

O T T A W A

January 15th, 1943.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1343.

Concentration Tests on Chromite Ores
from Ferguson and Scotty Creeks,
Ashcroft Mining Division,
British Columbia.

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Shipment:

Thirty-four sacks of chromite ore, total weight 2,400 pounds, were received on November 6th, 1942, from Douglas B. Sterrett, 328 St. Paul Street, Kamloops, British Columbia. The shipment was sent to these laboratories on the advice of Dr. H.M.A. Rice, Geologist, Mines and Geology Branch, Department of Mines and Resources, Ottawa.

The four different lots of ore comprising the shipment are listed below, together with the designation letter given them for this investigation:

Ferguson Creek West	-	99 lb.	(A)
" " East	-	998 "	(B)
Scotty Creek North	-	123 "	} (Composite C.)
" " South	-	282 "	

Location of the Properties:

The Ferguson Creek property is situated two miles from the mouth of Ferguson creek. The Scotty Creek property is located six miles upstream on Scotty creek. Both creeks are tributaries of the Bonaparte river, in the Ashcroft mining division, British Columbia.

Sampling and Analysis:

The four lots were crushed separately through the rolls to minus $\frac{1}{4}$ inch and representative samples were obtained by standard methods. These samples assayed as follows:

	<u>Cr₂O₃</u>	<u>Fe</u>
	- <u>Per cent</u> -	
Ferguson Creek West -	17.47	6.92
Ferguson Creek East -	20.37	8.92
Scotty Creek North -	20.09	7.45
Scotty Creek South -	18.85	8.39

Characteristics of the Ore:

FERGUSON CREEK LOTS

Six polished sections prepared from samples of the two Ferguson Creek lots were examined microscopically for the purpose of determining the character of the material.

Ore from the East Workings -

Sections from this sample indicate that the chromite is largely disseminated as medium-sized grains and is locally quite abundant. The chrome grains contain gangue inclusions varying from rare inclusion-free grains to those which contain as much as 50 per cent by volume of gangue. Some grains have been almost completely replaced by gangue, only the scattered remnants of chromite at present delineating

(Characteristics of the Ore, cont'd) -

the extent of the original chromite grains. The magnetite occurs largely in close association with the chromite as narrow veinlets in chrome grains, as irregular films and discontinuous coatings on the chrome grains, and, more rarely, as particles accompanying the gangue inclusions.

Ore from the West Workings -

The character of this material differs from that of the East workings. The chromite is disseminated but is coarser and most of the chrome grains are dense and contain few inclusions of gangue. Most of the magnetite occurs as grains scattered in the gangue, though a minor portion is present as thin films and tiny grains at the borders of the chrome grains and as tiny veinlets cutting them. Rare pyrite occurs in the gangue.

Conclusions regarding Ferguson Creek Ore -

Ore from the West workings would appear to be much more amenable to successful treatment than ore from the East workings. The former appears to be much like the Scotty Creek material and is perhaps somewhat easier to treat. The latter, however, would seem to present more difficulties both as to attaining satisfactory grade and as to improvement in the chrome-iron ratio.

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SCOTTY CREEK LOTS

Three polished sections were prepared from each of the two lots designated as coming respectively from the "South" and "North" workings of the Scotty Creek property. These sections were examined microscopically to determine the character of the ore.

(Continued on next page)

(Characteristics of the Ore, cont'd) -
Scotty Creek Lot, cont'd -

Ore from the South Workings -

The chromite occurs variably, from scattered disseminated grains to fairly massive chromite. In some areas there are coarse irregular networks of stringers of granular chromite.

Disseminated Type: -- The chromite of this type occurs as coarse to medium disseminated grains, largely above 200 mesh in size. Few inclusions of gangue are to be seen, but the grains have been fractured and the fissures have been filled with gangue minerals. Magnetite is present as (a) comparatively fine disseminated grains, largely below 200 mesh in size, and sometimes attached to chrome grains, and (b) occasional very thin films or shells around the borders of the chrome grains; such films are 5 microns and less in thickness. Pyrite is scattered very sparingly in the gangue as tiny grains. Two distinct ages of gangue are to be noted, the older being the main matrix in which the chromite is enclosed and the younger occurring as veinlets in the older gangue and containing the disseminated magnetite and pyrite; the younger gangue also veins the chromite.

