State Department of Geology and Mineral Industries

1069 State Office Building
Portland 1, Oregon

See L. Powder R. Iron

POWDER RIVER IRON OCCURRENCES

Sparta-Sheep Mtn. District
Baker County, Oregon

Foreword: This report represents a summation of data concerning the geology and history of prospect activity pertaining to a number of occurrences of iron ore located on the north flank of the Powder River in the canyon section between the Lower Powder and Eagle Valleys. It supercedes and replaces previous file reports entitled "Powder River Consolidated Mines Company", by N. S. Wagner, March 1944 and the follow-up Supplement No. 1, May 1, 1953. It also includes much of the geologic data described in a special file report made by Hal Prostka, September 1960.

Location and Ownership: Two occurrences are in the N½, Section 32, T. 8 S., R. 44 E. These are recorded as claimed by Culley and Elmer Trickel, Baker, Oregon. Another occurrence is located near the north quarter corner, Section 4, T. 9 S., R. 44 E. and has been held for a period of many years by Culley Trickel. A cluster of other occurrences including the strongest single showing yet exposed in the area is situated near the east quarter corner, Section 4, T. 8 S., R. 44 E., probably overlapping somewhat into Section 3. These are currently held by Walter, Harden, Alice and Merle Hanby of Baker, Oregon.

Most of the occurrences have a record of having been

held previously by Martin B. Taylor, Richland, Oregon, whose War Baby Claims covered the showings in Section 4 as early as August 1942. However, in 1944 it was thought that the mineral rights for these showings vested in a ranch title owned by Clyde Wilkensen and the occurrences were leased for a short time by F. M. Gunn, Medical Springs, Oregon and Walter Gardner, Union, Oregon, until the claim status situation was clarified.

The names of several other individuals have been identified with these occurrences over the years but whether in the capacity of claim owners or lessees is not now clear nor particularly pertinent. Old prospect pits observed on the occurrences at the time of the first recorded departmental visitation in 1944 probably constituted the Taylor location work of 1942.

Approximate distance by State Highway #86 (paved) to rail facilities in Baker is 30 miles. Physiographic conditions in the vicinity of the prospects in Section 4 are characterized by rugged topography with an elevation difference of around 400' between the road (BM 2467) and the occurrences. The prospects in section 32 are located at an elevation of 3300 feet and near the head of a relatively smooth but sloping meadow. All prospects are serviced by secondary roads with the best access being by dirt road leaving the Sparta road at a point approximately one mile north of the highway 86 junction. The land surface is covered with grass and sage only and on

the crests and flanks of many of the hills soil is frequently scant to lacking.

History: The first recorded examination of any of the several iron occurrences in this area by representatives of this department took place during February 1944 as the result of a request submitted by F. M. Gunn and Walter Gardner. Since 1944 the various prospects have been re-visited on several occasions by different members of the department's technical staff. The most recent of these follow-up examinations occurred during the late summer of 1960. This examination, made by the writer and Dr. Harold J. Prostka, resulted in a special file report concerning the probable geologic origin of the iron occurrences.

Another aspect of activity in connection with these occurrences is that they have been examined by many representatives of private industry. These examinations began during World War II when iron or similar heavy aggregate was periodically in urgent demand by the shipyards for ballast. During subsequent years, however, the objective of examinations shifted to appraisal of the occurrences as a source of ore for smelting purposes. Examinations for this objective were made by representatives of several domestic mining concerns and by agents for shipping companies and Japanese industrial interests. Although none of these independent examiners followed up their initial investigations by the expenditure of prospect-development capital, it is to be noted that most of the prospects have been explored extensively by dozer trenches put in from time to time by several of the various claim owners and their associates. This includes the production in

early 1962 of a two-car test shipment from one of the strongest showings.

Geology: The ore is a hematite-magnetite mixture, nearly black in color and generally massive in its manner of occurrence. Presently exposed showings range from a lens-shaped body three to six feet wide by several tens of feet long to pods having very considerably lesser proportions. The ore appears similar in all occurrences and usually contains in excess of 65-percent iron with phosphorus and sulphur negligible in amount. Analyses of grab samples from three occurrences indicate a TiO_2 content of approximately one percent. (Analytical results covering two shipments totalling in excess of 100 short tons are given in detail later).

Geologic study of the Sparta quadrangle by Prostka, 1962, has disclosed that the occurrences are located in a gradational contact zone between albite granite and quartz diorite intrusives which have been intruded in turn during the late Triassic by a swarm of basic dikes. These dikes are lithologically similar to the spillite flows found in the Clover Creek greenstone located elsewhere in the quadrangle and they probably represent feeder dikes for the Clover Creek spillites.

