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ANSCHUTZ
MINERALS CORPORATION

2400 ANACONDA TOWER • 555 SEVENTEENTH STREET • DENVER, COLORADO 80202 • 303-825-6100 • TWX 910-931-2620

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THE MINERAL

The absorbent mineral mined and processed by the Anschutz Minerals Corporation is technically described as a diatomaceous mixed layer calcium montmorillonite and commonly is referred to as a fuller's earth.

Both montmorillonite and fuller's earth can be confused in terms of their usage. In the case of montmorillonite, it is sometimes used interchangeably with bentonite, whereas fuller's earth is a descriptive term for a variety of mineral types, such as attapulgite and sepiolite, that not only have absorbent properties in the dried state but also have colloidal or gelling properties in the high moisture state. Further confusion arises when fuller's earth is used to include activated clay, naturally active clay, bleaching earths and bleaching clays, which are descriptive of a variety of mineral types subject to different processing techniques and end use applications.

An excellent general reference for the technician or the layman on the subject of mineral terminology is:

Murray H.H. 1975 *"Clays" Industrial Minerals and Rocks.* 4th Edition, Le Fond S.J., Editor AIME New York, pp. 521-523.

An excellent specific reference is:

Patterson, S.H. 1974 *Fuller's Earth and Other Industrial Mineral Resources of the Meigs-Attapulgus-Quincy District, Georgia and Florida,* Geological Survey Professional Paper 828, U.S. Government Printing Office, Washington D.C.

THE PRODUCT

Anschutz Minerals Corporation's products are composed of montmorillonite type fuller's earth. Processing involves mining, crushing, drying, screening and milling. By increasing the sorptivity the product has wide application in such areas as pet litter and industrial oil absorbent. Differentiation between product grades basically is in the drying temperature and sieve size distribution.

A typical product produced would be described as follows:

PHYSICAL PROPERTIES

Sieve Size Distribution

+6	5% Average
6/30	90% Average
-30	5% Maximum
Oil absorption	**1.10**
Water absorption	**1.30**
Bulk Density (loose)	30-32 lbs/cubic ft.
Color	Brown Tan

CHEMICAL PROPERTIES

(Moisture free basis)

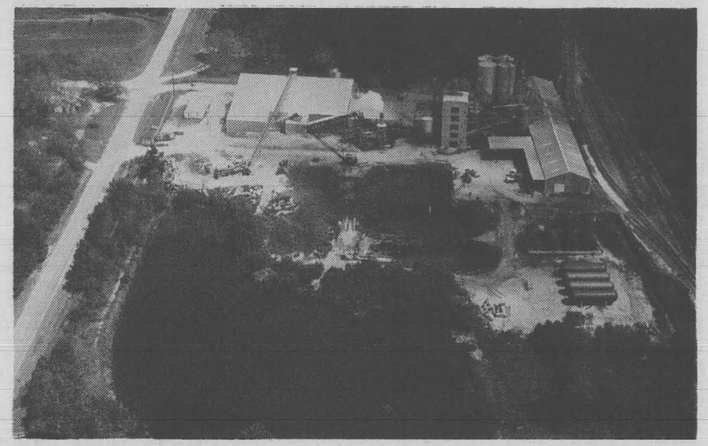
SiO_2	70.3%	FeO	Less than 1%
Al_2O_3	14.4%	Na_2O	Less than 1%
MgO	6.4%	TiO_2	Less than 1%
Fe_2O_3	4.0%	P_2O_5	Less than 1%
CaO	1.4%	MnO	Less than 1%
K_2O	1.2%	CO_2	Less than 1%

Oxides are listed for analytical convenience. They do not exist in the free state but are complexed in the mineral structure.

Product is a dried ground granular clay and is non toxic in nature.

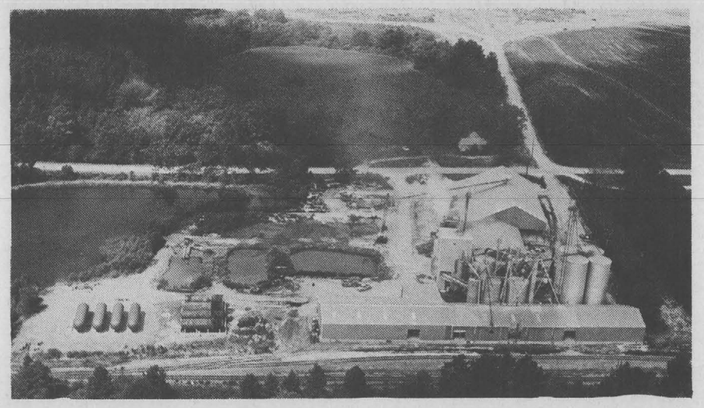
THE FACILITIES

Total reserve acreage held by Anschutz Minerals Corporation is in excess of 500 acres with total proven crude reserves of nearly 5,000,000 tons (finished product basis).



The plant has a designed capacity in excess of 100,000 short tons per year.

To the left of the five story screen house are crude storage, crushing and drying facilities — to the right are finished product storage and packaging and shipping facilities.



Bulk lines are available to load two bulk railroad hopper cars and one bulk hopper truck at a time.

The railroad siding can hold eight railroad box cars with four cars being loaded simultaneously.

Truck and export container shipments are handled from nine loading bays, three of which are under cover.

Advantages with ANSCHUTZ MINERALS CORPORATION

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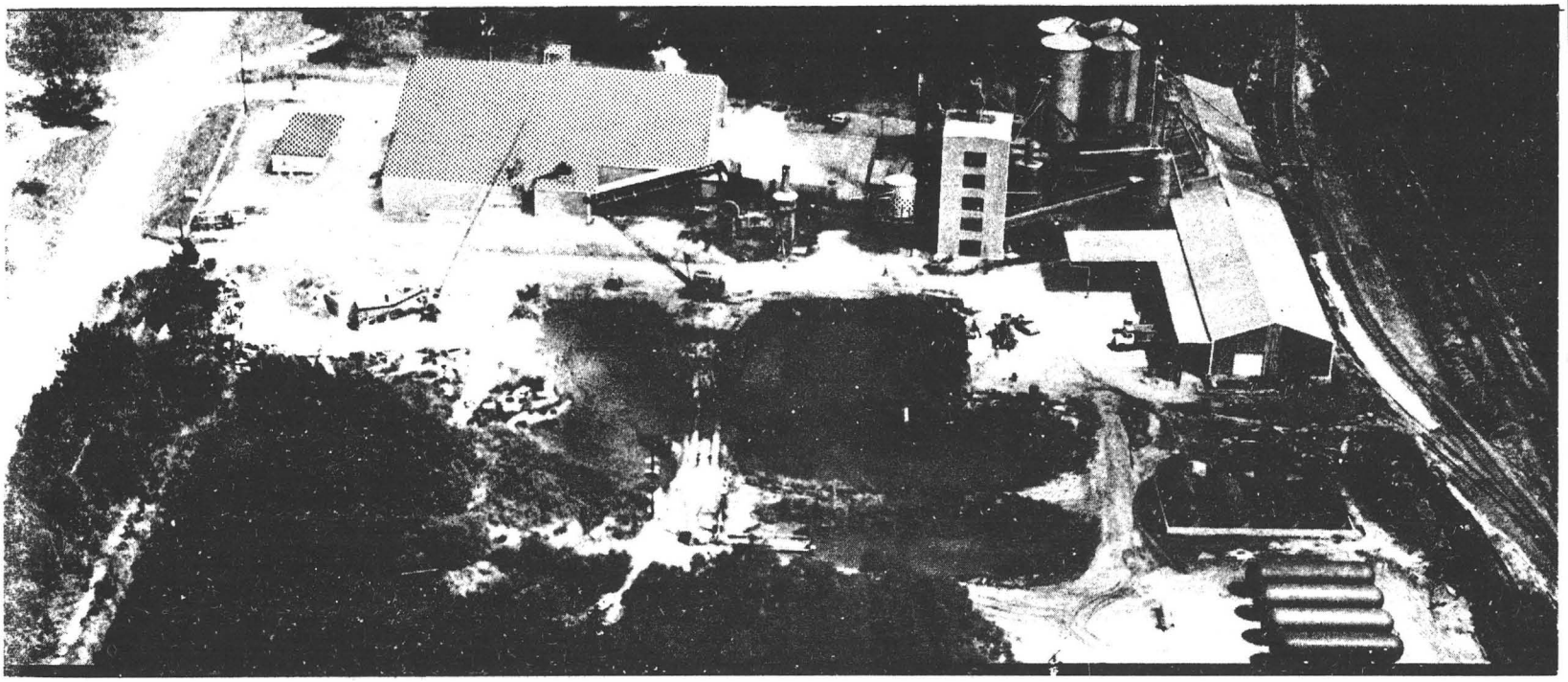


Reliability and continuity of supply from our mine to your warehouse is the hallmark of ANSCHUTZ MINERALS CORPORATION as your preferred source of quality industrial absorbent products.

Items 1 through 10 highlight steps in the mining, processing, packaging and shipping operations at our plant in Ochlocknee, Georgia.

① **MINE** (½ mile west of plant) 5 million tons of reserves (finished product basis).

② **CRUDE CLAY SHED** 9,500 tons of crude on hand at the plant.

③ **PROCESSING** Low temperature and high temperature drying to assure uniform product consistency.

④ **MILLING/SCREENING TOWER** Tight tolerance process control on sieve size distribution of finished product.

⑤ **BULK FINISHED PRODUCT STORAGE** 1500 tons of finished product on hand for prompt packaging or bulk shipment.

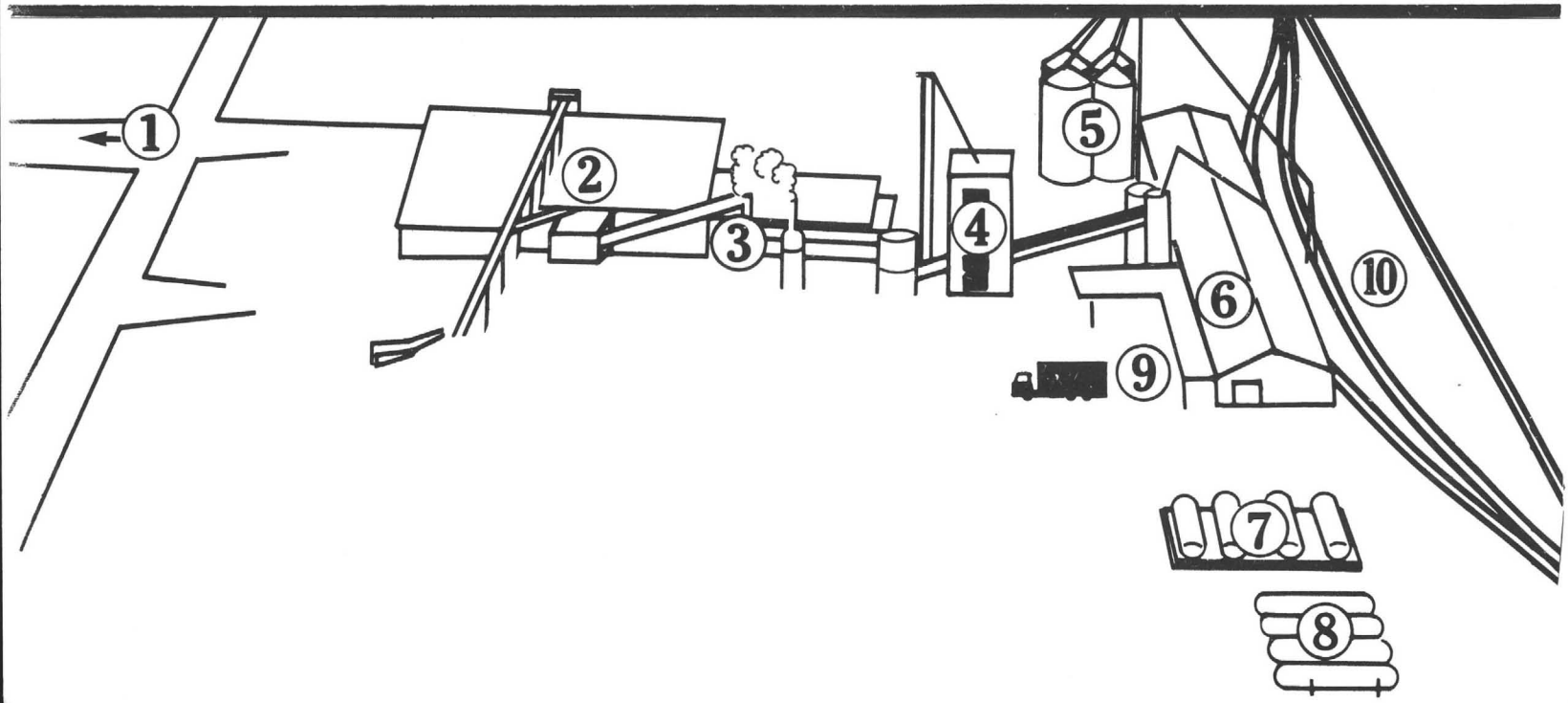
⑥ **PACKAGING / SHIPPING WAREHOUSE** 12,500 square feet dedicated to fast loading of trucks, containers and rail cars.

⑦ **FUEL OIL STORAGE** 80,000 gallons of storage capacity.

⑧ **PROPANE STORAGE** 120,000 gallons of storage capacity to assure standby alternative fuel source.

⑨ **TRUCK LOADING DOCK** 9 truck loading bays (3 under cover) to assure fast truck loading.

⑩ **RAIL SIDING** 1800 foot siding. 12 rail cars (either box car or hopper car) can be spotted on the siding and loaded.



FOR MORE INFORMATION

The Georgia sales office may be contacted for order entry, order scheduling, order follow-up, as well as prices, technical information, samples and freight estimates.