Massive Type: -- The massive, coarsely granular type of chromite results essentially from the more abundant occurrence of the mineral. The character of the chrome grains differs from that of the disseminated type in that many contain numerous inclusions of gangue and some show inclusions of magnetite also.

Network of Chrome Grains: -- This type consists of an irregular network of chromite grains that in places are abundant and form small masses. The grains are fractured, and these fissures, as well as fissures in earlier gangue,

(Characteristics of the Ore, cont'd) -

have been filled with later gangue carrying the magnetite and pyrite; rarely, magnetite is seen to be present as fine veinlets in chromite.

Conclusions regarding South Workings Ore -

The following tentative conclusions may be drawn from the microscopic examination:

1. Relatively coarse grinding would appear to be sufficient to free much of the chromite; owing to the finely divided character of the magnetite and pyrite such a grind would be unlikely to free these minerals from the gangue to any great extent, and this should prove advantageous.

2. Some of the magnetite will remain attached to the chromite, as some occurs as veinlets in the chrome grains.

3. In so far as the fine gangue inclusions in some of the chromite are concerned, any attempt to free this gangue from the chrome would not be economically practical.

Ore from the North Workings -

The material from the north workings is rather evenly distributed and comparatively coarse chromite grains which show some grouping into irregular sinuous bands. The chromite is relatively free from gangue inclusions and there appears to be little associated magnetite. The latter mineral is present, however, as very thin shells around the chrome grains and as tiny veinlets within them.

Conclusions regarding North Workings Ore -

Comparatively coarse grinding should be sufficient to effect freedom of most of the chrome, but since most of the small quantity of magnetite present is associated with

(Characteristic of the Ore, cont'd) -

the chrome, it seems probable that an appreciable improvement of the chrome-iron ratio is unlikely.

General Comment re. Scotty Creek Ore -

Combining the samples from the north and south workings, it might reasonably be expected that a minus 65 mesh grind will effect liberation of a high percentage of the chromite. The fracturing and veining of the chrome grains will tend to add to sliming.

Investigational Work:

The Ferguson Creek lots were investigated separately, while the Scotty Creek lots were combined to form a composite sample.

The work consisted of jig and table concentration of both the sized and unsized products. Also, the Haultain superpanner was used on portions of the table concentrates and the Davis Tube magnetic separator on other portions.

The test work showed that the sample from the Ferguson Creek West deposit is amenable to table concentration at a grind of minus 28 mesh, the concentrate assaying 48.6 per cent Cr_2O_3 and 14.66 per cent Fe, giving a Cr:Fe ratio of 2.27:1.

On the Ferguson Creek East and Scotty Creek lots it was not found possible to obtain a grade of table concentrates which would permit shipment under ordinary conditions. Jig concentrations of the coarsely crushed sized products from the different shipments was not successful in

(Investigational Work, cont'd) -

producing a shipping grade of concentrates. The Davis tube magnetic separator gave results which showed that magnetic separation was not applicable to **any of these lots.**

Details of Test Work:

Test No. 1 (A-B-C).

In this test, portions of the lots were crushed through a set of rolls to minus 8 mesh size and the pulp screened to different sized products. The plus 14, plus 20 and plus 28 mesh sizes were concentrated on a Gate-type jig, while the finer-sized products were concentrated on a Wilfley table.

Test No. 1-A. (Ferguson Creek West Ore).

Results of Jig Concentration:

<u>-8+14 Mesh Product.</u>					
Product	Weight, per cent	Assays, per cent		Distribution, per cent	
		Cr ₂ O ₃	Fe	Cr ₂ O ₃	Fe
Feed	100.00	16.67	7.01	100.0	100.0
Jig concentrate	38.66	17.29	7.07	40.1	39.0
Jig tailing	61.34	16.29	6.97	59.9	61.0
<u>-14+20 Mesh Product.</u>					
Feed	100.00	16.50	6.69	100.0	100.0
Jig concentrate	36.73	18.21	6.92	40.5	38.0
Jig tailing	63.27	15.51	6.56	59.5	62.2
<u>-20+28 Mesh Product.</u>					
Feed	100.00	17.80	7.02	100.0	100.0
Jig concentrate	32.70	20.56	7.57	37.8	35.2
Jig tailing	67.30	16.46	6.76	62.2	64.8

It is indicated from the above results that jig concentration is not effective on this type of ore.