Shearing subsequent to emplacement has altered many of these dikes to a dark green, fine-grained schist which releases much iron oxide upon weathering. The dikes are most abundant in the albite diorite phase of the pluton where they usually occur as linear bodies one to five feet wide and traceable for hundreds of feet. However, in the instance of the swarm bordering the albite granite-quartz diorite contact in the vicinity

of the iron prospects the dikes occur on a larger scale and are described as being "tens of feet wide and traceable for over a mile".

The entire pluton has undergone deformation with especially intense shearing along NW-trending zones. Therefore, since the orebodies occur either adjacent to the dikes or nearby in the sheared and silicified granitics, and since the dikes are notably iron-rich, the indications are that the orebodies represent segregations of the iron released from the dikes as a result of the secondary shearing and the induced metamorphism.

Under such conditions of origin the freed iron is sometimes able to accumulate and develop into occurrences of secondary nature at intervals along the shear zones where structural situations favor concentration and the size of any deposit formed at any particular place is governed by both the structural environment at that place and the amount of freed iron available for concentration. In view of these circumstances of genesis, prospects can be expected to occur at numerous, widely-dispersed locations along the shear zones and most of the occurrences will rate as separate and distinct entities between which there is little geologic liklihood of there being any interconnection of ore over and beyond the basic relationship-in-common of the occurrences to the associated dikes and shear zones. Since the dikes are notably abundant and strong in the contact area bordering the river it is entirely logical that occurrences of iron should be found more frequently in this area than in other portions of

the pluton containing fewer dikes.

The map accompanying this report spots the location of the known prospects and the distribution of rock types in the surrounding area. It was adapted from the larger geologic map of the Sparta quadrangle, by Prostka, 1962, to which the reader is referred for a more comprehensive description of the rock units and geologic setting than is given here.

Economics: Two car loads of ore taken from the strongest occurrence and shipped to the Hanna Nickel Smelter at Riddle, Oregon during the forepart of the summer of 1962 by Messers. Burdock and McClure, associates of one of the property owners, rates as the only known production to have been shipped from any of the occurrences. Pertinent statistics furnished by the Hanna Company concerning the assay value of these shipments is as follows:

Lot	Short tons (wet basis)	Fe%	SiO_2%	P%	S%
1.	61.95	67.2	2.07	0.005	0.005
2.	49.40	67.4	1.72	0.005	0.003

Ore of this grade is industrially acceptable and would most certainly support an attractive mining operation if present in sufficient quantity to justify an operation. To the extent that this is true the Powder River occurrences have merited preliminary exploratory attention. Unfortunately the reserve requirements for a successful iron-mining operation are customarily reckoned in the millions of tons while at best the dimensions of the Powder River occurrences as revealed to date cannot be described as having proved out to indicate a tonnage

potential even remotely approximating such a standard. In fact several of the original showings have turned out to be pods of very small proportions.

References: Prostka, H. J.; 1962, Geology of the Sparta Quadrangle, Oregon Department of Geology & Mineral Industries.

Prostka, H. J.; 1960, Lower Powder River Iron Occurrences, Oregon Department of Geology & Mineral Industries, unpublished file report.

Ross, C. P.; 1938, The Geology of Part of the Wallowa Mountains, Oregon Department of Geology & Mineral Industries, Bulletin #3.

Wedge, H. O.; Smelter Superintendent, Hanna Nickel Company, 1962; Personal communication covering shipment analyses.

Report by N. S. Wagner
January, 1963

State Department of Geology and Mineral Industries

702 Woodlark Building
Portland 5, Oregon

Powder River Consolidated Iron Company (Iron)

Sparta District
Baker County

This is Supplement No. 1 to a report written under the above title by N. S. Wagner, March 7, 1944.

General: The company mentioned in the original report is no longer in existence and the bulk of the iron showings formerly held by them are now held by claim (the War baby) by Mr. Martin B. Taylor, Box 303, Richland, Oregon.

According to Taylor the deeded land mentioned in the original report is now owned by Mr. Grant T. Shold, Richland. Furthermore, contrary to the inference in the original report, this deeded land does not carry the mineral rights so that the original company was in error in leasing the land in the first place, when, under the circumstances, they should have staked mining claims thereon. Nevertheless, Taylor reports having made a cash settlement with the original company by way of clearing property titles amongst all interested persons.

Report by: N.S.Wagner
Informant: Martin B. Taylor

RESUME OF NOTES TAKEN DURING EXAMINATION OF
POWDER RIVER CONSOLIDATED MINING COMPANIES HOLDINGS.

Examination by: N. S. Wagner
Date of examination: February 23, 1944

Accompanied in field by: Mr. F. M. Gunn and Mr. Walter Gardner, owners and instigators of this company, and Mr. Gardner's son and Mr. Hewlitt who was a disinterested visitor.

