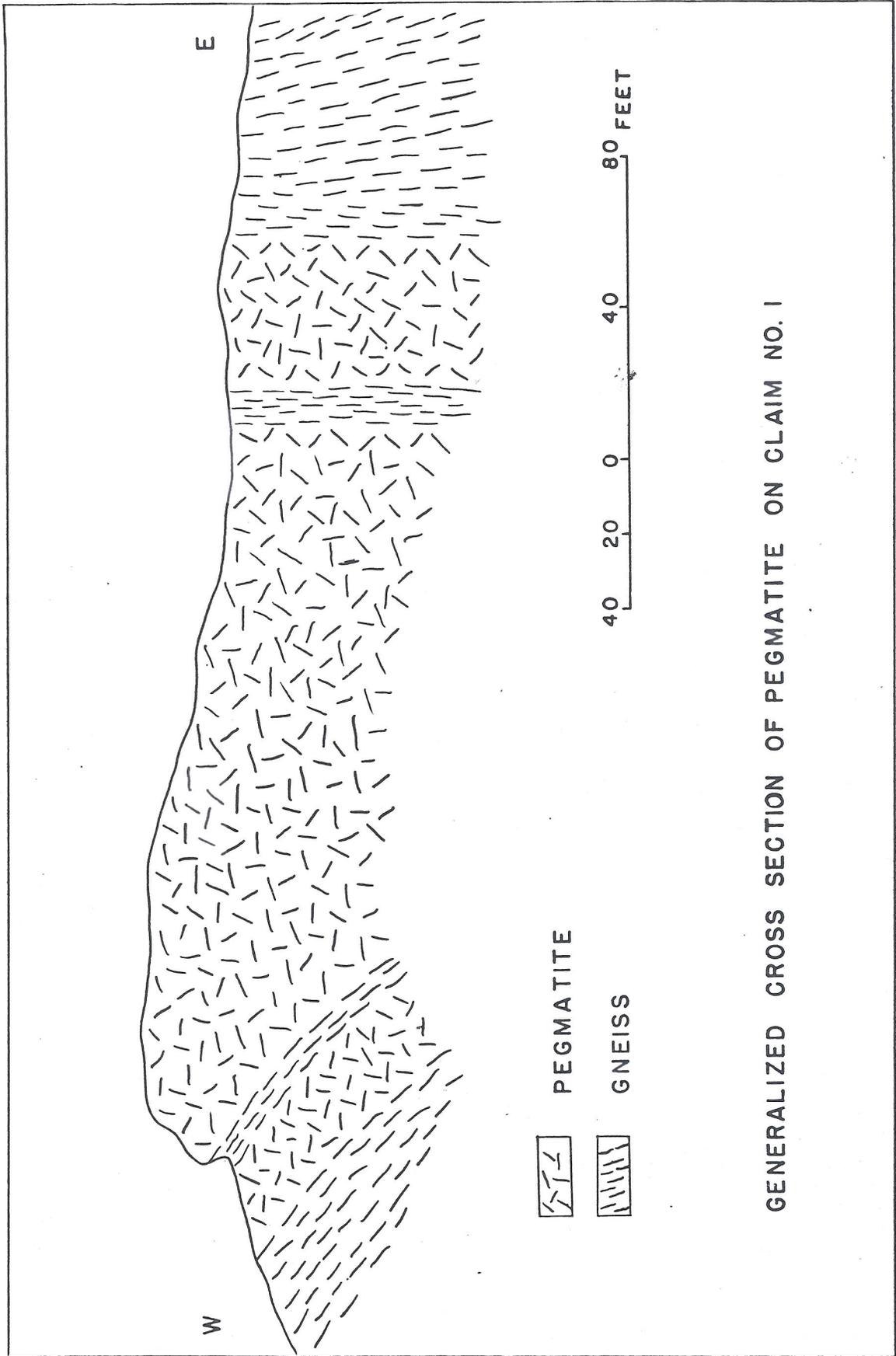
Appendix 1

Road Log

Miles

- 0.0 Casper, Wyo. U. S. Highway 20
- 52.0 Turn right (north) at Waltman.
- 60.0 Ariminto (last gas station) straight through town.
- 61.8 Road fork - keep straight ahead.
- 75.7 Take left fork, sign reads to Big Horn Mts.
- 81.9 Take road (auto tracks) to left.
- 82.0 Fence with gate.
- 83.8 Cross Creek.
- 84.3 Fence with gate.
- 84.6 Keep on trail to left of hill.
- 84.7 Fence with gate.
- 85.1 Cabin to left of road and old corral on right.
- 85.5 Fence with gate.
- 87.2 Take right fork leading up to top of hill.
- 87.6 Old fence line.
- 87.8 Cross draw just above aspen.
- 88.5 Cross draw with meadow.
- 88.8 Old Corral, keep to right.
- 89.6 Take right fork on hillside.

