State Department of Geology and Mineral Industries

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1069 State Office Building
Portland 1, Oregon

Preliminary Report

QUARTZ MOUNTAIN
BIG QUARTZ CLAIMS 1-13

Douglas County
Umpqua District

Owners: Roy Rannells, Riddle, and G. D. Rannells, Aurora, Oregon.

Location: The deposit is located in the NW¼ of sec. 2, T. 28 S., R. 1 E., on Quarts Mountain between 5,000 and 5,530 (summit) feet elevation. It is 35 miles from Tiller via the Quarts Mountain Road and 33 miles from Glide via the Little River Road. The new Forest Service logging road is within ½ mile of the deposit.

Area: Eleven claims were located in August 1957 and recorded October 23, 1957 (see claim map).

Geology: The area is underlain by volcanic rocks of the western Cascades including rhyolites, tuffs, agglomerate and some basic lavas. A broad zone of clay gouge with disseminated pyrite exposed in the road cut on the west slope of Quartz Mountain and manganese oxide staining common in fractured zones are obvious signs of mineralization.

The deposit consists of a large body of fine-grained, massive quartz and chalcedony. Most of the material is cryptocrystalline under the microscope. The deposit is roughly 2,500 feet long and 1,200 feet wide. It is exposed from 500 feet below to the summit of Quartz Mountain and forms steep cliffs nearly 300 feet high. A preliminary estimate shows about 80 million tons of high silica rock.

More detailed work is needed to determine the origin of the deposit but it is probably a large scale replacement of a tuff by silica. There are softer less silicified portions where differential weathering has developed caverns on some of the cliff faces. These soft portions appear

tuffaceous.

The following assays were made on the deposit:

Sample No.	SiO_2	Al_2O_3	LOI	(Ca,Mg,Fe)
P-22179	99.10	- - -	- - -	- - - -
P-22194	98.14	- - -	- - -	- - - -
(Av. of 6 private assays)	98.6	.60 to .66	0.3	(Very low)

Alumina is the only significant impurity. Sample P-22194 was taken at the time of the visit and is of small chips taken at 20-foot intervals over an irregular traverse on the northwest portion of the deposit.

Further work is anticipated to determine the full extent and origin of the deposit.

Visited: 10/28/57 with Roy Rannells.

Informant: Roy Rannells.

Report by: Len Ramp 11/27/57.

* * * * * * *

RAMP

Lab

ANALYSIS REPORT

HANNA NICKEL SMELTING CO.

Riddle, Oregon

To H. W. Harf

Chemical ✓

Quantometer

Lab. No.	Sample Description	~~Ni %~~
106203	7/6 Quarty Mat. - 3-1 - W. A. Foster	
	SiO_2	97.89
	Fe_2O_3	1.35
	Al_2O_3	0.14
	TiO_2	0.28
	CaO	0.06
	(P_2O_5) Phos.	0.017
		99.789
106204	7/6 Quarty. Mt. 3-2 - W. A Foster	
	SiO_2	97.55
	Fe_2O_3	1.28
	Al_2O_3	0.62
	TiO_2	0.25
	CaO	0.03
	Phos.	0.007
		99.73

Date 7-13-59

Signed Eric W. Iver

FM No. 602 RPCo.

ANALYSIS REPORT

HANNA NICKEL SMELTING CO.

Riddle, Oregon

To H. W Hart

Chemical ✓

Quantometer

Lab. No.	Sample Description	~~Ni %~~	
106205	7/6 Quarty Mt.	-	3-3 - W. A. Foster
	SiO_2	97.21	
	Fe_2O_3	1.50	
	Al_2O_3	0.81	
	TiO_2	0.36	
	CaO	0.08	
	Phos	0.019	
106206	7/6 Quarty Mt.		3-~~3~~4 - W. A. Foster
	SiO_2	94.85	
	Fe_2O_3	1.95	
	Al_2O_3	1.59	
	TiO_2	0.37	
	CaO	0.06	
	Phos	0.007	

Date 7-13-59

Signed Eric Wilson

FM No. 602 RPCo.

ANALYSIS REPORT

To H. W. Hard

HANNA NICKEL SMELTING CO.

Riddle, Oregon

Chemical ✓

Quantometer

Lab. No.	Sample Description	~~Anlys~~		
106207	7/4 Quarty Mt.	3-4		W. A. Foster
	SiO_2	94.52		
	Fe_2O_3	1.50		
	Al_2O_3	2.37		
	TiO_2	0.37		
	CaO	0.08		
	Phos.	0.014		
106208	7/4 Quarty Mt.	3-5		W. A. Foster
	SiO_2	94.15		
	Fe_2O_3	2.56		
	Al_2O_3	1.24		
	TiO_2	0.64		
	CaO	0.22		
	Phos.	0.011		

Date 7-13-59

Signed Eric Wilson

FM No. 602 RPCo.

ANALYSIS REPORT

HANNA NICKEL SMELTING CO.

Riddle, Oregon

To H. W Hard

Chemical ✓

Quantometer

Lab. No.	Sample Description						
107065	7/20 Quarty Mt.	3-34	—	W. A. Foster			
	SiO_2	98.58					
	Fe_2O_3	1.17					
	Al_2O_3	0.07					
	TiO_2	0.21					
	CaO	<0.03					
	Phos	0.003					
	L.O.I.	0					
107066	7/20 Quarty Mt.	3-35	—	W. A Foster			
	SiO_2	95.49					
	Fe_2O_3	1.07					
	Al_2O_3	2.37					
	TiO_2	0.45					
	CaO	<0.03					
	Phos.	0.015					
	L.O.I.	0.61					

Date 7-24-59 99.985 Signed Eric Wilson

FM No. 602 RPCo.

ANALYSIS REPORT

HANNA NICKEL SMELTING CO.

Riddle, Oregon

To. H. W. Hall

Chemical ✓

Quantometer

Lab. No.	Sample Description	~~Mix~~					
107067	7/20 Quartz Mt.	3-36	—	W. A. Foster			
	SiO_2	98.12					
	Fe_2O_3	0.86					
	Al_2O_3	0.68					
	TiO_2	0.33					
	CaO	<0.03					
	Phos.	<0.005					
	L.O.I.	0					
107068	7/20 Quartz Mt.	3-37	—	W. A. Foster			
	SiO_2	98.37					
	Fe_2O_3	1.18					
	Al_2O_3	0.10					
	TiO_2	0.15					
	CaO	<0.03					
	Phos	<0.005					
	L.O.I.	0.06					

Date 7-21-59

Signed Eric Gibson

FM No. 602 RPCo.

ANALYSIS REPORT

HANNA NICKEL SMELTING CO.

Riddle, Oregon

To H. W. Hart

Chemical ✓

Quantometer

Lab. No.	Sample Description						
107063	7/20 Quartz Mt. 13-5 (-1") — W. A. Foster						
	SiO_2	92.17					
	Fe_2O_3	1.34					
	Al_2O_3	3.96					
	TiO_2	0.26					
	CaO	0.15					
	Phos	0.014					
	L.O.I	1.78					
107064	7/20 Quartz Mt. 3-33 — W. A. Foster						
	SiO_2	97.86					
	Fe_2O_3	1.22					
	Al_2O_3	0.24					
	TiO_2	0.28					
	CaO	0.14					
	Phos	0.003					
	L.O.I	0.25					

Date 1-23-59

Signed Eric Wilson

FM No. 602 DPCo.

ANALYSIS REPORT

HANNA NICKEL SMELTING CO.

Riddle, Oregon

To H. W. Hard

Chemical ✓

Quantometer

Lab. No.	Sample Description				
107061	7/20 Quarry Mt.	Unworked	13-3	W. A. Foster	
	SiO_2	86.34			
	Fe_2O_3	2.10			
	Al_2O_3	6.84			
	TiO_2	0.34			
	CaO	0.28			
	Phos.	0.032			
	L.O.I.	3.72			
		99.652			
107062	7/20 Quarry Mt.	13-4	(+1")	—	W. A. Foster
	SiO_2	96.61			
	Fe_2O_3	1.35			
	Al_2O_3	0.89			
	TiO_2	0.29			
	CaO	0.08			
	Phos	<0.005			
	L.O.I.	0.53			

Date 7-23-59

Signed Eric W. Isor

FM No. 602 RPCo.

ANALYSIS REPORT

HANNA NICKEL SMELTING CO.

Riddle, Oregon

To H. W. Hard

Chemical ✓

Quantometer

Lab. No.	Sample Description			
107059	7/20 Quarty Mt.	13-1	—	W. A. Foster
	SiO_2	98.26		
	Fe_2O_3	0.87		
	Al_2O_3	0.21		
	TiO_2	0.14		
	CaO	0.08		
	Phos	<0.005		
	L.O.I	0.31		
107060	7/20 Quarty Mt.	13-2	—	W. A. Foster
	SiO_2	98.90		
	Fe_2O_3	0.81		
	Al_2O_3	0.10		
	TiO_2	0.12		
	CaO	0.05		
	Phos	<0.005		
	L.O.I	0		

Date 7-23-57

Signed Eric Wilson

FM No. 602 RPCo.

ANALYSIS REPORT

HANNA NICKEL SMELTING CO.

Riddle, Oregon

To H. W. Hard

Chemical ✓

Quantometer

Lab. No.	Sample Description	Wt%	
106527	7/11 Quarty Mtl.	3-32	— W. A. Foster
	SiO_2	97.97	
	Fe_2O_3	1.05	
	Al_2O_3	0.16	
	TiO_2	0.28	
	CaO	<0.03	
	Phos.	0.012	
	L.O.I.	0.43	
106528	7/11 Quarty Mtl.	10-1	— W. A. Foster
	SiO_2	98.61	
	Fe_2O_3	1.13	
	Al_2O_3	0.07	
	TiO_2	0.09	
	CaO	<0.03	
	Phos.	0.005	
	L.O.I.	0.07	

Date 7-21-59

Signed Eric Wilson

FM No. 602 RPCo.

ANALYSIS REPORT

HANNA NICKEL SMELTING CO.

Riddle, Oregon

To H. W Bard

Chemical ✓

Quantometer

Lab. No.	Sample Description	~~NiSi~~
106525	7/11 Quarty Mt.	3-30 — W. A. Foster
	SiO_2	98.02
	Fe_2O_3	1.32
	Al_2O_3	0.08
	TiO_2	0.22
	CaO	0.03
	Phos	0.005
	L.O.I.	0.28
106526	7/11 Quarty Mt.	3-31 — W. A. Foster
	SiO_2	97.72
	Fe_2O_3	1.28
	Al_2O_3	0.18
	TiO_2	0.21
	CaO	<0.03
	Phos	<0.005
	L.O.I.	0.53

Date 7-21-59

Signed Eric Wilson

FM No. 602 RPCo.

ANALYSIS REPORT

HANNA NICKEL SMELTING CO.

Riddle, Oregon

To H. W. Hurd

Chemical ✓

Quantometer

Lab. No.	Sample Description	
106519	7/11 Quarty Mt.	3-24 — W. A. Foster
	SiO_2	98.01
	Fe_2O_3	0.98
	Al_2O_3	0.17
	TiO_2	0.15
	CaO	0.05
	Phos.	0.008
	L.O.I.	0.48
106520	7/11 Quarty Mt.	3-25 — W. A. Foster
	SiO_2	96.99
	Fe_2O_3	1.50
	Al_2O_3	0.56
	TiO_2	0.18
	CaO	0.02
	Phos.	0.009
	L.O.I.	0.63

Date 7-18-59

Signed Eric Wilson

FM No. 602 RPCo.

ANALYSIS REPORT

HANNA NICKEL SMELTING CO.