(Continued on next page)

(Test No. 1-A, cont'd) -

Results of Wilfley Table Concentration:

-28+35 Mesh Product.

Product	Weight, per cent	Assays, per cent		Distribution, per cent		Ratios	
		Cr ₂ O ₃	Fe	Cr ₂ O ₃	Fe	Concentration	Cr:Fe
Feed	100.00	20.73	7.58	100.0	100.0		
Table conc.	31.93	46.05	13.94	70.9	58.7	3.1:1.	2.26:1.
" middling	51.96	10.23	4.84	25.6	33.2		
" tailing	16.11	4.45	3.83	3.5	8.1		

-35+48 Mesh Product.

Feed	100.00	22.80	9.93	100.0	100.0		
Table conc.	36.74	49.90	15.25	80.4	56.4	2.7:1.	2.24:1.
" middling	58.80	7.12	7.04	18.3	41.7		
" tailing	4.46	6.31	4.34	1.3	1.9		

-48 Mesh Product.

This product was deslimed prior to table concentration. The slime assayed 7.16 per cent Cr₂O₃ and 5.30 per cent Fe and was 16.40 per cent of the weight of the feed.

Product	Weight, per cent	Assays, per cent		Distribution, per cent		Ratios	
		Cr ₂ O ₃	Fe	Cr ₂ O ₃	Fe	Concentration	Cr:Fe
Feed	100.00	20.47	7.74	100.0	100.0		
Table conc.	30.72	52.15	15.95	78.3	63.3	3.3:1.	2.24:1.
" middling	21.51	16.24	6.36	17.1	17.7		
" tailing	47.77	2.00	3.08	4.6	19.0		

The above table concentrations indicate that a grind between 28 and 35 mesh is necessary in order to produce a fair grade of table concentrate.

Summary of Results, Test No. 1-A. (Ferguson Creek West).

Mesh Product	Weight, per cent	Calculated Head Assays, per cent		Distribution, per cent		Assays of Concentrates, per cent	
		Cr ₂ O ₃	Fe	Cr ₂ O ₃	Fe	Cr ₂ O ₃	Fe
- 8+14	47.2	16.68	7.01	44.4	45.6	17.29	7.07
-14+20	11.2	16.50	6.69	10.4	10.3	18.21	6.92
-20+28	11.0	17.80	7.02	11.1	10.6	20.56	7.57
-28+35	7.0	20.74	7.58	8.2	7.3	46.05	13.94
-35+48	6.0	22.80	9.93	7.7	8.3	49.90	15.25
-48	17.6	18.28	7.34	18.2	17.8	52.15	15.95
Totals	100.0	17.72	7.25	100.0	100.0		

(Details of Test Work, cont'd) -

Test No. 1-B. (Ferguson Creek East Ore).

Results of Jig Concentration:

-8+14 Mesh.				
Product	Weight, per cent	Assays, per cent		Distribution, per cent
		Cr ₂ O ₃	Fe	Cr ₂ O ₃
Feed	100.00	17.98	-	100.0
Jig concentrate	38.51	22.01	9.88	47.1
Jig tailing	61.49	15.46	-	52.9

-14+20 Mesh.				
Product	Weight, per cent	Assays, per cent		Distribution, per cent
		Cr ₂ O ₃	Fe	Cr ₂ O ₃
Feed	100.00	18.53	-	100.0
Jig concentrate	43.93	20.88	-	49.5
" tailing	56.07	16.70	-	50.5

-20+28 Mesh.				
Product	Weight, per cent	Assays, per cent		Distribution, per cent
		Cr ₂ O ₃	Fe	Cr ₂ O ₃
Feed	100.00	21.23	-	100.0
Jig concentrate	46.37	24.26	11.04	53.0
Jig tailing	53.63	18.63	-	47.0

It is evident that jig concentration is not applicable to Ferguson East.

