

CONTINUED EVALUATION OF NORTH CAROLINA FELDSPAR ORES
December 1968 Progress Report

(Lab. Nos. - See Table 1) - Book 224

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Description of Project

The tests described here are a continuation of a project to find and evaluate new sources of feldspar in North Carolina, begun in the spring of 1967. Test and evaluation procedures are identical to the standard procedures described in Section B of the December 1967 Progress Report. The quantitative and qualitative data in the following tables is a continuation of that initial report.

Location and Description of Samples

Table 1 gives general descriptions of locality and ore in the case of each sample. It is a continuation of Table 1, Section B, in the December 1967 Progress Report. Table 2, giving quantitative data on concentrates obtained, is a continuation of Table 2 in that same report.

Table 1

Location & Description of Twenty Samples Processed in 1968

<u>Field Sample No.</u>	<u>Lab Sample No.</u>	<u>General Location or Source</u>	<u>Description of Ore</u>
-	1812	Caldwell County, 6 miles south of Mortimer.	Cataclastic granite gneiss
-	1896A	Cabarrus County, road cut on U.S. 49 near school.	Concord syenite, hard
-	1896B	Cabarrus County, State highway pit, north side of U.S. 49.	Concord syenite, soft
-	1942	Wilson County	Granite, Sims Quarry, Superior Stone Co.
-	2000	Pitt County, Fountain, N.C.	Granite quarry, Superior Stone Co.
-	3029	Nash County, near Rocky Mount	Gray granite
-	3030	Nash County, near Rocky Mount	Pink granite
-	3058	Haywood County, near Dayco Southern Corp.	Light gray granite
-	3062	Halifax County, 4 miles N.E. of Essex.	Weathered granite with pink spar

Table 1

(Continued from page 1)

<u>Field Sample No.</u>	<u>Lab Sample No.</u>	<u>General Location or Source</u>	<u>Description of Ore</u>
-	3129A	Wake County, Rolesville Quarry.	Granite fines, minus 1/8 inch.
-	3129B	Wake County, Rolesville Quarry.	Granite fines, minus 1/4 inch size.
FG37	3202	Cabarrus County, Southwestern part of County, near syenite quarry.	Fresh augite syenite
FG38	3203	Cabarrus County, Northwestern part of County, edge of Kannapolis.	Weathered porphyritic granite
FG39	3209A	Henderson County, near Etowah School Road & French Broad River.	Henderson gneiss, hard
FG40	3209B	Henderson County, near Etowah School Road & French Broad River.	Henderson gneiss, semi-weathered
FG41	3210	Henderson County, south of Pleasant Grove Church on #1201.	Weathered Henderson gneiss
FG42	3211	Henderson County, south of Pleasant Grove Church on #1133.	Weathered Henderson gneiss
FG43	3212	Henderson County, south of Pleasant Grove Church on #1133.	Fresh Henderson gneiss
FG44	3213	Henderson County, Bane Road, south of Tonawanda.	Fresh Whiteside granite
FG45	3214	Henderson County, Bane Road, south of Tonawanda.	Weathered Whiteside granite

Table 2

Quantitative Results, Twenty Samples Processed in 1968

Field Sample #	Lab Sample #	FP #1		FP #2		FP #3		MD Qtz. % Wt.	Slime Loss % Wt.	Nonmag. Spar % of Hd. Fd.	Coarse Spar	
		Mica % Wt.	Fe-Minerals % Wt.	Fe-Minerals % Wt.	Feldspar % Wt.	Feldspar % Wt.	Screen Class				% of Hd. Fd.	K ₂ O
-	1812	2.8	3.9	45.2	33.9	14.2	34.1	+60	16.9	8.30	4.50	
-	1896A	1.1	13.3	67.5	0.0	18.1	42.7	+60	17.3	5.70	6.27	
-	1896B	1.0	12.8	65.2	0.5	20.5	49.9	+60	22.9	5.10	6.63	
-	1942	5.9	7.2	46.9	24.5	15.5	39.4	+60	21.7	6.65	5.80	
-	2000	0.9	12.1	51.2	15.7	20.1	14.5	+60	6.4	5.24	4.45	
-	3029	7.5	8.2	42.3	24.1	17.9	30.8	+60	15.0	2.98	5.96	
-	3030	2.0	3.7	50.9	27.8	15.6	43.5	+60	17.0	5.44	6.27	
-	3058	8.8	9.7	48.3	10.7	22.5	35.0	+60	16.4	0.60	8.25	
-	3062	5.1	10.3	36.5	19.5	28.6	24.2	+60	7.6	9.30	3.59	
-	3129A	4.3	2.6	59.2	20.0	13.9	56.2	+60	24.9	5.60	6.04	
-	3129B	4.7	2.1	50.5	22.2	20.5	47.0	+60	18.6	5.02	6.30	
FG37	3202	2.5	42.5	38.0	1.6	15.4	24.9	+60	9.5	0.20	2.67	
FG38	3203	4.5	1.7	38.1	25.1	30.6	31.5	+100	21.3	9.42	3.26	
FG39	3209A	11.9	12.9	31.7	14.1	29.4	20.8	+60	6.1	8.47	3.54	
FG40	3209B	16.2	11.6	18.8	29.9	23.5	13.7	+100	3.5	5.41	5.20	
FG41	3210	12.9	6.5	33.7	17.6	29.3	28.4	+100	14.7	9.70	3.04	
FG42	3211	15.6	4.2	9.9	28.8	41.5	3.8	-	-	13.21	0.85	
FG43	3212	10.1	3.5	53.6	15.9	16.9	45.9	+60	18.1	6.05	3.80	
FG44	3213	8.1	2.1	30.2	41.7	17.9	26.5	+100	14.0	8.70	3.77	
FG45	3214	6.8	1.6	32.0	34.9	24.7	28.3	+100	19.0	12.98	1.03	