Riddle, Oregon

To. H. W. Hard

Chemical ✓

Quantometer.

Lab. No.	Sample Description		
106521	7/11 Quarty Mt.	3-26	— W. A. Foster
	SiO_2	97.03	
	Fe_2O_3	1.52	
	Al_2O_3	0.65	
	TiO_2	0.20	
	CaO	0.07	
	Phos.	0.014	
	L.O.I.	0.41	
106522	7/11 Quarty Mt.	3-27	— W. A. Foster
	SiO_2	97.88	
	Fe_2O_3	1.35	
	Al_2O_3	0.18	
	TiO_2	0.23	
	CaO	0.06	
	Phos.	0.003	
	L.O.I.	0.18	

Date 7-18-59

Signed Eric Wilson

FM No. 602 RPCo.

ANALYSIS REPORT

HANNA NICKEL SMELTING CO.

Riddle, Oregon

To H. W. Hurd

Chemical ✓

Quantometer

Lab. No.	Sample Description	
106523	7/11 Quartz Mt. 3-28 — W. A. Foster	
	SiO_2	97.73
	Fe_2O_3	1.32
	Al_2O_3	0.25
	TiO_2	0.18
	CaO	0.05
	Phos.	0.007
	L.O.I.	0.38
106524	7/11 Quartz Mt. 3-29 — W. A Foster	
	SiO_2	97.69
	Fe_2O_3	1.38
	Al_2O_3	0.27
	TiO_2	0.18
	CaO	0.06
	Phos.	<0.005
	L.O.I.	0.24

Date 7-18-59

Signed Eric Wilson

FM No. 602 SPCo.

ANALYSIS REPORT

HANNA NICKEL SMELTING CO.

Riddle, Oregon

To H. W. Hard

Chemical ✓

Quantometer

Lab. No.	Sample Description	
107071	7/20 Quarry Mt.	3-40 — W. A Foster
	SiO_2	97.77
	Fe_2O_3	1.35
	Al_2O_3	0.13
	TiO_2	0.21
	CaO	0.04
	Phos	<0.005
	L.O.I.	0.27
107072	7/20 Quarry Mt.	3-41 — W. A. Foster
	SiO_2	96.52
	Fe_2O_3	1.95
	Al_2O_3	0.63
	TiO_2	0.27
	CaO	0.06
	Phos	0.018
	L.O.I.	0.48

Date 7-27-59

Signed Eric Wilson

FM No. 602 RPCo.

ANALYSIS REPORT

HANNA NICKEL SMELTING CO.

Riddle, Oregon

To H. W. Hard

Chemical ✓

Quantometer

Lab. No.	Sample Description		
107073	7/20 Quarry mt	3-42	— W. A. Foster
	SiO_2	97.97	
	Fe_2O_3	1.16	
	Al_2O_3	0.20	
	TiO_2	0.23	
	CaO	0.04	
	Phos	0.009	
	L.O.I.	0.26	
107074	7/20 Quarry mt.	3-43	— W. A. Foster
	SiO_2	97.83	
	Fe_2O_3	1.34	
	Al_2O_3	0.30	
	TiO_2	0.21	
	CaO	<0.03	
	Phos.	0.014	
	L.O.I	0.16	

Date 7-27-59

Signed [illegible]

FM No. 602 RPCo.

ANALYSIS REPORT

HANNA NICKEL SMELTING CO.

Riddle, Oregon

To H. W. Hard

Chemical ✓

Quantometer

Lab. No.	Sample Description	~~Mgs~~		
107075	7/20 Quarry Mt. 2-1		— W. A. Foster	
	SiO_2	97.62		
	Fe_2O_3	1.35		
	Al_2O_3	0.24		
	TiO_2	0.22		
	CaO	0.03		
	Phos.	0.016		
	L.O.I.	0.33		
107076	7/20 Quarry Mt. 10-2		— W. A. Foster	
	SiO_2	97.53		
	Fe_2O_3	1.11		
	Al_2O_3	0.29		
	TiO_2	0.26		
	CaO	0.03		
	Phos.	0.023		
	L.O.I	0.52		

Date..... Signed.....

FM No. 602 RPCo.

ANALYSIS REPORT

HANNA NICKEL SMELTING CO.

Riddle, Oregon

To H. W. Hurd

Chemical ✓

Quantometer

Lab. No.	Sample Description	[illegible]	
106513	7/11 Quarty Mt.	3-18	— W. A. Foster
	SiO_2	98.35	
	Fe_2O_3	0.90	
	Al_2O_3	0.19	
	TiO_2	0.16	
	CaO	0.03	
	Phos.	<0.005	
	L.O.I.	0.35	
106514	7/11 Quarty Mt.	3-19	— W. A. Foster
	SiO_2	98.56	
	Fe_2O_3	0.87	
	Al_2O_3	0.12	
	TiO_2	0.23	
	CaO	0.03	
	Phos.	<0.005	
	L.O.I.	0.17	

Date 7-17-59

Signed Eric Wilson

FM No. 602 RPCo.

ANALYSIS REPORT

To H. W. Hard

HANNA NICKEL SMELTING CO.

Riddle, Oregon

Chemical ✓

Quantometer

Lab. No.	Sample Description				
106515	7/11 Quarty Mt.	3-20	— W. A. Foster		
	SiO_2	97.97			
	Fe_2O_3	1.01			
	Al_2O_3	0.29			
	TiO_2	0.23			
	CaO	0.04			
	Phos	0.014			
	L.O.I	0.42			
106516	7/11 Quarty Mt.	3-21	— W. A. Foster		
	SiO_2	97.65			
	Fe_2O_3	1.20			
	Al_2O_3	0.38			
	TiO_2	0.28			
	CaO	0.03			
	Phos	<0.005			
	L.O.I.	0.21			

Date 7-17-59

Signed Eric Wilson

FM No. 502 RPCo.

ANALYSIS REPORT

HANNA NICKEL SMELTING CO.

Riddle, Oregon

To H. W. Hard

Chemical ✓

Quantometer

Lab. No.	Sample Description	
106517	7/11 Quarry Mt. 3-22 — W. A. Foster	
	SiO_2	97.10
	Fe_2O_3	1.40
	Al_2O_3	0.58
	TiO_2	0.22
	CaO	0.03
	Phos.	0.011
	L.O.I	0.58
106518	7/11 Quarry Mt. 3-23 — W. A. Foster	
	SiO_2	97.71
	Fe_2O_3	1.22
	Al_2O_3	0.33
	TiO_2	0.19
	CaO	0.03
	Phos.	0.004
	L.O.I.	0.42

Date 7-17-59

Signed Eric Wilson

FM No. 602 RPCo.

ANALYSIS REPORT

HANNA NICKEL SMELTING CO.

Riddle, Oregon

To H. W. Hard

Chemical ✓

Quantometer

Lab. No.	Sample Description		
106209	7/6 Quartz Mt.		3-6 — W. A. Foster
		SiO_2	88.86
		Fe_2O_3	1.35
		Al_2O_3	6.33
		TiO_2	0.23
		CaO	0.11
		Phos	0.028
		L.O.I.	3.08
106210	7/6 Quartz Mt.		3-7 — W. A. Foster
		SiO_2	95.76
		Fe_2O_3	1.35
		Al_2O_3	0.71
		TiO_2	0.19
		CaO	0.10
		Phos	0.022
		L.O.I.	1.89

Date 7-16-59

Signed Eric Wilson

FM No. 602 DPCo.

ANALYSIS REPORT

HANNA NICKEL SMELTING CO.

Riddle, Oregon

To H. W. Hard

Chemical ✓

Quantometer

Lab. No.	Sample Description	Ni%
106211	7/6 Quartz Mt. 3-6 — W. A. Foster	
	SiO_2	94.42
	Fe_2O_3	1.28
	Al_2O_3	2.52
	TiO_2	0.30
	CaO	0.10
	Phos	0.022
	L.O.I.	1.32
		99.962
106212	7/6 Quartz Mt. 3-9 — W.A. Foster	
	SiO_2	98.72
	Fe_2O_3	0.95
	Al_2O_3	<0.05
	TiO_2	0.22
	CaO	0.08
	Phos	0.008
	L.O.I.	0
		100.078

Date 7-16-59 Signed Eric Wilson

FM No. 502 RPCo.

ANALYSIS REPORT

HANNA NICKEL SMELTING CO.

Riddle, Oregon

To H. W. Hard

Chemical ✓

Quantometer

Lab. No.	Sample Description		
106213	⅞ Quartz Mt.	3-10	- W. A. Foster
	SiO_2	98.37	
	Fe_2O_3	0.83	
	Al_2O_3	0.15	
	TiO_2	0.18	
	CaO	0.14	
	Phos	0.003	
	L.O.I.	0.32	
		100.003	
106214	⅞ Quartz Mt.	3-11	- W. A. Foster
	SiO_2	97.56	
	Fe_2O_3	0.83	
	Al_2O_3	0.91	
	TiO_2	0.19	
	CaO	0.11	
	Phos.	0.012	
	L.O.I.	0.24	
		99.852	

Date 7-16-59

Signed Eric Wilson

FM No. 502 GPCo.

ANALYSIS REPORT

HANNA NICKEL SMELTING CO.

Riddle, Oregon

To H. W. Hard

Chemical ✓

Quantometer

Lab. No.	Sample Description	
106215	7/6 Quartz Mt.	3-12 — W. A. Foster
	SiO_2	97.80
	Fe_2O_3	1.20
	Al_2O_3	0.59
	TiO_2	0.23
	CaO	0.08
	Phos	0.003
	L.O.I	0.08
106216	7/6 Quartz Mt.	3-13 — W. A. Foster
	SiO_2	97.81
	Fe_2O_3	1.30
	Al_2O_3	0.43
	TiO_2	0.19
	CaO	0.07
	Phos	0.012
	L.O.I.	0.17

Date 7-16-59

Signed Eric Wilson

FM No. 602 DPCo.

ANALYSIS REPORT

HANNA NICKEL SMELTING CO.

Riddle, Oregon

To H. W. Hard

Chemical ✓

Quantometer

Lab. No.	Sample Description		
106217	7/6 Quartz Mt.	3-14	— W. A. Foster
	SiO_2	97.66	
	Fe_2O_3	1.05	
	Al_2O_3	0.58	
	TiO_2	0.34	
	CaO	0.11	
	Phos	0.018	
	L.O.I.	0.25	
106218	7/6 Quartz Mt.	3-15	— W. A. Foster
	SiO_2	97.76	
	Fe_2O_3	1.13	
	Al_2O_3	0.62	
	TiO_2	0.18	
	CaO	0.08	
	Phos	0.016	
	L.O.I	0.20	

Date 7-16-59

Signed Eric Wilson

FM No. 602 RPCo.

ANALYSIS REPORT

HANNA NICKEL SMELTING CO.

Riddle, Oregon

To H. W. Hard

Chemical ✓

Quantometer

Lab. No.	Sample Description	
106219	7/6 Quartz Mt. 3-16 — W. A. Foster	
	SiO_2	97.50
	Fe_2O_3	1.43
	Al_2O_3	0.49
	TiO_2	0.21
	CaO	0.08
	Phos	0.009
	L.O.I.	0.27
106512	7/11 Quartz Mt. 3-17 — W. A. Foster	
	SiO_2	98.34
	Fe_2O_3	0.68
	Al_2O_3	0.23
	TiO_2	0.19
	CaO	0.06
	Phos.	0.005
	L.O.I.	0.39

Date 7-16-59

Signed Eric Wilson

FM No. 602 RPCo.