Anschutz Minerals Corporation

Post Office Box 230

Ochlocknee, Georgia 31773

Watts	1-800-841-5671
Telephone	912-574-5181
TWX	810-788-3691
FAX	912-574-5292
Contact(s)	James Rogers
	Don Taylor
	Mary Vickers

Brown & Root, Inc. Post Office Box Three, Houston, Texas 77001

A. P. Ready
Vice President
Mining & Metal Industries

(713) 676-8431

DEC 11 1978

December 6, 1978

Mr. Gordon C. Presley
Operations Manager
Anschutz Minerals Corporation
2400 Anaconda Tower
555 Seventeenth Street
Denver, CO 80202

Dear Mr. Presley:

Subject: Appraisal/Evaluation
Fuller's Earth Plant
Ochlocknee, Georgia

In accordance with our letter-contract dated August 4, 1978 we have completed the work outlined under I-A. and I-B. to evaluate your Fuller's Earth plant and mine facilities.

The current value of your Fuller's Earth mine and mill operation based on duplicating it with comparable equipment, facilities, and mine development is estimated to be $4,649,400. This is a sum of an evaluation of $856,200 for the mine development and equipment and an evaluation of $3,793,200 for the processing plant.

This evaluation does not include any value for the railroad spur which the plant uses but which is on railroad property and owned by the servicing railroad. In addition this evaluation does not include a value for the ore reserves.

Estimate sheets covering details of the estimated value of the mine and plant facilities are attached.

It has been a pleasure to work with you and your staff on this interesting project. Please do not hesitate to call on us should any questions arise.

Very truly yours,

A. P. Ready

APR/LEW:lrv
Attachments

Brown & Root, Inc. HOUSTON, TEXAS
MINING & METAL INDUSTRIES
ESTIMATE

PROJECT NO. EL-0905

CLIENT ANSCHUTZ MINERAL CORP
PROJECT FULLER EARTH
LOCATION DEL NORTE CO

SHEET 1 OF 8
DATE

COST ACCOUNT SUB ACCT.	ACT.	DESCRIPTION	QUANTITY NO.	UNIT	UNIT PRICE L	PM	MS	CE	SC	LABOR MAN HOURS	LABOR	PERMANENT MATERIAL	EQUIP. NEW	EQUIP. USED	FREIGHT	ESTIMATED COST	DESIGN. ALLOW.	TOTAL
	105	Mobilization - Plant Site										13,500						13,500
	102	Sanitary Service								169	1606	2959				4565	457	4108
	102	Site Preparation								141	4,190	3889				8079	808	7271
	120	Storm Sewer & Drainage								137	1302	1522				2824	282	2542
	121	Road (Car Puller)								56	532	850	1645		5	3032	303	2729
	150	Bagging and Packing								582	5529	6600				12,129	1213	10,916
	160	Fencing								165	1596	5002				6,598	660	5938
	170	Utilities (Water Well & Tank and Lake Dam)								40	380	400	90,000			90,780	9078	81762
	180	LPG Storage Tanks (3)											1350			1350	135	1215
	181	Diesel Oil Stg. Tank											385			385	39	346
	190	Fuel Oil Storage Tanks (4)								341	3,240	2719		48,000	643	54,602	5460	49,142
	210	Office (Mobile Home)								50	475	350		15,000		15,825	1583	14,242
	220	Raw Material Storage, Maint. Shop and Lab								1765	16,796	30,970	226,800			274,566	15728	260,838
		TOTAL								3752	35,646	68761	320,180	63,000	648	474,735	32734	454,489

Brown & Root, Inc. HOUSTON, TEXAS

MINING & METAL INDUSTRIES
ESTIMATE

PROJECT NO. ER-0905

CLIENT Anschutz Mineral Corp SHEET 7 OF 8
PROJECT Fuller's Earth
LOCATION Oglethorpe, Ga. DATE

COST ACCOUNT SUB AREA	COST ACCOUNT ACT.	DESCRIPTION	QUANTITY NO.	QUANTITY UNIT	UNIT PRICE L	UNIT PRICE PM	UNIT PRICE MS	UNIT PRICE CE	UNIT PRICE SC	LABOR MAN HOURS	LABOR	PERMANENT MATERIAL	EQUIP. NEW	EQUIP. OLD	FREIGHT	INSTALLED COST	[illegible]	TOTA
	230	Screening Building								2871	27,275	112,671			1554	141,500	14,150	127,3
	240	Bagging Building								4,352	41,344	23,174	237,[illegible]	23,174		324,743	[illegible]	391,1
	310	Conveyors From Truck Building to Raw Stg.								1,920	18,240	12,306		62,000	499	[illegible]	[illegible]	[illegible]
	320	Process Conveyors								1410	13,395	17,760		25,000	234	56,389	[illegible]	5075
	330	Conveyor From Screening Bldg.								650	6175	1910		45,000	432	[illegible]	[illegible]	4816
	340	Tripper Conv. in Ore Stg. Bldg. 24" x 40' Lg.								800	7600		20,000		107	27,707	2771	[illegible]
	350	Bucket Elevators (7)								1,024	9728	24,280	68,000	68,000	891	102,899	10,290	92,60
	360	Material Handling Ductwork								589	5596	16,570				22,166	2166	20,00
	410	Feeders - Bin and Table Feeders to Dryer Feed Belt								40	380		2500	500	13	2943	294	2649
		TOTAL								13,656	129,733	208,671	327,556	223,674	3730	824,914	[illegible]	741,31

Brown & Root, Inc. HOUSTON, TEXAS

MINING & METAL INDUSTRIES
ESTIMATE

PROJECT NO. ER-0905

CLIENT
PROJECT
LOCATION

SHEET 3 OF 8

DATE

COST ACCOUNT SUB AREA	ACT.	DESCRIPTION	QUANTITY NO.	UNIT	UNIT PRICE L	PM	MS	CE	SC	LABOR MAN HOURS	LABOR	PERMANENT MATERIAL	EQUIP. NEW	EQUIP. USED	FREIGHT	INSTALLED COST	[illegible] ALLOW.	TOTAL
	412	SCREENS																
		TRIPLE DECK 4'x10' BONDED MACH.								100	950		1603	7294	58	8302	[illegible]	7477
		TWO DECK 4'x10' BONDED MACH.								100	950		8619		57	9626	963	[illegible]
		TRIPLE DECK 40"x84" RATEX MODEL 803								100	950		19,607		54	20,611	2061	[illegible]
	420	DRYER 9'ϕx80'								3033	28,814	23,231	280,000		2546	[illegible]	[illegible]	[illegible]
		DRIVE (SPECIAL PROD.)								40	380		3000		27	3407	341	3748
	430	CALCINER 7'ϕx70'								1732	16,454	12,935	255,200		2144	286,735	28,673	315,408
	440	COOLER 7'ϕx60'								1514	14,383	5,197	77,000	108,000	1608	129,188	12919	142,107
	450	CRUSHERS & CRUSHERS								1250	11,875	3200	99,000		415	114,490	11,449	125,939
	460	SLURRY DISPOSAL								423	4019	5641				9660	966	10,626
	470	BAGGING SYSTEM								1,020	9685	1710	10,700	96300		108,063	10,806	118,869
	471	BAGHOUSE CONVEYOR								400	3800	3810	6,300	11,700		13910	1391	15,301
	472	SHRINK WRAP CHAMBER								40	380			15,000	54	15,434	1543	16,977
		STRETCH WRAP MACHINE								20	190		8,500		20	8,710	871	9,581
	473	CASE SEALER								20	190			10,000	7	10,197	1020	11,217
		TOTAL								9802	93120	55724	764,749	248,294	6990	1,072,882	[illegible]	[illegible]

Brown & Root, Inc. HOUSTON, TEXAS
MINING & METAL INDUSTRIES
ESTIMATE

PROJECT NO. EQ-0905

CLIENT
PROJECT
LOCATION

SHEET 4 OF 8
DATE

COST ACCOUNT SUB AREA	ACT.	DESCRIPTION	QUANTITY NO.	QUANTITY UNIT	UNIT PRICE L	PM	MS	CE	SC	LABOR MAN HOURS	LABOR	PERMANENT MATERIAL	EQUIP. NEW	EQUIP. USED	FREIGHT	INSTALLED COST	INDIRECT PLE...	TOTAL
	474	Fold and Glue Machine								20	190		16,600		14	16,804	1680	15,1[illegible]
	475	Pallets											2000			2000	200	1800
	480	Dust Collection Scrubber								794	7543	6546		16,000	861	30,950	45,0[illegible]	[illegible]87 9[illegible]
	481	Duct Work (Dust Collection)								485	4600	13,637			67	18,312	1831	14,47[illegible]
	490	Product Storage Bins								274	2603	1508	15,000	25,000	625	44,736	4474	40,26[illegible]
		Pumps - Fuel Oil (2)								16	152		1570		5	1727	173	1554
		Water - Process								8	76		11,303		58	11,437	1144	10,293
		Water - Process Make-up								4	38		624		1	662	66	597
		Sump Pump								4	38		534		1	573	57	516
	492	Shop Equipment (Allowance)											50,000			50000	5000	45,000
	493	Fuel Oil Heaters								24	228		5,210		8	5446	545	4901
	494	Lab Equipment (Allowance)											15,000			15,000	1500	13,50[illegible]
	510	Front End Loader											49,000		237	49,237	4924	44,31[illegible]
	520	Bob Cat											11,000		40	11,040	-0-	11,040
		TOTAL								1629	15476	21,691	177,841	41,000	1840	657,868	66,892	593,184

Brown & Root, Inc. HOUSTON, TEXAS
MINING & METAL INDUSTRIES
ESTIMATE

PROJECT NO. _____

CLIENT _____
PROJECT _____
LOCATION _____

SHEET 5 OF 8
DATE _____

COST ACCOUNT		DESCRIPTION	QUANTITY		UNIT PRICE					LABOR MAN HOURS	LABOR	PERMANENT MATERIAL	EQUIP. NEW	EQUIP. USED	FREIGHT	INSTALLED COST	SALES TAX	TOTAL
DIV	ACT.		NO.	UNIT	L	PM	MS	CE	SC									
	530	FORKLIFT											15040		83	15123	1512	13 611
	710	WELL WATER DISTRIBUTION								570	5415	1522				6937	694	6243
	720	PROCESS WATER DIST.								711	6755	6533				13288	1329	11959
	730	FUEL OIL DISTRIBUTION								530	5035	6360				11,395	1140	10255
	740	L.P.G. DISTRIBUTION								94	893	450				1343	134	1209
	750	SCRUBBER DRAINS TO SLIME PONDS								295	2802	4489				7291	730	6561
		RECEIVING SUBSTATION								120	1140	5620				6760	676	6084
	820	ELECTRICAL DISTRIBUTION TO CENTER Nº 1								300	2850	3920				6770	677	6093
	830	ELECTRICAL DISTRIBUTION TO CENTER Nº 2								160	1520	6750				8270	827	7443
	840	ELECTRICAL DISTRIBUTION CENTER Nº 3								170	1615	2200				3815	382	3433
		TOTAL								2950	28025	37844	15040		83	80992	8101	72891

Brown & Root, Inc. HOUSTON, TEXAS

MINING & METAL INDUSTRIES
ESTIMATE

PROJECT NO. ER-0995

CLIENT
PROJECT
LOCATION

SHEET 6 OF 8

DATE

COST ACCOUNT SUB AREA	ACT.	DESCRIPTION	QUANTITY NO.	UNIT	UNIT PRICE L	PM	MS	CE	SC	LABOR MAN HOURS	LABOR	PERMANENT MATERIAL	EQUIP. NEW	EQUIP. USED	FREIGHT	INSTALLED COST	MISC. ACT.	TOTAL
	610	D-8 BULLDOZER											175,000		100	175100	0	175,10
	620	DRAGLINE 2yd. BE-30-B								100	950			90,000	1096	92,000		92,04
		DRAGLINE BE-88B-4HD								400	3800			300,000	3496	307,284		307,28
	630	ORE TRUCK											50,000			50,000	2,500	47,5
	640	DEWATERING SYSTEM								70	665	2941	6117		27	9750	950	9
	650	FUELING SYSTEM											385			385	35	350
	660	STRIP 230,198 BANK YARDS OF OVERBURDEN																139,1
		DRILL 2200 FT OF CORE @ $5.00/FOOT																11,000
		LAB TESTWORK ON CORE (COLO. RES. FNDATION)																30,000
		MINE SURVEY																6000
		GEOLOGICAL CONSULTING																20,000
		SUPERVISION & OVERHEAD																20,000
		TOTAL								570	5415	2941	231,5	390,000	4641	359,6	3,4	856,200

Brown & Root, Inc. HOUSTON, TEXAS
MINING & METAL INDUSTRIES
ESTIMATE

PROJECT NO. ER-0905

CLIENT
PROJECT
LOCATION

SHEET 7 OF 8
DATE

COST ACCOUNT SUB AREA	COST ACCOUNT ACT.	DESCRIPTION	QUANTITY NO.	QUANTITY UNIT	UNIT PRICE L	UNIT PRICE PM	UNIT PRICE MS	UNIT PRICE CE	UNIT PRICE SC	LABOR MAN HOURS	LABOR	PERMANENT MATERIAL	EQUIP. NEW	EQUIP. USED	FREIGHT	INSTALLED COST	MISC. ALLOW.	TOTAL
	850	ELECTRICAL DIST. TO PROCESS WATER SUPPLY (INC. IN 491)																
	860	ELECTRICAL DIST. TO WATER WELL (INC. IN 170)																
	870	ELECTRICAL DIST. TO MINE (INC IN 630)																
	880	COMMUNICATIONS								100	950	520				1470	147	1
		BOXCAR LOADER (HIGH SPEED) FLEXALUNE											30,000			30000		30,0
		FINES BIN (60 TONS)											11,960			11960		11,9
		TRACTOR "MACK" E-7BST-2301												4000		4000		4,0
		TOTAL								100	950	520	41,960	4000		47430	147	47,5

