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IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

June 25, 1954

Memorandum

Re: IMEA-3327
Clayton Silver Mines
Custer County, Idaho
$119,650
Lead-zinc

To: Mr. W. R. Griswold, IMEA

From: E. L. Newcomb, USGS

Subject: Withdrawal of application

We have noted the applicant's letter of May 18, 1954, attached to the Field Team Examination Report, which requested withdrawal of his application.

E. L. Newcomb
E. L. Newcomb
Geologist

UNITED STATES 500
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

June 22, 1954

Memorandum

To: Chief, Operations Control & Statistics Div.

From: Chief, Base Metals Division

Subject: Docket No. DMEA-3327, Clayton Silver Mines, Custer County, Idaho

This is to advise you that the above-cited application was withdrawn by the Applicant during the Field Team examination of the property (see Applicant's letter of May 18, 1954).

The docket on this case is returned herewith for filing.

W. R. Griswold

W. R. Griswold

UNITED STATES 500
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

June 22, 1954

Memorandum

To: Chief, Operations Control & Statistics Div.

From: Chief, Base Metals Division

Subject: Docket No. DMEA-3527, Clayton Silver Mines, Custer County, Idaho

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The docket on this case is returned herewith for filing.

W. R. Griswold
W. R. Griswold

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D.C.
No. 157 Howard Street
Spokane 4, Washington

June 10, 1954

Mr. George C. Selfridge, Chairman
Operating Committee, DMEA
Department of the Interior
Washington 25, D. C.

Re: Docket No. DMEA-3[illegible]7 (lead-zinc)
Clayton Silver Mines
Custer County, Idaho

Dear Mr. Selfridge:

Enclosed are four copies of a field examination report on the cited property by E. B. Nicholson, Geological Survey.

The application was withdrawn by the applicant by letter of May 18, 1954 (copies attached); however, as the field examination had been made previously, the field report was prepared for the record even though it will not be needed in any further handling of the application.

By Field Team, Region II

T. L. Weissenborn, Executive Officer
U. S. Geological Survey

Wing C. Agnew, Member
U. S. Bureau of Mines

Enclosures

cc: USBM (2)
Nicholson

Reviewed by
DMEA OPERATING COMMITTEE
6-18-54
(date)

W. M. YEATMAN, PRESIDENT
YAKIMA, WASHINGTON

NORMAN M. SMITH
OPERATING ENGINEER

CLAYTON SILVER MINES

ENGINEERING OFFICE
SUNSHINE STAR ROUTE
KELLOGG, IDAHO

May 18, 1954

Mr. Thor E. Kiilsgaard
Defense Minerals Exploration Administration
South 157 Howard Street
Spokane 4, Washington

Dear Sir:

Reference is here made to application (MF 103) for aid by Clayton Silver Mines for the Ella project dated April 21, 1954.

Recently Mr. H. B. Nickelson of the DMEA and Mr. V. Z. Johnson of the U. S. Bureau of Mines made their field examination of the Ella project. From conversations with these engineers we have concluded that the possibilities are too small for the amount of expenditures necessary to complete the project. Therefore this is to notify the Interior Department that we desire to withdraw the application.

Very truly yours,

Norman M. Smith

NORMAN M. SMITH

jh

RECEIVED
MAY 19 1954
U. S. G. S.
SPOKANE, WASH.

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
So. 157 Howard Street
Spokane 4, Washington

DEPARTMENT OF THE INTERIOR
Defense Minerals
REC'D
JUN 14 1954

June 4, 1954

MEMORANDUM

To: Field Team, Region II

From: Howard B. Nickelson, Geologist, U. S. Geological Survey

Subject: Docket No. DMEA-3327 (lead), Field Examination of Ella Mine, Custer County, Idaho, Clayton Silver Mines, P. O. Box 890, Wallace, Idaho.

SUMMARY

On April 21, 1954, an application was submitted by the Clayton Silver Mines to the Defense Minerals Exploration Administration to explore for lead and silver minerals in the Ella mine, Custer County, Idaho. The proposed work consisted of 2,100 feet of drifting, 500 feet of crosscutting, and 1,100 feet of diamond drilling; the total cost was estimated at $119,650.

The property was examined on May 4, 5, and 6, 1954, by Verdo Z. Johnson, Bureau of Mines, and the writer. Norman M. Smith, operating engineer for Clayton Silver Mines, assisted in the examination.

On May 18, 1954, the application was withdrawn because company officials concluded that exploration possibilities were too small for the expenditures necessary to complete the project. Discussions with the field examiners influenced their decision.

CONCLUSIONS AND RECOMMENDATIONS

The Ella vein outcrop lacks the wide and prominent limonite gossan zones which characterize other producing veins in this district. The strike length of the narrow ore lenses found on the Ella outcrop is less than 50 feet and these ore lenses, where mined, have failed to extend to any great depth. On the basis of these meager outcrops an exploration program 600 to 700 feet below surface appears to be a poor venture.

Reviewed by
DMEA OPERATING COMMITTEE
6-18-54
(date)

LOCATION OF THE PROPERTY

The property is located in the Bayhorse mining district, Custer County, Idaho, in sec. 24, T. 11 N., R. 17 E., Boise Meridian. The Ella mine is on the west side of Kinnikinic Creek, about half a mile north of Clayton, Idaho. The nearest railhead is at Mackay, Idaho, 80 miles from Clayton via U. S. Highway 93, which is passable throughout the year.

DESCRIPTION OF THE PROPERTY

The Ella and Clayton mines are located on three contiguous groups of patented and unpatented claims owned by the Clayton Silver Mines.

Mr. Smith furnished a transit survey map of the Ella mine, showing pits, trenches, and old stopes holed through to the surface. This map was subsequently used in mapping the geology of the mine.

The Ella mine is located about 1½ miles south of the Clayton mine. Since 1936 the Clayton mine has produced 2,058,759 ounces silver, 35,894,188 pounds of lead, 339,033 pounds of copper, 735 ounces of gold, 8,578,045 pounds of zinc from 535,874 tons of ore.

The Ella mine consists of approximately 2,900 feet of accessible underground openings on the main level. Two raises and an intermediate level 90 feet above the main level were inaccessible. Short adits, trenches, short shafts, and stopes holed to the surface are found along the vein's outcrop. All of these workings are illustrated on plate 1.

Approximately half the rail and pipe was left in the main adit. A frame shed at the portal could serve as a compressor or tool house. The REA power line crosses the Ella mine dump.

TERRAIN AND CLIMATE

The Salmon River area around Clayton is mountainous. Sage brush and grass abound on the foothills and conifer trees cover the mountain summits. The Kinnikinic Creek valley is narrow and its walls rise more than 1,000 feet above the creek. Quartzite and dolomite form cliffs on the west side of the creek in the vicinity of the outcrop of the Ella vein.

Light snowfall and some subzero weather occur during the winter but the summers are hot and dry.

HISTORY

Virtually all the production from the Ella mine occurred near the turn of the century. At that time the mine supplied the old Clayton smelter with considerable siderite for flux.

Umpleby, J. B. 1/, reported that most of the productive workings were caved in 1911.

The Ford Motor Company purchased the Ella group of claims, including the millsite and townsite, along with other properties in the area in 1926. No attempt was made by the Ford Company to reopen the mine.

The Clayton Silver mines bought the property in the spring of 1947 from the Ford Motor Company. The caved portal was reopened, the bottom of the old drift was lowered, and approximately 1,700 feet of drift and crosscuts were driven to the northwest. All of this new work was driven to the west of the Ella structure, in the vein hanging wall.

REGIONAL GEOLOGY

The regional geology is described by Irvin Lorraine Taillour in his Master of Science thesis, "Abstract of ore deposits of the Clayton area, Custer County, Idaho", presented to the faculty of the graduate school of Cornell University June 1948. Parts of Taillour's description of the regional geology and his map of the geology of the region are used in this report (pl. 2).

The sedimentary rocks in the Clayton area are composed of at least 6,000 feet of complex folded and faulted rocks of the Ordovician age.

The western part of the Clayton area is covered locally by the gently warped Challis volcanics. The eastern margin of the area has been intruded by a gabbro sill.

Three formations, the Ramshorn slate, the Kinnikinic quartzite, and the Saturday Mountain formation, all of the Ordovician age, comprise the only sedimentary rocks in the area.

Ramshorn Slate. The Ramshorn slate of lower Ordovician age has a thickness of more than 2,000 feet with the uppermost 800 feet exposed along Kinnikinic Creek and extending southward across the Salmon River.

1/ Umpleby, J. B., Some ore deposits in Custer Co., Idaho: U. S. Geological Survey Bull. 539, p. 73, 1913.

The rock is predominately a banded-dark green and purple slate with excellent cleavage that does not appear to be highly metamorphosed. The rock forms subdued topography with isolated outcrops.

Kinnikinic Quartzite. The Kinnikinic quartzite conformably overlies the Ramshorn slate and has a thickness of over 4,000 feet. The formation has been divided into the Lower member, the Clayton Quartzite member, the Ella Dolomite member, and the South Butte Quartzite member for convenience of mapping.

The Lower member is composed of interbedded massive siliceous quartzites and thin-bedded dolomitic quartzites, dolomites, and shales, with an aggregate thickness of at least 2,000 feet.

The Clayton Quartzite member is composed of a few shaly beds at the base but, in general, is a quartzite with pebbly and feldspathic layers. It has a total thickness of 1,580 feet. The member is quite resistant and forms hog-back ridges, cliffs, and prominent talus slopes.

The Ella Dolomite member is the principal ore horizon and consists wholly of dolomite with varying amounts of siliceous material. Fresh surfaces are dark gray to black but the rock weathers to a light gray and buff colors. The measured thickness is 340 feet.

The South Butte Quartzite member is generally light-colored, dense quartzite. It has a measured thickness of 840 feet.

Recent fossil discoveries indicate the Lower and Clayton Quartzites are middle Ordovician age, and the Ella Dolomite and South Butte quartzite members probably belong to upper Ordovician age.

Saturday Mountain Formation. The Saturday Mountain formation overlies the Kinnikinic Quartzite. It is composed of massive and thin-bedded carbonaceous dolomites and subordinate cherty beds. It has an aggregate thickness of about 3,000 feet. It has been assigned to the upper Ordovician age.

The Challis volcanics occur as scattered remnants on the top of the mountains west of Kinnikinic Creek.

