COPY

NATIONAL LEAD COMPANY
St. Louis Smelting and Refining Division
Fredericktown, Missouri

P.O. Box 351 Telephone 666

January 18, 1955

Mr. Carlton H. Rose, Manager
National Lead Company
Washington Office
1025 Connecticut Ave. NW,
Washington 6, D. C.

Dear Carl:

I am writing this letter to clarify certain aspects of the information contained in our application for exploration, Docket No. DMEA-3571.

Exploration work by this company and by other companies in the Southeast Missouri lead belt consists of two stages: (1) a preliminary stage comprising geophysical work and reconnaissance drilling designed to distinguish favorable areas and eliminate unfavorable areas; (2) a secondary stage involving more detailed geophysical work and additional drilling to discover ore. The third and final stage, that of specifically blocking out ore as a basis of plans for mining, does not enter into this exploration project.

In applying for the original Exploration Project (Idm-E48, Docket No. 1371X), the statement was made, "This easternmost area is rather flexible in extent and may be moved either east or west to some extent, according to the findings or drilling in the area. The reason for this is that the area outlined has never been explored to any great extent and the character, depth and other features of the formations are not too well known."

The preliminary stage of exploration was accomplished by this work to the extent that the area outlined in the project has been confirmed as one favorable for extended exploration. The new application is a continuation or extension of the previous DMEA Exploration Project.

In order to evaluate the success of the first DMEA Project, a comparison of the results of that program can be made with exploratory drilling by this company in the area during the past five years.

DMEA Project No. of Holes	Ore Grade	Indicative	Trace	Blank	Abandoned
213	7	18	87	79	22
100%	3.3%	8.4%	40.8%	37.2%	10.3%
1950 through 1954					
450	13	32	151	224	30
100%	2.89%	7.11%	33.55%	49.78%	6.67%

This tabulation shows that the DMEA project was slightly more productive than the past 5-year average. It is worthwhile to note that the above results constitute sufficient success in the exploratory stage to result in the discovery of many thousand tons of ore. It is expected that the indicative and trace showings in the holes already drilled in this proposed area will ultimately lead to the discovery of an ore body.

Referring to the application, page 2, section 4a, paragraph 3, the following statement is made: "The stratigraphic and structural information, along with the indicative mineralization encountered in the previous exploration project, confirms the area as one favorable for extended exploration."

The requirements that any area must fulfill to be favorable for mineralization are (1) favorable host rock, (2) favorable structural preparation and (3) access of mineralizing solutions to the host rock. In order to evaluate the favorableness of this proposed exploration area, a comparison can be made with the geological setting of the producing mines of the Fredericktown area.

The ore deposits of the Fredericktown District are disseminated, bedded, replacement deposits of galena, chalcopyrite, siegenite, marcasite, pyrite and minor amounts of sphalerite. All mines in the Fredericktown area are located in the lower light gray dolomite of the Bonneterre formation. All of the mines are located at or near the pinch-out line of the Lamotte sand on the flanks of pre-Cambrian "highs" or in basins between pre-Cambrian highs which have some sandstone underlying the Bonneterre dolomite. All of the mines are marked by fracturing resulting from local stresses due to differential compaction over the irregularities in the pre-Cambrian basement or due to features of sedimentation. All of the mines in this area are associated with through-going faults which apparently exerted control of some kind on the movement of mineralizing solutions which penetrated the Bonneterre horizon and deposited their load. The presence of these faults was such that the sources which caused them could have, under certain conditions, produced the localized structural conditioning of the favorable horizon. As stated in the application, page 4, paragraph 2, "The localization of ore appears to be controlled by pre-Cambrian topography; i.e., domical or anticlinal structures related to buried pre-Cambrian knobs and ridges, local and regional fracturing, minor folding and certain sedimentary features such as bars and other irregularities."

In this area which we propose to explore, sufficient exploratory work, geophysical, geological and drilling, has been completed so that we now know the following:

1. The lower section of the Bonneterre dolomite is a favorable host rock. Composition, appearance and texture are similar to the

lower section in the ore producing areas. We have found evidence that alteration and solution have taken place. Mineralization has also been found.

2. Favorable structural preparation exists in this area. The topography of the pre-Cambrian surface is irregular, as is indicated by the exposed pre-Cambrian knobs in the area. Drill holes show the Lamotte sandstone to be present in the lower lying parts of the pre-Cambrian surface. Therefore, the sandstone must pinch out against pre-Cambrian highs. Magnetic results reveal information on the structure of the pre-Cambrian rocks, on variation in their composition and on their relation to structures in the overlying sedimentary rocks. Many of the anomalies can be directly related to the relief of the basement rock. Experience has shown us that these irregularities in the pre-Cambrian surface produced fracturing in the overlying Bonneterre favorable for ore deposition.

Through-going faults and associated structures bound and traverse the area. It is logical to assume that they bear the same relation to structural preparation and ore deposition in this area that they do in the producing mines of the Fredericktown District and the entire Southeast Missouri lead belt.

3. Mineralizing solutions have access to the host rock and deposited their load. This is confirmed by the indicative mineralization shown in the drill holes listed in Table I of the report. Of the 46 holes completed, 8 holes show copper, lead or zinc mineralization.

A continuation of this exploration work consists of exploring this favorably proven area to determine where the mineralization has been localized sufficiently to constitute ore deposits.

Yours very truly,

J. E. Phebus
General Superintendent

JEP:mt

DRILL RECORD

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION
FREDERICKTOWN, MO.

Hole No. O.W. -1

Land Otto White Tract **Date: From** 6-13-50 **To** 7-10-50

Location of Hole 2,077.38' S and 1,773.85' ~~W~~ E of US-8

Latitude 99,471.33 **Departure** 136,550.99 **Elevation** 708.79

Struck Water at 45' **Stands at** 20' **Casing Used** 22' of 6¼"

Depth From	Depth To	Elevation	Description of Mineralization	Description of Formation
0	20			Red clay
20	75			Brown lime
75	110			Dark gray lime
110	115		Trace of Fe	Dark gray lime
115	120			Dark gray - gray lime
120	170			Light brown & gray lime
170	245		Faint trace of Fe	Gray lime
245	255		Trace of Fe	Dark gray - some gray lime
255	270		Trace of Fe	Gray - dark gray lime
270	300		Trace of Fe	Gray lime
300	320		Shines of Fe	Gray lime
320	325		Trace of Fe	Gray lime - green shale
325	380		Trace of Fe	Gray lime
380	425		Shines of Fe	Gray lime
425	480		Trace of Fe	Gray lime
480	555		Trace of Fe	Gray lime - green shale
555	565		Trace of Fe	Gray - dark gray - some pink lime - blue & green shale
565	570		Trace of Fe	Dark gray - gray - some pink lime - blue & green shale
570	580		Trace of Fe	Gray - some dark gray lime
580	605		Faint trace of Fe	Gray lime - green shale
605	620		Faint trace of Fe	Dark gray - gray - some pink lime - green shale
620	640		Faint trace of Fe	Pink - some dark gray lime - green shale
640	650			Gray - some dark gray & pink lime - green shale

REMARKS:

Elevation top of white sand

Elevation top of porphyry -78.79'

I certify the above to be correct:

s/ Glen E. Clark **Contractor**

John Sitzes **Drillers**

DRILL RECORD

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION
FREDERICKTOWN, MO.

Hole No. O.W.-1

Land ..... **Date:** **From** ..... **To** .....

Location of Hole .....

Latitude ..... **Departure** ..... **Elevation** .....

Struck Water at ..... **Stands at** ..... **Casing Used** .....

Depth From	Depth To	Elevation	Description of Mineralization	Description of Formation
650	665		Faint Trace of Fe	Pink lime - green shale
665	675		Faint Trace of Fe	Sandy pink lime - green shale
675	710		Faint Trace of Fe	Pink - some gray lime - green shale
710	720		Faint Trace of Fe	Pink - some dark gray lime - green shale
720	730		Faint Trace of Fe	Dark gray - some pink lime - porphyry - quartz
730	740			Porphyry & quartz (top of por. at 730')

REMARKS: .....