ANALYSIS REPORT

HANNA NICKEL SMELTING CO.

Riddle, Oregon

To H. W. Hard

Chemical ✓

Quantometer

Lab. No.	Sample Description	~~Ni%~~						
108689	8/19 Quarty Mt.	# 3-12A						
	SiO_2	97.72						
	Fe_2O_3	1.38						
	Al_2O_3	0.35						
	TiO_2	0.25						
	CaO	0.08						
	Phos	<0.005						
	L.O.I.	0.08						
108690	8/19 Quarty Mt.	# 10-3						
	SiO_2	97.96						
	Fe_2O_3	1.30						
	Al_2O_3	0.26						
	TiO_2	0.21						
	CaO	0.06						
	Phos.	<0.005						
	L.O.I.	0.15						

Date 8-25-59

Signed Eric Wilson

FM No. 602 RPCo.

ANALYSIS REPORT

HANNA NICKEL SMELTING CO.

Riddle, Oregon

To H. W. Hard

Chemical ✓

Quantometer

Lab. No.	Sample Description	~~Mins~~	
108687 8/19	Quartz Mt.		# 10-4
	SiO_2	97.84	
	Fe_2O_3	1.47	
	Al_2O_3	0.16	
	TiO_2	0.44	
	CaO	0.06	
	Phos	<0.005	
	L.O.I.	0	
108688 8/19	Quartz Mt.		# 3-13 A
	SiO_2	97.80	
	Fe_2O_3	1.20	
	Al_2O_3	0.37	
	TiO_2	0.29	
	CaO	0.08	
	Phos.	<0.005	
	L.O.I.	0.09	

Date 8-25-59

Signed Eric Wilson

FM No. 602 RPCo.

ANALYSIS REPORT

HANNA NICKEL SMELTING CO.

Riddle, Oregon

To H. Withard

Chemical ✓

Quantometer

Lab. No.	Sample Description	~~Wt%~~	
108685	8/19 Quarty Mt.		= 3-21 A
	SiO_2	97.24	
	Fe_2O_3	1.20	
	Al_2O_3	0.24	
	TiO_2	0.20	
	CaO	0.06	
	Phos	0.008	
	L.O.I	0.38	
108686	8/19 Quarty Mt.		= 3-44
	SiO_2	98.19	
	Fe_2O_3	0.75	
	Al_2O_3	0.50	
	TiO_2	0.25	
	CaO	0.08	
	Phos.	0.005	
	L.O.I.	0.20	

Date 8-25-59

Signed Emil Wilson

FM No. 602 RPCo.

L. L. HOAGLAND ASSAYER
7018 S. E. Seventeenth Ave.
Portland 2, Oregon
October 22, 1957

Samples from G. D. Rannells

Received October 11, 1957

Lab. No.	Sample Marked	Results of Analysis							
		% Silica (SiO_2)	% Alumina (Al_2O_3)	% Iron (Fe)	% Titania (TiO_2)	% Calcium (CaO)	% Magnesia (MgO)	% Phosphorus (P_2O_5)	% Ignition Loss
1430	No. 1	98.66	0.30	0.07	0.32	0.02	0.015	0.007	0.37
1431	No. 2	98.80	0.38	0.106	0.28	0.01	0.01	0.005	0.36
1432	No. 3	98.98	0.07	0.18	0.30	0.02	0.02	0.006	0.22
1433	No. 4	98.76	0.36	0.19	0.18	0.022	0.012	0.006	0.32
1434	No. 5	98.66	0.30	0.106	0.26	0.014	0.011	0.009	0.36
1436	No. 6	98.72	0.21	0.10	0.35	0.01	0.02	0.012	0.47

USDA, Forest Service

FS-2800-5 (1/90)
OMB NO. 0596-0022
EXPIRES: 07/31/92

PLAN OF OPERATIONS FOR MINING ACTIVITIES ON NATIONAL FOREST LANDS

Submitted by GERALD D. RANNELLS (Signature) | Owner (Title) | September 24, 1991 (Date)

Plan Received by (Signature) | (Title) | (Date)

I. GENERAL INFORMATION

A. Name of Mine/Project QUARTZ MTN.

B. Type of Operation Open pit hard rock mine
(lode, placer, mill, exploration, development, production, other)

C. Is this a (new/continuing) operation? (CIRCLE ONE)
If continuing a previous operation, this plan (replaces/modifies) a previous plan of operation. (CIRCLE ONE)

D. Proposed start-up date of operation September 24, 1991

E. Proposed duration of operations 30 years

F. Proposed seasonal reclamation close-out date 30 years

II. PRINCIPALS

A. Name, address and phone number of operator Gerald D. Rannells, 16870 SW Matador, King City, OR 684-1042 (home)
P.O. Box 40, Roseburg, OR 97470 (673-0419 Temp.)

B. Name, address, and phone number of authorized field representative (if other than the operator). Attach authorization to act on behalf of operator.

Gerald Rannells or Gary Bell

C. List the owners of the claims (if other than the operator)

Anna Lu Rannells

(If more space is needed to fill out a block of information, use additional sheets and attach to form.)

D. List name and address of any other lessees, assigns, agents, etc. and briefly describe their involvement with the operation, if applicable:

Gary Bell, P.O. Box 25, Tiller, OR 97484

WHITAKER EQUIPMENT & HAULING, INC., P.O. Box 40, Roseburg, OR 97470 673-6116

III. PROPERTY OR AREA

Name of claim and the legal land description where the operation will be conducted.

MC #	Name	Section	Township	Range
	BIG QUARTZ 1-31	2, W½	28S	1E, WM

IV. DESCRIPTION OF THE OPERATION

A. **Access.** Show on a map (USGS quadrangle map or a National Forest map, for example) the claim boundaries and describe and show on the map all access needs, on and off the claim. Specify what Forest Service existing roads will be used, where maintenance or reconstruction is proposed and where any new construction is necessary. For new construction, include construction specifications such as widths, grades, etc. Show location and size of culverts. Describe maintenance plans. Describe the type and sizes of vehicles and equipment that will be traveling the access routes.

Maintenance plan is to keep all roads in good condition, pit and storage yard in first class operating condition. A good house keeping maintenance plan.

B. Attach map, sketch or drawing showing location and layout of the area of operation. Include names and locations of any streams, creeks, and springs. Describe and explain on the map the type of operation, method or techniques you propose (examples: drilling, open pit mining, dredging, milling, etc.; include locations, capacity, size, amount, etc.). Show on the map and describe below the size and kind of all surface disturbance, such as trenches, pits, settling ponds, stream channels and run-off diversions, waste dumps, drill pads, timber disposal or clearance, etc. Include sizes, capacities, acreage, amounts, locations, materials involved, etc.

(If more space is needed to fill out a block of information, use additional sheets and attach to form.)

C. **Project Description.** Describe all aspects of the operation: how clearing will be accomplished, topsoil stockpiled, waste rock placed, tailing disposed of, etc. Calculate production rates and total volumes of waste rock and ore. Include justification and calculations for settling pond capacities and sizing of runoff diversion channels.

1. For first 12 months:

This project is an open pit, top of mountain. Hard rock will be drilled, shot then run through a crushing or screening plant for size. We hope to have very little waste as our market is for 1" to 1/16" for decorative and building stone. 1" to 6" for smelter plant at Riddle, 6" to large boulders for building stone. Any finer should go for road surface. We plan to clean up existing pit and to continue operation on the same area.

2. For total life of project:

At 100,000 ton per year, this project has a life of approximately 1500 years, but should continue as open pit mining operation as long as there is a market for Silica stone or rock. We feel we will operate at between 70,000 and 100,000 tons per year. This means 2800 to 4000 truck loads per year at 25 tons per truck.

(If more space is needed to fill out a block of information, use additional sheets and attach to form.)

D. **Describe the Equipment and Vehicles** you propose to use in your operation (Examples: drill, dozer, wash plant, mill, etc.). Include: sizes, capacity, frequency of use, etc.

A Finley power screen for sizing and washing, 1 dryer, 2 front-end loaders, back-hoe, five to six trucks, one grader, one to two drills and explosives.

E. **Structures.** Describe and include justification for the structures or facilities planned for the operation. Include such things as storage sheds, mill buildings, thickener tanks, fuel storage, powder magazines, pipe lines, water diversions, trailers, sanitation facilities, etc. Include justification and calculations for sizing of tanks, pipelines and water diversions. The fuel storage facilities should include containment structures that will hold the volume of the largest storage tank in case of a tank failure of leak. Show the locations on the sketch map.

No Structures - Fuel Storage ?

At this time, I believe all storage tanks and most processing facilities will be at the foot of the mountain, milepost 21, on South Umpqua Forest Road.

V. ENVIRONMENTAL PROTECTION MEASURES (SEE 36 CFR 228.8)

A. **Air Quality.** Describe measures to be taken to minimize impacts on air quality such as obtaining a burning permit for slash disposal or dust abatement on roads.

I do not plan on any slash burning, and do not believe there will be any other permit needed unless for the screen plant which I'll have a permit for.

Dust?

(If more space is needed to fill out a block of information, use additional sheets and attach to form.)

B. **Water Quality.** State how applicable state and federal water quality standards will be met. Describe what measures or management practices will be used to minimize water quality impacts and meet applicable standards.

1. If water is to be used in the operation (processing ore, washing ore, solution make-up, etc.) state how the water will be stored, treated an disposed of. If ponds of any type are proposed, such as for storage or settling, state how they will be designed and built. Provide storage capacities and water balance calculations. State how ponds will be maintained on an annual basis.

2. Describe methods to control runoff and erosion to prevent entry into surface water for all disturbed areas, including waste and tailings dumps.

3. Describe proposed surface water and groundwater quality monitoring, if required, to demonstrate compliance with federal or state water quality standards.

4. Describe what measures will be used to minimize potential water quality impacts during winter closure, if applicable.

5. If land application is proposed for wastewater disposal, the location and operation of the land application system should be described.

All waste water (should not be any solid waste), will be in pond and water will not be left to run into a stream and flow back into river or where it can polute any ponds. All of this operation will be done at location on yard at foot of mountain, milepost 21, South Umpqua forest service road, or at mine site.

C. **Solid Wastes.** State how any tailing, dumpage, or other waste produced by operations will be disposed of or treated so as to minimize adverse impacts. Include a statement that all unburnable garbage and refuse will be hauled off-Forest to a sanitary landfill.

It will be stored as much as possible in area for waste disposal and future use when needed, at mine site. All garbage will be ahuled to county garbage disposal.

D. **Scenic Values.** State how scenic values will be protected. Examples are screening, slash disposal, timely reclamation, etc.

This should improve our road at mine and the yard at foot of mountain, and area used in operation will be cleaned-up and will make a better operation.

(If more space is needed to fill out a block of information, use additional sheets and attach to form.)

E. **Fish and Wildlife.** All practicable measures to maintain and protect fisheries and wildlife habitat affected by the operations must be taken, and should be defined. Most of those measures involve avoidance of critical habitat such as along streams and bogs when planning roads, dumps, etc. Opportunities during reclamation to prevent erosion or plant browse or forage species should be described.

Should have no affect on fish or woldlife. If anything, would like to help improve it if possible.

F. **Cultural Resources.** Describe procedures for protection of historic and archeological values. The Forest Service is responsible for insuring that the area to be covered by the operating plan is inventoried prior to plan approval to determine the presence of significant cultural resources and will specify protective and/or mitigation measures to be taken by the operator. If previously undiscovered cultural resources (historic or prehistoric objects, artifacts, or sites) are exposed as a result of operations, the operator shall not proceed until he is notified by the District Ranger that he has complied with provisions for mitigating unforeseen impacts as required by 36 CFR 228.4(e) and 36 CFR 800.