The gabbro sill, located on the east side of Kinnikinic Creek, has intruded the Ramshorn slate and the Lower member of the Kinnikinic formation.

Structure

Rocks in the vicinity of Clayton have been folded into a series of northwest-trending anticlines and synclines.

Taillour reports that the assymetrical Clayton anticline, located between Kinnikinic Creek and Squaw Creek, trending N. 20° W., has been pinched against and partially thrust upon the west flank of a regional anticline which trends northeast of Clayton. A high angle reverse fault has eliminated the syncline that should lie between. This fault dips steeply westward and parallels the trend of the Clayton anticline. One mile to the west another longitudinal reverse fault has broken the east flank of the Clayton anticline.

A zone of normal faulting with two principal planes of movement forming a highly crumpled block between is located along Kinnikinic Valley and extends south across the Salmon River.

Numerous transverse faults striking N. 70° E. to east and dipping steeply southward have displaced the hanging wall block eastward from a few feet to over 4,000 feet. Considerable vertical movement has been experienced by the transverse fault just south of the Clayton mine causing the Clayton anticline south of the fault to plunge 20° to the north.

The intense faulting throughout the area has caused bedding plane adjustments, drag folding, and bedding plane shear and breccia zones, especially along the massive quartzite dolomite contacts.

Folding and associated longitudinal and transverse faulting are a result of forces acting from the southwest during the Laramide revolution.

Ore Deposits

Folding and faulting caused permeable zones in the Ella Dolomite where hydrothermal solution replaced the dolomite with siderite and sulfide minerals under mesothermal conditions, probably during the early Tertiary epoch of mineralization. A separate suite of similar minerals, but of lesser quantity, was deposited subsequent to a prolonged period of oxidation, probably correlative with the mid-Tertiary epoch of epic thermal mineralization.

On the west limb of the anticline, mature erosion before the Challis volcanics has left the deposits deeply oxidized, whereas recent erosion at lower altitudes on the east limb has left the deposits not so deeply oxidized. The Red Bird, South Butte, and Rob Roy deposits contain generally oxidized ore, whereas Clayton Silver and Ella mines are primary deposits.

Mineralogy

The mineral assemblage in the district hardly varies for each mine and is generally common to the Wood River region mineral

assembly. These minerals common to the Clayton Silver mine and the Ella mine are siderite, quartz, pyrite, galena, sphalerite, tetrahedrite, chalcopyrite, and polybasite.

Paragenesis

Quartz was the first mineral introduced; it was followed by shattering and then by the introduction of siderite and pyrite, which in turn was followed by slight shattering. Sphalerite, tetrahedrite, galena, chalcopyrite, and polybasite were introduced, completing the mineral assemblage during the early Tertiary epoch. Pyrite, galena, chalcopyrite, and marcasite were introduced during the mid-Tertiary epoch.

Structural Influence

Many of the ore deposits, such as those in the Clayton and South Butte mines are located near major transverse faults. Lesi of the mineral deposits were prepared by crushing caused by bedding movement and fracturing and brecciation caused by drag folds, which were intersected by shears that acted as feeders for the mineral solutions. These solutions replaced the rock in the permeable zones forming ore bodies. The impounding of the solution by the flattening of the hanging wall and by the pinching and narrowing of the shear zones increased the width and richness of the mineralization. In some places transverse faults may have served as feeders to the mineralized zones.

GEOLOGY AND DESCRIPTION OF THE ELLA MINE

The Ella structure strikes approximately N. 30° W. and dips very steeply to the southeast. The outcrop follows along the west valley wall 400 to 600 feet above Kinnikinic Creek. The structure partially follows and cuts the steep southeast dipping Ella Dolomite beds forming the east limb of the Clayton anticline.

The change in the dip of the dolomite beds near the crest of the anticline probably has resulted in greater openings for ore deposition, which may account for the fact that small lenses of ore which are exposed there have failed wherever mined to extend to any great depth.

Ella Underground Workings

The Ella structure was made accessible from the Ella portal by driving 515 feet of crosscut through the Clayton Quartzite and Ella Dolomite. The fault contact between the Ella Dolomite and the Clayton Quartzite was intersected 450 feet from the portal. The fault contact dips 70° to the southwest by projection, although the contact in the

crosscut is nearly vertical. The rocks bordering the contact had been badly crushed and brecciated but later were healed by calcite and quartz.

The Ella siderite vein, dipping vertically, was intersected 60 feet beyond the fault contact. The crosscut was extended 110 feet beyond the structure, where seven faults roughly parallel to the Ella structure were intersected.

A drift to the southeast for 290 feet showed the siderite vein pinched considerably just off the crosscut but continued sparingly for 160 feet. The structure at the face of the drift was very tight, showing only a quarter of an inch of gouge on the fault.

The drift to the northwest was driven 270 feet on a siderite vein ranging in width from 2 to 15 feet. The vein continues into the drift face as four, tight, fault strands.

Early exploration of the vein consisted of two raises and an intermediate level 90 feet above the Ella drift. The first raise, driven from the crosscut-vein intersection, holed to the surface 432 feet above the level; the second raise, driven 80 feet northwest of the crosscut, connected the intermediate level. The two stopes shown on the map southeast of the crosscut were apparently driven from the intermediate level. Taillour's map of the Ella mine shows that the intermediate level extended about 140 feet southeast and 180 feet northwest of the crosscut.

The Clayton Silver Mines began exploring the Ella structure beyond the northwest face of the old drift in 1947. A survey was run to determine the elevation of the Ella portal with respect to the 300 level of the Clayton mine and it was found that the Ella mine workings would connect with the 300 level. Such a connection could alleviate the Clayton mine's water problem. The portal was cleared and the floor of the old drift lowered to establish a grade to the 300 level of the Clayton mine. The new drift was begun on a hanging wall strand of the Ella structure, but the structure was soon lost in the east wall of the drift. The drift continued approximately 1,700 feet in a northwest direction entirely off the Ella structure. Some minor faults were encountered in this work, as shown on plate 1. The structure probably lies 200 to 300 feet southwest of these workings.

An examination was made of pits, old stopes, trenches, and shallow underground workings. (Illustrated by pl. 1.) These workings presented the best surface exposures of the Ella vein.

Two orcshoots southeast of the crosscut were apparently mined from the intermediate level, and the stopes holed to the surface. The

first stope was 55 feet long and was mined 2½ to 3 feet wide. The second stope was 45 feet long and was mined 2½ to 4 feet wide.

The first pits shown on plate 1 near the face of the northwest drift prospected two veins. A few pieces of low-grade vein material containing sparse galena were found in a pit that explored a 4-foot gossan zone on the eastern vein. The second pit, dug in a weak 30-foot gossan zone on the western vein, uncovered a few pieces of vein material containing sparse lead minerals, but no definite vein could be found in this pit. The small amount of vein material found in these two pits did not warrant sampling.

Considerably more galena and other lead minerals were found in the shallow shaft and trench above the face of the northwest drift. The trench exposed a vein, ranging in width from 1 to 4 feet, for a distance of about 40 feet along the vein.

A small shaft, inaccessible now, was driven on a split off the main vein in about 2½ to 3 feet of gossan containing veinlets of galena and other lead minerals. Locations and assay results of samples taken from these two pits are shown on plate 1. These samples indicate a high silver to lead ratio, due to the presence of silver-rich tetrahedrite.

Crosscutting to the Ella structure from the northwest face of the drift, which is 695 feet below the outcrop, might intersect this minor surface showing, but it is doubtful if the small ore lens extends to this depth.

The vertical section shown in the right-hand lower corner of the map was sketched from the first pit looking at the cliff approximately 300 feet beyond the small shaft and trench above the face of the drift. The sketch is not to scale, but it illustrates the attitudes of the veins and bedding and shows the Ella structure cutting through the steep-dipping beds of the anticline's limb.

The exploration program submitted by the applicant proposed drifting on the Ella structure to the northwest to explore under a mineralized area about 2,000 feet from the northwest drift face. This area is shown on the upper left-hand portion of plate 1.

A change in strike and dip of the vein is apparent northwest of the small shaft, as shown on the southeast portion of the map. This change is apparently due to the large transverse fault that lies a short distance to the northwest. (See pl. 2.).

There is evidence on the surface of an old caved stope that apparently was mined from the raise off the crosscut, as shown on

plate 1. The ore lens probably did not extend to the crosscut level, as it was not evident in the drift off the crosscut.

It appears economically and geologically unsound to drift over 2,000 feet from the face of the northwest drift to explore the limited potentiality of the Ella vein in this area.

Enclosures (2)
Distribution:
DMEA(4)
USBM(2)
USGS(SRO)
Nickelson
Docket

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

~~WASHINGTON 25, D. C.~~
So. 157 Howard Street
Spokane 4, Washington

June 10, 1954

Mr. George C. Selfridge, Chairman
Operating Committee, DMEA
Department of the Interior
Washington 25, D. C.

Re: Docket No. DMEA-3327 (lead-zinc)
Clayton Silver Mines
Custer County, Idaho

Dear Mr. Selfridge:

Enclosed are four copies of a field examination report of the cited property by H. B. Nickelson, Geological Survey.

The application was withdrawn by the applicant by letter of May 18, 1954 (copies attached); however, as the field examination had been made previously, the field report was prepared for the files even though it will not be needed in any further handling of the application.

By Field Team, Region II

A. E. Weissenborn

A. E. Weissenborn, Executive Officer
U. S. Geological Survey

Wing G. Agnew

Wing G. Agnew, Member
U. S. Bureau of Mines

Enclosures

cc: USBM (2)
Nickelson

W. M. YEAMAN, PRESIDENT
YAKIMA, WASHINGTON

NORMAN M. SMITH
OPERATING ENGINEER

CLAYTON SILVER MINES
ENGINEERING OFFICE
SUNSHINE STAR ROUTE
KELLOGG, IDAHO

May 18, 1954

Mr. Thor H. Kiilsgaard
Defense Minerals Exploration Administration
South 157 Howard Street
Spokane 4, Washington

Dear Sir:

Reference is here made to application (MF 103) for aid by Clayton Silver Mines for the Ella project dated April 21, 1954.

Recently Mr. H. B. Nickelson of the USGS and Mr. V. Z. Johnson of the U. S. Bureau of Mines made their field examination of the Ella project. From conversations with these engineers we have concluded that the possibilities are too small for the amount of expenditures necessary to complete the project. Therefore this is to notify the Interior Department that we desire to withdraw the application.