Elevation top of white sand .....

Elevation top of porphyry .....

I certify the above to be correct:

..... **Contractor**

..... **Drillers**

DRILL RECORD

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION
FREDERICKTOWN, MO.

Hole No. OW-2

Land Otto White Tract Date: From 2-21-51 To 3-21-51

Location of Hole 1,009.31' N and 1,332.07' E of O.W-1

Latitude 100,480.64 Departure 137,883.06 Elevation 659.31

Struck Water at 3.20' Stands at Surface Casing Used 12' of 6¼"

Depth From	Depth To	Elevation	Description of Mineralization	Description of Formation
0	5			Brown clay & flint
5	15			Brown clay - flint - lime boulders
15	20			Brown & dark gray lime
20	50		Faint trace of Fe	Dark gray lime
50	55			Dark gray - some gray lime
55	65			Gray & yellow lime
65	90			Light brown lime
90	95			Gray - some light brown lime
95	120		Faint trace of Fe	gray lime
120	165		Faint trace of Fe	Gray lime - green shale
165	170		Faint Trace of Fe	Gray - dark gray lime - green shale
170	180		Faint trace of Fe	Gray lime - green shale
180	190		Faint trace of Fe	Gray - dark gray lime - green shale
190	285		Trace of Fe	Gray lime - green shale
285	295		Shines of Fe	Gray lime - green shale
295	305		Trace of Fe	Gray lime
305	315		Shines of Fe	Gray lime
315	320		Trace of Fe	Gray & dark gray lime
320	325		Trace of Fe	Gray lime
325	340		Trace of Fe	Gray & dark gray lime
340	375		Trace of Fe	Gray lime
375	465		Faint Trace of Fe	Gray lime - green shale
465	480		Faint Trace of Fe	Gray lime
480	485		Faint Trace of Fe	Gray lime - gray shale
485	500		Faint trace of Fe	Gray lime - green shale
500	510		Trace of Fe	Gray - some dark gray lime - green shale
510	520		Trace of Fe	Gray & pink lime - green shale
520	525		Trace of Fe	Gray - dark gray & pink lime - green shale
525	540		Faint trace of Fe	Dark gray lime - green shale

REMARKS: Casing left in hole.

Elevation top of white sand -25.69

Elevation top of porphyry -40.69

I certify the above to be correct:

s/ Glen E. Clark Contractor

Fred Clark Drillers

Wendell Tinnin Helper

DRILL RECORD

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION
FREDERICKTOWN, MO.

Hole No. OW-2

Land ..... **Date:** **From** ..... **To** .....

Location of Hole .....

Latitude ..... **Departure** ..... **Elevation** .....

Struck Water at ..... **Stands at** ..... **Casing Used** .....

Depth From	Depth To	Elevation	Description of Mineralization	Description of Formation
540	550		Faint trace of Fe	Dark gray & light gray lime
550	600		Faint Trace of Fe	Dark gray lime
600	620		Faint Trace of Fe	Sandy light gray & pink lime
620	630		Faint trace of Fe	Sandy pink & some light gray lime
630	635		Faint Trace of Fe	Sandy pink - light gray lime - quartz
635	645		Faint Trace of Fe	Sandy pink - some light gray & dark gray lime
645	655		Faint Trace of Fe	Sandy dark gray - some pink & some light gray lime - green shale
655	665		Faint Trace of Fe	Dark gray lime
665	675		Faint Trace of Fe	Dark gray - some sandy light gray lime - quartz - green shale
675	680		Faint Trace of Fe	Dark gray lime - quartz - green shale - some porphyry
680	685			White sand - porphyry - quartz - dark gray lime - green shale
685	690		Trace of Fe	White sand, porphyry & quartz (top of s.s. at 685')
690	695		Trace of Fe	White sand - porphyry & quartz
695	700		Trace of Fe	Porphyry - some white sand
700	705		Trace of Fe	Porphyry - (top of por. at 700')

REMARKS: .....

Elevation top of white sand .....

Elevation top of porphyry .....

I certify the above to be correct:

..... **Contractor**

..... **Drillers**

DRILL RECORD

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION
FREDERICKTOWN, MO.

Hole No. W.V.-1

Land William Voges Tract **Date: From** 4-3-50 **To** 4-24-50

Location of Hole 1,324.03'S and 1,073.86' E of US-12

Latitude 101,580.05 **Departure** 136,744.58 **Elevation** 713.99

Struck Water at 75' **Stands at** 10' **Casing Used** 21' of 6¼"

Depth From	Depth To	Elevation	Description of Mineralization	Description of Formation
0	4			Brown clay
4	60	½		Dark gray lime
60	65			Dark gray - some gray lime
65	75			Grey lime
75	95			Light brown lime
95	100			Light brown & gray lime
100	130		Trace of Fe	Gray lime
130	140		Trace of Fe	Gray - some dark gray lime
140	170		Trace of Fe	Gray lime
170	185		Trace of Fe	Gray - dark gray lime - green shale
185	195		Good shines of Fe	Gray lime - green shale
195	215		Shines of Fe	Light gray lime
215	295		Shines of Fe	Gray lime
295	315		Good shines of Fe	Dark & light gray lime
315	335		Shines of Fe	Gray lime
335	345		Good shines of Fe	Gray - dark gray lime
345	360		Shinesof Fe	Gray lime
360	370		Shines of Fe	Gray - some dark gray lime
370	420		Shines of Fe	Gray lime - green shale
420	480		Trace of Fe	Light gray lime - green shale
480	490		Trace of Fe	Light gray - some pink lime - blue & green shale
490	520		Trace of Fe	Pink - some light gray lime - green & red shale
520	530		Trace of Fe	Light gray - some pink lime - green shale
530	590		Trace of Fe	Dark gray lime - green shale
590	595		Trace of Fe	Dark gray - some light gray lime - green shale

REMARKS:

Elevation top of white sand 53.99

Elevation top of porphyry 18.99

I certify the above to be correct:

s/ Glen E. Clark **Contractor**

Ed Bingham **Drillers**

Jess Hale Helper

DRILL RECORD

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION
FREDERICKTOWN, MO.

Hole No. W.V.-1

Land ..... **Date:** **From** ..... **To** .....

Location of Hole .....

Latitude ..... **Departure** ..... **Elevation** .....

Struck Water at ..... **Stands at** ..... **Casing Used** .....

Depth From	Depth To	Elevation	Description of Mineralization	Description of Formation
595	610		Trace of Fe	Light gray - dark gray lime - green shale
610	630		Trace of Fe	Pink - dark & light gray lime - green shale
630	635		Trace of Fe	Light gray - dark gray - pink lime - green shale
635	650		Trace of Fe	Pink - some dark gray lime
650	660		Trace of Fe	Pink - gray lime - some white sand
660	665		Trace of Fe	White sand - some dark gray & pink lime (top of W. sand at 660')
665	695		Trace of Fe	White sand - porphyry - sandy gray & pink lime
695	700			Porphyry & white sand - some quartz (top of por. at 695')
700	718			Porphyry - some quartz

REMARKS: .....

Elevation top of white sand .....

Elevation top of porphyry .....

I certify the above to be correct:

..... **Contractor**

..... **Drillers**

DRILL RECORD

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION
FREDERICKTOWN, MO.