I do not believe there is anything but hard rock on this property. Will do what is necessary to protect anything that needs protecting within reason.

G. **List all hazardous substances (by name and quantity required) which you intend to use or generate during the proposed operation. Operations USING or GENERATING HAZARDOUS SUBSTANCES must attach copies of other Federal and State agency permits, including all stipulations and conditions pertaining to the permit.**

Will use no hazardous materials other than explosives. These will be brought onto the area when needed for use and will not be stored on property.

H. **With regard to hazardous substances, discuss handling, storage, security (fencing), identification (signing), or other special operations requirements necessary to conduct the proposed operation.**

Gate at foot of mountain and storage yard at milepost 21, South Umpqua forest road, and danger signs on short road to top of mountain and mine site warning danger.

(If more space is needed to fill out a block of information, use additional sheets and attach to form.)

I. **Close-out Reclamation.** This section should describe the removal of structures and facilities, and the reclamation of the access road. It should specify that roads no longer needed: (1) be closed, (2) bridges and culverts be removed, (3) cross drains, dips, or water bars be constructed, and (4) the road surface be shaped to as near a natural contour as practicable and be stabilized. Show the expected date for completion of all reclamation.

If and when this is needed, we will do it.

VI. FOREST SERVICE EVALUATION OF PLAN OF OPERATIONS

A. Recommended Changes/Modifications for Plan of Operations: _____

B. **Bond** - As a further guarantee of faithful performance with the reclamation requirements agreed upon in the plan of operations, the operator delivers herewith and agrees to maintain a surety bond, cash, bond, irrevocable letters of credit in the sum of _____ ($_____).

ACKNOWLEDGMENTS

A. It is understood that should the nature of the operation change a modified or supplemental plan of operations may be required.

B. It is understood that approval of this plan of operations does not constitute: (1) Certification of ownership to any person named herein; and (2) Recognition of the validity of any mining claim named herein.

(If more space is needed to fill out a block of information, use additional sheets and attach to form.)

C. It is understood that a bond equivalent to the actual cost of performing the agreed upon mitigation and reclamation measures may be required before this plan can be approved.

D. It is understood that approval of this plan does not relieve me of my responsibility to comply with any other applicable State or Federal laws, rules or regulations.

E. It is understood that any information provided with this plan that is marked confidential will be treated by the agency in accordance with that agency's laws, rules and regulations.

I/We have reviewed and agree to comply with all conditions in this plan of operations, including the recommended changes and reclamation requirements. I/We understand that the bond will not be released until the Forest Officer in charge gives written approval of the reclamation work.

Don C Wilkins

Arnold D Runnells — Sept 24-91

Operator (or Authorized Official) — (Date)

OPERATING PLAN APPROVAL:

(Name) — (Title)

(Authorized Officer) — (Date)

Public reporting burden for this collection of information is estimated to average 2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Agriculture, Clearance Officer, OIRM, Room 404-W, Washington, D.C. 20250; and to the Office of Management and Budget, Paperwork Reduction Project (OMB #0596-0022), Washington, D.C. 20503.

U.S. Department of Agriculture – Forest Service

ROAD USE PERMIT
(Re: FSM 7770)

Authority:
Acts of 6/30/14, 4/24/50, 6/12/60, and 10/14/64;
(16 U.S.C. 498, 572, 530, and 532-38)

Gerald W. Rannells (Name) of 16870 S.W. Matador, King City, OR 97224 (Address and ZIP Code)

(hereafter called the permittee) is hereby granted use of the following road(s) or road segments: Quartz Mountain Road #27 for 11.0 miles and South Umpqua Road #28 for 15.4 miles. See attached map for haul route.

on the Umpqua National Forest, subject to the provisions of this permit including clauses 1 through 17, on page(s) 1 through 4 for the purpose of hauling 20,000 tons of crushed silica rock from a mining claim on Quartz Mountain, Sec. 2, T. 28S., R. 2E., W.M.

The exercise of any of the privileges granted in this permit constitutes acceptance of all the conditions of the permit.

1. **INVESTMENT SHARING RATES.** The rate for sharing under this permit is $0.49/ton (Per traffic unit, MBF, cu. yd. other—Specify). Permittee's share of investment will be met as provided for in clause 2.

Rate for sharing of maintenance is shown in clause 9.

Quartz Mountain Road = 0.19/ton
South Umpqua Road = 0.30/ton

~~2-1. **WORK REQUIRED TO ACCOMMODATE PERMITTED USE.** In accordance with this use, the permittee shall perform the work described below and in accordance with plans and specifications attached hereto:~~

WORK PERFORMANCE SCHEDULE. (Construction of required improvements or reconstruction will be completed within _____ months and before hauling commences.)[1] Work shall be performed in accordance with the attached schedule. In no case will haul be allowed to exceed the value of completed work.)[1] Credit will be allowed in the total of $ _____, which is the engineering estimate for the cost of the work to be credited to the share to be borne by this permitted use. In the event that permitted use will exceed the value of required work performed, the difference between the value of permitted use and work performed will be deposited in cash as provided in clause 2-3.

2-2. **COOPERATIVE WORK.** Although not required to accommodate the use herein permitted, it is desirable to the Forest Service and the permittee to have certain construction or reconstruction work accomplished coincident to use of the road.

The permittee shall perform the work described below in accordance with plans and specifications attached hereto.

Upon satisfactory performance, credit will be allowed in the total of $ _____ to the share to be borne by the permittee.

2-3. **CASH DEPOSITS REQUIRED IN LIEU OF WORK PERFORMANCE.** The permittee will deposit $ _____ with the Forest Service on or before _____. The amount deposited will be credited to the share to be borne by the permittee.

2-4. **COST RECOVERY.** In consideration for this use, the permittee shall deposit with the Forest Service the sum of $1,900.00 (and thereafter in individual deposits, equivalent to estimated charges before next payment is made, as called for by the Forest Service in advance of current road use).[1] When preferred by a permittee, a payment guarantee may be furnished in lieu of advance deposits. $1,900.00 in advance for 10,000 tons over Road #27 and an additional $1,900.00 for remainder of tonnage. $0.30/ton on as-hauled basis for South Umpqua Road #28.

This permit is accepted subject to all of its terms and conditions.

ACCEPTED	Permittee (Name and Signature) Gerald W. Rannells		Date
APPROVED	Issuing Officer (Name and Signature) ROBERT J. DEVLIN	Title Forest Supervisor	Date 9-22-89

[1] Delete if not applicable.

(over)

7700-41 (10/73)

~~PAYMENT GUARANTEE. Notwithstanding the provisions of clause 1, if the permittee furnishes and maintains an acceptable payment bond in a penal sum of not less than $ _____ guaranteeing payment for road use up to this amount, or in lieu thereof deposits in a Federal depository, through the Regional Fiscal Agent, and maintains therein negotiable securities of the United States having a market value in like sum and agreement authorizing the bond approving officer to sell or collect such securities if payment is not made within _____ ( ) days of request therefor, the Forest Service shall permit road use in advance of cash payment up to the penal sum of such bond or market value at time of deposit of negotiable securities, *provided*, that regardless of the penal sum of such payment bond or the value of such deposited securities, the permittee shall pay cash within _____ ( ) days of request therefor, for all performed road use. If any payment is not received within _____ ( ) days of request therefor, the Forest Service may suspend all hauling under this permit until payments due are received, and may take such action as is necessary to collect such payments from the payment guarantee surety, or by sale or collection of securities guaranteeing payments. In the event the permittee fails to make payment and collection is obtained from the surety, or from the sale or collection of the deposited securities, the Forest Service may thereafter require the permittee to make payments in advance of road use.~~

3. USE PLANS. Prior to May 1st each year this permit is in effect, permittee shall notify the District Ranger in writing of the approximate time when such use will commence, the anticipated duration of such use, the names and addresses of permittee's contractors or agents who will use the road on behalf of permittee, the estimated extent of use, and such other information relative to permittee's anticipated use as the Forest Service may from time to time reasonably request. If and when during the year there is any significant change with respect to the information so supplied by permittee, the permittee will notify the District Ranger promptly in writing of such change. Plans and changes will be approved by the Forest Service before use may commence.

4. USE RECORDS. The permittee shall monthly, or at other Forest Service approved intervals when the permittee is hauling over this road, furnish the tonnage scale records, or other records satisfactory to the Forest Service which give the volume of road use in terms related to rates in clause 1 under the authority of this permit.

5. COMPLIANCE WITH LAWS AND REGULATIONS. The permittee, in exercising the privileges granted by this permit, shall comply with the regulations of the Department of Agriculture and all Federal, State, county and municipal laws, ordinances or regulations which are applicable to the area or operations covered by this permit.

6. USE NONEXCLUSIVE. The privileges granted in this permit to use this road are not exclusive. The Forest Service may use this road and authorize others to use it at any and all times. The permittee shall use said road in such manner as will not unreasonably or unnecessarily interfere with the use thereof by other authorized persons, including Forest Service.

7. RULES GOVERNING USE. The permittee, its agents, employees, contractors or employees of contractors, shall comply with all reasonable rules prescribed by the Forest Service for control and safety in the use of this road and to avoid undue damage to the road. Such rules will include:

(1) Upon reasonable notice, closing the road or restricting its use when, due to weather conditions, or the making of alterations or repairs, unrestricted use would in Forest Service judgment, cause excessive damage, or create hazardous conditions;

(2) Upon reasonable notice, closing the road during periods when, in Forest Service judgment, there is extraordinary fire danger;

(3) Traffic controls, which in Forest Service judgment, are required for safe and effective use of the road by authorized users thereof;

(4) Prohibition upon the loading of logs on trucks while such trucks are standing on the roadway surface, except to recover lost logs; and

(5) Prohibition on the operation on this road of any vehicles or equipment having cleats or other tracks which will injure the surface thereof;

EXHIBIT II

JOBS

TOP OF THE MOUNTAIN & YARD AT THE FALLS	8000 HOURS	4 MEN
40,000 TON TO GLENBROOK TRUCKERS	8000 HOURS	4 MEN
30,000 TON TO YARD AT RIDDLE TRUCKERS	6000 HOURS	3 MEN
20,000 TON TO PORTLAND-BUILDING STONE	8000 HOURS	4 MEN
10,000 TON TO BAY AREA-BUILDING STONE	8000 HOURS	4 MEN
YARD AT RIDDLE, BOOKKEEPER, 2 SALESMEN, 3 YARD WORKERS	10000 HOURS	5 MEN
ROCK PRODUCTION FOR 70,000 TON	48000 HOURS	24 MEN

TOTAL LABOR COST AT 8.00 PER HOUR AND 4.00 PER HOUR INSURANCE AND OTHER COSTS.

PAYROLL AT 8.00 PER HOUR X 48000 HOURS	$384000.00
INSURANCE & MISCELLANEOUS COST @ 4.00	192000.00
TOTAL	$ 576000.00

ROCK TO GLENBROOK NICKEL SUPPLIES THE FERREL SILICON FURNACE. THIS PAYROLL IS APPROX-IMATELY 40 MEN TOTAL PAYROLL	$1047680.00
INSURANCE, TAXES, MISCELLANEOUS	523840.00
TOTAL	$1571520.00

TOTAL PAYROLL COSTS	$2147524.00

STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
Head Office: 1069 State Office Bldg., Portland 1, Oregon
Telephone: CApitol 6-2161, Ext. 488

Field Offices

2033 First Street
Baker

239 S. E. "H" Street
Grants Pass

* *

THE QUARTZ MOUNTAIN SILICA DEPOSIT, OREGON

By
Len Ramp*

A large deposit of fairly high-purity silica occurs on Quartz Mountain, about 35 air miles east of Roseburg, Douglas County, Oregon (see accompanying map). Quartz Mountain is a prominent craggy peak 5,530 feet in elevation, on the divide between Little River and South Umpqua River in sec. 2, T. 28 S., R. 1 E. It is reached by a forest access road connecting the South Umpqua River road and the Little River road. There is an abandoned Forest Service lookout station on top of the mountain.