Results of Wilfley Table Concentration:

-28+35 Mesh.						
Product	Weight, per cent	Assays, per cent		Distribution, per cent	Ratios	
		Cr ₂ O ₃	Fe	Cr ₂ O ₃	Concen- tration	Cr:Fe
Feed	100.00	24.23	-	100.0		
Table conc.	49.56	38.64	13.83	79.0	2:1	1.91:1
" middling	18.06	19.41	-	14.5		
" tailing	32.38	4.88	-	6.5		

-35+48 Mesh.						
Product	Weight, per cent	Assays, per cent		Distribution, per cent	Ratios	
		Cr ₂ O ₃	Fe	Cr ₂ O ₃	Concen- tration	Cr:Fe
Feed	100.00	24.87	-	100.0		
Table conc.	47.99	42.04	14.84	81.1	2.1:1	1.94:1
" middling	14.88	23.32	-	14.0		
" tailing	37.13	3.31	-	4.9		

(Continued on next page)

(Test No. 1-B, cont'd) -
 (Results of Wilfley Table Concentration, cont'd) -

-48 Mesh Product.

This product was deslimed prior to table concentration. The slime assayed 9.38 per cent Cr_2O_3 and 7.00 per cent Fe and was 8.92 per cent of the weight of the feed.

Product	Weight,	Assays,		Distribution,	Ratios	
	per cent	per cent	per cent	per cent	Concentration:	Cr:Fe
		Cr_2O_3	Fe	Cr_2O_3		
Feed	100.00	20.99	-	100.0		
Table conc.	32.51	42.41	14.13	65.7	3.1:1.	2.05:1.
" middling	19.59	25.53	-	23.8		
" tailing	47.90	4.60	-	10.5		

Table concentration of Ferguson East was not successful in producing a shipping grade of concentrate.

Summary of Results, Test No. 1-B, (Ferguson Creek East).

Mesh Product	Weight,	Calculated Head Assays,		Distribution,	Assays of Concentrates,	
	per cent	per cent	per cent	per cent	per cent	per cent
		Cr_2O_3	Fe	Cr_2O_3	Cr_2O_3	Fe
- 8+14	18.26	17.98	-	16.0	22.01	9.88
-14+20	13.95	18.53	-	12.6	20.88	-
-20+28	12.92	21.23	-	13.4	24.26	11.04
-28+35	12.23	24.23	-	14.5	38.64	13.83
-35+48	8.61	24.87	-	10.4	42.04	14.84
-48	34.03	19.95	-	33.1	42.41	14.13
Totals	100.00	20.50	-	100.0	---	---

These results indicate that the ores of the Ferguson East (B) and Scotty Creek (C) will grind much more easily than the Ferguson West ore, and will produce more slimes in mill practice.

(Details of Test Work, cont'd) -

Test No. 1-C. (Scotty Creek Composite).

Results of Jig Concentration:

-8+14 Mesh.				
Product	Weight, per cent	Assays, per cent		Distribution, per cent Cr ₂ O ₃
		Cr ₂ O ₃	Fe	
Feed	100.00	19.53	-	100.0
Jig concentrate	39.50	21.95	9.05	44.3
Jig tailing	60.50	17.95	-	55.7

-14+20 Mesh.				
Product	Weight, per cent	Assays, per cent		Distribution, per cent Cr ₂ O ₃
		Cr ₂ O ₃	Fe	
Feed	100.00	18.07	-	100.0
Jig concentrate	46.62	19.37	8.63	49.9
Jig tailing	53.38	16.95	-	51.1

As these jig concentrations did not give any worth-while results, the remainder of the sized products were concentrated on a Wilfley table.

Results of Wilfley Table Concentration:

-20+28 Mesh.						
Product	Weight, per cent	Assays, per cent		Distribution, per cent Cr ₂ O ₃	Ratios	
		Cr ₂ O ₃	Fe		Concen- tration	Cr:Fe
Feed	100.00	17.71	-	100.0		
Table conc.	41.27	28.53	11.15	66.5	2.4:1.	1.75:1.
" middling	18.54	17.61	-	18.4		
" tailing	40.19	6.64	-	15.1		

-28+35 Mesh.						
Product	Weight, per cent	Assays, per cent		Distribution, per cent Cr ₂ O ₃	Ratios	
		Cr ₂ O ₃	Fe		Concen- tration	Cr:Fe
Feed	100.00	17.80	-	100.0		
Table conc.	46.73	29.34	11.36	77.0	2.1:1.	1.77:1.
" middling	27.91	10.89	-	17.1		
" tailing	25.36	4.15	-	5.9		

-35+48 Mesh.						
Product	Weight, per cent	Assays, per cent		Distribution, per cent Cr ₂ O ₃	Ratios	
		Cr ₂ O ₃	Fe		Concen- tration	Cr:Fe
Feed	100.00	17.88	-	100.0		
Table conc.	39.86	35.11	12.62	78.2	2.5:1.	1.90:1.
" middling	25.12	9.27	-	13.0		
" tailing	35.02	4.46	-	8.8		

(Continued on next page)

(Test No. 1-C, cont'd) -
 (Results of Wilfley Table Concentration, cont'd) -

-48 Mesh Product.