Hole No. US-10

Land U. S. Forestry Tract Date: From 1-15-51 To 2-19-51

Location of Hole 1,451.74'S & 66.75'E of JH-6

Latitude 103,980.26 Departure 136,479.14 Elevation 824.24

Struck Water at 100' Stands at 37' Casing Used 75' of 6¼"

Depth From	Depth To	Elevation	Description of Mineralization	Description of Formation
0	25			Red clay & flint
25	70			Brown clay & flint
70	80			Gray & brown lime
80	110			Brown lime
110	115			Brown & dark gray lime
115	130			Dark gray lime
130	140			Brown & dark gray lime
140	160			Brown lime
160	215			Dark gray lime
215	220			Gray & dark gray lime
220	225			Gray & yellow lime
225	265			Light brown lime
265	275		Trace of Fe	Gray & light brown lime - green shale
275	285		Trace of Fe	Gray - some light brown lime
285	330		Trace of Fe	Gray lime - green shale
330	335		Trace of Fe	Gray - some dark gray lime - green shale
335	345		Trace of Fe	Gray lime - green shale
345	355			Gray & dark gray lime
355	390		Trace of Fe	Gray - some dark gray lime
390	405		Trace of Fe	Gray lime
405	420		Trace of Fe	Gray lime - green shale
420	455		Shines of Fe	Gray lime - green shale
455	465		Trace of Fe	Gray lime
465	480		Shines of Fe	Gray lime - green shale
480	490		Trace of Fe	Gray - some dark brown lime
490	545		Shines of Fe	Gray lime - green shale
545	645		Trace of Fe	Gray lime - green shale
645	665		Trace of Fe	Gray - some pink lime - gray & green shale
665	675		Ft. Trace of Fe	Gray - some pink & dark gray lime - gray & green shale

THE JOPLIN PRINTING CO., JOPLIN, MO.

REMARKS:

Elevation top of white sand 54.24

Elevation top of porphyry -40.76

I certify the above to be correct:

s/ Glen E. Clark Contractor

Fred Clark Drillers

Wendell Tinnin Helper

DRILL RECORD

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION
FREDERICKTOWN, MO.

Hole No. US-10

Land ..... Date: From ..... To .....

Location of Hole .....

Latitude ..... Departure ..... Elevation .....

Struck Water at ..... Stands at ..... Casing Used .....

Depth From	Depth To	Elevation	Description of Mineralization	Description of Formation
675	680		Faint Trace of Fe	Pink - some dark & light gray lime - gray & green shale
680	695			Pink - some gray lime - gray & green shale
695	710			Pink & red lime - gray & green shale
710	725			Pink lime - green shale
725	730			Dark gray - pink lime - green shale
730	740		Faint Trace of Fe	Dark gray lime
740	745		Faint Trace of Fe	Dark & light gray lime - green shale
745	750		Faint Trace of Fe	Sandy - dark gray & light gray lime - some pink lime - green shale
750	765		Trace of Fe	Sandy dark gray lime - gray sand - green shale - some quartz
765	770		Faint trace of Fe	Gray sand - some dark gray lime
770	780		Faint trace of Fe	Gray sand - some sandy dark gray lime (top of s.s. at 770')
780	795		Faint trace of Fe	Gray & white sand - some sandy light gray lime
795	810			Gray & white sand - some dark gray lime - gray shale
810	820		Trace of Fe	Gray & white sand - dark gray lime - gray shale
820	825		Faint trace of Fe	Gray & white sand - dark gray lime - gray shale
825	835		Faint trace of Fe	Gray sand - gray lime - some porphyry
835	850		Faint trace of Fe	White sand - some porphyry - green shale
850	855			White sand - porphyry - red lime - red shale
855	860			Red lime - green shale - red shale - some porphyry
860	865			Red lime - red & green shale - porphyry
865	870			Porphyry (top of por. at 865')

THE JOPLIN PRINTING CO., JOPLIN, MO.

REMARKS: .....

Elevation top of white sand .....

Elevation top of porphyry .....

I certify the above to be correct:

..... Contractor

..... Drillers

DRILL RECORD

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION
FREDERICKTOWN, MO.

Hole No. RM-1

Land R. O. McClanahan Tract Date: From 3-26-51 To 4-14-51

Location of Hole

Latitude Departure Elevation 674.38

Struck Water at 40' Stands at 5' Casing Used 47' of 6¼"

Depth From	Depth To	Elevation	Description of Mineralization	Description of Formation
0	13			Yellow clay
13	15			Yellow clay & brown lime boulders
15	25			Brown lime
25	40			Yellow clay - boulders & cracks
40	70			Brown lime
70	105			Brown - some gray lime
105	125			Light brown & gray lime
125	150			Light brown & gray lime - green shale
150	170			Light brown lime - green shale
170	205			Light brown lime
205	235		Faint trace of Fe	Gray - some light brown lime - green shale
235	255			Light brown & light gray lime
255	275		Faint trace of Fe	Gray - light brown lime
275	305		Faint trace of Fe	Light brown lime
305	310			Gray & light brown lime
310	315		Faint trace of Fe	Light brown lime
315	320		Trace of Fe	Gray & light brown lime
320	325		Good shines of Fe	Gray lime
325	330		Shines of Fe	Gray lime
330	340		Trace of Fe	Gray lime
340	345		Faint trace of Pb	Gray lime
			Trace of Fe	
345	350		Faint trace of Pb	Gray lime
			Trace of Fe	
350	370		Trace of Fe	Gray lime - green shale
370	415		Trace of Fe	Gray - some pink lime - green shale
415	420		Trace of Fe	Gray - some pink & light brown lime-green shale
420	425		Trace of Fe	Light brown - some gray & pink lime-green shale
425	435		Trace of Fe	Gray - light brown - some pink lime-green shale

THE JOPLIN PRINTING CO., JOPLIN, MO.

REMARKS: Casing left in hole

Elevation top of white sand

Elevation top of porphyry 161.38

I certify the above to be correct:

s/ Glen E. Clark Contractor

John Sitzes Drillers

Carl Adams Helper

DRILL RECORD

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION
FREDERICKTOWN, MO.

Hole No. RM-1

Land ..... Date: From ..... To .....

Location of Hole .....

Latitude ..... Departure ..... Elevation .....

Struck Water at ..... Stands at ..... Casing Used .....

Depth From	Depth To	Elevation	Description of Mineralization	Description of Formation
435	470		Faint trace of Fe	Gray lime - gray shale
470	485		Faint trace of Fe	Gray - some pink lime - gray & green shale
485	495		Faint trace of Fe	Pink lime - red & green shale
495	505		Faint trace of Fe	Red lime - red & green shale
505	510		Faint trace of Fe	Red - some gray lime - porphyry - green shale
510	525			Porphyry - some gray & red lime - green shale (top of por. at 513') (Lime probably falling in from above.)

THE JOPLIN PRINTING CO., JOPLIN, MO.

REMARKS: .....

Elevation top of white sand .....

Elevation top of porphyry .....

I certify the above to be correct:

..... Contractor

..... Drillers

DRILL RECORD

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION
FREDERICKTOWN, MO.

Hole No. JH-6

Land Herbert R. Johnson Tract Date: From 2-24-51 To 3-24-51

Location of Hole 310.26' N and 975.36' ~~W~~ E of JH-5

Latitude 105,432.00 Departure 136,412.39 Elevation 847.50

Struck Water at 105' Stands at 85' Casing Used 85' of 6¼"

Depth From	Depth To	Elevation	Description of Mineralization	Description of Formation
0	60			Brown mud
60	85			Brown lime
85	105			Brown lim3 - some flint - mud seams
105	140			Brown lime
140	145			Soft brown lime - mud - seams
145	155			Brown lime
155	165			Dark gray & brown lime
165	175		Faint Trace of Fe	Dark gray lime
175	185			Brown - some dark gray lime
185	190		Faint Trace of Fe	Dark gray lime
190	200		Faint Trace of Fe	Brown lime - green shale
200	215			Light brown lime - green shale
215	250			Light brown lime - gray & green shale
250	300		Faint Trace of Fe	Gray lime - green shale
300	320		Faint Trace of Fe	Gray - some yellow lime - green shale
320	330			Brown - gray & yellow lime - green shale
330	340			Gray & yellow lime - green shale
340	350		Trace of Fe	Gray & blue lime - green shale
350	360		Trace of Fe	Gray & blue lime - green shale
360	370		Trace of Fe	Light brown - gray lime - green shale
370	375		Trace of Fe	Light brown - gray & blue lime - green shale
375	440		Trace of Fe	Gray lime - green shale
440	465		Trace of Fe	Gray lime
465	470		Trace of Fe	Gray & dark gray lime
470	545		Trace of Fe	Gray lime
545	555		Trace of Fe	Gray lime - green shale
555	560		Trace of Fe	Gray lime
560	595		Trace of Fe	Gray lime - green shale
595	610		Trace of Fe	Gray lime - gray & green shale

THE JOPLIN PRINTING CO., JOPLIN, MO.