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NORMAN M. SMITH

jh

RECEIVED
MAY 19 1954
U. S. G. S.
SPOKANE, WASH.

D Mem

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
So. 157 Howard Street
Spokane 4, Washington

Department of the Interior
Defense Minerals Administration
RECEIVED
JUN 14 1954

June 4, 1954

MEMORANDUM

To: Field Team, Region II

From: Howard B. Nickelson, Geologist, U. S. Geological Survey

Subject: Docket No. DMEA-3227 (lead), Field Examination of Ella Mine, Custer County, Idaho, Clayton Silver Mines, P. O. Box 890, Wallace, Idaho.

SUMMARY

On April 21, 1954, an application was submitted by the Clayton Silver Mines to the Defense Minerals Exploration Administration to explore for lead and silver minerals in the Ella mine, Custer County, Idaho. The proposed work consisted of 2,100 feet of drifting, 500 feet of crosscutting, and 1,100 feet of diamond drilling; the total cost was estimated at $119,650.

The property was examined on May 4, 5, and 6, 1954, by Verdo Z. Johnson, Bureau of Mines, and the writer. Norman M. Smith, operating engineer for Clayton Silver Mines, assisted in the examination.

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CONCLUSIONS AND RECOMMENDATIONS

The Ella vein outcrop lacks the wide and prominent limonite gossan zones which characterize other producing veins in this district. The strike length of the narrow ore lenses found on the Ella outcrop is less than 50 feet and these ore lenses, where mined, have failed to extend to any great depth. On the basis of these meager outcrops an exploration program 600 to 700 feet below surface appears to be a poor venture.

LOCATION OF THE PROPERTY

The property is located in the Bayhorse mining district, Custer County, Idaho, in sec. 24, T. 11 N., R. 17 E., Boise Meridian. The Ella mine is on the west side of Kinnikinic Creek, about half a mile north of Clayton, Idaho. The nearest railhead is at Mackay, Idaho, 80 miles from Clayton via U. S. Highway 93, which is passable throughout the year.

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Approximately half the rail and pipe was left in the main adit. A frame shed at the portal could serve as a compressor or tool house. The REA power line crosses the Ella mine dump.

TERRAIN AND CLIMATE

The Salmon River area around Clayton is mountainous. Sage brush and grass abound on the foothills and conifer trees cover the mountain summits. The Kinnikinic Creek valley is narrow and its walls rise more than 1,000 feet above the creek. Quartzite and dolomite form cliffs on the west side of the creek in the vicinity of the outcrop of the Ella vein.

Light snowfall and some subzero weather occur during the winter but the summers are hot and dry.

HISTORY

Virtually all the production from the Ella mine occurred near the turn of the century. At that time the mine supplied the old Clayton smelter with considerable siderite for flux.

Umpleby, J. B. 1/, reported that most of the productive workings were caved in 1911.

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REGIONAL GEOLOGY

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Three formations, the Ramshorn slate, the Kinnikinic quartzite, and the Saturday Mountain formation, all of the Ordovician age, comprise the only sedimentary rocks in the area.

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The Ella Dolomite member is the principal ore horizon and consists wholly of dolomite with varying amounts of siliceous material. Fresh surfaces are dark gray to black but the rock weathers to a light gray and buff colors. The measured thickness is 340 feet.

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Recent fossil discoveries indicate the Lower and Clayton Quartzites are middle Ordovician age, and the Ella Dolomite and South Butte quartzite members probably belong to upper Ordovician age.

Saturday Mountain Formation. The Saturday Mountain formation overlies the Kinnikinic Quartzite. It is composed of massive and thin-bedded carbonaceous dolomites and subordinate shorty beds. It has an aggregate thickness of about 3,000 feet. It has been assigned to the upper Ordovician age.

The Challis volcanics occur as scattered remnants on the top of the mountains west of Kinnikinic Creek.

The gabbro sill, located on the east side of Kinnikinic Creek, has intruded the Ramshorn slate and the Lower member of the Kinnikinic formation.

Structure

Rocks in the vicinity of Clayton have been folded into a series of northwest-trending anticlines and synclines.

Taillour reports that the assymetrical Clayton anticline, located between Kinnikinic Creek and Squaw Creek, trending N. 20° W., has been pinched against and partially thrust upon the west flank of a regional anticline which trends northeast of Clayton. A high angle reverse fault has eliminated the syncline that should lie between. This fault dips steeply westward and parallels the trend of the Clayton anticline. One mile to the west another longitudinal reverse fault has broken the east flank of the Clayton anticline.

A zone of normal faulting with two principal planes of movement forming a highly crumpled block between is located along Kinnikinic Valley and extends south across the Salmon River.

Numerous transverse faults striking N. 70° E. to east and dipping steeply southward have displaced the hanging wall block eastward from a few feet to over 4,000 feet. Considerable vertical movement has been experienced by the transverse fault just south of the Clayton mine causing the Clayton anticline south of the fault to plunge 20° to the north.

The intense faulting throughout the area has caused bedding plane adjustments, drag folding, and bedding plane shear and breccia zones, especially along the massive quartzite dolomite contacts.

Folding and associated longitudinal and transverse faulting are a result of forces acting from the southwest during the Laramide revolution.

Ore Deposits

Folding and faulting caused permeable zones in the Ella Dolomite where hydrothermal solution replaced the dolomite with siderite and sulfide minerals under mesothermal conditions, probably during the early Tertiary epoch of mineralization. A separate suite of similar minerals, but of lesser quantity, was deposited subsequent to a prolonged period of oxidation, probably correlative with the mid-Tertiary epoch of epic thermal mineralization.

On the west limb of the anticline, mature erosion before the Challis volcanics has left the deposits deeply oxidized, whereas recent erosion at lower altitudes on the east limb has left the deposits not so deeply oxidized. The Red Bird, South Butte, and Rob Roy deposits contain generally oxidized ore, whereas Clayton Silver and Ella mines are primary deposits.

Mineralogy

The mineral assemblage in the district hardly varies for each mine and is generally common to the Wood River region mineral

assembly. These minerals common to the Clayton Silver mine and the Ella mine are siderite, quartz, pyrite, galena, sphalerite, tetrahedrite, chalcopyrite, and polybasite.

Paragenesis

Quartz was the first mineral introduced; it was followed by shattering and then by the introduction of siderite and pyrite, which in turn was followed by slight shattering. Sphalerite, tetrahedrite, galena, chalcopyrite, and polybasite were introduced, completing the mineral assemblage during the early Tertiary epoch. Pyrite, galena, chalcopyrite, and marcasite were introduced during the mid-Tertiary epoch.

Structural Influence

Many of the ore deposits, such as those in the Clayton and South Butte mines are located near major transverse faults. Lesi of the mineral deposits were prepared by crushing caused by bedding movement and fracturing and brecciation caused by drag folds, which were intersected by shears that acted as feeders for the mineral solutions. These solutions replaced the rock in the permeable zones forming ore bodies. The impounding of the solution by the flattening of the hanging wall and by the pinching and narrowing of the shear zones increased the width and richness of the mineralization. In some places transverse faults may have served as feeders to the mineralized zones.

GEOLOGY AND DESCRIPTION OF THE ELLA MINE

The Ella structure strikes approximately N. 30° W. and dips very steeply to the southeast. The outcrop follows along the west valley wall 400 to 600 feet above Kinnikinic Creek. The structure partially follows and cuts the steep southeast dipping Ella Dolomite beds forming the east limb of the Clayton anticline.

The change in the dip of the dolomite beds near the crest of the anticline probably has resulted in greater openings for ore deposition, which may account for the fact that small lenses of ore which are exposed there have failed wherever mined to extend to any great depth.

Ella Underground Workings

The Ella structure was made accessible from the Ella portal by driving 515 feet of crosscut through the Clayton Quartzite and Ella Dolomite. The fault contact between the Ella Dolomite and the Clayton Quartzite was intersected 450 feet from the portal. The fault contact dips 70° to the southwest by projection, although the contact in the

crosscut is nearly vertical. The rocks bordering the contact had been badly crushed and brecciated but later were healed by calcite and quartz.

The Ella siderite vein, dipping vertically, was intersected 60 feet beyond the fault contact. The crosscut was extended 110 feet beyond the structure, where seven faults roughly parallel to the Ella structure were intersected.

A drift to the southeast for 290 feet showed the siderite vein pinched considerably just off the crosscut but continued sparingly for 160 feet. The structure at the face of the drift was very tight, showing only a quarter of an inch of gouge on the fault.

The drift to the northwest was driven 270 feet on a siderite vein ranging in width from 2 to 15 feet. The vein continues into the drift face as four, tight, fault strands.

Early exploration of the vein consisted of two raises and an intermediate level 90 feet above the Ella drift. The first raise, driven from the crosscut-vein intersection, holed to the surface 432 feet above the level; the second raise, driven 80 feet northwest of the crosscut, connected the intermediate level. The two stopes shown on the map southeast of the crosscut were apparently driven from the intermediate level. Taillour's map of the Ella mine shows that the intermediate level extended about 140 feet southeast and 180 feet northwest of the crosscut.

The Clayton Silver Mines began exploring the Ella structure beyond the northwest face of the old drift in 1947. A survey was run to determine the elevation of the Ella portal with respect to the 300 level of the Clayton mine and it was found that the Ella mine workings would connect with the 300 level. Such a connection could alleviate the Clayton mine's water problem. The portal was cleared and the floor of the old drift lowered to establish a grade to the 300 level of the Clayton mine. The new drift was begun on a hanging wall strand of the Ella structure, but the structure was soon lost in the east wall of the drift. The drift continued approximately 1,700 feet in a northwest direction entirely off the Ella structure. Some minor faults were encountered in this work, as shown on plate 1. The structure probably lies 200 to 300 feet southwest of these workings.

An examination was made of pits, old stopes, trenches, and shallow underground workings. (Illustrated by pl. 1.) These workings presented the best surface exposures of the Ella vein.

Two oreshoots southeast of the crosscut were apparently mined from the intermediate level, and the stopes holed to the surface. The

first stope was 55 feet long and was mined $2\frac{1}{2}$ to 3 feet wide. The second stope was 45 feet long and was mined $2\frac{1}{2}$ to 4 feet wide.