This product was deslimed, prior to table concentration. The slime assayed 11.46 per cent Cr_2O_3 and was 12.84 per cent of the weight of the feed.

Product	Weight, per cent	Assays, per cent		Distribution, per cent Cr_2O_3	Ratios	
		Cr_2O_3	Fe		Concentration	Cr:Fe
Feed	100.00	21.22	-	100.0		
Table conc.	18.35	39.69	14.52	34.3	5.0:1.	1.87:1.
" middling	29.03	28.20	-	38.6		
" tailing	52.62	10.94	-	27.1		

Summary of Results, Test No. 1-C. (Scotty Creek Composite).

Mesh Product	Weight, per cent	Calculated Assays, per cent Cr_2O_3	Head per cent Cr_2O_3	Distribution, per cent Cr_2O_3	Assays of Concentrates, per cent	
					Cr_2O_3	Fe
-8 +14	36.60	19.53		37.5	21.95	9.05
-14+20	11.70	18.08		11.1	19.37	8.63
-20+28	8.86	17.71		8.2	28.53	11.15
-28+35	7.97	17.80		7.4	29.34	11.36
-35+48	7.42	17.88		7.0	35.11	12.62
+48	27.45	19.98		28.8	39.69	14.52
Totals	100.00	19.06		100.0	-	-

Test No. 2 (A-B-C).

Following the results as given in Test No. 1, portions of Ferguson West (A), Ferguson East (B) and Scotty Creek Composite (C) were crushed through a set of rolls to minus 35 mesh in the case of Ferguson West (A), to minus 48 mesh for Ferguson East (B), and to minus 48 mesh for Scotty Creek (C). The pulp so obtained was then concentrated on a Wilfley table.

(Continued on next page)

(Test No. 2 (A-B-C), cont'd) -

Test No. 2-A, (Ferguson Creek West).

Wilfley Table Concentration of Minus 35 Mesh Pulp.						
Product	Weight, per cent	Assays, per cent		Distribution, per cent Cr ₂ O ₃	Ratios	
		Cr ₂ O ₃	Fe		Concen- tration:	Cr:Fe
Feed	100.00	19.20	-	100.0	:	:
Table conc.	13.64	53.36	15.92	37.9	7.3:1.	2.29:1.
" middling	20.43	38.32	-	40.8	:	:
" sands	35.15	2.62	-	4.8	:	:
" slimes	30.78	10.30	-	16.5	:	:

Test No. 2-B, (Ferguson Creek East).

Wilfley Table Concentration of Minus 48 Mesh Pulp.						
Product	Weight, per cent	Assays, per cent		Distribution, per cent Cr ₂ O ₃	Ratios	
		Cr ₂ O ₃	Fe		Concen- tration:	Cr:Fe
Feed	100.00	20.42	-	100.0	:	:
Table conc.	5.59	44.16	14.95	12.1	17.9:1.	2.02:1.
" middling	30.28	36.48	-	54.1	:	:
" sands	31.25	7.59	-	11.6	:	:
" slimes	32.88	13.80	-	22.2	:	:

Test No. 2-C, (Scotty Creek Composite).

Wilfley Table Concentration of Minus 48 Mesh Pulp.						
Product	Weight, per cent	Assays, per cent		Distribution, per cent Cr ₂ O ₃	Ratios	
		Cr ₂ O ₃	Fe		Concen- tration:	Cr:Fe
Feed	100.00	20.50	-	100.0	:	:
Table conc.	8.34	44.76	14.32	18.2	12:1.	2.14:1.
" middling	16.91	36.52	-	30.1	:	:
" sands	46.45	14.90	-	33.8	:	:
" slimes	28.30	12.97	-	17.9	:	:

Test No. 3 (A-B-C).

In this test portions of the table concentrates from Test No. 2 were reconcentrated on a Haultain superpanner. The resulting panner concentrates were assayed for Cr₂O₃ and Fe.