Brown & Root, Inc. HOUSTON, TEXAS
MINING & METAL INDUSTRIES
ESTIMATE

PROJECT NO. ER-0905

CLIENT ANSCHUTZ MIN. CORP. SHEET 9 OF 8
PROJECT FULLER'S EARTH PLANT
LOCATION OCHLOCKNEE GA. DATE 11-10-7

COST ACCOUNT SUB AREA	COST ACCOUNT ACT.	DESCRIPTION	QUANTITY NO.	QUANTITY UNIT	UNIT PRICE L	UNIT PRICE PM	UNIT PRICE MS	UNIT PRICE CE	UNIT PRICE SC	LABOR MAN HOURS	LABOR	PERMANENT MATERIAL	EQUIP. RENT	EQUIP. USED	FREIGHT	INSTALLATION COST	MISC. ITEMS	TOT
	910	CONSTRUCTION EQUIPMENT												105,000				105,
	920	CONSTRUCTION OVER HEAD LABOR									72,000							72,
	930	CONSTRUCTION INDIRECTS																120
	935	BURDEN ON LABOR (D.L.+O.H.L.)																8
	940	SALES TAX @ 4%																102
	950	ENGINEERING																220
	960	SPARE PARTS (ALLOWANCE)																10
	970	CONSTRUCTION FEE																200,
		TOTAL									72,000			105,000				915,
		PLANT TOTAL																3,793
		MINE TOTAL																856
		FACILITIES TOTAL																4,649
		TOTAL																

ORE RESERVE ESTIMATES

FULLERS EARTH PROPERTIES
THOMAS COUNTY, GEORGIA

Prepared for: The Anschutz Corporation
Denver, Colorado

Richard H. Olson
Consultant - Industrial Minerals

December 21, 1978

INTRODUCTION

Estimates of ore reserves have been calculated for six fullers earth properties which Anschutz Corporation now has under lease in Thomas County, Georgia. These properties, all in the immediate vicinity of Ochlocknee, Georgia, are:

Chester Cooper
F. Cooper
P. O. Cooper
Gordy
Groover North
Groover South

The writer has personal knowledge of the core-drilling of the Chester Cooper, Groover South, and the southern portion of the Groover North properties, having supervised said drilling of these properties for Anschutz Corporation in 1976. As for the remaining properties, the drilling of them was performed before I ever had worked in the district; therefore, I have had to use the work of others there, mainly the work of Mr. Richard J. Councill, then a consulting geologist and now Chief Geologist of Seaboard Coast Line Railroad in Jacksonville, Florida.

PRIOR WORK

Mr. Richard J. Councill was involved as a consulting geologist in the exploration and evaluation of the F. Cooper, P. O. Cooper, Gordy, and Groover North (which he calls "Groover B") properties in the late 1960's. Unfortunately, he did not have the luxury of sitting on these drill holes and collecting and documenting the validity of the drill samples, as I did for Anschutz in the field in 1976.

Mr Councill informed me over the telephone that he was only on these properties "very briefly". He sat on very few of the drill holes and most of those are on the Groover South property, which Anschutz re-drilled in 1976 and for which, consequently, there is no need for the results of Mr. Councill's work. Mr. Councill was not afforded the opportunity to study and sample the cores as they lay in core boxes, but rather received such samples in loose fashion from one Mr. Stan Smith (now deceased, but who was neither a qualified geologist or mining engineer). Mr. Councill told me that <u>if</u> the samples as sent to him by Mr. Smith were accurately collected and described, then Councill's reports are totally reliable; Mr. Councill satisfactorily and clearly allows for this area of doubt in his cover letters of February 3, 1969 on his report on the Groover North property and those of May 1, 1969 on the F. Cooper, P. O. Cooper, and Gordy properties.

None of the foregoing may be taken in the slightest as adverse reflection upon Mr. Richard J. Councill's ability, competence, or methods of operation; quite the contrary, for I have never heard anything but favorable comments about him. Rather, it must be remembered that consultants may be used in various ways and that due to their clients' wishes or financial constraints do not always have the luxury of conducting field projects in the manner in which they would wish to.

METHODS USED

The terminology of and methods used in the determination of the ore reserves in this report are those described on pages 2-4 of U. S. Geological Survey Professional Paper 940 (1976).

All of the reserves in this report fall into either the Measured or Indicated categories, which taken together comprise the larger category of "Demonstrated" ore. None of the reserves in this report have fallen into the Inferred category.

Indeed, it would have taken little additional work and expense to have placed all of the ore reserves as calculated in this report into the Measured category. If Mr. Councill had been allowed to satisfactorily supervise the drilling projects of the late 1960's and if my core samples from the Chester Cooper property had been satisfactorily analyzed and tested before being composited, then all of the ore reserves in this report could be placed in the Measured category.

For the Groover South and the southern portion of the Groover North properties, no additional work is necessary beyond that already documented in the report of R. H. Olson/J. J. Lawson to Dr. D. L. Murphy of May 27, 1976.

For the other properties, the pertinent areas of influence governed by each drill hole were measured by Compensating Polar Planimeter and then multiplied by the ore thickness of that hole in order to obtain a figure for acre-feet of ore in each of the polygonal blocks involved. The past experience of Dr. Haydn H. Murray, Dr. C. E. Weaver, and Mr. Richard J. Councill (all experts in the clay field and particularly in fullers earth) justifies the use of the factor of 650 tons of finished product for each acre-foot of ore-in-place; indeed, this is deemed to be a conservative number, i.e. a compromise on the conservative side. The term "tons of finished product" relates to quantities of finished product which can be manufactured from larger quantities of "green"tons of ore-in-place. The common rule-of-thumb allows that it takes 2.5 "green" tons of ore-in-place to make one ton of finished product. Neither this rule-of-thumb method nor the use of the 650 tons of finished product per acre-foot of ore-in-place factor, however, allows for mining and milling losses. Inasmuch as the

writer has no personal knowledge of such losses in Anschutz' Ochlocknee, Georgia operation, it is better for me to present the ore reserves as I have calculated them in tons of finished product (assuming 100% mining recovery and plant utilization) and then allow for experienced Anschutz staff members to factor such reserve figures downward to tons of product which may actually be manufactured and shipped out of the plant from the individual properties involved. No attempt has been made to "weight" the area of influence of any drill hole by grade or ore thickness; the borders of such areas are simply established as being equidistant between each set of adjacent drill holes.

The method used is further conservative in that the overlying bentonitic or "plastic" clay (with higher bulk density than that of the fullers earth ore) has never been included in the ore reserve calculations of any drill holes supervised and sampled by the writer. This is also thought to be true for the drilling of the late 1960's, but Mr. Richard J. Councill could not adequately assure that such is absolutely always the case.

PROPERTIES

Groover South:

The Groover South property contains ore-in-place capable of supplying 1,340,975 tons of finished product. All of this is Measured ore reserve, as documented in the report of R. H. Olson/J. J. Lawson to Dr. D L. Murphy of May 27, 1976. The drill hole spacing, for the most part, was laid out on a 400-foot square grid and the test work on the drilling samples by Yara Engineering Company and Colorado School of Mines Research Institute delineated the stratigraphic limits of ore in each of the drill holes. The average unweighted overburden:ore ratio for drill holes upon this property is 2.0:1.0

Groover North:

The Groover North property is somewhat of a "hybrid". The southernmost portion of this property (slightly less than one-half of the total area of the property) was core-drilled under the writer's supervision in early 1976. The northernmost portion of this property was drilled in the late 1960's in a less thorough fashion and the results of that project are not satisfactorily documented.

The seven drill holes of the 1976 project govern an area in the southernmost portion of the property which is capable of supplying 807,980 tons of finished product from its ore-in-place. All of this is Measured ore reserve, as documented in the report of R. H. Olson/ J. J. Lawson to Dr. D. L. Murphy of May 27, 1976. With only one

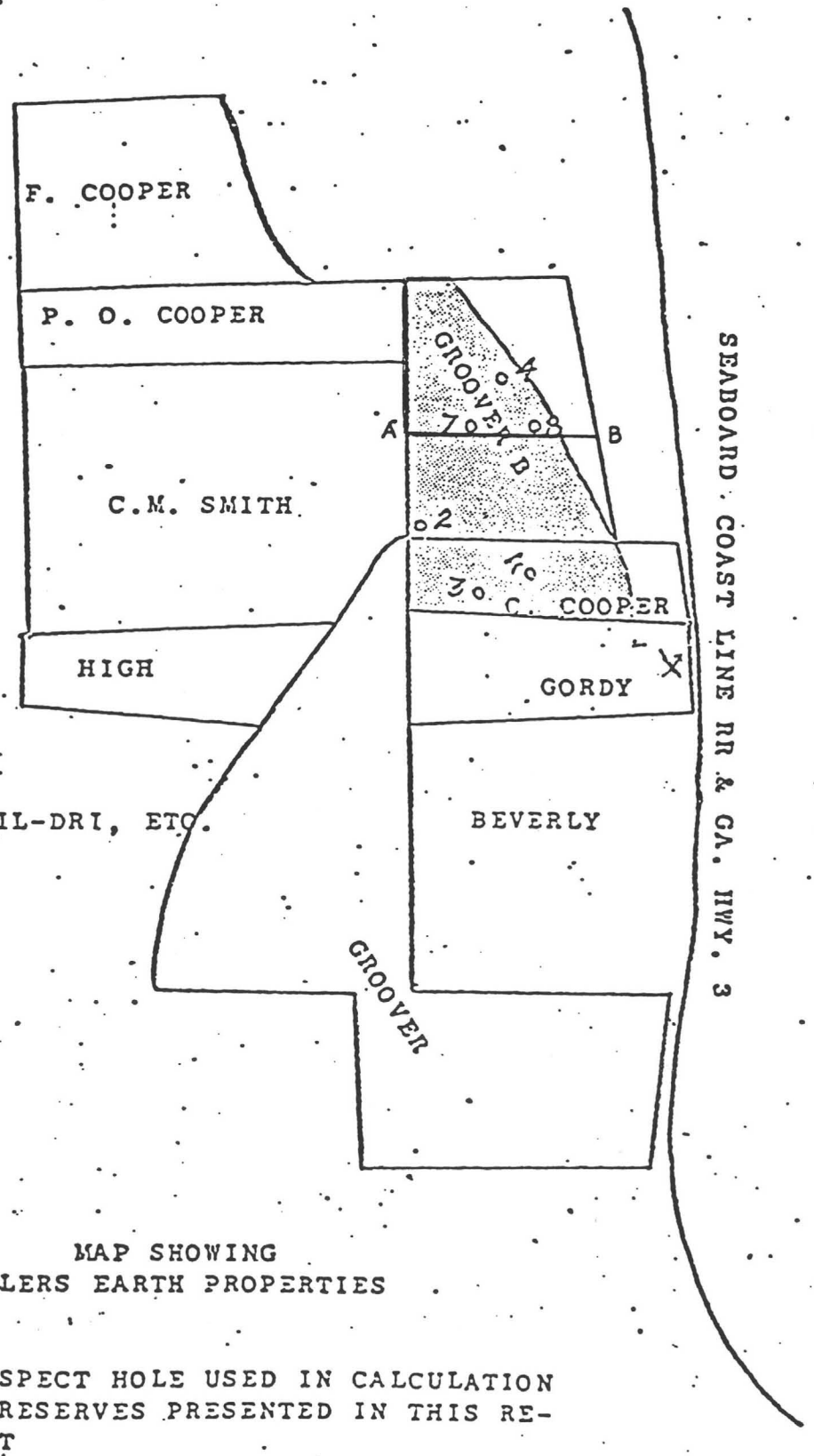
exception, the drill holes were located upon a 400-foot square grid and the test work on the drilling samples by Yara Engineering Company and Colorado School of Mines Research Institute delineated the stratigraphic limits of ore in each of the drill holes. The average unweighted overburden:ore ratio for drill holes upon this portion of the property is 1.6:1.0.

The three drill holes of the project of the late 1960's are shown on Exhibit A (taken from R. J. Councill's report of February 3, 1969). The line "AB" separates the two areas discussed herein. Using an average ore thickness of 30 feet for the shaded area only (31.4 acres), one could obtain a quantity of ore-in-place capable of supplying 612,300 tons of finished product. If the total area to the north of line "AB" is considered to have an average ore thickness of 30 feet, it would contain a quantity of ore-in-place capable of supplying 1,101,750 tons of finished product. Mr. Richard J. Councill informed me over the telephone that the outlines of the shaded areas in his reports were defined largely by drill holes not shown on his maps and for which no information of a factual nature was available to him -- in other words, these boundaries were compiled from information furnished by Mr. Stan Smith. Consequently, the correct answer for the amount of ore reserves upon this northernmost portion of this property undoubtedly lies somewhere between the figures of 612,300 and 1,101,750 tons of finished product; in order to remain conservative, the lower figure is used in this report. Due to the manner in which the drilling project of the late 1960's was conducted and various other pertinent circumstances, the 612,300 tons of finished product must be considered as an Indicated ore reserve.

Chester Cooper:

The Chester Cooper property was core-drilled under the writer's supervision in late 1976. A brief account of how this drilling and sampling was conducted is given in my letter of December 28, 1976 to Dr. D. L. Murphy.