The first pits shown on plate 1 near the face of the northwest drift prospected two veins. A few pieces of low-grade vein material containing sparse galena were found in a pit that explored a 4-foot gossan zone on the eastern vein. The second pit, dug in a weak 30-foot gossan zone on the western vein, uncovered a few pieces of vein material containing sparse lead minerals, but no definite vein could be found in this pit. The small amount of vein material found in these two pits did not warrant sampling.

Considerably more galena and other lead minerals were found in the shallow shaft and trench above the face of the northwest drift. The trench exposed a vein, ranging in width from 1 to 4 feet, for a distance of about 40 feet along the vein.

A small shaft, inaccessible now, was driven on a split off the main vein in about $2\frac{1}{2}$ to 3 feet of gossan containing veinlets of galena and other lead minerals. Locations and assay results of samples taken from these two pits are shown on plate 1. These samples indicate a high silver to lead ratio, due to the presence of silver-rich tetrahedrite.

Crosscutting to the Ella structure from the northwest face of the drift, which is 695 feet below the outcrop, might intersect this minor surface showing, but it is doubtful if the small ore lens extends to this depth.

The vertical section shown in the right-hand lower corner of the map was sketched from the first pit looking at the cliff approximately 300 feet beyond the small shaft and trench above the face of the drift. The sketch is not to scale, but it illustrates the attitudes of the veins and bedding and shows the Ella structure cutting through the steep-dipping beds of the anticline's limb.

The exploration program submitted by the applicant proposed drifting on the Ella structure to the northwest to explore under a mineralized area about 2,000 feet from the northwest drift face. This area is shown on the upper left-hand portion of plate 1.

A change in strike and dip of the vein is apparent northwest of the small shaft, as shown on the southeast portion of the map. This change is apparently due to the large transverse fault that lies a short distance to the northwest. (See pl. 2.)

There is evidence on the surface of an old caved stope that apparently was mined from the raise off the crosscut, as shown on

plate 1. The ore lens probably did not extend to the crosscut level, as it was not evident in the drift off the crosscut.

It appears economically and geologically unsound to drift over 2,000 feet from the face of the northwest drift to explore the limited potentiality of the Ella vein in this area.

Enclosures (2)
Distribution:
DMEA(4)
USBM(2)
USGS(SRO)
Nickelson
Docket

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON 25, D. C.

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
MAY 5 - 1954

May 4, 1954

Betty

Memorandum

To: W. R. Griswold, DMEA

From: O. M. Bishop, Base Metals Branch

Subject: Docket No. DMEA-3327 - Application for lead-zinc exploration by Clayton Silver Mines, Custer County, Idaho ($127,900)

I have reviewed the subject docket noting it to be reasonably well prepared, although lacking documentation in the form of samples, ore widths, etc., for the ore structure on the Ella and Climax claims. These data should be available from the 1,800 feet of drift, beginning with the Ella portal. The text of the application states that the Ella shear zone is a faulted segment of the shear zone now being mined in the Clayton mine. If this is so the ore widths, grade, dip, plunge, and nature of the country rock, and data on the mining methods adapted to the ore would be of importance in evaluating the property for further exploration.

In any case the field team should carefully review the application and examine the proposal on the ground, obtaining whatever documentation is necessary for final decision.

O. M. Bishop

O. M. Bishop

Copy to: Minerals Division
A. R. Kinkle
O. M. Bishop
Files

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON 25, D. C.

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
MAY 5 - 1954

May 4, 1954

Memorandum

To: W. R. Griswold, DMEA

From: O. M. Bishop, Base Metals Branch

Subject: Docket No. DMEA-3387 - Application for lead-zinc exploration by Clayton Silver Mines, Custer County, Idaho ($127,900)

I have reviewed the subject docket noting it to be reasonably well prepared, although lacking documentation in the form of samples, ore widths, etc., for the ore structure on the Kila and Climax claims. These data should be available from the 1,800 feet of drift, beginning with the Kila portal. The text of the application states that the Kila shear zone is a faulted segment of the shear zone now being mined in the Clayton mine. If this is so the ore widths, grade, dip, plunge, and nature of the country rock, and data on the mining methods adapted to the ore would be of importance in evaluating the property for further exploration.

In any case the field team should carefully review the application and examine the prospect on the ground, obtaining whatever documentation is necessary for final decision.

O. M. Bishop

O. M. Bishop

Copy to: Minerals Division
A. R. Kinkle
O. M. Bishop
Files

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON 25, D. C.

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
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MAY 6 - 1954

May 4, 1954

Memorandum

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From: O. M. Bishop, Base Metals Branch

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In any case the field team should carefully review the application and examine the proposal on the ground, obtaining whatever documentation is necessary for final decision.

O. M. Bishop

O. M. Bishop

Copy to: Minerals Division
A. R. Kinkle
O. M. Bishop
Files

April 29, 1954

Clayton Silver Mines
P. O. Box 890
Wallace, Idaho

Subject: DMEA-3327
Re: Exploration Assistance
Clayton Mine

Gentlemen:

The receipt of your application dated April 21, 1954 for exploration assistance under the Defense Production Act of 1950, as amended, is hereby acknowledged.

Your application has been assigned Docket Number DMEA-3327 and referred to the Base Metals Division.

Kindly refer to DMEA-3327 in any future correspondence relating to your application.

Sincerely yours,

Robert E. Adams
Chief, Operation's Control
and Statistics Division

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

April 29, 1954

Memorandum

To: Executive Officer, DMEA Field Team, Region II

From: Chief, Operation's Control and Statistics Division

Subject: Assignment of Docket Number

There is listed below the assigned docket number to an application recently received from Region II.

DMEA - 3327 Clayton Silver Mines.

Robert E. Adams,
Chief, Operation's Control
and Statistics Division

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
~~WASHINGTON 25, D.C.~~
So. 157 Howard Street
Spokane 4, Washington

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
APR 29 1954

April 26, 1954

Mr. George C. Selfridge, Chairman
Operating Committee, DMEA
Department of the Interior
Washington 25, D. C.

Re: DMEA application (lead-zinc)
Clayton Silver Mines
Custer County, Idaho

Dear Mr. Selfridge:

Enclosed please find the original and two copies of a DMEA application submitted by the Clayton Silver Mines, Custer County, Idaho. One copy of the application has been retained for the files of this office.

The Clayton Silver Mines has during recent years been one of the more prominent lead-silver producing mines in the central part of Idaho. The property has operated continuously except for a period of several months about two years ago when the mine was shut down because of a strike. At the Clayton Silver Mine the lead-silver-zinc ore occurs as replacement bodies in dolomite. These ore bodies are of large size and the mine is currently reported to have ample ore reserves. The present program is designed to explore a continuation of the Clayton ore zone in an area to the southeast beyond a large east-west fault.

At our earliest opportunity we will make a field examination of the property, following which we will forward the report to your office together with Field Team recommendations.

Sincerely yours,

Thor H. Kiilsgaard

Thor H. Kiilsgaard
Acting Member
DMEA Field Team, Region II

Enclosures
cc: USBM (2)

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

~~WASHINGTON 25, D.C.~~
So. 157 Howard Street
Spokane 4, Washington

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
APR 29 1954

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Operating Committee, DMEA
Department of the Interior
Washington 25, D. C.

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Clayton Silver Mines
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Sincerely yours,

Thor H. Kiilsgaard
Acting Member
DMEA Field Team, Region II

Enclosures
cc: USBM (2)

MF-103
(Revised April 1952)

UNITED STATES DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

Form Approved.
Budget Bureau No. 42-R1035.2.

RECEIVED
APR 23 1954
U. S. G. S.
SPOKANE, WASH.
DEPARTMENT OF
Defense Minerals
Administration
RECEIVED
APR 29 1954

APPLICATION FOR AID IN AN EXPLORATION PROJECT, PURSUANT TO DMEA ORDER 1, UNDER THE DEFENSE PRODUCTION ACT OF 1950, AS AMENDED

Not to be filled in by applicant

Docket No. 3327
Metal or Mineral Lead-Zinc
Date Received
Estimated Cost $127,900
Participation (Government %)

INSTRUCTIONS

1. *Name of applicant.*—(*a*) State here your full legal name, in the form in which you will wish to contract, and your mailing address: Clayton Silver Mines
P. O. Box 890
Wallace, Idaho

(*b*) If other than an individual, add to your name above whether a corporation, partnership, etc., and the name of the State in which incorporated or otherwise organized.

(*c*) If a corporation, add to above statement, titles, names and addresses of officers.

(*d*) If a partnership, add to the above statement the names and addresses of all partners.

2. *General.*—Read DMEA Order 1, "Government Aid in Defense Exploration Projects," before completing this application. Submit this application and all accompanying papers in quadruplicate (four copies), with your name and address on each sheet of the application and on all accompanying papers. Where sufficient space is not provided on the form for all required information, state it on an accompanying paper, with a reference in each case to the instruction to which it refers by number. Comply with all applicable instructions; or, if not applicable, so state. File the application with Defense Minerals Exploration Administration, Department of the Interior, Washington 25, D. C., or with the nearest field executive officer thereof.

3. *Applicant's property rights.*—(*a*) State the legal description of the land upon which you wish to explore, including all land which you possess or control that may be benefited by the exploration, and excluding any land or interest in land which is not to be included in the exploration project contract

(*b*) State any mine name by which the property is known.

(*c*) State your interest in the land, whether owner, lessee, purchaser under contract, or otherwise

(*d*) If you are not the owner, submit with this application a copy of the lease, contract, or other document under which you control the property.

(*e*) If you own the land, describe any liens or encumbrances on it

(*f*) If the land consists of unpatented claims, add to the description above, the book and page numbers for each recorded location notice.

4. *Physical description.*—(*a*) Describe in detail any mining or exploration operations which have been or now are being conducted upon the land, including existing mine workings and production facilities. State your interest, if any, in such operations. Also describe accessibility of mine workings for examination purposes.

(*b*) State past and current production, and ore reserves, if any, giving quantities and grades.

(*c*) Describe the geologic features of the property, including mineralization, type of deposit (vein, bedded, etc.), and your reasons for wishing to explore. Illustrate with maps or sketches. Send with your application (but not necessarily as a part of it) any geologic or engineering report, assay maps, or other technologic information you may have, indicating on each whether you require its return to you.

(*d*) State the facts with respect to the accessibility of the project: Access roads, distances to shipping, supply and residence points.