(Continued on next page)

(Test No. 3 (A-B-C), cont'd)

Haultain Superpanner Concentrations of Table Concentrates.

Test No. 3-A. (Ferguson Creek West).						
Product	Weight,		Assays,		Distribution,	
	per cent	per cent	Cr ₂ O ₃	Fe	Cr ₂ O ₃	Fe
						Cr:Fe ratio
Feed	100.00	53.98	15.92	100.0	100.0	
Concentrate	26.10	54.83	15.70	26.5	25.7	2.39:1.
Tailing	73.90	53.68	15.00	73.5	74.3	

Test No. 3-B. (Ferguson Creek East).						
Product	Weight,		Assays,		Distribution,	
	per cent	per cent	Cr ₂ O ₃	Fe	Cr ₂ O ₃	Fe
						Cr:Fe ratio
Feed	100.00	44.36	14.95	100.0	100.0	
Concentrate	50.75	45.59	15.90	52.2	53.9	1.96:1.
Tailing	49.25	43.10	13.98	47.8	46.1	

Test No. 3-C. (Scotty Creek Composite).						
Product	Weight,		Assays,		Distribution,	
	per cent	per cent	Cr ₂ O ₃	Fe	Cr ₂ O ₃	Fe
						Cr:Fe ratio
Feed	100.00	44.31	14.32	100.0	100.0	
Concentrate	58.82	44.85	14.49	59.5	59.5	2.12:1.
Tailing	41.18	43.56	14.08	40.5	40.5	

The above results indicate the maximum concentrations of the chromite mineral possible at the different grinds.

Test No. 4 (A-B-C).

In this test, other portions of table concentrates from Test No. 2 (A-B-C) were ground to pass 100 percent minus 100 mesh and the magnetic material in the sample concentrated in a Davis magnetic tube. This magnetic concentrate was weighed and assayed for Cr₂O₃ and Fe.

(Continued on next page)

(Test No. 4 (A-B-C), cont'd) -

Davis Tube Magnetic Concentrations.

Test No. 4-A. (Ferguson Creek West).

Product	Weight,	Assays,		Distribution,		Cr:Fe ratio
	per cent	per cent Cr ₂ O ₃	Fe	per cent Cr ₂ O ₃	Fe	
Feed	100.00	53.20	16.03	100.00	100.00	
Mag. conc.	1.17	41.47	27.60	0.91	2.01	
" tailing	98.83	53.34	15.90	99.09	97.99	2.30:1.

Test No. 4-B. (Ferguson Creek East).

Feed	100.00	44.22	15.13	100.00	100.00	
Mag. conc.	0.18	31.58	40.51	0.13	0.48	
" tailing	99.82	44.25	15.09	99.87	99.52	2.01:1.

Test No. 4-C. (Scotty Creek Composite).

Feed	100.00	44.72	14.03	100.00	100.00	
Mag. conc.	0.27	32.95	32.41	0.20	0.62	
" tailing	99.73	44.76	13.98	99.80	99.38	2.19:1.

It is apparent from these magnetic concentrations that not enough magnetite is freed to affect the grade of table concentrate.

Test No. 5 (A-B-C).

Portions of the different lots were crushed through a set of rolls, to pass the Ferguson West portion 100 per cent minus 28 mesh and the East and Scotty Creek portions 100 per cent minus 35 mesh. The pulps were then concentrated on a Wilfley table and the resultant table concentrates given a screen analysis for Cr₂O₃ and Fe.

(Continued on next page)

(Test No. 5 (A-B-C), cont'd) -

Test No. 5-A. (Ferguson Creek West).

Table Concentration of Minus 28 Mesh Pulp.

Product	Weight,	Assays,		Distribution,		Ratios	
	per cent	per cent	per cent	per cent	per cent	Concentration	Cr:Fe
		Cr ₂ O ₃	Fe	Cr ₂ O ₃	Fe		
Feed	100.00	17.99	6.95	100.0	100.0		
Table conc.	24.52	48.65	14.66	66.3	51.7	4.1:1.	2.27:1.
" middling	10.10	17.66	7.19	9.9	10.5		
" sands	35.73	3.24	2.99	6.4	15.4		
" slimes	29.65	10.54	5.27	17.4	22.4		

Screen Analysis of Table Concentrate.