Unfortunately, the core samples from this drilling project were not analyzed and tested in a manner satisfactory for the calculation of Measured ore. Only the "grit" content was determined upon individual core samples, or at least upon relatively small composites of such individual core samples. No bulk density determinations were made upon individual core samples. These core samples have now been discarded; therefore, none of the ore reserves calculated for this project can be placed in the Measured category, which requires a grade of ore to be "computed from the results of detailed sampling." The writer's position on this matter is that it would take at least "grit" and bulk density determinations to firmly establish a sample as being of ore quality. Therefore, even though I personally inspected each sample megascopically in the field and am certain that all of the core samples bagged and shipped



MAP SHOWING
FULLERS EARTH PROPERTIES

o - PROSPECT HOLE USED IN CALCULATION OF RESERVES PRESENTED IN THIS REPORT

SCALE: 1" = 1667 Feet

Exhibit A

FIG. 1-A

to Colorado School of Mines Research Institute came from the fullers earth zone (i. e. they were all situated well below the overlying bentonitic or "plastic" clay), by strict interpretation of the methods of calculating ore reserves, all such reserves calculated for this property must be placed in the Indicated category.

Exhibit B, a photocopy of a portion of Leland R. Ferrell's 1"=300 feet map of May 1976, shows the areas of influence ascribed to each of the eleven core-drill holes of the 1976 drilling project. Ten of these drill holes are considered to be ore holes; only CC-7 is not considered to be an ore hole. Areas 100 feet wide along the eastern boundary of the property and 25 feet wide along the northern boundary of the property are excluded from the ore reserve calculations. Areas for each of the ten ore holes were measured by Compensating Polar Planimeter. The ore thicknesses for each hole are taken from Exhibit 1, Page A-7 of C. S. M. R I. Project Report A60519 of May 10, 1977 to Mr. Ray Blair. The acre-feet of ore and tons of finished product for each of the ten polygonal blocks were then calculated as shown in the table below:

Drill Hole	Planimetered Area	Ore Thickness	Acre-Feet of Ore	Finished Product
CC-1	2.3 acres	39 feet	89.7	58,305 tons
CC-2	2.4	50	120.0	78,000
CC-3	2.4	44	105.6	68,640
CC-5	2.9	45	130.5	84,825
CC-6	3.1	52	161.2	104,780
CC-9	3.7	44	162.8	105,820
CC-10	2.1	36	75.6	49,140
CC-11	3.3	50	165.0	107,250
CC-13	4.6	32	147.2	95,680
CC-14	2.7	28	75.6	49,140
				801,580 tons

In summary, with present knowledge and information, the Chester Cooper property is considered to contain a quantity of ore-in-place capable of supplying 801,580 tons of finished product. All of this ore reserve must be placed in the Indicated category.

F. Cooper:

During the drilling project of the late 1960's one drill hole was sunk upon the F. Cooper property (see Exhibit C, taken from R. J. Councill's report of May 1, 1969). It governs an area of 16.5 acres and reportedly has a 30-foot thickness of ore. Such a block would contain a quantity of ore capable of supplying 321,750 tons of finished product. All of this ore reserve must be placed in the Indicated category.

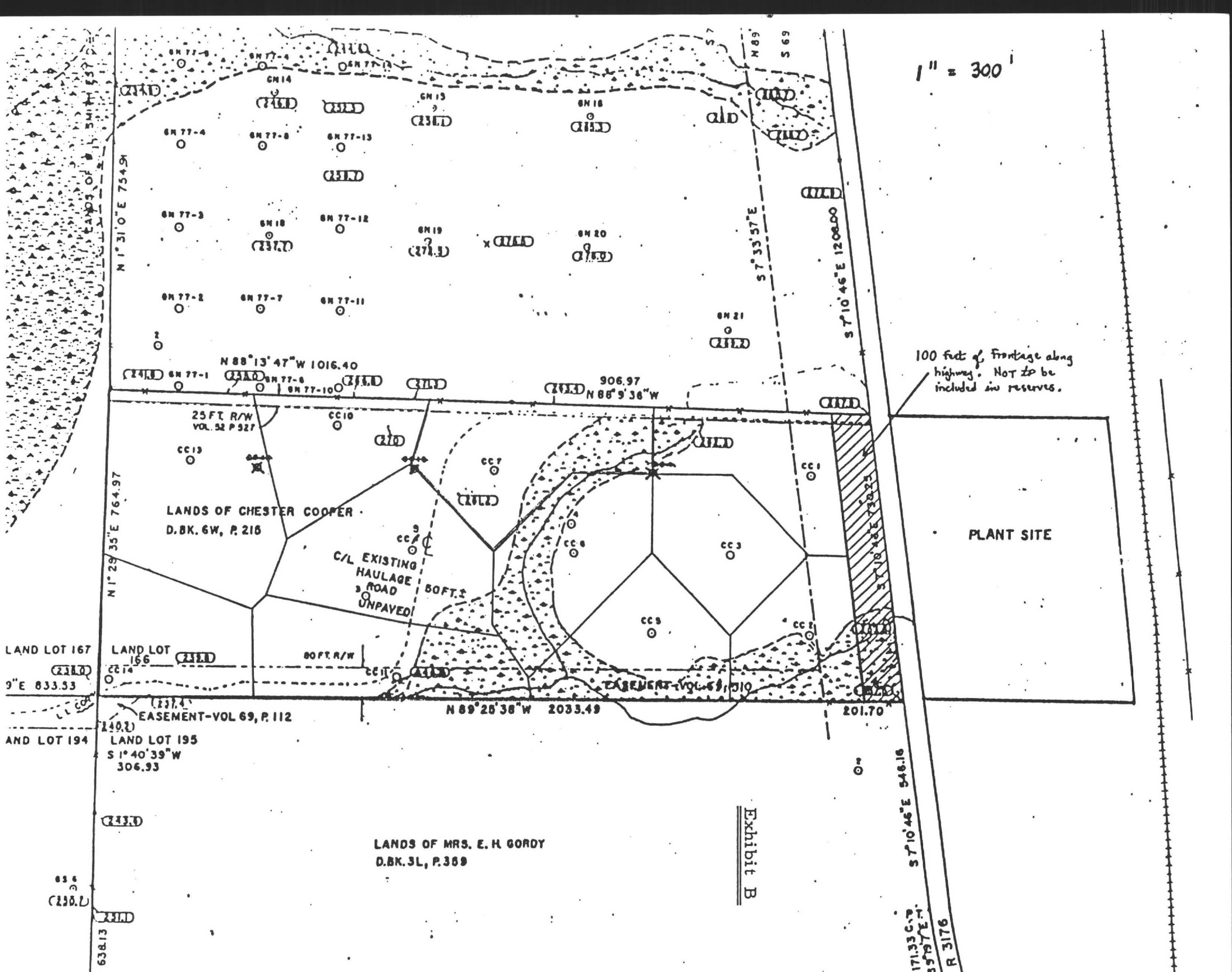
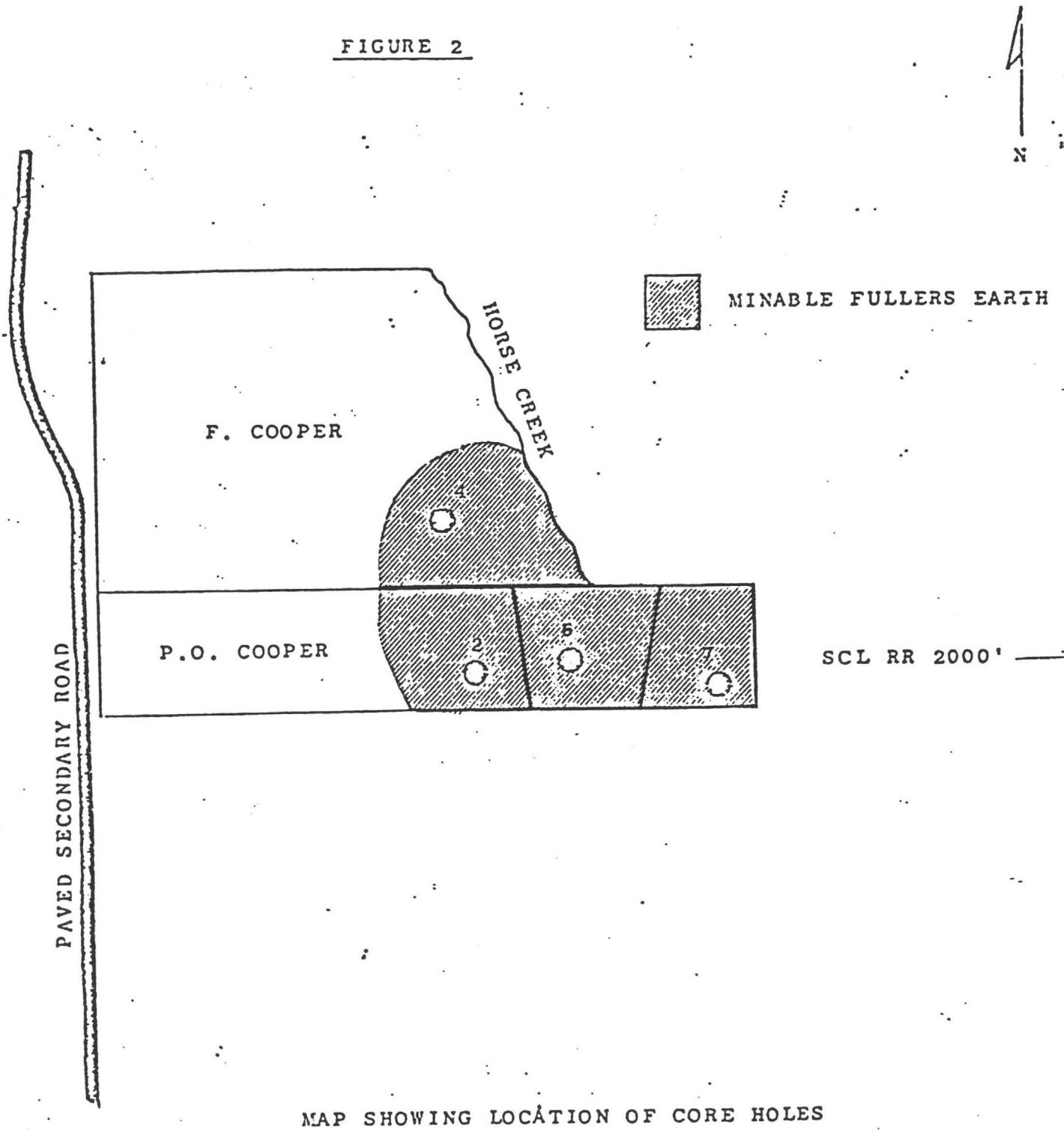

1" = 300'
GN 14
GN 15
GN 16
GN 77-4
GN 77-8
GN 77-13
GN 77-3
GN 18
GN 77-12
GN 19
GN 20
GN 77-2
GN 77-7
GN 77-11
GN 21
GN 77-1
GN 77-6
GN 77-10
N 1° 31' 0" E 754.91
N 88° 13' 47" W 1016.40
906.97
N 88° 9' 36" W
S 7° 33' 57" E
S 7° 10' 46" E 1208.00
100 feet of Frontage along highway. Not to be included in reserves.
25 FT. R/W VOL. 52 P 927
CC 10
CC 13
CC 7
CC 1
CC 6
CC 3
CC 9
CC 5
CC 14
CC 11
LANDS OF CHESTER COOPER D.BK. 6W, P. 218
C/L EXISTING HAULAGE ROAD UNPAVED
80 FT.
PLANT SITE
N 1° 29' 35" E 764.97
LAND LOT 167
LAND LOT 166
80 FT. R/W
EASEMENT-VOL 69, P. 310
EASEMENT-VOL 69, P. 112
N 89° 28' 38" W 2033.49
201.70
AND LOT 194
LAND LOT 195
S 1° 40' 39" W 306.93
LANDS OF MRS. E. H. GORDY D.BK. 3L, P. 369
S 7° 10' 46" E 548.18
R 3176
638.13
Exhibit B

FIGURE 2



MAP SHOWING LOCATION OF CORE HOLES
COOPER FULLERS EARTH DEPOSIT, PIP
PETROLEUM CORPORTION

1"= 840 Feet

Exhibit C

P. O. Cooper:

During the drilling project of the late 1960's three drill holes were sunk upon the P. O. Cooper property (see Exhibit C). The ore reserve calculations for these three holes are shown in the table below:

Drill Hole	Planimetered Area	Ore Thickness	Acre-Feet of Ore	Finished Product
2	12.2 acres	25 feet	305.	198,250 tons
6	11.7	42	491.4	319,410
7	9.0	37	333.	216,450
				734,110 tons

All of this ore reserve must be placed in the Indicated category.