(*e*) State the availability of manpower, materials, supplies, equipment, water, and power.

5. *The exploration project.*—(*a*) State the mineral or minerals for which you wish to explore.....

(*b*) Describe fully the proposed work, including a map or sketch of the property showing a plan (and cross sections if needed) of any present mine workings, and the location of the proposed exploration work as related to such features as contacts, veins, ore-bearing beds, etc.

(*c*) The work will start within ..... days and be completed within ..... months from the date of an exploration project contract.

(*d*) State the operating experience and background of the applicant with relation to the ability to carry out such exploration project, and also that of the person or persons who will supervise the operations.

6. *Estimate of costs.*—Furnish a detailed estimate of the costs of the proposed work (you will have to use a separate sheet), under the following headings. Add the totals under all headings to give the estimated total cost of the project:

(*a*) *Independent contracts.*—(Note.—If the applicant does not intend to let any of the work to contractors, write "none" after this item. To the extent that the work is to be contracted, do not repeat the cost of the contract-work in subsequent items.) State the cost of any proposed independent contracts for the performance of all or any part of the work, expressed in terms of units of work (such as per foot of drilling, per foot of drifting, per hour of bulldozer operations, per cubic yard of material moved, etc.).

(*b*) *Labor, supervision, consultants.*—Include an itemized schedule of numbers, classes and rates of wages, salaries or fees for necessary labor, supervision and engineering and geological consultants.

(*c*) *Operating materials and supplies.*—Furnish an itemized list, including items of equipment costing less than $50 each, and power, water and fuel.

(*d*) *Operating equipment.*—Furnish an itemized list of any operating equipment to be rented, purchased, or which is owned and will be furnished by the Operator, with the estimated rental, purchase price, or suggested use-allowance based on present value, as the case may be.

(*e*) *Rehabilitation and repairs.*—Furnish a detailed list showing the cost of any necessary initial rehabilitation or repairs of existing buildings, installations, fixtures, and movable operating equipment, now owned by the Operator and which will be devoted to the exploration project.

(*f*) *New buildings, improvements, installations.*—Furnish a detailed list showing the cost of any necessary buildings, fixed improvements, or installations to be purchased, installed or constructed for the benefit of the exploration project.

(*g*) *Miscellaneous.*—Furnish a detailed list showing the cost of repairs to and maintenance of operating equipment (not including initial rehabilitation or repairs of the Operator's equipment), analytical work, accounting, workmen's compensation and employers' liability insurance, and payroll taxes.

(*h*) *Contingencies.*—Give an estimate of any necessary allowances for contingencies not included in the costs stated above.

NOTE.—No items of general overhead, corporate management, interest, taxes (other than payroll and sales taxes), or any other indirect costs, or work performed or costs incurred before the date of the contract, should be included in the estimate of costs.

7. (*a*) Are you prepared to furnish your share of the cost of the proposed project in accordance with the regulations on Government participation (Sec. 7, DMEA No. 1)?

(*b*) How do you propose to furnish your share of the costs?

☐ Money ☐ Use of equipment owned by you ☐ Other

Explain in detail on acompanying paper.

CERTIFICATION

The undersigned, whether as an individual, corporate officer, partner, or otherwise, both in his own behalf and acting for the applicant, certifies that the information set forth in this form and accompanying papers is correct and complete, to the best of his knowledge and belief.

Dated April 21, 1954

CLAYTON SILVER MINES
(Applicant)

By A H Featherstone
Vice President

Title 18, U. S. Code (Crimes), Section 1001, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

U. S. GOVERNMENT PRINTING OFFICE 16—66551-1

Clayton Silver Mines
P. O. Box 890
Wallace, Idaho

MF 103

1. (b) A corporation organized under the laws of the State of Arizona.

(c) Officers:

W. M. Yeaman, President
Box 34
Yakima, Washington

Ray Morrison, Secretary
Box 890
Wallace, Idaho

A. H. Featherstone, Vice President
Wallace
Idaho

DEPARTMENT OF THE INTERIOR
Bureau Mines Administration
RECEIVED
APR 29 1954

Clayton Silver Mines
P. O. Box 890
Wallace, Idaho

3. (a) (1) The properties of the Clayton Silver Mines are located along Kinnikinic Creek, Custer County, Idaho in parts of Sections 11, 12, 13, 14, 23, 24 and 25; T. 11 N: R. 17 E; Boise Meridian, and consist of the following contiguous groups of lode mining claims:

Ella Group - Mineral Survey No. 3144A (4 claims)

Ella	Climax
Overland	Crown

Camp Bird Group - Mineral Survey No. 3196 (25 claims)

Camp Bird	Galena No. 2 Fraction
Camp Bird No. 2	Galena No. 3
Camp Bird No. 3	Galena No. 4
Camp Bird No. 4	Galena No. 5
Camp Bird No. 5	Galena No. 6
Nancy Lee	Discovery No. 1
Lily No. 2	Discovery No. 2
Rose	Discovery No. 3
Rose No. 1	"A"
Rose No. 2	"B"
Rose No. 3	"C"
Galena No. 1	"D"
Galena No. 2	

Rose Group - Mineral Survey No. 3327 (6 claims)

Rose No. 5	Rose No. 8
Rose No. 6	Rose No. 9
Rose No. 7	Rose No. 10

Rose No. 4 Lode Claim - Mineral Survey No. 336 (1 claim)

3. (a) (2) Area to be explored and benefitted by the exploration and to be included in the exploration project contract:

Rose No. 1 lode mining claim, Mineral Survey No. 3196
Rose No. 2 lode mining claim, Mineral Survey No. 3196
Crown lode mining claim, Mineral Survey No. 3144A
Climax lode mining claim, Mineral Survey No. 3144A
Ella lode mining claim, Mineral Survey No. 3144A

Clayton Silver Mines
P. O. Box 890
Wallace, Idaho

3. (a) (3) Area to be excluded and not to be included in the exploration contract:

All remaining claims in Mineral Survey Nos. 3196, 3327, 336 and 3144A and B

3. (b) Clayton Mine

(c) Owner

(e) No liens nor incumbrances

(f) Work to be all on patented claims

4. (a) The main workings of the Clayton Mine are located in the Camp Bird, Camp Bird No. 2 and Camp Bird No. 4 lode claims and consist chiefly of a 620 foot, two compartment vertical shaft and five working levels. The bottom, 500 level, is not yet fully developed. The mine is fully equipped with modern mining machinery for efficient operations.

The surface plant is sufficient to completely accomodate efficient exploitation of the deposit as now known. The flotation mill has a capacity of 100 tons daily and is now operating 7 days a week.

Power is supplied by the Salmon River Electric Co-op, but the company has 5 electric generating units as auxillaries and two air compressors.

The area to be explored is in or in the vicinity of the Crown lode claim. Entrance will be gained through the Ella tunnel. Portal of the Ella tunnel in Rose No. 7 lode claim, is some 5,500 feet south of the Clayton main workings and at an elevation slightly below the 300 level of the Clayton mine. Nearly all mine workings are accessible for examination.

4. (b) Production History:

The present concentration mill was completed and began operating on July 3, 1935. At that time only lead-silver concentrates were produced. In June, 1942, the zinc concentrating units were completed and zinc concentrating began at that time.

The ore produced and metals recovered from the Clayton Mine from 1936 through 1953 are as follows:

Year	Oz. Silver	Pounds Lead	Pounds Copper	Oz. Gold	Pounds Zinc	Tons Ore
1936	89,467	1,279,270	5,137	39		20,215
1937	102,373	1,394,674	9,864	49		28,224
1938	124,664	1,762,301	22,118	43		37,533
1939	120,965	1,852,031	17,040	31		38,241
1940	112,597	1,842,045	17,721	37		39,354
1941	127,952	2,489,918	21,947	39		40,976
1942	138,539	3,023,618	25,165	51	1,217,405	41,259
1943	185,990	2,903,980	40,184	74	1,041,650	38,982
1944	214,418	3,407,583	33,573	78	572,615	39,258
1945	119,704	1,939,615	19,445	38	618,507	28,027
1946	41,751	758,338	6,437	14	254,167	10,764
1947	122,504	2,115,587	24,454	52	774,828	24,366
1948	96,461	1,751,723	14,944	40	847,770	29,077
1949	46,772	1,076,943	7,239	17	401,176	14,502
1950	111,029	2,391,666	18,475	32	830,859	30,749
1951	116,668	2,317,326	18,136	43	1,510,952	23,562
1952	72,953	1,316,119	15,762	28	448,702	20,518
1953	113,952	2,271,451	21,392	30	*59,414	30,267
Total	2,058,759	35,894,188	339,033	735	8,578,045	535,874

* Zinc concentrates stock piled, contents not included here.

4. (b) (Continued) Proven ore reserves at the end of the year 1953 are estimated at 93,380 tons.

4. (c) Exhibit "A":

The host rock of the Clayton Mine ore deposits is chiefly dolomite. The dolomite formation known as the Ella Dolomites is generally some 300 feet thick but at the mine in many places it has been drawn or stretch to a lesser width. The outstanding geologic structural feature is a north-south, asymmetrical anticline with its steep dipping limb to the east.

In this steep dipping east limb of the anticline a wide (some 150 feet) shear zone has developed roughly parallel to the bedding. Within the shear zone large, roughly tubular ore shoots have been discovered and exploited. The ore deposits contain considerable siderite as the essential gangue mineral. The gangue is disseminated throughout much of the zone but varies widely in abundance from place to place. Accompanying the siderite are the ore minerals galena, sphalerite and small amounts of tetrahedrite.

South of the main mine workings and near the south end of the 300 level, occurs an east-west fault. Displacement to the right along the fault is believed to be some 800 feet. South of the fault the shear zone is referred to as the Ella zone of mineralization.

The Ella shear zone is traced on its outcrop from the southern part of the Ella claim northwestward through the Ella, Climax and Crown claims. The zone disappears under overburden in the Rose No. 2 claim. The most pronounced outcroppings are found on the north end of the Crown claim. Geologically these outcroppings are similar to those of the Clayton just to the north.

Some production prior to 1900 came from the Ella zone. This production consisted of lead-zinc-silver ores similar to those now being mined from the Clayton.

In the ends of the stopes on the Ella can be found galena in siderite. Northward, along the surface and high along a precipitous valley wall can be traced the outcrop of the shear zone which in many places can be found impressive quantities of galena in siderite.