For location of sites visited see accompanying map.

Test pit #1. This used to be about 10' x 20', but is old and so filled with slough that only a few loose chinks of iron and one large one about three feet through are to be seen. The large one probably is in place. This pit is situated on the crest of a high, narrow ridge. Sufficient exposures of bedrock show that the iron doesn't strike parallel with this ridge. While occasional pieces of iron can be found down a steep draw which heads from this pit and runs in a S40W direction therefrom, these may very well be pieces which were dug from the hole and which have since rolled down the draw. Mr. Gunn talked about the vein striking at right angles to the ridge and running down the hill on either side, but careful search by Mr. Gardner Jr. and me in spite of Mr. Gunn's insistence on not taking the time revealed no trace of float on the slope to the west whatsoever. All parties fanned out down the slope to the east enroute to the 2nd pit instead of taking the circuitous, but level, path around the canyon. While thin basalt covered part of the slope, considerable bedrock was exposed. No one found any sign of ore either down this slope or up the opposite one although Mr. Gunn was very positive about the veins going through there. A grab sample from this pit, EB 13, was assayed with the following results.

Fe	66.78 %
TiO_2	1.09
P.	0.015
S.	Trace.

Test pit #2. This is situated somewhat more than ½ mile distant from #1 in a slightly east of south direction, as judged from its assigned location on the topographic map for Pine Quad. A lense of iron about 3' thick, striking N85E and dipping 45 degrees to the S is exposed for about 25'. This is also on the crest of a ridge and Mr. Gardner reports having found no trace of iron down the long, steep slope to the West. However, unprospected croppings did show on the relatively flat top to the east for an estimated 50'. A steep local gully crosses the strike here and although Gardner, Gunn and I zigzagged through here along the projected line of strike, no iron was found on either slope. The country rock here is light colored and quite soft and probably is one of the islands of schist Ross speaks of. Maybe just deeply weathered granite. Sample EB 14, a grab sample assayed as follows.

Fe	68.5 %
TiO_2	1.08
P.	0.0145
S	Trace

Test pit #3. This is an old caved cut on the west slope of the same ridge that #2 is on but it is situated quite some distance down the slope to the east. Only a few loose pieces of iron were to be seen. While this is on the projected strike of the lense exposed in #2, it is separated bu about 400 yards of country on which no evidence of iron was seen.

Test pit #4. This occurs near the base of the same eastern hillside that #3 is on, but it is some 700 to 800 yards to the north (slightly east) of #3. Here an inadquate cut shows about 18" of iron in the face. None is apparent on up the hill to the west, but unprospected croppings do extned some 50' down the hill. In one place the cropping appears to attain the width of 20", but this may very well be due to one or more parallel lenses. In any event, it is very local. Sample EB 15, agrab, came from here and assayed as follows.

Fe	67.75%
TiO_2	0.85
P.	0.017
S.	Trace

In looking for another occurrence which was never found, a traverse was made to about the north center of Section 3 and thence due south to the cars.

We then drove to the Macy Mine and hiked to the location shown on the map, this supposedly being a big "blowout" of iron. This "blowout" occurs at the base of a considerable thickness of basalt and is either a coarsely crystalline phase of the basalt or a local and relatively basic intrusive. Sample EB 16 came from here and was sent in for petrographic analysis, being reported as follows. "Probably a diabase and composed of plagioclase, probably labradorite, augite and magnetite. It may be a very coarse grained basalt, but I would suspect from what you say, plus the appearance of the rock, that it is a dike rock."

Gardner had operated a mine owned by Mr. Hewlitt's father here some thirteen years ago and has at various times been employed at the Macy. He was admittedly going on his recollections when he included this "blowout" as another iron ore showing, and he recognized it as not being such immediately. Mr. Gunn however, spoke at great length about recovering substantial quantities of an unknown metal by a special process of his from rock "very similar to this, but somewhat more serpentinized" located somewhere else.

Both Gardner and Gunn seem thoroughly satisfied with the worth of this property and with the potential reserves and statements, to the contrary, or questions or suggestions by me relative to the need for tremendous tonnage, the lack of tonnage here, the need for proving up their beliefs - the lack of likelihood of doing so, etc., fell on completely deaf ears.

6/46

Powder River Consolidated Mines Co — Iron

NAME — OLD NAMES — PRINCIPAL ORE — MINOR MINERALS

8 S — 44 E — 32-33 + 3+4 respectively.
T — R — S

PUBLISHED REFERENCES

Baker ..... COUNTY

Sparta ..... AREA

3000 ..... ELEVATION

Baker Richland Highway ..... ROAD OR HIGHWAY

35 miles to Baker ..... DISTANCE TO SHIPPING POINT

MISCELLANEOUS RECORDS

PRESENT LEGAL OWNER (S) F M Gunn ..... Address Medical Springs, Oregon

OPERATOR none

Name of claims	Area	Pat.	Unpat.
720 acres deeded land			
4			✓

Name of claims	Area	Pat.	Unpat.