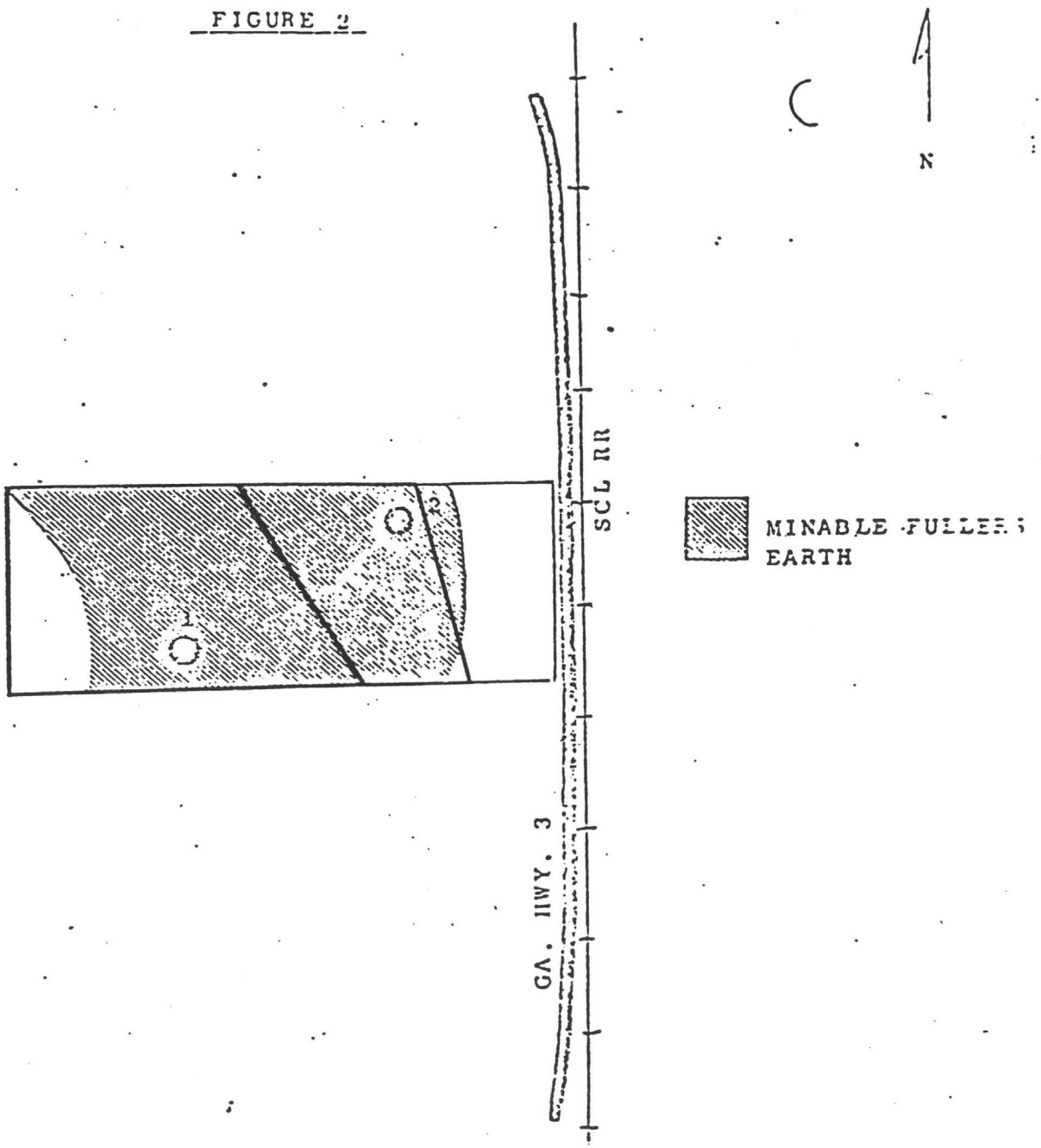
Gordy:

During the drilling project of the late 1960's two drill holes were sunk upon the Gordy property (see Exhibit D, taken from R. J. Councill's report of May 1, 1969). The ore reserve calculations for these two holes are shown in the table below:

Drill Hole	Planimetered Area	Ore Thickness	Acre-Feet of Ore	Finished Product
1	33.1 acres	26 feet	860.6	559,390 tons
2	15.7	26	408.2	265,330
				824,720 tons

All of this ore reserve must be placed in the Indicated category.

FIGURE 2



MAP SHOWING LOCATION OF CORE HOLES
GORDY FULLERS EARTH DEPOSIT, PIP
PETROLEUM CORPORTION

1"= 840 FEET

Exhibit D

SUMMARY

The following is a summary of the ore reserves as calculated for the six subject properties:

Property	Measured Reserve (tons finished prod.)	Indicated Reserve (tons finished prod.)	Inferred Reserve
C. Cooper	---	801,580	---
F. Cooper	---	321,750	---
P. O. Cooper	---	734,110	---
Gordy	---	824,720	---
Groover North	807,980	612,300	---
Groover South	1,340,975	---	---
	2,148,955	3,294,460	None

As described under the heading "Methods Used" the ore reserve figures given in this report relate to tons of finished product which could be manufactured from given volumes of ore-in-place, assuming that there are no mining and milling losses. Anschutz staff members, armed with experience gained at the Ochlocknee, Georgia operation, will have to factor these figures in order to arrive at the quantities of product which can be manufactured and shipped from the plant from the individual properties involved.

R. H. Olson

Richard H. Olson
Consultant - Industrial Minerals

December 21, 1978

Brown & Root, Inc. Post Office Box Three, Houston, Texas 77001

William R. Ryan
Vice President

(713) 676-3800

February 23, 1979

FEB 26

Anschutz Minerals Corporation
2400 Anaconda Tower
555 Seventeenth Street
Denver, CO 80202

Attention: Mr. Gordon C. Presley
Operations Manager

Re: Proposal for Engineering, Procurement and Construction Services for a Fullers Earth Plant in Ochlocknee, Georgia Dated January 5, 1979

Gentlemen:

Brown & Root, Inc. is pleased to submit supplementary information relative to our proposal for Engineering, Procurement, and Construction services on your proposed Fullers Earth Plant to be built near Ochlocknee, Georgia.

This information is presented in response to inquiries made to our Mr. Wayne Mitchell.

I. BUDGET ESTIMATE

The location of the new facilities to a site a mile or so distant from the original proposed location will not affect the estimate of cost presented with Mr. A. P. Ready's letter of December 27, 1978, with the exception of the potential for variations relating to:

1. Water source location respective to the new site?
2. Proximity of the new plant location to:
   a. Access Road?
   b. Railroad?

This is further based on the assumption that the new site is a level, dry property with no unusual clearing or preparation requirements.

II. OVERALL PROJECT SCHEDULE

Beginning Engineering activities on April 1, 1979, we project a total time requirement for completion of the facilities to the point of initial start-up to be nine and one-half months. This is predicated upon full scale engineering effort with an uninterrupted transition from design to detail engineering, a coordinated procurement program, and construction with essentially all of the work performed by Brown & Root forces with mobilization on site taking place on July 15, 1979. We assume final clean-up and move-out to take place after plant start-up and these activities are not included in the above time frame.

We hereby extend the period of valitity of our proposal of January 5, 1979 until April 15, 1979. We wish to also confirm that our proposed percentage fee may be converted to a lump sum amount at your option upon completion of the definitive estimate.

We appreciate the opportunity to provide this additional information. Should you have any further questions, we will be pleased to meet with you to provide the additional clarifications desired.

Sincerely,

BROWN & ROOT, INC.

W. R. Ryan
WRR:pg

cc: Mr. A. P. Ready
Mr. W. T. Mitchell

Budget Estimate
100,000 TPY Fuller's Earth Plant
Ochlocknee, Georgia
December, 1978

1.	Estimate of September 29, 1978 for replacement of existing plant using new equipment		$4,231,000
2.	New equipment added in appraisal letter of Dec. 6		46,000
3.	Additional facilities to be added in new plant:		
	a) Cone bottom on 4 silos	$ 21,000	
	b) Heavy duty elevators and conveyors [Includes additional elevators and conveyors for 4 additional silos]	80,000	
	c) Office building - 2500 S.F.	125,000	
	d) R.R. spur [700 L.F. and 2 turnouts]	65,000	
	e) Additional warehouse	150,000	
	f) Piping and electrical [Includes new elevators and conveyors]	80,000	
		. . .	521,000
4.	Additional mine equipment:		
	a) Dewatering Systems	$ 10,000	
	b) Haul trucks (3)	150,000	
	c) Dragline, 30-B (1)	150,000	
	d) Self loading scrappers (34 cy) (2) Tractor - $170,000 Scrapper - 122,000 $292,000 x 2 =	584,000	
	e) Mine development [Taken from Sept. 29 estimate]	227,000	
		. . .	1,121,000
5.	Additional engineering and indirects		100,000
		Subtotal	$6,019,000
	Add for four additional cone bottom silos		65,000
			$6,084,000
	Escalation @ 8%		486,000
		Subtotal	6,570,000
	Contingency @ 10%		657,000
		TOTAL	$7,227,000
	Add for fabricated plate steel silos in lieu of corrugated metal		$ 230,000

FULLER'S EARTH - EQUIPMENT LIST

MOBILE EQUIPMENT

STRIPPING DRAGLINE (88-B)
STRIPPING DOZER (D-8)
STRIPPING DOZER (D-8)
RENTED STRIPPING SCRAPER (CAT. 623)

MINING DRAGLINE 30B

HAUL TRUCK NO. 1 (MACK)
HAUL TRUCK NO. 2 (CCC)
HAUL TRUCK NO. 3 (CCC)

CAT. 920 FRONT END LOADER (NEW)
CAT. 920 FRONT END LOADER (OLD)

BOBCAT CLEAN-UP LOADER

FORKLIFT NO. 1
FORKLIFT NO. 2

DELTA 88 COMPANY CAR
CHEV. IMPALA COMPANY CAR
PICK-UP TRUCK NO. 1
PICK-UP TRUCK NO. 2
CHEV. IMPALA (BALTIMORE SALESMAN)
CHEV. IMPALA (ALBANY, GA SALESMAN)
CHEV. CELEBRITY (BRONX, NY SALEMAN)
YARD TRACTOR (MACK)

PROCESS EQUIPMENT

PRIMARY CRUSHER FEED BELT
PRIMARY CRUSHER
CRUDE SHED FEED BELT
CRUDE SHED SHUTTLE BELT

SECONDARY CRUSHER FEED BELT
SECONDARY CRUSHER
TERTIARY CRUSHER FEED BELT
TERTIARY CRUSHER
ROTARY DRYER PLATE FEEDER
ROTARY DRYER FEED BELT
ROTARY DRYER
ROTARY DRYER DUST SCRUBBER
ROTARY DRYER DISCHARGE ELEVATOR
DRIED SURGE BIN DISCHARGE ELEVATOR
CRACKER MILL NO. 1
CRACKER MILL NO. 2
RECIRCULATION ELEVATOR
PRODUCT SCREEN NO. 1
PRODUCT SCREEN NO. 2
PRODUCT SCREEN NO. 3
PRODUCT SCREEN NO. 4
PRODUCT SCREEN NO. 5
ROLL MILL NO. 1
ROLL MILL NO. 2
ROLL MILL NO. 3
ROLL MILL NO. 4
ROLL MILL NO. 5
SCREENED PRODUCT CONVEYORS
SCREENED FINES ELEVATOR
ROTARY SINTERER
ROTARY SINTERER DISCHARGE ELEVATOR
ROTARY COOLER
ROTARY COOLER DISCHARGE BELT
PRODUCT ELEVATOR NO. 1
PRODUCT ELEVATOR NO. 1-A
PRODUCT ELEVATOR NO. 2
PRODUCT ELEVATOR NO. 3
PRODUCT ELEVATOR NO. 4 (ALUMINUM)
PRODUCT ELEVATOR NO. 5
SILO DISCHARGE CONVEYORS
DRIED PRODUCT CONVEYOR

SINTERER & COOLER DUST SCRUBBER
MILLHOUSE & PACKAGING DUST SCRUBBER
SCRUBBER WATER SUPPLY PUMPS (3)
SCRUBBER PRESSURE PUMPS (2)

MINE DE-WATERING PUMP NO. 1
MINE DE-WATERING PUMP NO. 2

OFFICE BUILDING & EQUIPMENT
SUPPLY & INVENTORY BUILDING & EQUIPMENT

BULK PRODUCT LOADING TOWER
RAILCAR PULLER

FUEL OIL STORAGE SYSTEM
PROPANE SYSTEM
ELECTRICAL CONTROL
SHOP EQUIPMENT
LAB EQUIPMENT

PACKAGING

FORCE-FLOW VALVE-BAG PACKER SYSTEM
UNION-CAMP SOM PACKER SYSTEM
ETBAUR SOM PACKER SYSTEM
SMALL LINE BAGGING SYSTEM NO. 1
SMALL LINE BAGGING SYSTEM NO. 2
BAG DISTRIBUTION CONVEYOR SYSTEM
HIGH-SPEED BOX-CAR LOADER
STRETCH WRAPPER
AIR COMPRESSOR
ELECTRICAL CONTROL

ADDITIONS TO BROWN & ROOT

PLANT EVALUATION

	COST
2nd Track	$ 48,000
Propane System	153,000
Two Cracker Mills	10,000
No. 4 Mill	7,000
No. 4 Screen	6,500
No. 5 Mill	7,000
No. 5 Screen	6,500
Dried Surge Bin Discharge Elevator	9,000
Four 300-Ton Silos W/Feed & Discharge Elevator and Discharge Conveyors	103,000
Back-up Cat. 920 Front-end Loader	47,000
Second Forklift Truck	9,000
Second D-8 Dozer	140,000
Second Haul Truck	55,000
Bulk Loading Tower	4,000
Motorgrader	13,608
Standby 200 H.P. Motor	5,000
New Elevator No. 4	22,298
Paved Bag Storage Area	4,214
3rd Haul Truck	50,000
Bin-D-Cators	9,867
Yard Tractor	20,000
Mine Fuel Oil Tank	3,923
2 Scrubber Pressure Pumps	5,870
Extend Mill Roof	9,200
Crude Shed Extension	3,190
Supply & Inventory Building	20,000
Office Room	1,644
December 1982	773,814

FULLER'S EARTH OPERATION

APPRAISAL EVALUATION

Brown & Root Appraisal (12/6/78)	$4,649,400
Added since appraisal (Dec. 1982)	773,814
Sub-Total	$5,423,214
*Chemical Process Industries "Plant & Equipment Cost Index" Increase since 1978 $\frac{35.74 + 32.28}{2} = 34.01\%$	1,844,435
1983 Plant, Mine Development and Mine Equipment Replacement Cost	$7,267,649