It is believed that there is a connection between ore found in the main Clayton workings and the showings found along the Ella shear zone.

4. (d) Access Roads:

U. S. Highway 93 to Clayton, thence one and one half miles by good graded road. Major supplies obtained at Salt Lake City, Utah, shipped to Mackay, Idaho thence to mine by local truck firm.

4. (e) Availability very good on all items.

Clayton Silver Mines
P. O. Box 890
Wallace, Idaho

MF 103

5. (a) Lead and zinc

5. (b) See Exhibit "A":

It is proposed to drive the Ella drift northward along the shear zone a distance of 2,100 feet, and in addition to the drifting, it is proposed to drive 500 feet crosscutting and to diamond drill 1,100 feet of exploration holes.

5. (c) Work will begin within 20 to 40 days and will be completed within 20 months after date of contract.

5. (d) Clayton Silver Mines have been continuously operating for the past 19 years. Its staff and directors are fully experienced in mining.

6. (a) Estimated Costs:

Diamond drilling 1,100 feet @ $7.50 per foot $8,250.00

6. (b) Labor, Supervision and Engineering:

Direct mining labor consisting of miners, muckers and trammer performed as piece contract with the operator at the approximate cost to operator of $12.50 per foot

2,600 feet @ $12.50 32,500.00 - $[illegible]

	Rate per Month	Cost per Month	
1 surface labor	$350.00	$350.00	
1/2 mechanic and electrician	380.00	190.00	
1/2 foreman	520.00	260.00	
Engineering and geology	350.00	350.00	
Total cost per month		$1,150.00	
Total for 20 months			23,000.00 $8.85

6. (c) Operating Materials and Supplies:

Track (rail, ties, spikes, etc)	$3,500.00	
Pipe	2,300.00	
Explosives	10,400.00	
Vent pipe	2,600.00	
Bits and drill steel	7,150.00	
Power, electric	3,000.00	
Fuel, diesel	3,000.00	
Small tools	500.00	32,450.00 $12.44

6. (d) Equipment furnished by operator on rental basis:

	Rate per Month	Cost per Month	
2 rock drills	$60.00	$120.00	
1 mucker, Eimco 12-B	250.00	250.00	
4 mine cars, 32 cubic feet	30.00	120.00	
1 locamotive and batteries	600.00	600.00	
1 air compressor	350.00	350.00	
1 fan and motor	20.00	20.00	
Total cost per month		$1,460.00	
Total for 20 months			29,200.00 $11.23

$45.00/ft.

Clayton Silver Mines
P. O. Box 890
Wallace, Idaho

6. (e) Rehabilitation:

Buildings - roof and windows	$100.00	
Fuel tanks and pump	400.00	
Tracks on dump	200.00	
Vent pipe to present face	1,800.00	
Total rehabilitation		$2,500.00
Total (b) through (e)		$119,650.00

Cost per foot of drifting and crosscutting $46.00

6. (g) None

6. (h) Included in (b)

7. (a) Yes

7. (b) By money and equipment.

MF-103
(Revised April 1952)

UNITED STATES DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

Form Approved.
Budget Bureau No. 42-R1035.2.

RECEIVED
APR 23 1954
U. S. G. S.
SPOKANE, WASH.

APPLICATION FOR AID IN AN EXPLORATION PROJECT, PURSUANT TO DMEA ORDER 1, UNDER THE DEFENSE PRODUCTION ACT OF 1950, AS AMENDED

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
APR 29 1954

Not to be filled in by applicant

Docket No. 3327
Metal or Mineral Lead-Zinc
Date Received
Estimated Cost $127,900
Participation (Government %)

INSTRUCTIONS

1. *Name of applicant.*—(*a*) State here your full legal name, in the form in which you will wish to contract, and your mailing address: Clayton Silver Mines
P. O. Box 890
Wallace, Idaho

(*b*) If other than an individual, add to your name above whether a corporation, partnership, etc., and the name of the State in which incorporated or otherwise organized.

(*c*) If a corporation, add to above statement, titles, names and addresses of officers.

(*d*) If a partnership, add to the above statement the names and addresses of all partners.

2. *General.*—Read DMEA Order 1, "Government Aid in Defense Exploration Projects," before completing this application. Submit this application and all accompanying papers in quadruplicate (four copies), with your name and address on each sheet of the application and on all accompanying papers. Where sufficient space is not provided on the form for all required information, state it on an accompanying paper, with a reference in each case to the instruction to which it refers by number. Comply with all applicable instructions; or, if not applicable, so state. File the application with Defense Minerals Exploration Administration, Department of the Interior, Washington 25, D. C., or with the nearest field executive officer thereof.

3. *Applicant's property rights.*—(*a*) State the legal description of the land upon which you wish to explore, including all land which you possess or control that may be benefited by the exploration, and excluding any land or interest in land which is not to be included in the exploration project contract

(*b*) State any mine name by which the property is known.

(*c*) State your interest in the land, whether owner, lessee, purchaser under contract, or otherwise

(*d*) If you are not the owner, submit with this application a copy of the lease, contract, or other document under which you control the property.

(*e*) If you own the land, describe any liens or encumbrances on it

(*f*) If the land consists of unpatented claims, add to the description above, the book and page numbers for each recorded location notice.

4. *Physical description.*—(*a*) Describe in detail any mining or exploration operations which have been or now are being conducted upon the land, including existing mine workings and production facilities. State your interest, if any, in such operations. Also describe accessibility of mine workings for examination purposes.

(*b*) State past and current production, and ore reserves, if any, giving quantities and grades.

(*c*) Describe the geologic features of the property, including mineralization, type of deposit (vein, bedded, etc.), and your reasons for wishing to explore. Illustrate with maps or sketches. Send with your application (but not necessarily as a part of it) any geologic or engineering report, assay maps, or other technologic information you may have, indicating on each whether you require its return to you.

(*d*) State the facts with respect to the accessibility of the project: Access roads, distances to shipping, supply and residence points.

(*e*) State the availability of manpower, materials, supplies, equipment, water, and power.

5. *The exploration project.*—(*a*) State the mineral or minerals for which you wish to explore .....

.....

(*b*) Describe fully the proposed work, including a map or sketch of the property showing a plan (and cross sections if needed) of any present mine workings, and the location of the proposed exploration work as related to such features as contacts, veins, ore-bearing beds, etc.

(*c*) The work will start within ..... days and be completed within ..... months from the date of an exploration project contract.

(*d*) State the operating experience and background of the applicant with relation to the ability to carry out such exploration project, and also that of the person or persons who will supervise the operations.

6. *Estimate of costs.*—Furnish a detailed estimate of the costs of the proposed work (you will have to use a separate sheet), under the following headings. Add the totals under all headings to give the estimated total cost of the project:

(*a*) *Independent contracts.*—(Note.—If the applicant does not intend to let any of the work to contractors, write "none" after this item. To the extent that the work is to be contracted, do not repeat the cost of the contract-work in subsequent items.) State the cost of any proposed independent contracts for the performance of all or any part of the work, expressed in terms of units of work (such as per foot of drilling, per foot of drifting, per hour of bulldozer operations, per cubic yard of material moved, etc.).

(*b*) *Labor, supervision, consultants.*—Include an itemized schedule of numbers, classes and rates of wages, salaries or fees for necessary labor, supervision and engineering and geological consultants.

(*c*) *Operating materials and supplies.*—Furnish an itemized list, including items of equipment costing less than $50 each, and power, water and fuel.

(*d*) *Operating equipment.*—Furnish an itemized list of any operating equipment to be rented, purchased, or which is owned and will be furnished by the Operator, with the estimated rental, purchase price, or suggested use-allowance based on present value, as the case may be.

(*e*) *Rehabilitation and repairs.*—Furnish a detailed list showing the cost of any necessary initial rehabilitation or repairs of existing buildings, installations, fixtures, and movable operating equipment, now owned by the Operator and which will be devoted to the exploration project.

(*f*) *New buildings, improvements, installations.*—Furnish a detailed list showing the cost of any necessary buildings, fixed improvements, or installations to be purchased, installed or constructed for the benefit of the exploration project.

(*g*) *Miscellaneous.*—Furnish a detailed list showing the cost of repairs to and maintenance of operating equipment (not including initial rehabilitation or repairs of the Operator's equipment), analytical work, accounting, workmen's compensation and employers' liability insurance, and payroll taxes.

(*h*) *Contingencies.*—Give an estimate of any necessary allowances for contingencies not included in the costs stated above.

NOTE.—No items of general overhead, corporate management, interest, taxes (other than payroll and sales taxes), or any other indirect costs, or work performed or costs incurred before the date of the contract, should be included in the estimate of costs.

7. (*a*) Are you prepared to furnish your share of the cost of the proposed project in accordance with the regulations on Government participation (Sec. 7, DMEA No. 1)?

(*b*) How do you propose to furnish your share of the costs?

☐ Money ☐ Use of equipment owned by you ☐ Other

Explain in detail on acompanying paper.

CERTIFICATION

The undersigned, whether as an individual, corporate officer, partner, or otherwise, both in his own behalf and acting for the applicant, certifies that the information set forth in this form and accompanying papers is correct and complete, to the best of his knowledge and belief.

Dated April 21, 1954

CLAYTON SILVER MINES
(Applicant)

By A. H. Featherstone
Vice President

Title 18, U. S. Code (Crimes), Section 1001, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

U. S. GOVERNMENT PRINTING OFFICE 16—66551-1

Clayton Silver Mines
P. O. Box 890
Wallace, Idaho

MF 103

1. (b) A corporation organized under the laws of the State of Arizona.