The Quartz Mountain silica deposit is owned by Roy Rannells of Riddle, Oregon, and Gerald Rannells of Aurora, Oregon. About 30 claims were located in 1957 shortly after the Forest Service road into the area was completed. Development work at present consists of access roads, discovery cuts, and a pit in the talus on the northwest slope of the mountain where about 400 tons of silica have been taken out for smelter test at the Hanna Nickel Smelting Company at Riddle, Oregon.

Walter A. Foster, geologist for The Hanna Mining Company, has conducted a sampling and mapping program to determine the quality and quantity of the deposit.

GEOLOGY

Geologic Background:

The Quartz Mountain area lies in the belt of Western Cascades volcanic rocks composed of continental flows and pyroclastics which have been deformed and partially altered.

Most of the upper portion of Quartz Mountain is made up of a tough and massive grayish white cryptocrystalline silica rock which stands in bold relief. Vertical cliffs from 50 to more than 200 feet in height are prominent features on the north and east sides of the mountain. The main body of silica is about 3,000 feet long by 1,200 feet wide and crops out mainly between 4,800 feet and the top of the mountain at 5,530 feet. Silicified rock is also exposed at various places in Quartz Creek, a short distance to the northeast. The area between Quartz Creek and Quartz Mountain is covered by extensive slide debris, much of which is relatively pure silica rock.

Tuff Series:

The oldest formation is composed of a great thickness of pyroclastic rocks ranging from tuffaceous siltstones to agglomerates and including tuff breccias, lapilli tuffs, fine-grained crystal tuffs, and minor welded tuffs. Near Quartz Mountain the tuffs are mostly light colored and in large part altered to clay minerals and replaced in varying amounts by silica. The relict textures

* Field Geologist, State of Oregon Department of Geology and Mineral Industries.

of the silica rock appear to be those of fine-grained crystal tuffs and lapilli tuffs.

Fossil leaves and wood fragments are found in some of the fine-grained tuffaceous lacustrine sediments in the tuff series. A collection of leaves was made from an outcrop of these sediments 4 miles south of the map area in the SW¼ sec. 26, T. 28 S., R. 1 E. This collection, which contains Engelhardtia (fruits), Platanus, and possibly Salix, Alnus, and Alangium, has been tentatively identified as an Oligocene-Miocene flora. Other Oligocene-Miocene floras in the Western Cascades include the Rujada flora from Layng Creek in T. 21 S., R. 1 E. (Lakhanpal, 1958) and the Scio flora and other fossil leaf collections from the Mehama volcanics in the Lebanon quadrangle (Allison and Felts, 1956). Various collections of Oligocene-Miocene plants, identified by R. E. Brown of the U. S. Geological Survey occur in similar tuffaceous rocks mapped as Little Butte volcanic series in the Medford quadrangle (Wells and others, 1956) and in the Western Cascades in general (Peck, 1960).

Rhyolite Intrusives:

Rhyolite and dacite porphyry dikes intruding the tuff series are fairly common in the area. A few fairly large siliceous intrusive bodies were observed during reconnaissance mapping along the South Umpqua River. Included in these are a dacite porphyry dike at Deer Lick Falls about five miles southeast of Quartz Mountain and banded rhyolite dikes exposed in the South Umpqua River at Camp Coffee Pot, sec. 17, T. 29 S., R. 1 E., and about 3/4 mile above the South Umpqua Falls. Several rhyolite dikes were observed along the Quartz Mountain road between the South Umpqua River and the map area. Clay alteration and pyrite impregnation in the tuff series appear to be closely related to the rhyolite intrusives.

Basalt Flows and Dikes:

Lavas of andesitic to basaltic composition overlie the tuffs unconformably and a few small dikes and sills of similar composition intrude the tuffs. These basic lavas are generally fresh and have textures varying from glassy to porphyritic, occasionally with feldspar phenocrysts so abundant as to appear coarse grained. In places, the lava is bleached and almost completely altered to clay. This is especially evident along the road west of Quartz Mountain. Peck (1960) maps the lavas as part of the Sardine formation of upper Miocene age.

Structure:

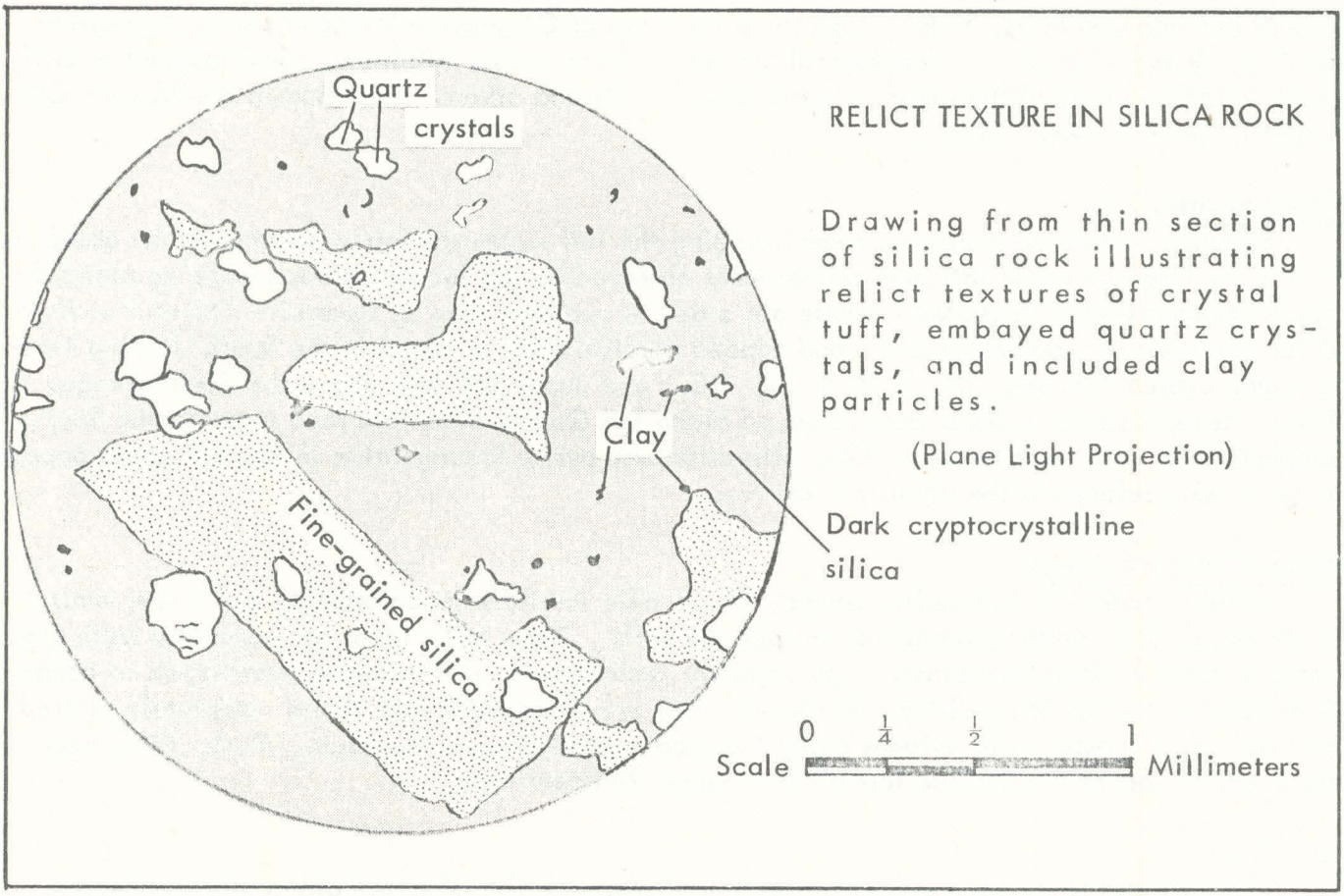
The tuffs and lavas generally strike in a northwesterly direction and dip gently northeast. Wherever attitudes can be seen in the deposit of silica rocks the northwest strike and low dip to the northeast is also apparent. Where the tuff series is better exposed outside the map area along the South Umpqua River, it has a similar strike and dip.

Faults are evident at various places and are probably more numerous than shown on the map. The west-trending fault mapped along the north edge of the main silica deposit is visible where it offsets a basalt flow exposed in the road on the northwest flank of Quartz Mountain. Along this same fault on the northeast flank there is an associated gossan indicating alteration and mineralization. Rocks north of this fault appear to have been downthrown. It is possible that another body of silica lies to the north under the slide debris.

Mineralization:

In addition to the widespread silicification, the tuffs and to a lesser extent the basic lavas, are in places completely altered to clay. Areas of intense rock alteration are impregnated throughout with small crystals of pyrite. Surface alteration of these clayey rocks containing abundant disseminated pyrite have in places produced typical gossans. Secondary iron-aluminum sulfate minerals have also formed in caverns and overhanging bluffs in the clayey pyrite-impregnated tuffs.

As shown on the map, the silcified tuffs are interbedded with less silicified layers of altered clayey tuffs. Some of the silicified horizons contain many caverns. Those at Caves Camp site are so large that they were used for living quarters by the mine owners during the exploration period. The cavernous weathering is the result of differential porosity of the silicified tuffs. Porous clayey areas, not completely replaced by silica, absorb water and are thus subjected to more rapid weathering and deterioration by frost action.



Origin of the Silica:

Relict textures of tuff in the silica rock are visible both megascopically and in thin section (see accompanying figure). It is apparent that the silica of Quartz Mountain is due to silicification (replacement of the tuffs by silica). The process by which this took place is not completely understood. One of the more feasible explanations is that the action of hot springs, with highly reactive siliceous thermal waters ascending through and migrating laterally in the more porous layers of tuff, caused wholesale replacement by silica. The possibility of the mountain having been a major vent or a concentration of hot springs emerging along faults or fractures may also be considered. It is also possible that the deposit was formerly opalite and that it later altered by diagenesis to chalcedony. Opalites are commonly formed by the action of thermal waters in areas of volcanic activity.

The presence of secondary iron-aluminum sulfate minerals formed by the leaching action of sulfate solutions (derived by alteration of pyrite) on the clays may explain the formation of the silica deposit. The fact that some of the zones of clay alteration containing disseminated pyrite are partly silicified would lend support to such a theory.

ECONOMICS

Analysis:

The average grade of the silica rocks has not been established for the overall deposit but the better grade contains from 96 to 99 percent silica. The principal impurities are iron, alumina, and titania. A typical analysis shows: 98 percent SiO_2, 1 percent Fe_2O_3, .2 percent Al_2O_3, .3 percent TiO_2, .05 percent CaO, .005 percent P_2O_5, and a small loss on ignition. The loss on ignition (water) appears to be directly proportional with the alumina content. This is reasonable in light of the small inclusions of clay (kaolinite) seen in thin sections of the silicified rock.

Uses of Silica:

High purity silica has been applied to many industries. Some of the more important uses are listed below:

Metallurgical
- Silicon metal, ferrosilicon, and other silicon alloys.
- Flux in smelting basic ores, foundry mold wash and foundry parting sand.