REMARKS:

Elevation top of ~~sandstone~~ porphyry ~~105.70~~

Elevation top of porphyry 107.50

I certify the above to be correct:

s/ Glen E. Clark Contractor

John Sitzes Drillers

Carl Adams Helper

DRILL RECORD

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION
FREDERICKTOWN, MO.

Hole No. JH-6

Land ..... Date: From ..... To .....

Location of Hole .....

Latitude ..... Departure ..... Elevation .....

Struck Water at ..... Stands at ..... Casing Used .....

Depth From	Depth To	Elevation	Description of Mineralization	Description of Formation
610	615		Faint Trace of Fe	Gray - some pink lime - gray & green shale
615	649		Faint Trace of Fe	Gray & pink lime - gray & green shale
640	675		Faint Trace of Fe	Pink - some gray lime - red & green shale
675	705		Faint trace of Fe	Pink lime - red & green shale
705	735		Faint trace of Fe	Pibk lime - green shale
735	740			Pink - some dark gray lime - red & green shale
740	745			Porphyry - pink lime (top of por. at 740')
745	760			Porphyry

THE JOPLIN PRINTING CO., JOPLIN, MO.

REMARKS: .....

Elevation top of white sand .....

Elevation top of porphyry .....

I certify the above to be correct:

..... Contractor

..... Drillers

DRILL RECORD

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION
FREDERICKTOWN, MO.

Hole No. L.S.-1

Land Les Starkey Tract Date: From 12-29-50 To 1-11-51

Location of Hole

Latitude Departure Elevation 690.13

Struck Water at 15' Stands at 0' Casing Used 27' of 6¼" - 20' of 8¼"

Depth From	Depth To	Elevation	Description of Mineralization	Description of Formation
0	5			Brown ~~[illegible]~~ clay
5	25			Brown lime - creek gravel
25	50			Brown lime
50	115		Trace of Fe	Brown lime
115	125		Trace of Fe	Gray & brown lime
125	245		Trace of Fe	Gray lime - green shale
245	290		Shines of Fe	Gray lime - green shale
290	315		Trace of Fe	Pink lime - red & green shale
315	320		Trace of Fe	Red lime - green shale
320	325		Trace of Fe	Red lime - green shale - prophyry
325	335			Porphyry - (top of por. at 325')

THE JOPLIN PRINTING CO., JOPLIN, MO.

REMARKS:

Elevation top of white sand

Elevation top of porphyry 365.1

I certify the above to be correct:

s/ Glen E. Clark Contractor
Fred Clark Drillers
Wendell Tinnin Helper

DRILL RECORD

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION
FREDERICKTOWN, MO.

Hole No. H.E. -2

Land Heltibrand Tract Date: From 12-12-50 To 12-28-50

Location of Hole

Latitude Departure Elevation 680.64

Struck Water at Stands at 0 Casing Used 21' of 6¼"

Depth From	Depth To	Elevation	Description of Mineralization	Description of Formation
0	15			Yellow clay
15	85			Brown lime
85	95			Dark brown lime
95	140			Brown lime
140	150		Trace of Fe	Gray - some brown lime - green shale
150	160		Trace of Fe	Brown - some gray lime
160	230			Brown lime
230	240			Brown - some gray lime
240	310		Trace of Fe	Gray lime
310	355		Trace of Fe	Gray lime - green shale
355	395		Trace of Fe	Pink - some gray lime - green shale
395	465			Pink lime - green shale
465	510			Red lime - red & green shale
510	515			Red lime - red shale - some porphyry
515	520			Porphyry (top of por. at 515')

THE JOPLIN PRINTING CO., JOPLIN, MO.

REMARKS: Left in hole for water well

Elevation top of white sand

Elevation top of porphyry 165.6

I certify the above to be correct:

s/ Glen E. Clark Contractor
John Sitzed Drillers
Carl Adams Helper

EXHIBIT A

OPTION CONTRACT

THIS AGREEMENT, Made this _____ day of _____, 19_____, by and between and his wife, parties of the first part, and NATIONAL LEAD COMPANY, ST. LOUIS SMELTING AND REFINING DIVISION, a corporation, party of the second part;

WITNESSETH:

1. That the parties of the first part in consideration of the sum of One Dollar ($1.00) and other valuable considerations to them paid, the receipt of which is hereby acknowledged, and of the covenants and agreements hereinafter set out to be kept and performed by party of the second part, do by these presents GRANT, BARGAIN and SELL unto party of the second part the exclusive right and option to buy, upon the terms and conditions hereinafter set out and within the time hereinafter specified, the underground and mineral rights and not to exceed ( ) acres of the surface rights in and to the following described land, lying, being and situate in the County of , State of Missouri, to-wit:

2. This option to buy shall operate and be in force for a period of one year beginning on the _____ day of _____, 19_____.

3. Parties of the first part covenant and agree as part of the consideration of this contract that this option contract will be renewed and extended, in all of its terms, for a period of three (3) months upon payment or tender by party of the second part to parties of the first part the sum of Twenty-five Cents (25¢) per acre. In like manner and upon like payments or tenders, this option contract will be further renewed and extended, for like periods, successively for a term of five (5) years from the date of the expiration of the first year hereof. All renewal and extension payments due hereunder shall be paid by party of the second part to parties of the first part by check mailed, postage prepaid, to parties of the first part at ; such payments to be mailed on or before the beginning dates of renewal and extension periods.

4. If party of the second part shall, during the life of this option contract or any renewal or extension thereof, elect to exercise its option to buy the underground and mineral rights in and to the land herein described, under the terms of this contract, it shall pay to parties of the first part, their heirs or assigns, the sum of One Hundred Dollars ($100.00) per acre, in cash, therefor, less the amount of all payments theretofore made pursuant to this option contract including renewal or extension payments paid and due at the time of notice of intention to purchase.

If party of the second part purchases the mineral and underground rights, parties of the first part agree to give and grant, and do hereby give and grant, unto party of the second part the right of ingress and egress for exploration and mining purposes and for the sinking of shafts and installing of mine ventilation equipment and the use of so much of the surface as may be necessary for the use and maintenance of the same.

In the event party of the second part purchases the mineral and underground rights as herein provided, parties of the first part hereby give and grant to party of the second part the right and option to purchase surface rights in and to not to exceed ( ) acres of the above described land, within six (6) years from date hereof, and party of the second part agrees to pay parties of the first part for the surface rights so purchased

It is further agreed that in the event party of the second part purchases surface rights as herein provided, parties of the first part agree to give and grant, and do hereby give and grant, unto party of the second part

the right of ingress and egress and the right to construct and maintain power, gas, air and water lines over and across the land herein described but not purchased by party of the second part.

5. For the purpose of this contract only the aggregate acreage as stated herein is taken to be correct, but if upon election to purchase under the terms of this contract or at any time during the life of said contract or any renewal or extension thereof, the party of the second part shall so desire, the true acreage of said land shall be ascertained by a survey made by a competent surveyor, and the cost of said survey shall be paid by party of the second part. It is further agreed that if the true acreage be different from that stated herein, any payment or calculation by or upon the acreage herein stated shall be corrected and adjusted to the true acreage.

6. Parties of the first part agree that party of the second part shall have the right, at any time, to redeem for parties of the first part by payment, any mortgages, taxes or other liens on the above described land, in the event of default of payment by parties of the first part. It is further agreed that any sum or sums so paid by party of the second part shall be deducted from the purchase price hereinbefore provided.