*Listed only when K₂O is at least 8.5%

		Fine Spar					Nonmag. Quartz % of Hd. Fd.					Composite Spar Anal.* Approx.			
Fe ₂ O ₃	Screen Class	% of Head Feed		Quartz			K ₂ O	Na ₂ O	Fe ₂ O ₃	K ₂ O	Na ₂ O	Fe ₂ O ₃	K ₂ O	Na ₂ O	Fe ₂ O ₃
		Feed	Head	K ₂ O	Na ₂ O	Fe ₂ O ₃									
0.20	-60	17.2	7.40	5.00	0.14	0.29	0.24	0.09	27.7						
0.34	-60	25.4	5.49	6.52	0.24										
0.35	-60	27.0	4.44	6.85	0.27										
0.36	-60	17.7	6.59	5.59	0.19	0.07	0.07	0.02	22.9						
0.64	-60	8.1	5.08	6.05	0.34	0.17	0.18	0.13	10.9						
0.24	-60	15.8	3.16	5.73	0.14	0.05	0.04	0.04	22.7						
0.07	-60	26.5	5.89	5.82	0.05	0.09	0.08	0.02	26.5						
0.36	-60	18.6	0.41	8.26	0.14	0.16	1.35	0.12	5.7						
0.17	-60	16.6	8.05	4.19	0.15	0.09	0.08	0.09	17.6						
0.07	-60	31.3	6.32	5.58	0.06	0.07	0.06	0.03	19.4						
0.07	-60	28.4	5.18	5.83	0.05	0.05	0.05	0.02	21.0						
0.27	-60	15.4	0.11	2.67	0.44	0.41	2.07	1.43							
0.14	-100	10.2	7.90	4.08	0.14	0.07	0.06	0.02	23.5	8.9	3.5	0.14			
0.22	-60	14.7	7.35	3.80	0.11	0.19	0.16	0.27	10.9						
0.54	-100	10.2	5.15	5.82	0.15	2.48	1.54	0.16	23.8						
0.14	-100	13.7	7.01	4.25	0.09	0.29	0.44	0.16	13.6						
0.20	-	No split made		-	-	0.04	0.04	0.04	27.2	13.2	0.9	0.20			
0.24	-60	27.8	5.89	4.87	0.07	0.13	0.11	0.06	14.2						
0.07	-100	12.5	7.20	4.56	0.05	2.21	1.90	0.05	39.8						
0.05	-100	9.3	12.01	1.87	0.05	0.09	0.03	0.03	32.6	12.6	1.3	0.05			

Comments

The samples dealt with in this report can be classified as follows regarding origin:

1. Eleven miscellaneous samples which were on hand prior to the inception of this program.
(Samples #1812 to #3129, inclusive)
2. Two ores from Cabarrus County.
(Samples #3202 and #3203)
3. Five gneiss samples from Henderson County.
(Samples #3209A to #3212, inclusive)
4. Two Whiteside granite samples from Henderson County.
(Samples #3213 and #3214)

Regarding feldspar concentrates obtained from the above four groups, the following comments are offered:

Group 1, Miscellaneous - So far as K_2O - Na_2O analysis is concerned, a number of feldspar concentrates are acceptable in ceramic applications where concentrate K_2O level is relatively low (5% or above), such as for sanitary ware. Samples yielding feldspars of this grade are: Nos. 1812, 1896A, 1942, 2000, 3030, 3062, 3129A, and 3129B. However, in all cases where Fe_2O_3 analysis on the spar runs above about 0.07%, there is doubt regarding possibility of economic beneficiation. Also, the percent weight of nonmagnetic feldspar recovered must be considered. If this figure is below 50% of head feed, then prospects for development appear doubtful under present conditions, assuming economic success depends mainly on feldspar concentrate. However, a plus factor in some instances is the existence of some granite fines from quarrying operations, which are already size-reduced to a considerable extent, and are in addition a waste product not reckoned in any financial accounting, except perhaps as a hauling cost for dumping. Such a waste product might well add to profits if beneficiated. In addition to being considered as a source of feldspar under the program of this report, such granite fines are also within the scope of another program: that of mineral tailings (wastes) utilization. The MRL has been actively involved in this program for the past 8 years.

The following samples can be classified both as feldspar ores and as tailings: 1896A, 1896B, 1942, 2000, 3129A, and 3129B. However, preceding remarks regarding these samples still apply, and the last two may still be the only ones acceptable for usual ceramic applications, leaving the others still as subjects of future tailings use research.

Group 2, Cabarrus County - Sample #3202 appears out of the question on any basis, while #3203 would probably be of interest only if improved iron-mineral removal could be effected with little further loss, and a market found for the silica sand in addition.

Group 3, Henderson County Gneiss - Here, only Sample #3212 shows enough spar recovery, plus alkali grade, to be of interest. Again, iron mineral removal should be improved. There is apparently considerable variation in the gneiss of this area. Comparison can be made with Sample #3187 (Dec. 1967 Progress Report)

Group 4, Henderson County, Whiteside Granite - In the case of Samples #3213 and #3214, assay and grade are promising, but spar recovery is low. Again, such formations as these could be of interest if a glass - or sand-lime brick-sand product could also be marketed. Sample #3214 yields a spar product meeting high-grade ceramic specifications.

Future Sampling and Testing: Based on tests run during 1968, further sampling of various areas and ores might include:

1. Wake County - Granite formations as #3129A & #3129B.
2. Henderson County - Granite gneiss as #3199 & #3203.
3. Henderson County - Whiteside granite as #3213 & 3214.

Testing will be resumed as time permits on a substantial number of feldspar ores which have been brought in from the field.