Abrasives
- Scouring and polishing powders and soaps.
- Sandpaper, whetstones, and sandblast.
- Production of silicon carbide (carborundum).
- Pebbles for ore-grinding mills.

Refractory
- Silica firebrick and other refractories.

Miscellaneous
- Road-surfacing aggregate.
- Chicken grit.

Chemical
- Lining for acid towers.
- Filtering medium.
- Catylitic agent in petroleum refining.
- Cement.
- Manufacture of sodium silicate (water-glass), silicones, and other chemicals.

Mineral Fillers
- Inert extender in paint, wood filler, fertilizer, insecticides, rubber, phonograph records, linoleum, etc.

Ceramics
- Pottery, glazes, and enamels.
- Manufacture of glass and fused quartz chemical apparatus.

Building
- Roofing granules.
- Rubble stone for exterior walls.
- Aggregate for stucco and plaster.

Most users of silica demand a uniform high-purity raw material containing 97 percent or more SiO_2. The production of high-purity silicon metal, such as that produced by the National Metallurgical plant in Springfield, Oregon, requires an ultra-pure variety of quartz, 99.7 plus percent SiO_2. Most of their quartz is obtained from the Crystal Peak deposit in California, a short distance west of Reno, Nevada.

Objectionable impurities in the production of ferrosilicon metal include calcium, arsenic, phosphorous, and refractory elements such as aluminum, titanium, and magnesium. Physical properties such as toughness and whiteness are also important in certain uses.

Silica Production in Oregon:

The only producer of high-purity silica in Oregon is the Bristol Silica Company. This

company has operated a quarry and plant near Rogue River, Oregon, since 1938. The Quartz Mountain property, although not in production at the present, represents a vast supply of relatively high-purity silica for use in the future.

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* * * * *

AMERICAN MINING CONGRESS RESOLUTIONS

The following resolutions on gold, silver, and monetary policies were adopted at the meeting of the American Mining Congress at Las Vegas, Nevada, in October, 1960:

1. The restrictions on the purchase, ownership and sale of gold by United States citizens be abolished.
2. The Administration recognize the historical and traditional confidence in gold and silver as monetary metals throughout the world, and as part of its foreign policy aid other governments in restoring gold and silver coinage -- and currencies convertible into gold -- as a standard of value and as a circulating medium.
3. Congress fix the ratio at which the dollar and gold are to be made fully convertible and take all steps necessary to provide for the orderly restoration of the gold standard.
4. The Treasury, prior to restoration of full convertibility, cease sales of gold for industrial uses.
5. The Secretary of the Treasury, under the discretionary powers granted him by the Act of July 31, 1946, cease sales of silver at less than the monetary value and retain the Treasury's dwindling supply of free silver for future subsidiary coinage requirements.
6. The Congress act to prevent the wasteful reduction of our silver stocks by immediately monetizing the presently held free silver and declaring inviolate the present monetary stocks, as well as insuring the supply of silver to our country by amending the Act of July 31, 1946, to eliminate the 30 percent seigniorage charge.
7. The tax on silver transactions be repealed and the buying and selling of silver for future delivery be allowed.
8. The Government give immediate recognition to the increased costs of producing gold within the United States by means of an increase in the price paid to domestic producers for newly mined gold.

* * * * *

STATE OF THE MINING INDUSTRY - STRATEGIC METALS*

By
S. H. Williston**

The strategic metal industry in the United States has reached, or will reach in the next few months, the production levels of 1939. We are again the "have not" nation in strategic metals that we were before World War II.

At one time or another during the last 20 years we have produced up to 100 percent of our annual mercury requirements, up to 50 percent of our antimony requirements, roughly 15 percent of our chrome and manganese requirements, 200 percent of our tungsten requirements, and 50 percent of our cobalt requirements. It cannot be said, in the light of these facts, that we do not have the deposits to mine.

As it so happens, deposits of these strategic metals are relatively abundant in some of the lower labor cost countries in the world. Thus chrome, cobalt, antimony, beryl, columbium, manganese and tungsten come from countries such as Africa, Turkey, Brazil, Bolivia, Red China, and India, where the total wages per day are far less than the cost of the American miner per hour, and the types of deposits are such that the efficiency of labor in these countries is fully equal to the efficiency of the American miner. Thus, in the United States labor costs in strategics range from 500 percent to 5000 percent of foreign labor costs. Further, when, as, and if technical experts or American technical equipment are necessary our own government has been quite willing to assist the foreigner in acquiring that knowledge and machinery.

While many of the manufacturers of finished goods in the United States enjoy tariff rates ranging as high in some cases as 50 percent ad valorem, or even higher, tariffs on the strategic metals are either non-existent, as in the cases of chrome, cobalt and columbium, or extremely low (less than 10 percent) such as the case in respect to antimony, manganese and mercury. Of all of the strategics only tungsten has a tariff in excess of 10 percent, and it is interesting to note that only tungsten is showing a slightly improved production figure at the present time.

These two reasons clearly explain the almost complete elimination of the strategic mining industry. There is, however, a contributing cause which is most difficult to understand, and that is the apparent policy of our government in Washington to permit the complete elimination of this industry so long as the cold war continues. You may recall that at the end of World War II a strategic mineral policy was proposed that we leave our minerals in the ground and procure them from unfriendly foreign nations. That proposal was never officially adopted and the man who made it came to an ignominious and tragic end, yet, at the present time, that policy has been apparently firmly established as the underlying strategic mineral policy of the United States.

Where, except in the strategics, are metals repeatedly taken from the military stockpile without Congressional approval and without published Presidential permission?

Where, except in the strategics, do government agencies use barter for the procurement of their current requirements?

Where, except in strategics, are government agencies' requirements acquired 90 percent from abroad at prices no lower than domestic, and without giving domestic producers an opportunity to bid?

Where, except in the strategics, are government import figures falsified?

Where, except in the strategics, are barter contracts entered into after announcement that our stockpiles are full to overflowing?

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* Presented at the 1960 Metal Mining and Industrial Minerals Convention and Exposition, American Mining Congress, Las Vegas, Nev., October 10-13, 1960.

**Executive Vice President, Cordero Mining Co., Palo Alto, Calif.

It might be wise for producers of other metals to examine the precedents set by government action in the strategics. They could prove disastrous to other industries beside our own.

The present situation as to the individual strategics is as follows:

Antimony:

Domestic production of antimony is limited to by-product metal from Idaho which accounts for about 5 percent of domestic antimony requirements. Antimony in the ore is worth about 13 cents a pound, as the metal, about 26 cents a pound, and the ad valorem tariff is less than 5 percent. Our present supply of antimony comes from Mexico, Red China, South Africa and Bolivia.

Cobalt:

The only primary cobalt producer in the United States has closed down. The refining equipment and mining plant machinery has been sold. World cobalt prices have declined materially and even the Canadian cobalt producers announced that they will be unable to continue operations. Although there is some by-product production in the United States, the principal source of cobalt for consumption in the United States is now the Congo and Castro's Cuba. Cobalt is on the free list.

Chromite:

Domestic production of chromite is limited to the Mouat Montana operations of American Chrome on a government contract which expires in 1961. Metallurgical investigations, looking toward the production of ferro-chrome, are reported as satisfactory, but the recent decline in imported chrome ore prices must make continued operation considerably less than certain.

Metallurgical grade chrome production on the West Coast and in Alaska ceased in 1958. These chrome mines are no longer on a stand-by basis but are closed and caved. Little of the reserves developed are now available.

Chrome in the ore is worth approximately 3 cents a pound, as ferro-chrome it is worth 30 cents a pound, and as electrolytic chrome metal a little over $1 a pound. United States' requirements of chrome come from Turkey and the East Coast of Africa. Chrome is on the free list.

Columbium:

The only producer of appreciable amounts of columbium, Porter Brothers in Idaho, discontinued mining operations in early 1960. Columbium in the ore is worth less than $2 a pound but, as the metal, is worth $50 a pound. United States' requirements of columbium come from Brazil and Africa. Columbium is on the free list.

Manganese:

Domestic production of manganese has declined drastically since the termination of the government purchase program. A small amount of battery manganese and special-purpose manganese is being produced in Montana. The Three Kids operation in Nevada is still operating but will not continue beyond the middle of next year. Current United States' requirements of manganese come from Brazil, India and Africa. Manganese in the ore is worth approximately 3 cents a pound and, as electrolytically reduced metal, slightly over 30 cents a pound. Tariff protection is considerably less than 10 percent.

Mercury:

As a result of lowered prices mercury production in the United States dropped 20 percent during 1959 and will probably decline another 20 percent in 1960. World-wide production has also declined materially in the last two years for the same reason. Domestic production is able to supply almost half of domestic commercial requirements, the balance coming from Mexico, Italy, and Spain. Tariff protection is less than 10 percent.

Tungsten:

Two primary producers of tungsten, as well as one by-product producer, are in operation, and two additional mines have announced reopening. Since the Bureau of Mines has discontinued production statistics on tungsten, and since the producing picture is subject to change without much notice, accurate estimates are difficult to make. It is, however, rather certain that United States production is in excess of one-fourth our consumption requirements but not as much as one-half our requirements. While the world price of tungsten has improved materially in the last year or so from its extreme low point, domestic costs have continued to rise so that present tungsten prices cannot bring forth much more tungsten production than that now in operation or considering operation. The balance of United States' tungsten requirements comes from Australia, Korea, Brazil, Red China, Bolivia and Africa. Tungsten is the only strategic metal which has an import duty in excess of 10 percent ad valorem.

* * * * *

MINING NEWS OF SOUTHWESTERN OREGON

Harry Commers of Grants Pass shipped two carloads of copper-bearing vein quartz from the Copper Eagle (Brass Ledge) mine in the Galice district, Josephine County, to the Tacoma Smelter. The shipments were made during October.

The War Eagle Quicksilver mine in Jackson County is being explored by Dave Chase of Medford, Oregon. He has moved his 10-ton Gould type rotary furnace from the Bonita mine to the War Eagle. The lower drift and shaft have been opened and the upper drift extended for about 60 feet to the east. Small amounts of ore are being mill tested.

* * * * *

SURVEY PUBLISHES RECENT TECHNICAL FINDINGS

A new type of publication has been issued by the U. S. Geological Survey as an experiment to meet public and professional demand for prompt release of important research results. This is Professional Paper 400, "Geological Survey Research 1960", issued in two separately bound chapters, 400-A and 400-B. Chapter 400-A, with 138 pages and four illustrations, presents a synopsis of a wide variety of geologic studies by the Survey's Geologic Division. Chapter 400-B, with 515 pages and 303 illustrations, consists of 232 individually authored papers averaging about 1,000 words in length. Some are scientific notes announcing new discoveries; others are summaries of more comprehensive investigations. Included in Chapter 400-B are the following reports on Oregon geology:

"Age and correlation of some unnamed volcanic rocks in south-central Oregon," by George W. Walker.

"Upper Triassic graywackes and associated rocks in the Aldrich Mountains, Oregon," by T. P. Thayer and C. E. Brown.

"The John Day formation in the Monument quadrangle, Oregon," by Richard V. Fisher and Ray E. Wilcox.

"Cenozoic volcanism in the Oregon Cascades," by Dallas L. Peck.

Copies of Professional Paper 400-A and 400-B are available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at $1.00 and $4.25 respectively.

* * * * *

OPTIMISM EXPRESSED FOR GOLD MINING

Las Vegas, Nev., October 13 -- "The outlook for the gold and silver mining industries is good," declared Dr. Elgin Groseclose, financial consultant and internationalist of Washington, D. C., speaking at the 1960 Mining Show of the American Mining Congress.