7. Notice of intention to purchase shall be in writing and shall be given to parties of the first part at least thirty (30) days before the expiration of this option contract, and parties of the first part shall within ninety (90) days after the receipt of such notice, furnish to party of the second part an abstract of title, showing in parties of the first part an indefeasible, perfect title, in fee simple, free and clear from all liens, encumbrances, claims, burdens and obligations. Conveyance to be by general warranty deed, including the covenant to defend. Parties of the first part shall, within ninety (90) days after furnishing abstract to party of the second part as herein provided, correct any defect appearing in the abstract, and in the event of the failure of parties of the first part to do so within said time, party of the second part, at its option, may proceed to correct the same, charging parties of the first part with all costs and expenses in relation thereto, including attorneys' fees.

8. Parties of the first part hereby give and grant to party of the second part the right of ingress and egress, and to go upon the above described land and prospect the same for lead or other valuable minerals with a diamond drill or churn drill, or other such implements, tools and machinery and in such manner as said party of the second part may choose, and to dig, drill, bore, blast, tunnel and sink shafts in and upon said land, and to place such machinery thereon as party of the second part may deem necessary for efficiently prospecting said land, with the right to party of the second part to remove all property so placed thereon at any time during the term hereof or within one year after the termination of this option contract. Party of the second part is further given the right to use from said land without cost all water necessary for such drilling and prospecting.

9. Parties of the first part shall have the right to enter upon said land for the purpose of inspection and examination, not unnecessarily interfering with the prospecting operations of the party of the second part, and parties of the first part shall have the right to inspect and examine any and all drill cores or cuttings taken from said land, provided such inspections and examinations are made in the presence of representatives of party of the second part.

10. It is further agreed that all diamonds, bits, rods and pipe that may be lost by party of the second part in prospecting said land shall be and remain the absolute property of said party of the second part, and parties of the first part do hereby recognize such continual ownership, and guarantee to party of the second part the right and privilege to go in and upon said land

at any time within one year after the termination of this option contract for the purpose of searching for, seeking and recovering any such lost diamonds, bits, rods and pipes.

11. Party of the second part shall pay for any damage caused by prospecting operations hereunder to the surface of the land or to growing crops or improvements on said land. It is mutually agreed that in the event the parties hereto cannot agree as to the amount of such damage, the question of damage shall be submitted to the arbitration of three disinterested citizens living in , Missouri, one of the arbitrators to be chosen by parties of the first part, one by party of the second part, and the third by the two arbitrators thus selected; the finding of the arbitrators shall be final and binding.

12. In the case of failure of party of the second part to keep and perform the terms of this option contract, parties of the first part may give thirty (30) days' written notice of the violation complained of, and if such violation or default is not removed within said period, this option contract shall thereupon terminate, at the option of parties of the first part, which remedy shall be exclusive.

13. Party of the second part may at any time, if it desires to do so, upon the payment of all extension and renewal payments then due, surrender and terminate this option contract by giving seven (7) days' written notice of intention so to do, and thereupon party of the second part shall be relieved from all obligations hereunder, except claims for damages in accordance with paragraph 11 of this option contract.

14. Party of the second part shall have the right to assign or sublet this option contract and all interests therein.

15. Any notice herein authorized or required to be given parties of the first part must be in writing and may be served by mailing the same by registered mail, postage prepaid, addressed to parties of the first part, their heirs or legal representatives, at . Any notice herein authorized or required to be given party of the second part must be in writing and may be served by mailing the same by registered mail, postage prepaid, addressed to party of the second part, its legal representatives, successors or assigns, at Fredericktown, Missouri. The effective date of any notice herein authorized or required shall be the date of mailing of such notice as shown by registered receipt.

16. The terms and conditions of this option contract shall be binding upon and inure to the benefit of the heirs, successors, legal representatives and assigns of the parties hereto.

IN WITNESS WHEREOF, the parties hereto have duly executed this indenture, the day and year first above written.

_____

_____

Parties of the First Part

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION

By _____

Party of the Second Part

ACKNOWLEDGMENT

STATE OF MISSOURI)
) ss.
COUNTY OF)

On this _____ day of _____, 19_____, before me personally appeared and , his wife, to me known to be the persons described in and who executed the foregoing instrument, and acknowledged that they executed the same as their free act and deed.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my notarial seal at my office in _____, Missouri, the day and year last above written.

My term expires: _____

_____
Notary Public

ACKNOWLEDGMENT

STATE OF NEW YORK)
) ss.
COUNTY OF NEW YORK)

On this _____ day of _____, 19_____,
before me personally came
to me known, who, being by me duly sworn, did depose and say that he resides
in ,
that he is of NATIONAL LEAD COMPANY,
the corporation described in and which executed the above instrument; that he knows the seal of said corporation, that the seal affixed to said instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation, and that he signed his name thereto by like order.

My term expires: _____.

_____
Notary Public

DRILL RECORD

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION
FREDERICKTOWN, MO.

Hole No. D.D.H. MK-1

Land E. E. McCormack Tract Date: From 3-2-53 To 7-15-53

Location of Hole 3,695.90' S and 683.00' E of JV-1

Latitude 87,403.70 Departure 147,747.54 Elevation 724.03

Struck Water at 5' Stands at Flowing Casing Used See Remarks

Depth From	Depth To	Elevation	Description of Mineralization	Description of Formation
0	75		CHURN DRILLING	Flint & clay
75	165			Light brown lime
165	220			Dark brown lime
220	268			Mud opening
268	280			Dark brown lime
280	285			Dark brown lime (2' opening)
285	290			Dark brown lime
290	300			Black lime
300	330			Dark brown lime
330	350			Dark brown & black lime
350	370		Tr of Fe	Dark gray lime
370	380		Tr of Fe	Light brown lime
380	405		Heavy Fe	Dark gray lime
405	410		Heavy Fe	Light brown lime
410	415		Tr of Fe	Light brown lime
415	425		Tr of Fe	Light gray lime
425	430		Tr of Fe	Light gray lime & green shale
430	450		Tr of Fe	Light gray lime
450	475		Tr of Fe	Light brown lime
475	480		Tr of Fe	Light brown & light gray lime
480	490		Tr of Fe	Light gray lime
490	500		Heavy Fe	Light gray lime
500	510		Sh of Fe	Light gray lime
			DIAMOND DRILLING	
510	515			Gray dense fine xtln dolomite
515	724		Tr of Fe	Light gray coarse xtln dolomite, little green shale. Streaks of brown fine xtln. dolo. @ 596-599 and 607-611. Gray & dense @ 633-647.

THE JOPLIN PRINTING CO., JOPLIN, MO.

REMARKS: 106' of 8¼", 280' of 6¼", 510' of 3"

Elevation top of white sand —

Elevation top of porphyry -19

I certify the above to be correct:

Contractor

Drillers

DRILL RECORD

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION
FREDERICKTOWN, MO.

Hole No. D.D.K. MK-1

Land ..... Date: From ..... To .....

Location of Hole .....

Latitude ..... Departure ..... Elevation .....

Struck Water at ..... Stands at ..... Casing Used .....

Depth From	Depth To	Elevation	Description of Mineralization	Description of Formation
724	743		Tr of Fe	Pink & light gray coarse xtln dolomite. green shale. Red shale 732-743.
743	744		Tr of Fe	Red weathered ryolite porphyry. (top of porp. 743)
CHURN DRILLING				DIAMOND DRILLING
3-2-53 to 3-24-53				4-17-53 to 4-21-53
S/ Glen E. Clark			Contractor	S/ C.A. Johnson Contractor
Carl Adams			Driller	C.A. Johnson - Lester Martin Drillers
Kenneth Miller			Helper	B. Martin, Jr. - Harry Cook Helpers
Pulling Casing				
7-14-53 to 7-15-53				
Pulled: 510' of 3"				
200' of 6¾"				
Lost 80' of 6¾"				
106' of 8"				
Time: 15 Hours				
		S/ Glen E. Clark - Contractor		

THE JOPLIN PRINTING CO., JOPLIN, MO.