(c) Officers:

W. M. Yeaman, President
Box 34
Yakima, Washington

Ray Morrison, Secretary
Box 890
Wallace, Idaho

A. H. Featherstone, Vice President
Wallace
Idaho

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
APR 29 1954

Clayton Silver Mines
P. O. Box 890
Wallace, Idaho

3. (a) (1) The properties of the Clayton Silver Mines are located along Kinnikinic Creek, Custer County, Idaho in parts of Sections 11, 12, 13, 14, 23, 24 and 25; T. 11 N: R. 17 E; Boise Meridian, and consist of the following contiguous groups of lode mining claims:

Ella Group - Mineral Survey No. 3144A (4 claims)

Ella	Climax
Overland	Crown

Camp Bird Group - Mineral Survey No. 3196 (25 claims)

Camp Bird	Galena No. 2 Fraction
Camp Bird No. 2	Galena No. 3
Camp Bird No. 3	Galena No. 4
Camp Bird No. 4	Galena No. 5
Camp Bird No. 5	Galena No. 6
Nancy Lee	Discovery No. 1
Lily No. 2	Discovery No. 2
Rose	Discovery No. 3
Rose No. 1	"A"
Rose No. 2	"B"
Rose No. 3	"C"
Galena No. 1	"D"
Galena No. 2	

Rose Group - Mineral Survey No. 3327 (6 claims)

Rose No. 5	Rose No. 8
Rose No. 6	Rose No. 9
Rose No. 7	Rose No. 10

Rose No. 4 Lode Claim - Mineral Survey No. 3336 (1 claim)

3. (a) (2) Area to be explored and benefitted by the exploration and to be included in the exploration project contract:

Rose No. 1 lode mining claim, Mineral Survey No. 3196
Rose No. 2 lode mining claim, Mineral Survey No. 3196
Crown lode mining claim, Mineral Survey No. 3144A
Climax lode mining claim, Mineral Survey No. 3144A
Ella lode mining claim, Mineral Survey No. 3144A

Clayton Silver Mines
P. O. Box 890
Wallace, Idaho

3. (a) (3) Area to be excluded and not to be included in the exploration contract:

All remaining claims in Mineral Survey Nos. 3196, 3327, 336 and 3144A and B

3. (b) Clayton Mine

(c) Owner

(e) No liens nor incumbrances

(f) Work to be all on patented claims

Clayton Silver Mines
P. O. Box 890
Wallace, Idaho

4. (a) The main workings of the Clayton Mine are located in the Camp Bird, Camp Bird No. 2 and Camp Bird No. 4 lode claims and consist chiefly of a 620 foot, two compartment vertical shaft and five working levels. The bottom, 500 level, is not yet fully developed. The mine is fully equipped with modern mining machinery for efficient operations.

The surface plant is sufficient to completely accomodate efficient exploitation of the deposit as now known. The flotation mill has a capacity of 100 tons daily and is now operating 7 days a week.

Power is supplied by the Salmon River Electric Co-op, but the company has 5 electric generating units as auxillaries and two air compressors.

The area to be explored is in or in the vicinity of the Crown lode claim. Entrance will be gained through the Ella tunnel. Portal of the Ella tunnel in Rose No. 7 lode claim, is some 5,500 feet south of the Clayton main workings and at an elevation slightly below the 300 level of the Clayton mine. Nearly all mine workings are accessible for examination.

4. (b) Production History:

The present concentration mill was completed and began operating on July 3, 1935. At that time only lead-silver concentrates were produced. In June, 1942, the zinc concentrating units were completed and zinc concentrating began at that time.

The ore produced and metals recovered from the Clayton Mine from 1936 through 1953 are as follows:

Year	Oz. Silver	Pounds Lead	Pounds Copper	Oz. Gold	Pounds Zinc	Tons Ore
1936	89,467	1,279,270	5,137	39		20,215
1937	102,373	1,394,674	9,864	49		28,224
1938	124,664	1,762,301	22,118	43		37,533
1939	120,965	1,852,031	17,040	31		38,241
1940	112,597	1,842,045	17,721	37		39,354
1941	127,952	2,489,918	21,947	39		40,976
1942	138,539	3,023,618	25,165	51	1,217,405	41,259
1943	185,990	2,903,980	40,184	74	1,041,650	38,982
1944	214,418	3,407,583	33,573	78	572,615	39,258
1945	119,704	1,939,615	19,445	38	618,507	28,027
1946	41,751	758,338	6,437	14	254,167	10,764
1947	122,504	2,115,587	24,454	52	774,828	24,366
1948	96,461	1,751,723	14,944	40	847,770	29,077
1949	46,772	1,076,943	7,239	17	401,176	14,502
1950	111,029	2,391,666	18,475	32	830,859	30,749
1951	116,668	2,317,326	18,136	43	1,510,952	23,562
1952	72,953	1,316,119	15,762	28	448,702	20,518
1953	113,952	2,271,451	21,392	30	*59,414	30,267
Total	2,058,759	35,894,188	339,033	735	8,578,045	535,874

* Zinc concentrates stock piled, contents not included here.

4. (b) (Continued) Proven ore reserves at the end of the year 1953 are estimated at 93,380 tons.

4. (c) Exhibit "A":

The host rock of the Clayton Mine ore deposits is chiefly dolomite. The dolomite formation known as the Ella Dolomites is generally some 300 feet thick but at the mine in many places it has been drawn or stretch to a lesser width. The outstanding geologic structural feature is a north-south, asymmetrical anticline with its steep dipping limb to the east.

In this steep dipping east limb of the anticline a wide (some 150 feet) shear zone has developed roughly parallel to the bedding. Within the shear zone large, roughly tubular ore shoots have been discovered and exploited. The ore deposits contain considerable siderite as the essential gangue mineral. The gangue is disseminated throughout much of the zone but varies widely in abundance from place to place. Accompanying the siderite are the ore minerals galena, sphalerite and small amounts of tetrahedrite.

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The Ella shear zone is traced on its outcrop from the southern part of the Ella claim northwestward through the Ella, Climax and Crown claims. The zone disappears under overburden in the Rose No. 2 claim. The most pronounced outcroppings are found on the north end of the Crown claim. Geologically these outcroppings are similar to those of the Clayton just to the north.

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In the ends of the stopes on the Ella can be found galena in siderite. Northward, along the surface and high along a precipitous valley wall can be traced the outcrop of the shear zone which in many places can be found impressive quantities of galena in siderite.

It is believed that there is a connection between ore found in the main Clayton workings and the showings found along the Ella shear zone.

4. (d) Access Roads:

U. S. Highway 93 to Clayton, thence one and one half miles by good graded road. Major supplies obtained at Salt Lake City, Utah, shipped to Mackay, Idaho thence to mine by local truck firm.

4. (e) Availability very good on all items.

6. (e) Rehabilitation:

Buildings - roof and windows	$100.00	
Fuel tanks and pump	400.00	
Tracks on dump	200.00	
Vent pipe to present face	1,800.00	
Total rehabilitation		$2,500.00
Total (b) through (e)		$119,650.00

Cost per foot of drifting and crosscutting $46.00

6. (g) None

6. (h) Included in (b)

5. (a) Lead and zinc

5. (b) See Exhibit "A":

It is proposed to drive the Ella drift northward along the shear zone a distance of 2,100 feet, and in addition to the drifting, it is proposed to drive 500 feet crosscutting and to diamond drill 1,100 feet of exploration holes.

5. (c) Work will begin within 20 to 40 days and will be completed within 20 months after date of contract.

5. (d) Clayton Silver Mines have been continuously operating for the past 19 years. Its staff and directors are fully experienced in mining.

6. (a) Estimated Costs:

Diamond drilling 1,100 feet @ $7.50 per foot	$8,250.00

6. (b) Labor, Supervision and Engineering:

Direct mining labor consisting of miners, muckers and trammer performed as piece contract with the operator at the approximate cost to operator of $12.50 per foot

2,600 feet @ $12.50			32,500.00
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1/2 foreman	520.00	260.00	
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Total for 20 months			23,000.00

6. (c) Operating Materials and Supplies:

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Pipe	2,300.00	
Explosives	10,400.00	
Vent pipe	2,600.00	
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Power, electric	3,000.00	
Fuel, diesel	3,000.00	
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6. (d) Equipment furnished by operator on rental basis:

	Rate per Month	Cost per Month	
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4 mine cars, 32 cubic feet	30.00	120.00	
1 locomotive and batteries	600.00	600.00	
1 air compressor	350.00	350.00	
1 fan and motor	20.00	20.00	
Total cost per month		$1,460.00	
Total for 20 months			29,200.00

7. (a) Yes

7. (b) By money and equipment.

DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
224 NEW CUSTOMHOUSE
DENVER 2, COLORADO

OFFICIAL BUSINESS

C. O. Mittendorf, Administrator
Defense Minerals Exploration Adm.
Interior Building
Washington 25, D. C.

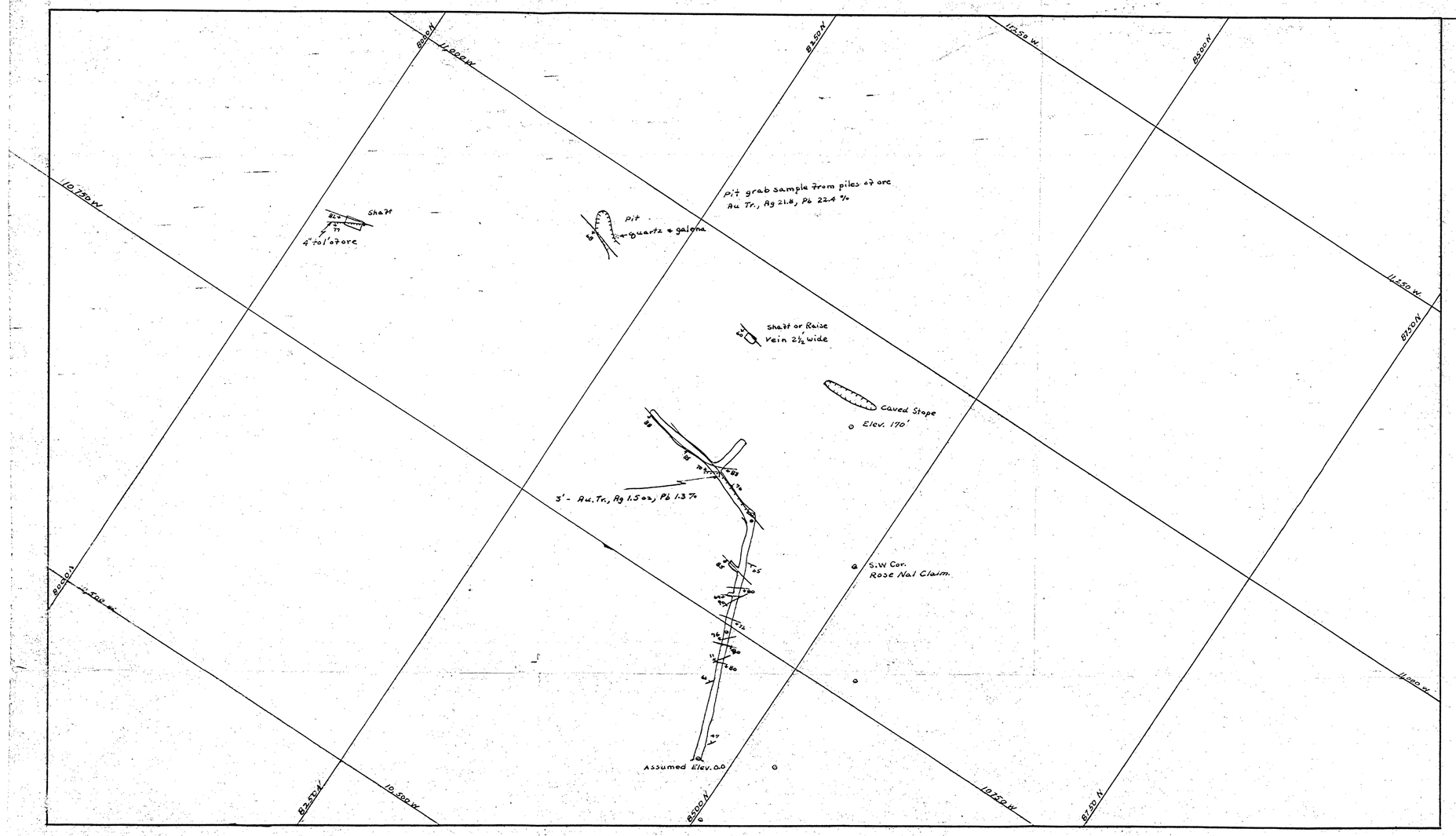
(PMGC)