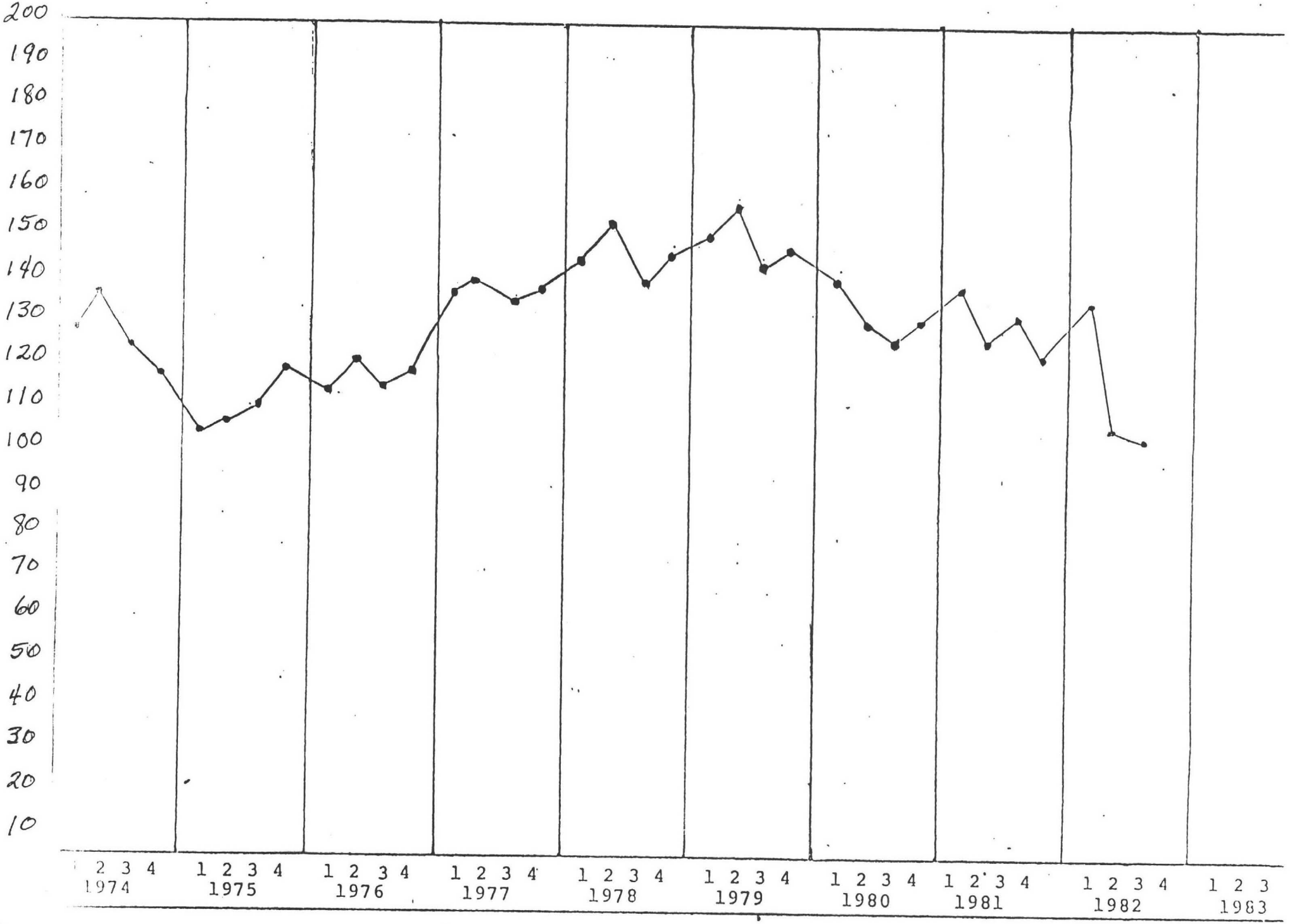
*CPI Plant Cost Index	(1978)	218.8	
	(1979)	238.7	(up 35.74%)
	(1980)	261.2	
	(1981)	297.0	
CPI Machinery Cost Index	(1978)	545.3	
	(1979)	599.4	(up 32.28%)
	(1980)	659.6	
	(1981)	721.3	

ANSCHUTZ MINERALS CORPORATION PROSPECTUS

1. OVERVIEW
2. PRODUCTION
3. MEMORANDUM - FULLER'S EARTH PERFORMANCE
4. BROWN & ROOT APPRAISAL dd 12-6-78
5. BROWN & ROOT PROPOSAL dd 2-23-79
6. ADDITIONS TO BROWN & ROOT APPRAISAL
7. BROWN & ROOT APPRAISAL EVALUATION
8. ECONOMIC INDICATORS
9. EQUIPMENT LIST
10. ROLLING STOCK LIST
11. ORE RESERVES ESTIMATE
12. RESERVES MAP
13. ANSCHUTZ MINERALS CORPORATION BROCHURE

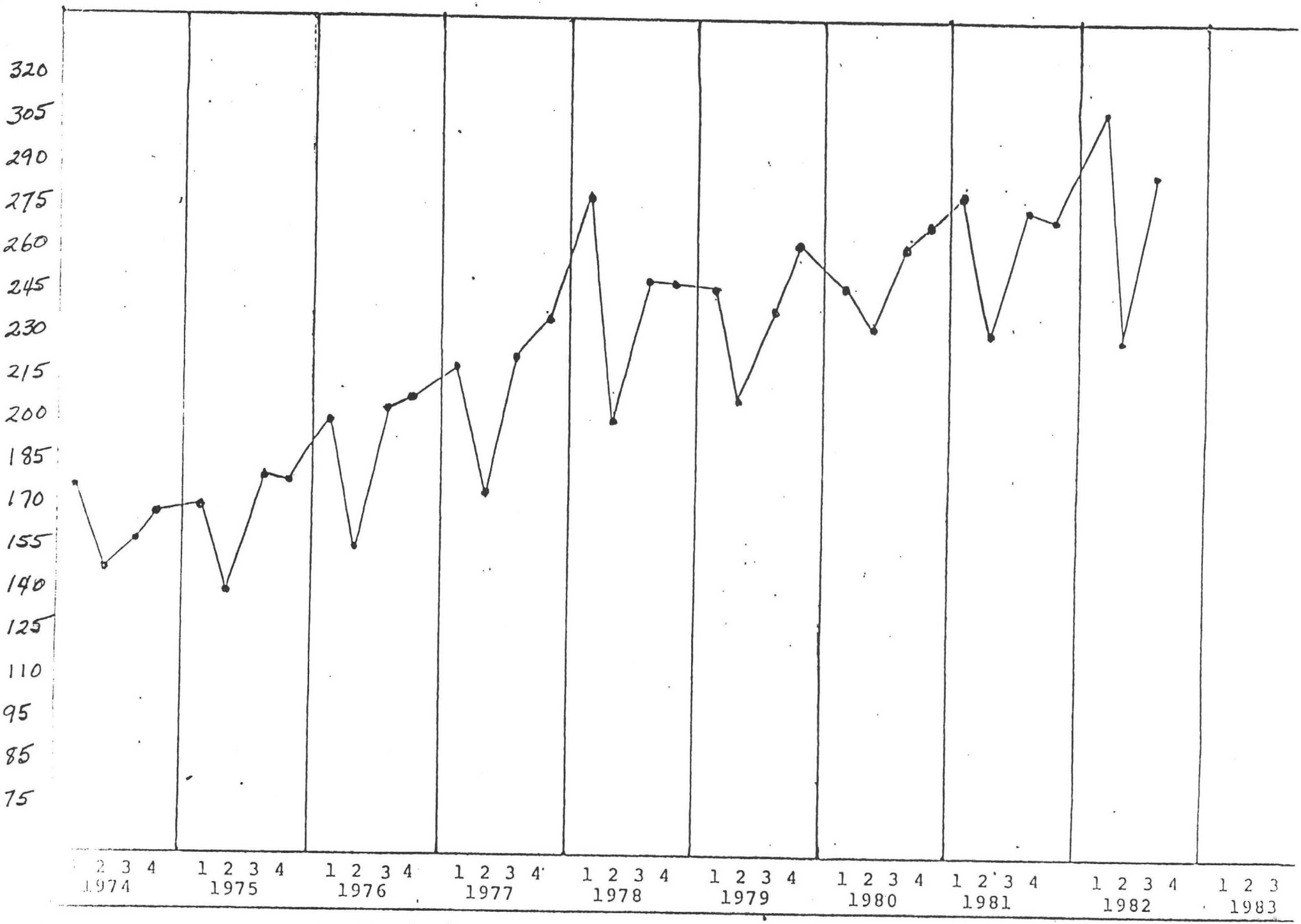
SMI - INDEX OF MARKET VOLUME

OIL & GREASE MARKET



SMI - INDEX OF MARKET VOLUME

PET ABSORBENT MARKET



OVERVIEW OF THE FULLER'S EARTH INDUSTRY

Background

The fuller's earth industry is among the most complex in the industrial minerals field due to basic confusion in definition of fuller's earth by mineral type and processing.

Historically, fuller's earth is a biblical term describing the absorbent earths used by fuller's in cleaning wool. In modern times fuller's earth connotes an absorbent mineral irrespective of mineral type or processing.

For our purposes, fuller's earth refers to a clay mineral whose processing only consists of drying and grinding. This would include micaceous sericites, montmorillonites, attapulgite and sepiolites. It would exclude swelling bentonites sometimes referred to as montmorillonites and gelling-grades of attapulgite and sepiolite, fresh-water and salt-water drilling muds respectively, as well as acid-activated bentonites and diatomaceous earths.

Analysis of secondary data in reviewing the "fuller's earth industry" is confused by mineral terminology and definition of processing. Primary data developed by an individual experienced in minerals, mineral processing and mineral end-use application are of much more relevance and value.

Production and Processing

Production and processing of fuller's earth is relatively simple when compared with most mine-mill systems. The crude ore

is mined by open pit methods with small draglines and transported by truck to nearby plants. As it is delivered to the plant, crude fuller's earth contains approximately 50 percent volatile matter, chiefly free and combined water. It takes approximately 2.6 green tons to produce one ton of finished product.

Upon its arrival at the plant, the ore is passed through a primary shredder or crusher and transported by conveyors to the crude-clay storage shed. From the clay shed it is conveyed to secondary crushers where it is reduced to granules or flakes, 3/8-inch in size or smaller. Some plants use only a single crushing stage, reducing the material to the 2 - 3-inch size range. Subsequent drying/sintering, grinding and screen classification of one-stage material produces a "salt and pepper" product which, except for its appearance, has basically the same absorptive and bulk density characteristics of the two-stage material. Its principle drawback is in sales appeal.

Drying/sintering generally takes place in countercurrent rotary kilns. These kilns operate over a range of 300 - 1200°F and can be fired by either gas or oil. At least one plant, Waverly Mineral Products in the Ochlocknee-Meigs area, uses a two-stage drying and sintering process. There, ore from the dryer feed-bin passes through a fluid-bed dryer where the clay is heated to about 375°F and then moves on to a rotary sinterer. Following drying/sintering, regardless of the process, the product is fed into a rotary cooler.

The remaining steps in the processing consist of size reduction, classification and, except for bulk sales, bagging

and packaging. A combination of grinding roll-mills and screens yields a variety of granular product grades, while the undersize material is sometimes classified into a range of fine grades. The most common granular grades are in the 6/30, 6/40 and 6/60 mesh ranges.

An integrated materials handling and conveying system provides for recycling between stages of milling and screening. Every effort is made to favor production of granular grades and to minimize fine-grade production.

The single-pass system must have the milling/screening process after sintering and cooling; and in the two-pass system the milling/screening process can be done between the drying and the sintering process. The advantage in the two-pass system is that the screened fines can be discarded before additional drying costs are added to the product in the sintering process.

Finished product passes directly from the product storage bins to hopper cars in the case of bulk sales and to bagging facilities in the case of packaged products. Depending on the market-mix, plants usually have two-to-three bagging lines where the product is pre-weighed and bagged in a single high-speed operation. Pet litter is packaged in bags ranging from two-to-50 pounds, whereas floor absorbent and animal litter for commercial operators are packaged in 25-to-50 pound bags. Bags of 25 pounds and less are then baled or shrink-packaged to facilitate transportation and handling. The finished products pass on conveyors directly into either box cars or trucks.

Historic Uses

Fuller's earths, in the general term, were historically used as contact filtration media (dusts) in the purification and clarification of oils, both petroleum-based and edible types (soybean, cottonseed, etc.). Technological change resulted in the use of granular clay for percolation filtration applications. A similar change occurred in the agricultural market from fines or dusts used in crop dusting to usage of granular clays as carriers for toxicants in pesticides (a pest being a weed, insect, fungus or rodent). Technical change also occurred in the industrial absorbent market with a switch from sand or sawdust to the safer, more efficient granular clay.

Changes in application and the technology made dust or fines (basically minus 60-mesh material) a surplus by-product which they are to this day.

The most startling shift in the fuller's earth market took place in the late 50's and early 60's with the development of the use of granular absorbent clay as pet litter or cat box absorbent. The term "Kitty Litter" (a registered tradename of Lowe's) is the most notable example.

Present Status

The complexity of the fuller's earth industry resulting from confusion in terminology also applies to the complexity in producers and markets.

Producers range in size and sophistication from multi-billion dollar, multi-nationals such as ITT and Engelhard to

small individual proprietorships like Mid-Florida Mining Co. and Absorbent Clays.

Marketing ranges from bulk hopper cars, sold to large agricultural chemicals companies such as Monsanto, to single 10# bags of pet litter sold over the supermarket shelf to individual, unsophisticated consumers.

Basically we are addressing ourselves to six market segments and end-uses.