Mesh Product	Weight,	Assays,		Distribution,		Cr:Fe ratio
	per cent	per cent	per cent	per cent	per cent	
		Cr ₂ O ₃	Fe	Cr ₂ O ₃	Fe	
28+ 35	8.0	44.94	13.88	7.4	7.6	2.22:1.
35+ 48	15.8	49.45	15.19	16.1	16.4	2.23:1.
48+ 65	22.7	50.55	15.25	23.6	23.4	
65+100	18.3	48.66	14.69	18.3	18.3	
100+150	15.8	44.67	13.47	14.5	14.5	
150+200	10.3	47.61	14.08	10.0	9.9	
200	9.1	53.87	15.60	10.1	9.9	2.36:1.
Totals	100.0	48.65	14.66	100.0	100.0	

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Test No. 5-B. (Ferguson Creek East).

Table Concentration of Minus 35 Mesh Pulp.

Product	Weight,	Assays,		Distribution,		Ratios	
	per cent	per cent	per cent	per cent	per cent	Concentration	Cr:Fe
		Cr ₂ O ₃	Fe	Cr ₂ O ₃	Fe		
Feed	100.00	20.96	8.82	100.0	100.0		
Table conc.	26.90	42.84	14.33	55.0	43.7	3.7:1.	2.05:1.
" middling	16.00	30.54	11.65	23.3	21.1		
" sands	34.10	5.68	4.86	9.2	18.8		
" slimes	23.00	11.38	6.28	12.5	16.4		

Screen Analysis of Table Concentration.

Mesh Product	Weight,	Assays,		Distribution,		Cr:Fe ratio
	per cent	per cent	per cent	per cent	per cent	
		Cr ₂ O ₃	Fe	Cr ₂ O ₃	Fe	
35+ 48	23.3	42.07	14.23	22.9	23.1	2.02:1.
48+ 65	26.8	42.60	14.13	26.6	26.4	
65+100	18.7	42.78	14.28	18.7	18.6	
100+150	17.5	43.01	14.38	17.6	17.6	
150+200	8.2	44.11	14.89	8.4	8.5	
200	5.5	44.94	14.99	5.8	5.8	2.05:1.
Totals	100.0	42.84	14.33	100.0	100.0	

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(Continued on next page)

(Test No. 5 (A-B-C), cont'd) -

Test No. 5-C. (Scotty Creek Composite).

Table Concentration of Minus 35 Mesh Pulp.

Product	Weight, per cent	Assays, per cent		Distribution, per cent		Ratios Concen- tration:Cr:Fe	
		Cr ₂ O ₃	Fe	Cr ₂ O ₃	Fe		
Feed	100.00	19.49	8.18	100.0	100.0		
Table conc.	15.75	39.65	14.31	32.1	27.6	6.3:1.	1.90:1.
" middling	18.99	30.08	11.40	29.3	26.5		
" sands	32.20	7.96	4.71	13.1	18.5		
" slimes	33.06	15.04	6.79	25.5	27.4		

Table Analysis of Table Concentrate.

Mesh Product	Weight, per cent	Assays, per cent		Distribution, per cent		Cr:Fe ratio
		Cr ₂ O ₃	Fe	Cr ₂ O ₃	Fe	
- 35+ 48	14.8	38.80	13.78	14.5	14.2	1.93:1.
- 48+ 65	21.9	39.26	14.28	21.7	21.9	
- 65+100	22.9	39.38	14.08	22.7	22.5	
-100+150	22.9	39.65	14.38	22.9	23.0	
-150+200	11.4	41.19	14.94	11.8	11.9	
-200	6.1	41.35	15.19	6.4	6.5	1.86:1.
Totals	100.0	39.65	14.31	100.0	100.0	

SUMMARY AND CONCLUSIONS:

Ferguson Creek West Lot, A -

On this lot the test work showed that jig concentration was not suitable.

The Wilfley table concentration produced a concentrate assaying 48.65 per cent Cr₂O₃ and 14.66 per cent Fe, with a chrome-iron ratio of 2.27:1, at a grind of 100 per cent minus 28 mesh; the recovery was about 75 per cent of the Cr₂O₃. At a grind of 100 per cent minus 35 mesh a table concentrate assaying 53.36 per cent Cr₂O₃ and 15.92 per cent Fe was obtained, with a chrome-iron ratio of 2.29:1. When this latter concentrate was treated on a Haultain superpanner, a panner concentrate was secured assaying 54.83 per cent

(Summary and Conclusions, cont'd) -

Cr_2O_3 and 15.70 per cent Fe with a chrome-iron ratio of 2.39:1.