He based his optimism upon an acute and growing shortage of the precious metals and the necessity to stimulate higher production. "Paradoxically", he said, "although 60 percent of the total gold produced since the discovery of America is still in existence, and over 20 percent of the silver, the demand for both far exceeds the supply." He pointed out that while world industrial production is expanding at the rate of 5 percent a year, carrying with it a monetary expansion of 60 percent in the decade, the gold stock to support this money has increased only 14 percent. In the case of silver, he said, new industrial techniques are creating a voracious demand for the metal, and taking annually more than the world produces. Meantime, he added, demand for silver for coinage is also expanding. Dr. Groseclose emphasized: "In the U. S., some 40 million ounces of silver coins are required annually to meet the appetite of juke boxes, parking meters, laundromats, and other vending machines. Abroad, governments are rediscovering that cheap substitutes like copper, aluminum, and dirty paper do not serve the dignity of sovereignty and are turning again to silver for their small coinage."

The shortage of gold arises from the vast increase in money and claims on money, which only gold can ultimately settle, he declared. Citing International Monetary Fund figures, Dr. Groseclose pointed out that in the years 1950-1959, free world money supply increased by 60 percent, and in Continental Europe, where the claims on U. S. gold are the highest, the money supply doubled.

Dr. Groseclose predicted a further devaluation of the dollar unless steps are taken to curb the balance of payments deficit and the gold outflow, which has been going on now since 1949. The decade of the nineteen fifties is the first decade in American history to register a net decline in U. S. gold holdings. This decline, which has taken 20 percent of the gold stock, he stated, occurs at a time of extraordinary domestic expansion, itself requiring increased supplies of money.

The cause of the gold outflow is the adverse balance of payments, which began coincidental with the foreign aid program, Groseclose said. He pointed out "The cumulative adverse balance for the decade is around $18 billion. In addition to loss of $5 billion in gold, foreigners have added to their dollar holdings some $13 billion, which represents an added potential threat to the gold supply."

Dr. Groseclose urged, as to silver, a cessation of Treasury sales to industry, and the maintenance of substantial stocks of silver as a prime strategic reserve. As to gold, he pointed out that as the world monetary and credit structure depends upon a stable dollar, foreign expenditures of the government should be curtailed until the gold reserves of this country are replenished. He expressed the conviction that a stable dollar is more important to the world than foreign aid, and that a stable dollar can be maintained only through a hundred percent reserve. Meantime, as a measure of protection, he recommended suspension of international convertibility of the dollar and the establishment of a free gold market to determine the proper value at which the dollar should be exchanged. (From American Mining Congress Press Release, October 13, 1960).

* * * * *

EARLY CRETACEOUS AMMONITES DESCRIBED

The U. S. Geological Survey has just issued Professional Paper 334-F, "Ammonites of Early Cretaceous Age (Valanginian and Hauterivian) from the Pacific Coast States", by Ralph W. Imlay. The publication is for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. The price is $1.25, paperbound. The report describes 26 genera and 65 species of ammonites from Washington, Oregon, and California, gives localities, and makes correlations. It supplements the earlier study by Imlay (Prof. Paper 314-G, 1959) on the pelecypod Buchia (formerly Aucella) in the interpretation of the Jurassic-Cretaceous boundary on the Pacific Coast.

* * * * *

CRIB MINERAL RESOURCES FILE 12

RECORD IDENTIFICATION
RECORD NO..... M020162
RECORD TYPE..... X1N
INFORMATION SOURCE... 1
MAP CODE NO. OF REC..

REPORTER
NAME..... FERNS, MARK L. (BROOKS, HOWARD C.)
AFFILIATION..... ODGMI
DATE..... 81 01

NAME AND LOCATION
DEPOSIT NAME..... QUARTZ MOUNTAIN SILICA

COUNTRY CODE..... US
COUNTRY NAME: UNITED STATES

STATE CODE..... OR
STATE NAME: OREGON

COUNTY..... DOUGLAS
DRAINAGE AREA..... 17100302 PACIFIC NORTHWEST
PHYSIOGRAPHIC PROV..... 13 WESTERN CASCADES
LAND CLASSIFICATION..... 41

QUAD SCALE	QUAD NO OR NAME
1: 62500	QUARTZ MTN

LATITUDE	LONGITUDE
43-09-50N	122-40-18W

UTM NORTHING	UTM EASTING	UTM ZONE NO
4778850	526700	+10

TWP..... 028S
RANGE.... 001E
SECTION.. 02
MERIDIAN. WILLAMETTE

COMMODITY INFORMATION
COMMODITIES PRESENT..... SIL

PRODUCER(PAST OR PRESENT):
MAJOR PRODUCTS.. SIL

ANALYTICAL DATA(GENERAL)
96-99 % SIO2

PRESENT/LAST OWNER..... HANNA NICKEL CO.

DESCRIPTION OF DEPOSIT

DEPOSIT TYPES:
SILICA REPLACEMENT OF TUFF
FORM/SHAPE OF DEPOSIT:

SIZE/DIRECTIONAL DATA

SIZE OF DEPOSIT.....	LARGE	
MAX LENGTH.....	1200	FT
MAX WIDTH.....	3000	FT
MAX THICKNESS.....	700	FT

DESCRIPTION OF WORKINGS
SURFACE

PRODUCTION
YES
SMALL PRODUCTION

SOURCE OF INFORMATION (PRODUCTION).. RAMP, 1972

PRODUCTION COMMENTS.... RATE OF PRODUCTION IS ABOUT 20,000 TONS PER YEAR USED IN NICKEL ORE REDUCTION AT THE HANNA NICKEL CO. SMELTER NEAR RIDDLE, OREGON

GEOLOGY AND MINERALOGY

AGE OF HOST ROCKS..... OLIGO-MIO
HOST ROCK TYPES..... SILICIFIED RHYOLITE TUFF

LOCAL GEOLOGY
NAMES/AGE OF FORMATIONS,UNITS,OR ROCK TYPES
1) NAME: LITTLE BUTTE VOLCANIC SERIES
AGE: OLIGO-MIO

GENERAL REFERENCES
1) RAMP, L., 1972, GEOLOGY AND MINERAL RESOURCES OF DOUGLAS COUNTY, OREGON; ODGMI BULL. 75, P. 85

UG - 285
Spec. Ident.

STATE DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

2033 First Street
Baker, Oregon

1069 State Office Building
Portland 1, Oregon

239 S.E. "H" Street
Grants Pass, Oregon

REQUEST FOR SAMPLE INFORMATION

The State law governing analysis of samples by the State assay laboratory is given on the back of this blank. Please supply the information requested herein fully and submit this blank filled out along with the sample.

Your name in full Len Ramp (DOGAMI)

Street or P.O. Box P.O. Box 417 City & State Grants Pass, Oregon

Are you a citizen of Oregon? Yes Date on which sample is sent 10/24/60

Name (or names) of owners of the property

Are you hiring labor? Are you milling or shipping ore?

Name of claim sample obtained from Quartz Mtn. Silica Deposit

Location of property or source of sample (If legal description is not known, give location with reference to known geographical point.)

County Douglas Mining District Umpqua Unclassified

Township 28 S. Range 1 E. Section 2 Quarter section SE

How far from passable road? 3/4 mile Name of road Quartz Mtn. Rd.

	Channel (length)	Grab	Assay for	Description
Sample no. 1		x	Spec. Ident.	from landslide break protected overhang
Sample no. 2				

(Samples for assay should be at least 1 pound in weight)

(Signed) Len Ramp

DO NOT WRITE BELOW THIS LINE - FOR OFFICE USE ONLY - USE OTHER SIDE IF DESIRED

Sample Description Yellow to pale brown efflorescent sulfate mineral of iron and alumimum? n circa 1.565

Sample number	GOLD oz./T.	GOLD Value	SILVER oz./T.	SILVER Value				
UG-285 P-25886								

Report issued Card filed Report mailed 11-15-60 Called for

SIR-5

UG - 285
Spec. Ident

COPY

FIELD OFFICES:
2033 FIRST STREET
BAKER
239 SOUTHEAST "H" STREET
GRANTS PASS

STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
1069 STATE OFFICE BUILDING
PORTLAND 1

Date November 15, 1960

Field Laboratory Number UG-285 Name Len Ramp

General Laboratory Number P-25886 Address DOGAMI

Spectrographic Laboratory Number _____ City _____

QUALITATIVE SPECTROGRAPHIC ANALYSIS
(Quantities estimated to nearest power of ten)

1. Elements present in concentrations over 10%

   Silicon, iron

2. Elements present in concentrations 10% to 1%

   Aluminum

3. Elements present in concentrations 1% to 0.1%

   - - - - - - -

4. Elements present in concentrations 0.1% to .01%

   Titanium, copper, zinc

5. Elements present in concentrations .01% to .001%

   Manganese, chromium, vanadium

6. Elements present in concentrations below .001%

   Nickel

Radioactivity Nil

Mercury Nil

Thomas C. Matthews, Spectroscopist

GEOLOGY OF THE QUARTZ MOUNTAIN SILICA DEPOSIT, OREGON

By

Len Ramp*

I N T R O D U C T I O N

A large deposit of fairly high-purity silica occurs on Quartz Mountain, about 35 air miles east of Roseburg, Douglas County, Oregon (See accompanying map). Quartz Mountain is a prominent craggy peak 5,530 feet in elevation, on the divide between Little River and South Umpqua River in sec. 2, T. 28 S., R. 1 E. It is reached by a forest access road connecting the South Umpqua River road and the Little River road. There is an abandoned Forest Service lookout station on top of the mountain.

The Quartz Mountain silica deposit is owned by Roy Rannells of Riddle, Oregon, and Gerald Rannells of Aurora, Oregon. About 30 claims were located in 1957 shortly after the Forest Service road into the area was completed. Development work at present consists of access roads, discovery cuts, and a pit in the talus on the northwest slope of the mountain where about 400 tons of silica have been taken out for smelter test at the Hanna Nickel Smelting Company at Riddle, Oregon.

Walter A. Foster, geologist for The Hanna Mining Company has conducted a sampling and mapping program to determine the quality and quantity of the deposit.

G E O L O G Y

Geologic background: The Quartz Mountain area lies in the belt of Western Cascades volcanic rocks composed of continental flows and pyroclastics

* Field Geologist, State of Oregon Department of Geology and Mineral Industries.

which have been deformed and partially altered (Peck, 1960).

Most of the upper portion of Quartz Mountain is made up of a tough and massive grayish white cryptocrystalline silica rock which stands in bold relief. Vertical cliffs from 50 to more than 200 feet in height are prominent features on the north and east sides of the mountain. The main body of silica is about 3000 feet long by 1200 feet wide and crops out mainly between 4800 feet and the top of the mountain. Silicified rock is also exposed at various places in Quartz Creek, a short distance to the northeast. The area between Quartz Creek and Quartz Mountain is covered by extensive slide debris, much of which is relatively pure silica rock.

Tuff series: The oldest formation is composed of a great thickness of pyroclastic rocks ranging from tuffaceous siltstones to agglomerates and including tuff breccias, lapilli tuffs, fine-grained crystal tuffs, and minor welded tuffs. Near Quartz Mountain the tuffs are mostly light colored and in large part altered to clay minerals and replaced in varying amounts by silica. The relict textures of the silica rock appear to be those of fine-grained crystal tuffs and lapilli tuffs.