#1 MKT = L.A.
#2 MKT = OAKLAND/BAYAREA
ESTM = 1/3 OF TOTAL = 208,000 TPY
208,000 X 10% = 28,000 TONS
GROWTH IN LA & BAYAREA

A. Pet litter

Present market is estimated at 586,000 tons of mineral-based litter with an additional mineral-equivalent of 100,000 tons supplied by Clorox in the form of pelletized alfalfa ("Litter Green"). Total market (mineral and mineral-equivalent) of 686,000 tons is growing at the rate of 10% per year in tonnage and in excess of 15% per year in dollar value.

B. Industrial oil absorbent

Present market is estimated at 447,000 tons. Tonnage is dependent on industrial activity and growth parallels the gross national product.

C. Export (primarily Europe)

Present market for U.S. produced exported material is estimated at 120,000 tons with activity concentrated in one large and several small European producers.

The European Economic Community, together with the U.K., is about the same size, population-wise, as the U.S.A. Therefore, demographically and industrially, the

assumption can be made that the EEC represents a market potential similar to the U.S.A. for product of well over a million tons.

However, methods of distribution are antiquated in Europe and language barriers inhibit large-scale "national" advertising, giving rise to immature development thus far for absorbent clays. The industry believes that this condition will change in the near future.

D. Agricultural

Due to product characteristics, our type of clay is basically unsuitable for widespread usage in the agricultural market exploited by the attapulgite producers elsewhere in the district and producers in the lower Midwest. The market is estimated at 242,000 tons and is dependent on growing season and weather as well as crop prices. This market segment has been down-graded from short-term considerations but contacts are being maintained in the industry in the event of technological or product changes.

E. Gelling

This market segment, probably exceeding 200,000 tons, is precluded from consideration since it is specific to the minerals attapulgite and sepiolite produced by Engelhard, Floridin, Milwhite and Industrial Mineral Ventures. Product is a high moisture, fine-ground, colloidal clay and is used in applications such as

salt-water drilling mud, suspension aids for high-solids liquid fertilizers and as an asbestos substitute in tape-joint compounds.

F. Miscellaneous

As noted above, dusts or fines (primarily - 60 mesh) are surplus by-products of granular clay production. Application development in these dusts is restricted by the large research efforts needed to prove their use or modify their performance in certain applications as well as their historic low-price levels as by-product wastes.

These dusts are excellent high oil absorption extenders and fillers but their abrasiveness (due to sand content) and their poor color (compared with Kaolin or calcium carbonate) restrict their general acceptance and use.

PRODUCTION

Reserve Exploration

Specifics regarding the ore reserve evaluation are discussed elsewhere in the report. On the Groover and Cooper leases, combined rotary and core drilling was done on 400-foot centers to define the depth of overburden and nature of the ore-body. Samples were taken in two-foot increments for laboratory testing. Testing was done by the Colorado School of Mines Research Institute. It involved drying and sintering the material over a range of temperatures and subsequent determinations of bulk density and oil-water absorption capacity, throughout a number of sieve grades.

Mine Planning

Once the geometry of the clay reserve had been established, maps were prepared to assist in both near and long-term open-pit mine planning. Such planning over a five-to-ten year period is necessary in order to document application for a Mined Land Use Permit. The State of Georgia has strict rules and regulations to insure compliance with its Land Reclamation Law.

Having explored, tested and mapped the properties, careful study was given to the initial opening of the pit in order to take advantage of topography, location of waste dumps, clay quality and stripping ratios. It was decided to commence operations on the Groover North and Chester Cooper properties.

Overburden removal is the largest single expenditure in clay mining and involves many factors. For example, waste dumps are being placed so that they are nearby but in such a location that there is no danger of washback into the pit.

Overburden removal has also been planned in such a manner that it is moved only once, because repeated movement of the same material serves only to increase costs. For this reason, except for the initial mine opening, the stripping program is planned years in advance and the overburden is moved only once.

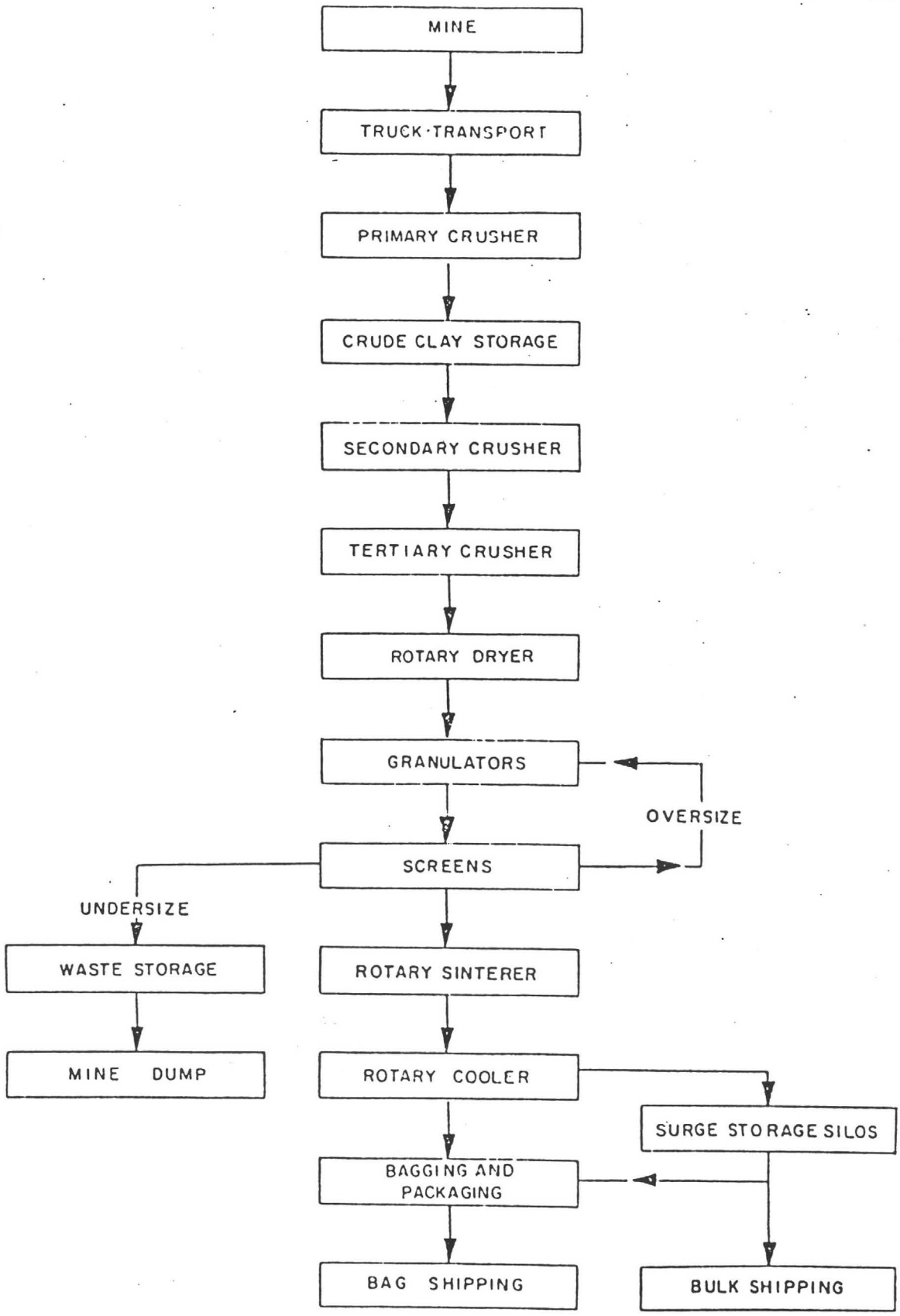
Experience has demonstrated that a variety of methods for overburden removal is necessary because of different physical characteristics. Portions of the overburden are removed best by casting with a long-boom dragline whereas other overburden must be removed using scraper-pans. The former type is being removed by a Bucyrus-Erie 88-B dragline using a four cubic-yard bucket on a one hundred and twenty-foot boom. The latter type is now moved using a rented scraper-pan.

Mining

The flow of material from the mine through the plant is shown diagramatically in Figure 2. In the mining of fuller's earth, draglines offer several distinct advantages. Among them is the blending function that occurs when the dragline bucket traverses the full face of clay as the bucket fills. A Bucyrus-Erie 30B dragline is used for actual clay mining. This machine is equipped with a two cubic-yard bucket on a sixy-foot boom.

In open-pit mining control of water, both surface drainage and ground water, is extremely important. Two four-inch centrifugal trash pumps with fifteen-horsepower electric motors are currently in use. These pumps are mounted on pontoons so that they float on the surface of the water which collects in sumps.

As the clay is mined by the dragline, it is loaded directly into haul-trucks. Diesel trucks with twenty-ton capacities are utilized for the 2000-ft. haul to the plant.



PROCESSING FLOW SHEET

ANSCHUTZ MINERALS CORPORATION FULLERS EARTH OPERATION

OCHLOCKNEE, GEORGIA

FIGURE 2

Crude Handling

At the plant, haul-trucks are backed up a ramp and the loads are dumped onto a feed belt that supplies material to the single-roll primary crusher. The primary crusher has a rated capacity of more than 200 tons per hour. The minus 4-inch lumps of clay fall onto an eighty-seven-foot-long, twenty-four-inch-wide conveyor belt which transports the clay to the top of the crude clay shed. At the top of the crude clay shed, a twenty-four-inch shuttle-belt conveyor distributes the clay to the desired portion of the shed.

The crude shed is 80' x 150' and has a designated storage capacity of 8000 tons. It has an attached covered haulway where a feed-loader operates to supply the material to a single-roll secondary crusher. The secondary crusher reduces the minus 4-inch feed to minus 1½ inches.

From the secondary crusher, the clay moves along a twenty-four-inch conveyor belt to the top of the rotary dryer feed-bin where it passes through the tertiary crusher and drops into the rotary dryer feed-bin. The tertiary crusher is a Bonded Double-Roll crusher that reduces the rotary dryer feed to minus 3/8 inches.

The rotary dryer feed-bin is equipped with an adjustable speed, revolving table-feeder that provides a constant rate of feed to the rotary dryer. As the table-feeder revolves, the material is scraped onto a twenty-four-inch conveyor belt that discharges into the feed-hood of the rotary dryer to begin the pyro-processing operation.

The crude handling system is designed to hold several days supply of material for plant feed, to provide sufficient blending of mined product, and to properly size the feed to the pyro-processing system. Minus 3/8-inch rotary dryer feed provides optimum drying-fuel efficiency and yields a even-colored product.

Pyro-Processing

The pyro-processing system consists of one 9' x 80' rotary dryer, one 7' x 70' rotary sinterer and one 6' x 60' rotary cooler. All three units are equipped with high-energy venturi, stainless steel wet scrubbers. Each scrubber is powered by two-hundred horsepower fans to provide 50,000 cubic feet-per-minute scrubbing capacity. Scrubbers are necessary to comply with the Georgia State Air Quality Control Law that requires particulate removal from rotary dryer exhaust gases.

Both the rotary dryer and the rotary sinterer are equipped with six-inch-thick 2500^0 F refractory for half of their lengths and stainless steel lifters over their full lengths. Refractory is required to prevent the drying heat from burning through the rotary tube. Stainless steel lifters are used to circulate the material being dried and thus provide a cascading curtain of material which passes through the heated air-stream.

The rotary dryer is equipped with a 5,000,000 BTU oil burner that can burn Nos. 1, 2, 3, 4, 5, or 6 fuel-oil and propane. The rotary sintering unit also will burn each of the different grades of fuel-oil and propane. The higher numbered fuel-oils are cheaper in cost and higher in BTU values. They do not, however, burn as easily as the Nos. 1 and 2 fuel-oil. They must be heated to reduce their viscosity prior to being pumped through pipes to the burners. Fuel-oil storage consists of our 20,000-gallon capacity tanks tied into a common feed system. A propane system is used as an alternate source of drying fuel. The system consists of four 30,000-gallon tanks, a vaporizer and facilities for receiving the propane supply by either truck transport or rail tank cars.

The product discharge temperature from the rotary dryer is 300 - 350^0 F and from the rotary sinterer it is 950 - 1100^0 F. Dried material generally has a moisture content of 3 to 6 percent, whereas the sintered product's moisture is 1 to 1½ percent.

The rotary cooler has no refractory and no stainless steel lifters. The lifters are mild steel. This unit's function is to cool the sintered product prior to its being fed to storage silos, packaging bins, or directly to hopper cars for bulk shipment.

Mining and Screening

Because of the several advantages of having a two-pass system, the pyro-processing steps are interrupted between the drying and sintering systems by the milling/screening system. The advantages of milling and screening after drying and before sintering are two-fold. First, a more even-colored product is produced by having the product sized before it is sintered. If the milling function is done after sintering, a varicolored product results because of differential heating between the surface and interior portions of the particles. Secondly, unmarketable minus 60-mesh fines are created by the milling/screening process. It is economical to discard these finds before additional drying costs are incurred in the sintering process.

The milling/screening system consists of two cracker mills, five vibrating screens and five double-roll crushers. Dried material from the rotary dryer is discharged into a bucket elevator that transfers the material to a 100-ton dried-crude surge-bin. The surge-bin discharge elevator transfers the material to the two cracker mills for initial dried-crude crushing. The material is then transferred to the top floor of the five-story milling/screening tower by the recirculating elevator where the material is passed over the vibrating screens and the crushed material is separated into oversize, product and undersize (fines). The oversize is fed to the crushers and after crushing, the material is lifted by the recirculating elevator to be passed over the screens again.

There is a 100-ton surge-bin between the rotary dryer and the milling and screening tower. The use of this bin provides flexibility in that the two process

functions are not dependent on the continuous operation of each other. This assures continuity in the total manufacturing process. One of the functions can be temporarily interrupted while the other continues to operate.