When another portion of the minus 35 mesh concentrate was treated in the Davis magnetic tube, only 1.17 per cent of the material was found to be magnetic.

The microscopic examination of the polished sections showed that most of the chrome grains are dense and contain few inclusions of gangue.

Ferguson Creek East Lot, B -

On the Ferguson East lot the test work showed that jig concentration was not suitable.

The Wilfley table concentration gave concentrates assaying 42.84 per cent Cr_2O_3 and 14.33 per cent Fe at a grind of 100 per cent minus 35 mesh. The chrome-iron ratio of this concentrate was 2.05:1 and the recovery was about 75 per cent of the Cr_2O_3 . At a grind of 100 per cent minus 48 mesh, a table concentrate assaying 44.16 per cent Cr_2O_3 and 14.95 per cent Fe was obtained with a chrome-iron ratio of 2.02:1. When a portion of this latter concentrate was treated on a Haultain superpanner, a panmer concentrate assaying 45.59 per cent Cr_2O_3 and 15.90 per cent Fe resulted. This concentrate gave a chrome-iron ratio of 1.96:1.

When another portion of the minus 48 mesh concentrate was ground to minus 100 mesh and treated in a Davis magnetic tube, only 0.18 per cent of this concentrate was found to be magnetic.

The microscopic examination of the polished sections indicated that the chromite is largely disseminated as medium-sized grains and that these grains contain gangue inclusions varying from rare inclusion-free grains to those which contain

(Summary and Conclusions, cont'd) -

as much as 50 per cent by volume of gangue.

Scotty Creek Composite, C -

On the Scotty Creek lots the test work was confined to a composite sample containing equal parts of each lot.

It was found that jig concentration was not feasible.

Wilfley table concentration on ore crushed to minus 35 mesh gave a concentrate assaying 39.65 per cent Cr_2O_3 and 14.31 per cent Fe with a chrome-iron ratio of 1.90:1. The recovery was low, however, being less than 60 per cent of the Cr_2O_3 . By crushing to 100 per cent minus 48 mesh, table concentrates assaying 44.76 per cent Cr_2O_3 and 14.32 per cent Fe resulted, the chrome-iron ratio being 2.14:1 and the recovery less than 50 per cent of the Cr_2O_3 . When this latter concentrate was treated on a Haultain superpanner, a panner concentrate was obtained assaying 44.85 per cent Cr_2O_3 and 14.49 per cent Fe and having a chrome-iron ratio of 2.12:1.

Another portion of the minus 48 mesh concentrate was crushed to minus 100 mesh and treated in the Davis magnetic tube. Only 0.27 per cent of the material was found to be magnetic.

The microscopic examination of the polished sections indicated that grinding to minus 65 mesh was necessary to effect liberation of the chromite grains which are relatively free from gangue inclusions.

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From the above summarization of the work done on the different lots, it is apparent that ~~the Fergusont~~ West deposit offers the best chance of economic exploitation. This ore concentrates readily on a Wilfley table and a

(Summary and Conclusions, cont'd) -

shipping grade assaying 50 per cent Cr_2O_3 and 15 per cent Fe should be obtained at grinds of from minus 28 to minus 35 mesh. The chrome-iron ratio of 2.25:1, however, is rather high in Fe.

On the Ferguson East and Scotty Creek lots it was not found possible to secure Wilfley table concentrates much better than 44 per cent Cr_2O_3 and 14 per cent Fe, at a grind of minus 48 mesh. A chrome-iron ratio of about 2:1 only was obtained, which was not attractive.

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In practice, the ore would be ground in rod or low-discharge ball mills and passed over a screen of the required fineness. The pulp passing through the screen then would be sized in a hydraulic sizer and each fraction concentrated on individual tables. The slime portion would be thickened and passed over slime tables. Tailings would be discharged from each table, while a middling product from the sand tables would be dewatered, reground, and returned to the hydraulic sizer. The middling from the slime tables should be reconcentrated on a separate table. With properly balanced equipment, the above flow-sheet should yield maximum recoveries.

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HLB:GHB.