EQUIPMENT ON PROPERTY none

MI-21

DEPARTMENTAL RECORDS on file in	P'land	G.P.	Baker
REPORTS			
Powder River Consolidated Mines Co NSW Mar 7 1944			X
SHIPMENT AND ASSAY RECORDS			
MAPS			

POWDER RIVER IRON OCCURRENCES — Powder River Consolidated Mines Co. — Iron

NAME | OLD NAMES | PRINCIPAL ORE | MINOR MINERALS

8 and 9S (T) | 44E (R) | 32-33 & 3 & 4 resp. (S)

Baker ..... COUNTY

Sparta ..... AREA

3000' ..... ELEVATION

Baker-Richland Highway ..... ROAD OR HIGHWAY

35 miles to Baker ..... DISTANCE TO SHIPPING POINT

PUBLISHED REFERENCES

Geologic Map Sparta Quad, Prostka, 1962

MISCELLANEOUS RECORDS

PRESENT LEGAL OWNER (S) ..... Walt & Harden Hanby ..... Address ..... Baker, Oregon .....

..... Culley & Elmer Trickel ... . Baker, Oregon .....

....

....

OPERATOR ..... None .....

Name of claims	Area	Pat.	Unpat.
720 acres deeded land			x

Name of claims	Area	Pat.	Unpat.

EQUIPMENT ON PROPERTY

MI-21

DEPARTMENTAL RECORDS on file in	P'land	G.P.	Baker
REPORTS			
Powder River Consolidated Mines Co NSW. March 7, 1944			x
Supplement No. 1 to above report, by NSW May 18, 1953	x		x
Lower Powder River Iron Occurrences by H. Prostka 9-21-60	x		x
Powder River Iron Occurrences, N. S. W. January, 1963	x		x
SHIPMENT AND ASSAY RECORDS			
Hanna Nickel Smelting Company, Riddle, Oregon. Letter Oct. 8, 1962			x
MAPS			

State Department of Geology and Mineral Industries

1069 State Office Building
Portland 1, Oregon

See Powder R. Iron

December 28, 1962

Lower Powder River Iron Occurrences

Sparta-Sheep Mountain District
Baker County

Location: T 8 & 9S, R 44 E.

The magnetite deposits are found in the albite granite and quartz diorite phases of what has been called the Albite Granite, Ross (1938, p. 45). The intrusive ranges in composition from quartz-albite granophyre, and quartz diorite to gabbro and pyroxenite. Every gradation between these rock types are found. When unaltered, the albite granite is a light gray, coarse-grained, rock consisting of quartz and albite with some partially chloritized biotite. The quartz diorite consists predominantly of plagioclase and hornblende with varying amounts of quartz and biotite.

Basic dikes intrude the plutonic rocks. They are either dark green, dense, and of very fine grain, or medium-grained with coarse plagioclase phenocrysts. Both types have been metamorphosed to the greenschist facies as have the Triassic sediments. The tertiary basaltic dikes have not been so affected, hence it is concluded that the basic dikes were emplaced prior to the post-Upper Triassic deformation. These basic dikes are most abundant in the albite granite phase of the pluton usually occurring as linear bodies one to five feet wide and often traceable for hundreds of feet. Upon weathering they free much iron oxide, much more so than the metabasalts of the Clover Creek greenstone, indicating their much higher iron content.

Deformation, especially intense shearing along NW-trending zones has altered the character of this complex of rocks. The albite granite becomes a white sugary mylonite, or when silicified, a light gray, very brittle cherty rock. The quartz diorite alters to a dark gray aphanitic mass with quartz-albite veinlets coursing through it. Quartz, albite, and epidote segregations are present as veins up to a foot wide. Shearing alters the basic dikes to dark green, fine-grained schist.

The magnetite deposits are located in a gradational contact zone between the albite granite and quartz diorite which has been intruded by a swarm of basic dikes. These dikes are tens of feet wide and traceable for over a mile from BM 2416 along the Powder River northwestward into the southern border of section 33. The magnetite bodies occur either adjacent to the dikes or in the sheared and silicified granitic rocks. Since the dikes were noted to be iron-rich it is probable that there is a genetic relationship between the magnetite deposits and the presence of the dike swarm.

The suggested hypothesis of origin is that iron-rich basic dikes intruded along a N 50-60 W-trending shear zone were later altered by renewed movement. This effected low-grade metamorphism and some sort of metamorphic segregation of the iron into pod-like bodies of magnetite.

Report by: Hal Protska
September 21, 1960