Screened product is conveyed to the rotary sintering unit and the fines are discarded. The fines are piped to the fines elevator and then discharged into a sixty-ton-fines-bin. A mine haulage truck carries the fines back to the mine on return trips while hauling crude to the plant. Fines are dumped and blended into the overburden for backfilling use.

Cooled product from the rotary cooler falls into a twenty-four-inch belt conveyor that carries it to the No. 4 bucket elevator which lifts the material and distributes it to either the Nos. 5, 6, or 7 bucket elevators. These elevators raise the material for transfer either to the 125-ton capacity Nos. 1 and 2 silos, or to the 300-ton capacity Nos. 3, 4, 5, 6, silos, to the packaging bins, or to the railroad siding for hopper car bulk loading.

Packaging

The packaging function is the most labor intensive process in the fuller's earth industry. This results from the range of bag sizes, particularly products packaged for cat-box absorbent. Cat litter is packaged in 4-lb., 5-lb., 8-lb., 10-lb., 20-lb., 40-lb., and 50-lb. bags. Oil and grease absorbent is usually packaged in 40-lb. and 50-lb. bags.

Bag closure can be accomplished several ways. Sewn-open-mouth bags are most common, and others are valve-bags. Valve-bags are tube-filled with pressurized vessels equipped with scaled-weight cut-offs. The bags are furnished with polyethylene-lined valves to provide closure ease and to prevent leakage.

The plant has three small-bag packaging lines equipped with Bemis weigh-scale dropping units and Do-Boy sewing systems. The large-package line for sewn-

open-mouth bags is equipped with a dropping unit from Union Bag Camp Corp. and a Do-Boy sewing system. Another system for valve-bags has a two-spout St. Regis Force-Flow Packer and peripheral bag conveyors.

Bags 25-lbs. and smaller are baled prior to loading. Bales are large paper bags that contain 40-lbs. or 50-lbs. of the smaller bags. Examples of these are two 25-lb. bags, two 20-lb. bags, five 10-lb. bags, five 8-lb. bags, ten 5-lb. bags, and ten 4-lb. bags. The filled bales are manually folded and taped.

Bales or loose 25-lb., 40-lb., and 50-lb. bags are either loaded loose in railcars or trucks, or palletized prior to loading. Palletized units can be stretch-wrapped or loaded with no protection. Stretch-wrapping provides a pallet package that has unit integrity that keeps the bags from falling and protects against abrasion with other bags or the walls of the shipping unit in which it is loaded. The stretch-wrapper is a model SVS-80 Ken-Tech unit capable of handling up to two pallets-per-minute.

Warehousing and Shipping

Warehousing is an extremely important function in the fuller's earth industry. The variety of bags needed requires a tremendous amount of square-footage in a warehouse so that proper bag storage and inventorying can be accomplished. Additionally, finished product storage is imperative so that rapid response to customer order and loading can be effected.

The plant has 12,500 square feet of packaging and warehousing space. Up to twelve railcars can be contained on the two spur tracks and up to nine truck trailers can be spotted at the loading dock. This provides the flexibility necessary to respond to both rail and truck orders as they are received. The loading and warehousing equipment consists of bag/baler conveyors and two forklifts. Additional equipment includes a yard-tractor used for spotting trailers at the loading dock.

Miscellaneous

In addition to the mining and production equipment, a closed, four-pond slimes collection system for removal of particulate matter from the wet-scrubber waters is an integral part of the processing system. Scrubber water flows by gravity into one of two primary ponds where most particulate settlement occurs. The water then overflows to the secondary pond where additional settlement occurs. The return water pumps are located in the tertiary pond. Make-up water to replace evaporation-loss is obtained from the four-acre pond on the property. No process water is allowed to drain from the property.

PLANT AND ORE RESERVE EVALUATIONS

Plant Evaluation

In 1978, Brown and Root, Inc., of Houston, Texas, undertook an appraisal of the entire operation to determine its replacement value at current labor and material costs. B & R concluded that the value of the project at that time amounted to $4,649,400. The plant was valued at $3,793,200, and the mine development and equipment at $856,200. Included in these figures was a 10% depreciation factor covering the first year of operation. In view of the inflation of capital and labor costs since the valuation, the $4.6 million figure is conservative.

As an adjunct to appraisal, B & R prepared a proposal for Phase II, covering the complete engineering, procurement and construction of a second, 100,000 ton per year plant facility. Preliminary results indicate that the cost of the second plant, complete with mining equipment and expanded mine development, will be about $7,200,000. This figure includes a 8% escalation factor and a 10% contingency.

Ore Reserve

Dr. Richard H. Olson, an industry expert specializing in industrial minerals such as fuller's earth, was assigned the task of estimating the ore reserves underlying the five leases. All the reserves fall into the measured or indicated categories. Collectively, they comprise a larger category of demonstrated ore. None of the reserves are categorized as inferred. Nominal additional drilling and testing would be required to transfer all the reserves into the measured category.

Ore reservs, expressed as tons of finished product, are summarized as follows:

Property	Measured	Indicated
C. Cooper		801,580
F. Cooper		321,750
P. O. Cooper		734,110
Gordy		824,720
Groover North	897,980	612,300
Groover South	1,340,975	
TOTALS	2,148,955	3,294,460

With a contiguous ore reserve of nearly 5.5 million tons, the existing plant, at its maximum capacity, can be supplied with raw material for over 50 years. Consequently, a second plant of comparable capacity can draw upon the same reserve without affecting the economic lives of either plant.

Economic Evaluation

The Brown and Root appraisal was done in detail on the plant and equipment using a replacement cost basis. The total valuation for plant site, plant processing and mine equipment and mine development was $4,649,400. To this amount must be added the value of the clay reserves. A value for the reserves can be established by using the discount method commonly used by banks for financing purposes. The profit potential per year can be estimated based on profit per ton times the annual capacity to produce. This annual profit potential is then discounted over a ten-year period at 15%. Based on a 100,000 ton-per-year production schedule and a $10/ton pre-tax profit potential, the present value of the ore reserve is roughly $5 million. Collectively, the mine/mill and reserve can then be valued at slightly more than $9.6 million.

The $9.6 million does not, however, take into account such items as normal start-up costs and the front-end cost of becoming established in a new business

venture (market development, sales promotion, etc.). These expenses are conservatively estimated at between $500,000 and $750,000. Thus, a more realistic present value of the project would be a figure between $10.0 million and $10.4 million.

ANSCHUTZ

MEMORANDUM

FROM: G. C. Presley **DATE:** January 4, 1983

SUBJECT: Fuller's Earth Performance

(CALENDAR YEAR BASIS)

YEAR	TONS SOLD	DOLLAR'S INCOME	NO. ACCTS	SOLD TO COMPETITION TONS	%
1978	21,183.88	$ 980,519.60	22	15,753.44	74.4
1979	42,027.47	2,155,356.11	42	29,823.61	71.0
1980	25,182.865	1,441,738.55	95	7,592.72	30.2
1981	49,416.298	3,104,637.54	163	3,374.63	6.8
1982	56,928.55	3,835,730.23	215	1,190.77	2.1

GCP:me

Ex 316

GEORGIA OFFICE

Inventory of Rolling Stock

1982 CHEVROLET CELEBRITY , BLUE, 4 CYLINDER
SERIAL #1G1AW19R9CG117591 (OWNED)

1981 CHEVROLET IMPALA, 4-DOOR
SERIAL #1ALG9K6BJ280113 (OWNED)

1979 CHEVROLET IMPALA, 4-DOOR
SERIAL #1L69G9S149675 (OWNED)

1979 OLDSMOBILE DELTA 88, BLUE, 8 CYLINDER
SERIAL #3N69R9X113625 (OWNED)

1979 GMC PICKUP, BEIGE
SERIAL #TCU1491626515 (OWNED)

1979 GMC PICKUP, WHITE
SERIAL #TCU1491526560 (OWNED)

1979 FORD PICKUP,
SERIAL #F14HRFE1664 (LEASED)

1979 FORD PICKUP
SERIAL #F14HRFE16 (LEASED)

1974 GMC DUMP TRUCK
SERIAL # TDH924V582673 (OWNED)

1978 MACK DUMP TRUCK
SERIAL #DM685S38342 (LEASED)

1980 CRANE CARRIER DUMP TRUCK
SERIAL # M44244DA27702 (LEASED)

1979 CRANE CARRIER DUMP TRUCK
SERIAL #M44244DA27696 (LEASED)

1974 FORKLIFT, CLARK TYPE G
SERIAL #2355023676 (OWNED)

1977 FORKLIFT,
SERIAL #TMC-3160249 (OWNED)

D8-K DOZER
SERIAL #77V9992 (LEASED)

D8-H DOZER
SERIAL #46A19062 (OWNED)

CAT 623 SCRAPER
SERIAL #46P1441 (OWNED)

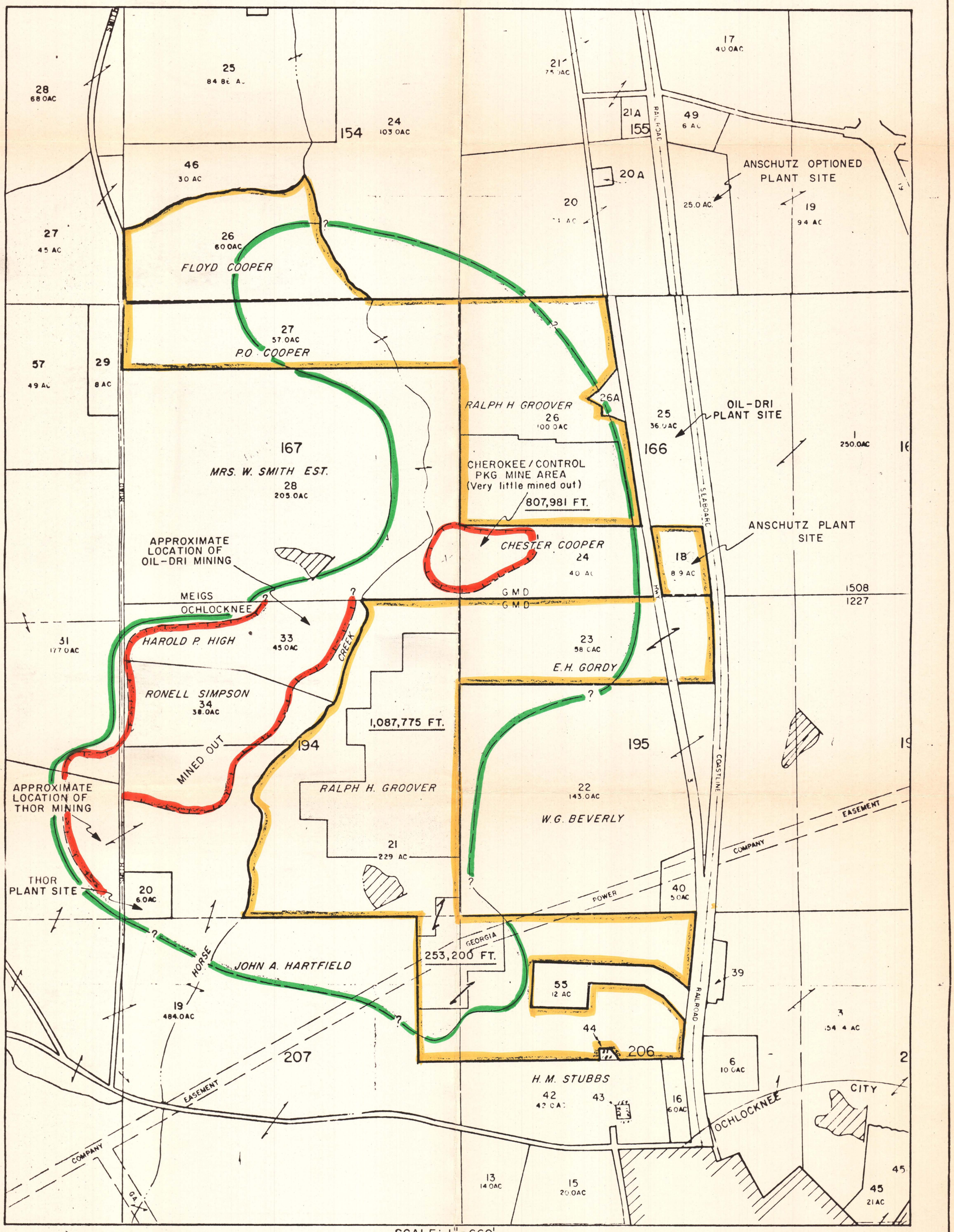
30-B DRAGLINE
SERIAL #133700 (LEASED)

88-B DRAGLINE
SERIAL #133700 (LEASED)

FRONT-END LOADER ,1975
SERIAL # 62K8392 (OWNED)

FRONT-END LOADER, 1977
SERIAL # 62K10137 (OWNED)

BOB CAT LOADER, 1978
SERIAL # 4960M11600 (OWNED)



SCALE: 1" = 660'

EXPLANATION

- PIP LEASES
- ORE RESERVE AREA AS OF 5/27/76
- APPROXIMATE LIMITS OF FULLERS EARTH
- 807,981 FT. FINISHED TONS OF PRODUCT
- AREA OF ACTIVE OR PAST MINING

THE ANSCHUTZ CORPORATION
1110 DENVER CLUB BLDG - 518 17th St - DENVER, COLORADO 80202 Phone (303) 573-5665

REFERENCE MAP SHOWING LOCATION OF
FULLERS EARTH ZONE AND PIP
PETROLEUM LEASES AND PLANT SITE
OCHLOCKNEE, THOMAS COUNTY, GEORGIA

PLATE 1