Fossil leaves and wood fragments are found in some of the fine-grained tuffaceous lacustrine sediments in the tuff series. A collection of leaves was made from an outcrop of these sediments 4 miles south of the map area in the SW¼ sec. 26, T. 28 S., R. 1 E. This collection, which contains Engelhardtia (fruits), Platanus, and possible Salix, Alnus, and Alangium, has been tentatively identified as an Oligocene-Miocene flora. Other Oligocene-Miocene floras in the Western Cascades include the Rujada flora from Layng Creek in T. 21 S., R. 1 E. (Lakhanpal, 1958) and the Scio flora and other fossil leaf collections from the Mehama volcanics in the

Lebanon quadrangle (Allison and Felts, 1956). Various collections of Oligocene-Miocene plants, identified by R.E. Brown, occur in similar tuffaceous rocks mapped as Little Butte volcanic series in the Medford quadrangle (Wells and others, 1956) and in the Western Cascades in general (Peck,1960).

Rhyolite intrusives: Rhyolite and dacite porphyry dikes intruding the tuff series are fairly common in the area. A few fairly large siliceous intrusive bodies were observed during reconnaissance mapping along the South Umpqua River. Included in these are a dacite porphyry dike at Deer Lick Falls about 5 miles southeast of Quartz Mountain and banded rhyolite dikes exposed in the South Umpqua River at Camp Coffee Pot, sec. 17, T. 29 S., R. 1 E., and about 3/4 mile above the South Umpqua Falls. Several rhyolite dikes were observed along the Quartz Mountain road between the South Umpqua River and the map area. Clay alteration and pyrite impregnation in the tuff series appear to be closely related to the rhyolite intrusives.

Basalt flows and dikes: Lavas of andesitic to basaltic composition overlie the tuffs unconformably and a few small dikes and sills of similar composition intrude the tuffs. These basic lavas are generally fresh and have textures varying from glassy to porphyritic, occasionally with feldspar phenocrysts so abundant as to appear coarse grained. In places, the lava is bleached and almost completely altered to clay. This is especially evident along the road west of Quartz Mountain. Peck (1960) maps the lavas as part of the Sardine formation of Upper Miocene age.

Structure: The tuffs and lavas generally strike in a northwesterly direction and dip gently northeast. Wherever attitudes can be seen in the siliceous rocks the northwest strike and low dip to the northeast is also

apparent. Where the pyroclastic rocks and sedimentary beds are better exposed outside the map area along the South Umpqua River they have a similar strike and dip.

Faults are evident at various places and are probably more numerous than shown on the map. The west-trending fault mapped along the north edge of the main silica deposit is visible where it offsets a basalt flow exposed in the road on the northwest flank of Quartz Mountain. Along this same fault on the northeast flank there is an associated gossan indicating alteration and mineralization. Rocks north of this fault appear to have been downthrown. It is possible that another body of silica lies to the north under the slide debris.

Mineralization: In addition to the widespread silicification, the tuffs and to a lesser extent the basic lavas are in places completely altered to clay. Areas of intense rock alteration are impregnated throughout with small crystals of pyrite. Surface alteration of these clayey rocks containing abundant disseminated pyrite have in places produced typical gossans. Secondary iron-aluminum sulfate minerals have also formed in caverns and overhanging bluffs in the clayey pyrite-impregnated tuffs.

As shown on the map, the silicified tuffs are interbedded with less silicified layers of altered clayey tuffs. Some of the silicified horizons contain many caverns. Those at Caves Camp site are so large that they were used for living quarters by the mine owners during the exploration period. The cavernous weathering is the result of differential porosity of the silicified tuffs. Porous clayey areas not completely replaced by silica absorb water and are thus subjected to more rapid weathering and deterioration by frost action.

Origin of the silica: Relict textures of tuff in the silica rock are visible both megascopically and in thin section (see accompanying figure). It is apparent that the silica of Quartz Mountain is due to silicification (replacement of the tuffs by silica). The process by which this took place is not completely understood. One of the more feasible explanations is that the action of hot springs, with highly reactive siliceous thermal waters ascending through and migrating laterally in the more porous layers of tuff, caused wholesale replacement by silica. The possibility of the mountain having been a major vent or a concentration of hot springs emerging along faults or fractures may also be considered. It is also possible that the deposit was formerly opalite and that it later altered by diagenesis to chalcedony. Opalites are commonly formed by the action of thermal waters in areas of volcanic activity.

The presence of secondary iron-aluminum sulfate minerals formed by the leaching action of sulfate solutions (derived by alteration of pyrite) on the clays may be a clue to the origin of at least part of the silica. The fact that some of the zones of clay alteration containing disseminated pyrite are partly silicified would lend support to such a theory.

E C O N O M I C S

Analysis: The average grade of the silica rock has not been established for the overall deposit but the better grade contains from 96 to 99 percent silica. The principal impurities are iron, alumina, and titania. A typical analysis shows: 98 percent SiO_2, 1 percent Fe_2O_3, .2 percent Al_2O_3, .3 percent TiO_2, .05 percent CaO, .005 percent P_2O_5, and a small loss on ignition. The loss on ignition (water) appears to be directly proportional with the alumina content. This is reasonable in light of

the small inclusions of clay (kaolinite) seen in thin sections of the silicified rock.

Uses of silica: High purity silica has been applied to many industries. Some of the more important uses are listed below (Ladoo and Myers, 1951):

Metallurgical

Silicon metal, ferrosilicon, and other silicon alloys.
Flux in smelting basic ores, foundry mold wash and foundry parting sand.

Abrasives

Scouring and polishing powders and soaps.
Sandpaper, whetstones, and sandblast.
Production of silicon carbide (carborundum).
Pebbles for ore-grinding mills.

Refractory

Silica firebrick and other refractories.

Chemical

Lining for acid towers.
Filtering medium.
Catylitic agent in petroleum refining.
Cement.
Manufacture of sodium silicate, silicones, and other chemicals.

Mineral fillers

Inert extender in paint, wood filler, fertilizer, insecticides, rubber, phonograph records, linoleum, etc.

Ceramics

Pottery, glazes, and enamels.
Manufacture of glass and fused quartz chemical apparatus.

Building

Roofing granules.
Rubble stone.
Aggregate for stucco and plaster.

Miscellaneous

Road and driveway surfacing aggregate.
Chicken grit.

Most users of silica demand a uniform high-purity raw material containing 97 percent or more SiO_2. The production of high-purity silicon metal, such as that produced by the National Metallurgical plant in Springfield, Oregon, requires an ultra-pure variety of quartz, 99.7 plus percent SiO_2. Most of their quartz is obtained from the Crystal Peak deposit in California, a short distance west of Reno, Nevada.

Objectionable impurities in the production of ferrosilicon metal include calcium, arsenic, phosphorous, and refractory elements such as aluminum, titanium, and magnesium. Physical properties such as toughness and whiteness are also important in certain uses.

Silica production in Oregon: The only producer of high-purity silica in Oregon is the Bristol Silica Company. This company has operated a quarry and plant near Rogue River, Oregon, since 1938. The Quartz Mountain property, although not in production at the present, represents a vast supply of relatively high-purity silica for use in the future.

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Peck, Dallas L., 1960, Geologic reconnaissance of the Western Cascades in Oregon north of latitude 43°: U.S. Geological Survey Open File Report.

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SG - 236
SiO_2

STATE DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

2033 First Street
Baker, Oregon

1069 State Office Building
Portland 1, Oregon

239 S.E. "H" Street
Grants Pass, Oregon

REQUEST FOR SAMPLE INFORMATION

The State law governing analysis of samples by the State assay laboratory is given on the back of this blank. Please supply the information requested herein as fully as possible and submit this blank filled out along with the sample.

Your name in full Len Ramp

Post office address P.O. Box 417 Grants Pass, Oregon

Are you a citizen of Oregon? _____ Date on which sample is sent 8/18/58

Name (or names) of owners of the property _____

Are you hiring labor? _____ Are you milling or shipping ore? _____

Name of claim sample obtained from Big Quartz #2

Location of property or source of sample (If legal description is not known, give location with reference to known geographical point.)

County Douglas Mining District Umpqua

Township 28 S Range 1 E Section 2 Quarter section _____

How far from passable road? 800' Name of road Qtz. Mtn. Mine Rd.

	Channel (length)	Grab	Assay for	Description
Sample no. 1			SiO_2	
Sample no. 2				

(Samples for assay should be at least 1 pound in weight)

(Signed) L. R.

DO NOT WRITE BELOW THIS LINE - FOR OFFICE USE ONLY - USE OTHER SIDE IF DESIRED

Sample Description White porous chalcedony with some clay alteration.

Sample number	GOLD oz./T.	GOLD Value	SILVER oz./T.	SILVER Value	Silica			
SG-236 P-23340	- - -		- - -		98.41 %	- - - -	- - - -	- - - -

Report issued _____ Card filed _____ Report mailed 10/3/58 Called for _____

SIR-5

L. L. HOAGLAND ASSAYER
7018 S. E. Seventeenth Ave.
Portland 2, Oregon
October 22, 1957

Samples from G. D. Rannells

Received October 11, 1957

Lab. No.	Sample Marked	Results of Analysis							
		% Silica (SiO_2)	% Alumina (Al_2O_3)	% Iron (Fe)	% Titania (TiO_2)	% Calcium (CaO)	% Magnesia (MgO)	% Phosphorus (P_2O_5)	% Ignition Loss
1430	No. 1	98.66	0.30	0.07	0.32	0.02	0.015	0.007	0.37
1431	No. 2	98.80	0.38	0.106	0.28	0.01	0.01	0.005	0.36
1432	No. 3	98.98	0.07	0.18	0.30	0.02	0.02	0.006	0.22
1433	No. 4	98.76	0.36	0.19	0.18	0.022	0.012	0.006	0.32
1434	No. 5	98.66	0.30	0.106	0.26	0.014	0.011	0.009	0.36
1436	No. 6	98.72	0.21	0.10	0.35	0.01	0.02	0.012	0.47

98.66
.30
.106
.26
.014
.011
.009
.36
99.800

RG - 517
Complete Spec. & SiO_2

STATE DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

2033 First Street
Baker, Oregon

1069 State Office Building
Portland 1, Oregon

239 S.E. "H" Street
Grants Pass, Oregon

REQUEST FOR SAMPLE INFORMATION

The State law governing analysis of samples by the State assay laboratory is given on the back of this blank. Please supply the information requested herein as fully as possible and submit this blank filled out along with the sample.

Your name in full Len Ramp (DOGAMI)

Post office address P.O. Box 417 Grants Pass, Oregon

Are you a citizen of Oregon? Yes Date on which sample is sent 10-29-57

Name (or names) of owners of the property G. D. Rannels & Roy Rannells

Are you hiring labor? _____ Are you milling or shipping ore? _____

Name of claim sample obtained from Big Quartz Mine

Location of property or source of sample (If legal description is not known, give location with reference to known geographical point.)

County Douglas Mining District Umpqua

Township 28 S Range 1 E Section 2 Quarter section NW

How far from passable road? ½ mile Name of road Qtz. Mtn. Rd.

	Channel (length)	Grab	Assay for	Description
Sample no. 1	20 ft. interval	chip	Complete Spec & SiO_2	Taken over north & west portion of deposit.
Sample no. 2				

(Samples for assay should be at least 1 pound in weight)

(Signed) L.R.

DO NOT WRITE BELOW THIS LINE - FOR OFFICE USE ONLY - USE OTHER SIDE IF DESIRED

Sample Description Fine-grained massive quartz and chalcedony. Appears to be silicified tuff.

Sample number	GOLD oz./T.	GOLD Value	SILVER oz./T.	SILVER Value	SILICA SiO_2			
P-22194 RG-517	- - -	- -	- - -	- -	98.14%	- - -	- - -	- - -

Report issued _____ Card filed _____ Report mailed 11-7-57 Called for _____

SIR-5