REMARKS: 106' of 8" casing left in hole to prevent cratering. This hole is flowing about 120-150 gpm water.

Elevation top of white sand .....

Elevation top of porphyry .....

I certify the above to be correct:

..... Contractor

..... Drillers

DRILL RECORD

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION
FREDERICKTOWN, MO.

Hole No. D.D.H. BW-2

Land John Brower Tract Date: From 1-29-53 To 5-22-53

Location of Hole 915.01'N & 73.66'W of BW-1

Latitude 109,410.25 Departure 153,356.64 Elevation 918.83

Struck Water at 200 Stands at 175 Casing Used See Remarks

Depth From	Depth To	Elevation	Description of Mineralization	Description of Formation
0	25		CHURN DRILLING	Pink clay & flint
25	85			Yellow clay & flint
85	180			Brown clay & flint
180	240			Dark brown mud & flint
240	300			Brown lime & flint
300	310			Light brown & little gray lime
310	325			Brown lime
325	360			Light brown lime
360	370			Light brown & little yellow lime
370	390			Brown lime
390	415		Little Fe	Brown & gray lime
415	430		Little Fe	Grgy lime - little shale
430	450		Little Fe	Dark gray & brown lime
450	475			Dark gray & dark brown lime & shale
475	542			Dark gray lime
			DIAMOND DRILLING	
542	613			Dark brownish gray shaly banded fine xtln dolomite. Few blebs of pink secondary dolomite & calcite. Glauconite pellets 612-613. (Davis)
613	625		Faint Tr of Fe	Light greenish gray med. xtln dolomite.
625	654			Light brown fractured fine xtln dolo. Calcite & brown stain on fractures.
654	715		Tr of Fe & calcite	Light gray coarse xtln dolomite green shale.
715	725		Tr of Fe	Light gray med. xtln dolomite, mottled with dark gray dolomite "Breccia". - Green shale.
725	748			Gray fine xtln dolomite.

THE JOPLIN PRINTING CO., JOPLIN, MO.

REMARKS: 240'-10" of 6¾"; 542' of 3" casing set by Churn drill.

Elevation top of white sand ---

Elevation top of porphyry -213

I certify the above to be correct:

Contractor

Drillers

DRILL RECORD

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION
FREDERICKTOWN, MO.

Hole No. D.D.H. BW-2

Land ..... Date: From ..... To .....

Location of Hole .....

Latitude ..... Departure ..... Elevation .....

Struck Water at ..... Stands at ..... Casing Used .....

Depth From	Depth To	Elevation	Description of Mineralization	Description of Formation
748	800			Grayish brown fine xtln dolomite.
800	840		Tr of Fe & calcite @ 825-840	Brown fine xtln dolomite. Streaks of light gray dolo. 825-840.
840	896		Tr of Fe; Qtz. lined vugs @ 888	Dark brown fine xtln dolomite calcite seams.
896	905		Tr of Fe & Calcite	Light brown & light gray dolomite.
905	915		Tr of Fe	Gray med. to coarse xtln mottled dolo. Blobs of calcite & pink dolo. - little green shale.
915	1042		Tr of Fe Tr of Pb & Zn @1009-1010 & 1017; Tr Pb & Pk. dolo. @ 1022-1037; 2 blebs Pb @ 1040-1042.	Dark brownish gray fine xtln dolomite. Dark shale on stylolites. 1023; Tr Zn @ 1027 & 1029; 1 bleb Pb @
1042	1098		Tr Pb 1057-1058	Dark gray fine xtln dolomite, thin wavy bands of dark shale.
1098	1102			Dark gray silty mottled fine xtln dolo. Wavy bands dark shale.
1102	1120		1 bleb Pb @ 1106	Dark gray fine xtln dolomite; green pellets & fossils. Few scattered qtz. & porp. grains.
1120	1132			Dark gray fine xtln dolomite & porphyry boulders.
1132	1134			Purple Rhyolite Porphyry (Top of Porp. 1132)

THE JOPLIN PRINTING CO., JOPLIN, MO.

REMARKS: Note: Tr of Pb are on fractures.

Elevation top of white sand .....

Elevation top of porphyry .....

I certify the above to be correct:

..... Contractor

..... Drillers

DRILL RECORD

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION
FREDERICKTOWN, MO.

Hole No. D.D.H. 81-2

Land ..... Date: From ..... To .....

Location of Hole .....

Latitude ..... Departure ..... Elevation .....

Struck Water at ..... Stands at ..... Casing Used .....

Depth From	Depth To	Elevation	Description of Mineralization	Description of Formation
CHURN DRILLING				DIAMOND DRILLING
1-29-53 to 2-16-53				4-22-53 to 4-27-53
s/ C. A. Johnson			Contractor	s/ C. A. Johnson Contractor
Roland Miller			Driller	C. A. Johnson & Lester Martin Drillers
Charles Miller			Helper	B. Martin, Jr. & Harry Cook Helpers
Pulling Casing				
5-21-53 to 5-22-53				
Pulled: 240' of 6¾"				
54.2' of 3"				
Time: 15 hours				
		s/ C. A. Johnson	Contractor	

THE JOPLIN PRINTING CO., JOPLIN, MO.

REMARKS: .....

Elevation top of white sand .....

Elevation top of porphyry .....

I certify the above to be correct:

..... Contractor

..... Drillers

DRILL RECORD

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION
FREDERICKTOWN, MO.

Hole No. D.D.H. VX-11

Land David Wilkinson Tract Date: From 2-17-53 To 5-26-53

Location of Hole 605.00'S & 8.19'E of VA-1

Latitude 108,892.68 Departure 151,170.11 Elevation 871.14

Struck Water at 165' Stands at Casing Used See Remarks

Depth From	Depth To	Elevation	Description of Mineralization	Description of Formation
0	60		CHURN DRILLING	Yellow clay & flint
60	80			Pink clay & flint
80	230			Yellow clay & flint
230	237			Brown mud & flint
237	275			Light brown lime
275	305			Brown & little gray lime
305	325			Brown & gray lime & shale
325	380			Brown lime
380	395			Brown & gray lime
395	415			Dark brown lime
415	430			Gray & brown lime
430	495			Dark brown lime & little shale
495	550			Dark gray lime
			DIAMOND DRILLING	
550	564			Light gray fine xtln dolomite.
564	578		MnO_2 Dendrites	Pink silty fine xtln dolomite.
578	597		MnO_2 Dendrites	Pink & light brown silty fine xtln dolomite.
597	670			Light gray coarse xtln dolomite, green shale. Brown stain on fractures & vugs.
670	695		Tr of Fe	Light gray & black mottled & banded fine xtln dolomite.
695	754		6" Calcite @ 718 & 743	Gray fine xtln dolomite
754	825			Brown fine xtln slightly porous dolomite.
825	865		Sh Fe @ 825 & 865	Dark brown fine xtln porous dolomite. Tr calcite @ 855-865.
865	943		Tr of Fe & calcite	Gray med. & coarse xtln. dolomite. Little green shale. Vuggy streaks.

THE JOPLIN PRINTING CO., JOPLIN, MO.

REMARKS: 238' of 6½"; 330' of 4-7/8"; 550' of 3" casing set by Churn Drill.

Elevation top of white sand -305

Elevation top of porphyry -345

I certify the above to be correct:

Contractor

Drillers

DRILL RECORD

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION
FREDERICKTOWN, MO.

Hole No. D.D.H. VI-11

Land ..... Date: From ..... To .....

Location of Hole .....

Latitude ..... Departure ..... Elevation .....

Struck Water at ..... Stands at ..... Casing Used .....