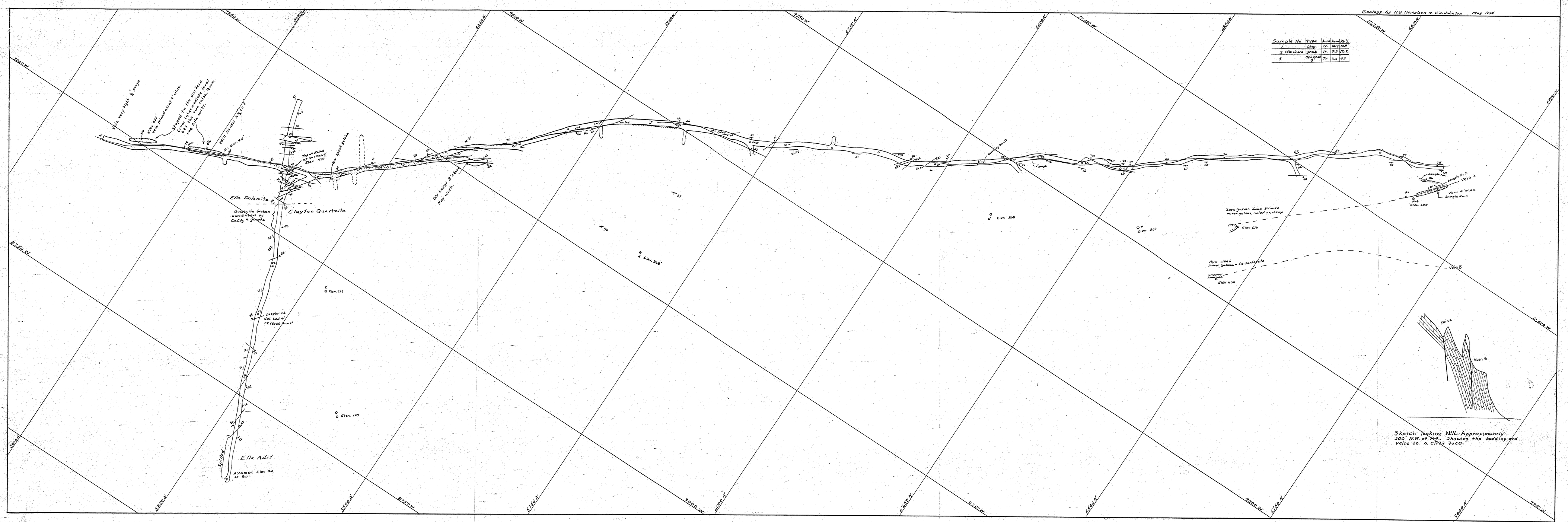
Docket No. DMEA 3327

ELLA MINE

CUSTER COUNTY, IDAHO

SCALE 1" = 50'





Geology by H.B. Nicholson & V.Z. Johnson May 1958

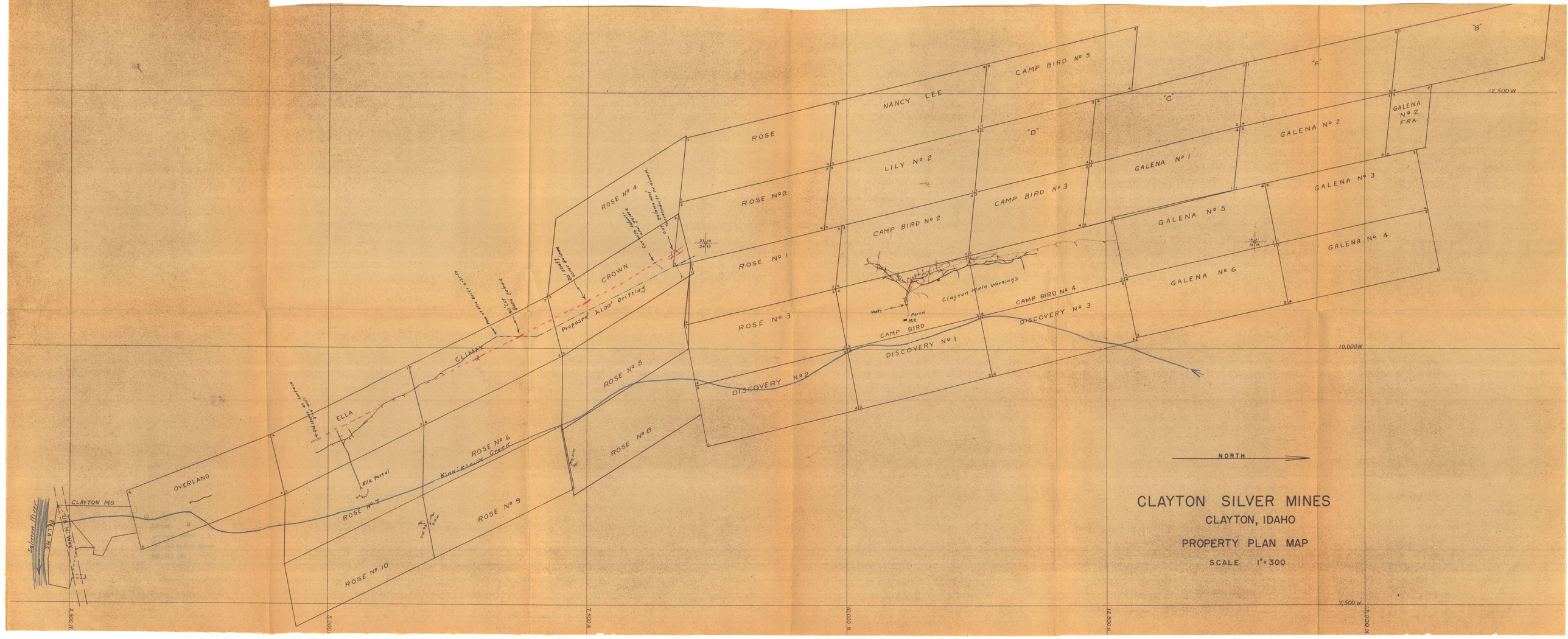
Sample No.	Type	Au oz/t	Ag oz/t	Pb %
1	chip	Tr.	18.4	12.8
2 Pile of ore	grab	Tr.	9.3	12.2
3	chip	Tr	3.3	4.9

Sketch looking N.W. Approximately 300' N.W. of Pit. Showing the bedding and veins on a cliff face.

Plate No 1

GEOLOGIC MAP
OF THE
CLAYTON AREA
CUSTER COUNTY, IDAHO
By IRVIN TAILLEUR
EXPLANATION
SEDIMENTARY ROCKS
QUATERNARY
Qal
ALLUVIUM
Ql
TALUS
ORDOVICIAN
Osm
SATURDAY MTN FM. IORE HORIZON
Oksb
SOUTH BUTTE QTZTE
KINNIKINIC QUARTZITE
Oke
ELLA DOLO
Okc
CLAYTON QTZTE
Okl
LOWER MEMBER
Or
RAMSHORN SLATE
IGNEOUS ROCKS
MIOCENE
Tcv
CHALLIS VOLCANICS
gb
GABBRO
FAULT
INFERRED FAULT
CONTACT
INFERRED CONTACT
20°
1000 500 0 1000 2000 3000 FT
T12N
T11N
R17E
R18E
RED BIRD MINE
BRUNO CR.
SQUAW CREEK
SOUTH BUTTE MINE
ROB ROY PROPERTIES
CLAYTON SILVER MINE
KINNIKINIC CREEK
ELLA MINE
SALMON RIVER
SULLIVAN CREEK
FRENCH CREEK
A
A'
B
B'
C
C'
D
D'

Plate No. 2


CLAYTON SILVER MINES
CLAYTON, IDAHO
PROPERTY PLAN MAP
SCALE 1" = 300
NORTH
Salmon River
CLAYTON MS
U.S. HIGHWAY
OVERLAND
ELLA
Ella Portal
Kinnikinick Creek
CLIMAX
ROSE No 7
ROSE No 6
ROSE No 9
ROSE No 10
ROSE No 8
ROSE No 5
ROSE No 4
CROWN
Proposed Adit Drifting
ROSE No 3
ROSE No 1
ROSE No 2
ROSE
DISCOVERY No 2
DISCOVERY No 1
CAMP BIRD
Clayton Main Workings
Shaft
Portal
Mill
CAMP BIRD No 4
DISCOVERY No 3
CAMP BIRD No 2
CAMP BIRD No 3
LILY No 2
NANCY LEE
CAMP BIRD No 5
"D"
"C"
"A"
"B"
GALENA No 1
GALENA No 2
GALENA No 2 FRA.
GALENA No 3
GALENA No 4
GALENA No 5
GALENA No 6
12,500 W
10,000 W
7,500 W
2,500 N
5,000 N
7,500 N
10,000 N
12,500 N
14,000 N