Go over hill and park in sagebrush before valley gets narrow and enters aspen grove. Camp 1/2 mile down valley. Do not drive down to camp unless car has compound gear.



GENERALIZED CROSS SECTION OF PEGMATITE ON CLAIM NO. 1

LEGEND

100 STATION NUMBER
(28) GEIGER COUNTER CLICKS PER MINUTE

S SAMPLE

SCALE 1" = 10'



100
○ (28)

GNEISS

101
○ (28)

PEGMATITE

99
○ (22)
S

102
○ (19)

98
○ (31)
S

103
○ (32)

97
○ (38)
S

GNEISS

96
○ (28)
S

108
○ (19)

107
○ (35)

106
○ (19)

105
○ (52)

104
○ (38)

SKETCH MAP OF TEST LOCATIONS PEGMATITE S.E. COR. 13

- | | | |
|---------------|-----------------|---------------|
| | | ○ 189 (20) |
| | ○ 190 (21) | ○ 188 (56) |
| | ○ 191 (23) | ○ 187 (27) |
| | ○ 192 (26) | ○ 186 (41) |
| | ○ 192 A (29) | ○ 185 (67) |
| | ○ 193 (32) | ○ 184 (60) |
| | ○ 194 (48) | ○ 183 (92) |
| | ○ 195 (39) | ○ 182 (54) |
| | ○ 196 (40) | ○ 181 (51) |
| | ○ 197 (46) | ○ 180 (31) |
| | ○ 198 (92) | ○ 179 (36) |
| | ○ 199 (60) | ○ 178 (48) |
| | ○ 200 (83) | ○ 177 (74) |
| ○ 218 (47) | ○ 201 (57) | ○ 176 (50) |
| ○ 217 (52) | ○ 202 (53) | ○ 175 (39) |
| ○ 216 (37) | ○ 203 (58) | ○ 174 (40) |
| ○ 215 (37) | ○ 204 (21) | ○ 173 (43) |
| ○ 214 (60) | ○ 205 (25) | ○ 172 (42) |
| ○ 213 (34) | ○ 206 (43) | ○ 171 (62) |
| ○ 212 (36) | ○ 207 (17) | ○ 170 (45) |
| ○ 211 (46) | ○ 208 (40) | ○ 169 (40) |
| ○ 210 (34) | ○ 209 (34) | ○ 168 (56) |
| | | ○ 167 (20) |
| | | ○ 166 (20) |
| | | ○ 165 (50) |
| | | ○ 164 (34) |
| | | ○ 163 (36) |

SKETCH MAP OF TEST LOCATIONS

PEGMATITE ON CLAIM I

| | | |
|--------------|--------------------|--------------|
| | 144 ○(23) S | |
| 143 ○(18) | 145 ○(26) S | |
| 142 ○(22) | 146 ○(25) S | 161 ○(29) |
| 141 ○(53) | 147 ○(51) S | 160 ○(48) |
| 140 ○(51) | 148 ○(35) S | 159 ○(35) |
| 139 ○(34) | 149 ○(33) S | 158 ○(36) |
| 138 ○(42) | 150 ○(40) S | 157 ○(30) |
| 137 ○(33) | 151 ○(47) S | 156 ○(25) |
| 136 ○(40) | 152 ○(143) S | 155 ○(39) |
| 135 ○(42) | 153 ○(31) S | 154 ○(29) |
| 134 ○(27) | | |
| 133 ○(34) | | |

LEGEND

150 STATION NUMBER

(40) GEIGER COUNTER CLICKS
PER MINUTE

S SAMPLE

SCALE 1" = 20'

SKETCH MAP OF TEST LOCATIONS
PEGMATITE N.E. COR. NO. 9

LEGEND

| | | |
|---|--|---|
| <p>109 ○(24) S</p> <p>110 ○(48) S</p> <p>111 ○(31)</p> <p>112 ○(20)</p> <p>113 ○(26)</p> <p>114 ○(25) S</p> <p>115 ○(25) S</p> <p>116 ○(34) S</p> <p>117 ○(31) S</p> <p>118 ○(43) S</p> <p>119 ○(39) S</p> <p>120 ○(39) S</p> | <p>120a ○(30)</p> <p>121 ○(36)</p> <p>122 ○(46)</p> <p>123 ○(26)</p> <p>124 ○(26)</p> <p>125 ○(54)</p> <p>126 ○(34)</p> <p>127 ○(56)</p> <p>128 ○(106)</p> | <p>129 ○(97)</p> <p>130 ○(43)</p> <p>131 ○(55)</p> <p>132 ○(30)</p> |
|---|--|---|

115 STATION NUMBER
(25) GEIGER COUNTER CLICKS
PER MINUTE

S SAMPLE

—|— CLAIM CORNER

SCALE 1" = 20'

SKETCH MAP OF TEST LOCATIONS

PEGMATITE ON CLAIMS 16 & 17