Depth From	Depth To	Elevation	Description of Mineralization	Description of Formation
943	1000		Tr of Re	Dark brown fine xtln slightly porous dolomite.
1000	1105			Dark brownish gray fine xtln dolomite. Thin wavy bands of dark shale.
1105	1141			Light gray dense sandy fine xtln dolo. Faint trace of bright green shale. Laminated @ 1139-1141.
1141	1147			Green & pink silty fine xtln dolomite. Green shaly sand streaks & porp. grains.
1147	1155			Pink sandy med. xtln dolomite. Sandy green shale seams.
1155	1166			Pink dense med. to coarse xtln dolomite. Little green shale on stylolites.
1166	1176			Green & little pinkish gray fine xtln sandy dolomite. Laminated in part.
1176	1198			Gray sand. Heavy porp. buttons @ 1193-1198 (Top of S.S. 1176)
1198	1201			Dark gray silty shale
1201	1216		Tr Pb @ 1202½	Gray sand.
1216	1219			Red Rhyolite Porphyry. (Top of Porp. 1216)

THE JOPLIN PRINTING CO., JOPLIN, MO.

REMARKS: .....

Elevation top of white sand .....

Elevation top of porphyry .....

I certify the above to be correct:

..... Contractor

..... Drillers

DRILL RECORD

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION
FREDERICKTOWN, MO.

Hole No. D.D.H. UX-11

Land ..... Date: From ..... To .....

Location of Hole .....

Latitude ..... Departure ..... Elevation .....

Struck Water at ..... Stands at ..... Casing Used .....

Depth From	Depth To	Elevation	Description of Mineralization	Description of Formation
CHURN DRILLING				DIAMOND DRILLING
2-17-53 to		3-26-53		4-30-53 to 5-7-53
s/ C. A. Johnson			Contractor	s/ C. A. Johnson Contractor
Roland Miller			Driller	C. A. Johnson - Lester Martin Drillers
Bill Miller			Helper	B. Martin, Jr. - Harry Cook Helpers
Pulling Casing				
5-23-53 to		5-26-53		
Pulled:		214' of 6⅝"		
		202' of 4-7/8"		
		390' of 3"		
Lost:	24' of 6⅝"			
	128' of 4-7/8"			
	160' of 3"			
Time:	29 hours			
	s/ C. A. Johnson Contractor			

THE JOPLIN PRINTING CO., JOPLIN, MO.

REMARKS: .....

Elevation top of white sand .....

Elevation top of porphyry .....

I certify the above to be correct:

..... Contractor

..... Drillers

DRILL RECORD

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION
FREDERICKTOWN, MO.

Hole No. D.D.H. WI-12

Land David Wilkinson Tract Date: From 3-27-53 To 5-21-53

Location of Hole 174.41'S & 459.38'E of WI-2

Latitude 107,058.35 Departure 151,045.04 Elevation 771.19

Struck Water at 40' Stands at 40' Casing Used See Remarks

Depth From	Depth To	Elevation	Description of Mineralization	Description of Formation
0	95		CHURN DRILLING	Yellow clay & flint
95	240			Brown clay & flint
240	255			Dark mud
255	275			Light brown lime
275	280			Mud opening
280	315			Light brown lime
315	325			Light brown lime - broken ground
325	372			Light brown lime
372	374			Opening
374	395			Light brown lime & little shale
395	420			Brown lime & little shale
420	430			Light brown lime
430	437			Opening
437	445			Brown lime & little shale
445	460			Brown & gray lime
460	486			Brown lime
486	488			Opening
488	491			Gray & brown lime
			DIAMOND DRILLING	
491	555			Light gray & brownish gray coarse xtln broken vuggy dolomite. Brown stain.
555	560		Pt Pr Pe	Light gray coarse xtln dolomite. Heavy green shale. 6" dk. gr. dense dolo. @ 555.
560	644			Light brownish gray & gray med. xtln dolomite. Few vugs.
644	670			Brown fine to med. xtln dolomite porous streaks.

THE JOPLIN PRINTING CO., JOPLIN, MO.

REMARKS: 101' of 8"; 257' of 6 5/8"; 309' of 4-7/8"; 491' of 3" casing set by Churn Drill.

Elevation top of white sand -289

Elevation top of porphyry -349

I certify the above to be correct:

Contractor

Drillers

DRILL RECORD

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION
FREDERICKTOWN, MO.

Hole No. D.D.H. VI-12

Land ..... Date: From ..... To .....

Location of Hole .....

Latitude ..... Departure ..... Elevation .....

Struck Water at ..... Stands at ..... Casing Used .....

Depth From	Depth To	Elevation	Description of Mineralization	Description of Formation
670	688			Light gray & brownish gray med xtln dolomite.
688	748		Ft Tr Fe	Dark brownish gray fine xtln porous dolomite.
748	754			Light gray & dark brown fine xtln dolomite.
754	833		Ft Tr of Fe	Light gray med. to coarse xtln dolomite. Vuggy streaks. Little green shale.
833	909			Dark gray fine xtln dolomite few vugs.
909	941		Tr of Fe	Dark gray fine xtln dolomite, wavy bands of dark shale
941	955		Tr of Fe	Dark gray dolomite. Dark greenish gray shale seams up to 1' thick.
955	986			Dark gray dolomite. Wavy bands dark shale. Some sandy streaks.
986	991			Light brownish gray sandy fine to med. xtln dolomite.
991	1006			Light gray sandy fine to med. xtln dolo.
1006	1019		Sh of Fe Pb & Cu @ 1006' (3") Sh Pb @ 1013½, Tr Cu @ 1015, Sh Pb & Cu @1016½.	Light greenish gray fine xtln dolomite. seams & vugs of pink sec. dolomite. Green shale & little dolo. 1009-1010.
1019	1029			Light grayish pink fine xtln dolo. 6" green shale @ 1023.
1029	1038			Green & pinkish gray fine xtln silty dolo. Green sh. seams.
1038	1041			Pink & green fine xtln laminated dolo.
1041	1043			Light greenish gray fine xtln dolomite. Little green shale & pink sec. dolomite.

THE JOPLIN PRINTING CO., JOPLIN, MO.

REMARKS: .....

Elevation top of white sand .....

Elevation top of porphyry .....

I certify the above to be correct:

..... Contractor

..... Drillers

DRILL RECORD

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION
FREDERICKTOWN, MO.

Hole No. D.D.H. WI-12

Land ..... Date: From ..... To .....

Location of Hole .....

Latitude ..... Departure ..... Elevation .....

Struck Water at ..... Stands at ..... Casing Used .....

Depth From	Depth To	Elevation	Description of Mineralization	Description of Formation
1043	1046			Brown fine xtln vuggy dolomite.
1046	1053			Light gray fine xtln dolomite. Heavy porp. & qtz. grains.
1053	1060			Light gray & green mottled fine xtln dolomite. Porp. buttons 1058-1060.
1060	1068			White sand & porp. buttons. (Top of S.S. 1060)
1068	1075			Dark gray silty dolomitic sand & porp. buttons.
1075	1102			White sand, silt, & porp. buttons.
1102	1120½			Sand, porp. buttons & disseminated green shale.
1120½	1125			Red & gray weathered Porphyry. (Top of porp. 1120½)
CHUCK DRILLING				DIAMOND DRILLING
3-27-53 to 4-17-53				5-7-53 to 5-14-53
s/ C. A. Johnson			Contractor	s/ C. A. Johnson Contractor
Roland Miller			Driller	C. A. Johnson-Lester Martin Drillers
Bill Miller			Helper	B. Martin, Jr.,- Harry Cook Helpers
Pulling Casing				
5-19-53 to 5-21-53				
Pulled:	101' of 8"			
	257' of 6⅝"			
	309' of 4-7/8"			
	474' of 3"			
Lost:	17' of 3"			
Time:	20 hours			

THE JOPLIN PRINTING CO., JOPLIN, MO.

REMARKS: s/ C. A. Johnson Contractor

Elevation top of white sand .....

Elevation top of porphyry .....

I certify the above to be correct:

..... Contractor

..... Drillers

NATIONAL LEAD COMPANY

ST. LOUIS SMELTING AND REFINING DIVISION

FREDERICKTOWN, MISSOURI

P. O. BOX 351 TELEPHONE 666

March 16, 1955

The following discussion and enclosed charts have been prepared and are submitted in order to clarify our application for exploration, Docket No. DMEA-3571.

A. Provisional Drilling Program, Docket No. DMEA-3571.

The approximate location of proposed initial drill holes is shown on the enclosed prints of Figure 8 and 9. Discussion of this initial drilling follows the text of the application (pp. 6-9).

I. Grounder Creek, Pine Union and Marquand Areas (Fig. 8).

Initial drilling will consist of two holes near the corner of Sections 15, 14, 22 and 23, T32N, R8E. The first hole (1) will be drilled south of the magnetically indicated pinch-out line to determine the presence of the Lamotte sand, the lithologic character of the lower part of the Bonneterre dolomite and the presence of mineralization. The second hole (2) will be drilled on the pre-Cambrian side of the inferred pinch-out line in order to establish the presence of this favorable condition.

The location of additional holes along this east striking magnetic structure will be based on the data obtained from holes 1 and 2 and the magnetic data.

Drilling along the north striking pinch-out line will be deferred until additional magnetic work has been done.

II. Castor-Liberty Area (Fig. 8).

A section of holes (3, 4 & 5) will be drilled across the apparent saddle structure in Sections 26 and 27, T33N, R8E, to determine the structure, stratigraphy and lithology of this feature. The area is interpreted as being particularly favorable for a "noncontact" type ore deposit (assuming the Lamotte sand crosses or nearly crosses the pre-Cambrian saddle) for the following reasons:

1. The area is structurally high.

2. Favorable host rock (our lower light gray dolomite or James' 1/ Marker Zone 6, quartz silt or Wuestner's 2/

1/ James, J.A., 1949, Geologic Relationships of the Ore Deposits in the Fredericktown Area, Missouri, Mo. Geol. Survey and Water Resources, R.I. No. 8.

2/ Wuestner, C.E.R., 1952, The Lithology and Insoluble Residue Zones of the Bonneterre Dolomite, Washington University, St. Louis, Unpublished Thesis.

fine sand zone) was penetrated in adjacent drill holes SU-1, RO-1, HW-1 and HC-1. (See Fig. 12, Print of Wuestner's Plate 2-Insoluble Residue Cross-Section.)

3. Minor amounts of mineralization were found in drill holes SU-1, RO-1, HW-1 and HC-1 indicating that mineralizing solutions traversed the area.

4. The Lamotte sandstone is known to be present in drill holes RO-1, HW-1 and HC-1.

Hole 3 is located on the east flank of the interpreted saddle structure, hole 4 on the crest and hole 5 on the west flank. Hole 6 will be drilled on the crest near the pinch-out line of the Lamotte sandstone. This distribution of initial holes should yield good stratigraphic, lithologic, mineralogic and structural control for further exploration drilling in the area.

A group of holes (7, 8, 9, 10 & 11) will be drilled near the corner of Sections 13, 14, 23 and 24, T33N, R8E. This area is favorable for a "contact" type ore deposit. The structural feature producing the favorable condition is an east striking pre-Cambrian ridge which protrudes through the Lamotte sandstone. This structure is favorable for the following reasons:

1. It is structurally high.

2. The east striking fractures paralleling the length of the ridge must intersect the north striking fractures paralleling the general north striking Lamotte "shoreline."

3. Favorable host rock (lower light gray dolomite of the Bonneterre) is known to be present.

4. Indicative mineralization was encountered in previous drilling.

Drill holes 7, 9 and 11 have been located to more closely define the Lamotte pinch-out line and to prospect for ore grade mineralization (See Figs. 8 & 10).

Hole 8 will be located after Number 9 has been completed. This hole will also be located to more closely define the pinch-out line and to explore for ore grade mineralization.

Two provisional drill holes (12 & 13, Fig. 8) have been located in the vicinity of drill holes TN-1, VA-3 and SX-3. This area is structurally similar to the preceding area inasmuch as a contact type deposit will be sought and the structure consists of a pre-Cambrian protrusion partially surrounded by the Lamotte sandstone.

Drill holes 12 and 13 are located to more closely define the Lamotte pinch-out line and to explore for ore grade mineralization.

III. Higdon, Turkey Creek and Twin Oaks Area (Figs. 9 & 11).

Provisional drill holes 14 and 15 are shown on Figure 9. These holes will be drilled to explore for ore grade mineralization and to more closely establish the location of the pinch-out line. A pinch-out line must exist in this area because drill holes UN-2, FS-1, BY-1 and CN-1 penetrated the Lamotte sand and the pre-Cambrian igneous rocks outcrop to the south of these holes with no intervening outcrop of the Lamotte sand. Traces of galena were found in drill hole CN-1. BY-1 contained 2 feet which assayed 5.82% Zn.

Drill holes 16, 17 and 18 will be drilled to explore and outline the favorable structure indicated by the magnetic work and the pre-Cambrian outcrops in this area. This extension of the pre-Cambrian (see pinch-out line, Fig. 9) into the Lamotte sand basin is favorable for a contact type ore deposit. However, drilling of holes 16, 17 and 18 will be deferred until additional geologic studies to confirm the areal geology have been completed. The area lies on the down throw side of the indicated position of the Higdon fault, and therefore the Lamotte sand may be at such a depth that exploration drilling in this area will not be feasible. However, the existence of the pre-Cambrian and Potosi (?) outcrops indicates that the throw on the fault is not as great in this area as it is in the Liberty Area.

B. Stratigraphic Sections (Figs. 10 and 11).

Two stratigraphic sections, one of the Castor-Liberty Area and one of the Turkey Creek Area, are enclosed. An insoluble residue cross section extending from the JN Area through the Castor Area (Fig. 12) is also included.

C. Data on Company Holes

Drill logs of company holes within or near the proposed exploration area which were not included with the application are submitted. These holes (OW-1, OW-2, WV-1, US-10, RM-1, JH-6, LS-1 and HE-2) are located in the eastern part of the US Area and are shown on the enclosed print of Figure 8.

D. Geography

Fredericktown, Missouri, located at 37° 33½' North Latitude and 90° 17½' West Longitude, is about 75 miles south of St. Louis, Missouri.

The proposed exploration area is about 8 miles east of Fredericktown (see Fig. 13) and is located on the southeast flank of the St. Francis Mountains.

The area is hilly but is not mountainous. The lowest elevation near the exploration area is about 570 feet in the Castor River valley at the town of Marquand. The most elevated place is the summit of Cottoner Mountain, which is 1,200 feet above sea level. The maximum relief is thus about 630 feet. A local relief of 600 feet occurs at Cottoner

Mountain, but the average relief within the exploration area does not exceed 200 feet.

The exploration area has been maturely dissected by tributaries of the Castor River which drains the area. Castor River flows in a southerly direction along the western margin of the area.

Most of the lands indicated as residuum on Fig. 7 of the application consist of narrow wooded ridges and valleys (see Fig. 13) unsuited for agriculture. The larger pre-Cambrian outcrops such as Cottoner Mountain are expressed as high wooded hills, the summits of which are generally rounded and soil covered. The steeper slopes consist of igneous outcroppings or rubble.

Outcrops of Cambrian sediments such as the Bonneterre dolomite (Fig. 7) have produced soils which are utilized as pasture or cultivated lands.

Principal outcrops of the sedimentary rocks occur along the major drainage such as the Castor River and its larger tributaries.

Respectfully submitted,

Robert P. Uhley

Robert P. Uhley
Geologist

NATIONAL LEAD COMPANY
WASHINGTON OFFICE
1025 CONNECTICUT AVE., N. W.
WASHINGTON 6, D. C.

CARLTON H. ROSE
MANAGER

March 21, 1955

W309

Department of Interior
Defense Minerals Exploration Administration
Washington 25, D. C.

Re: Application for Exploration
DMEA-3571

Dear Sirs:

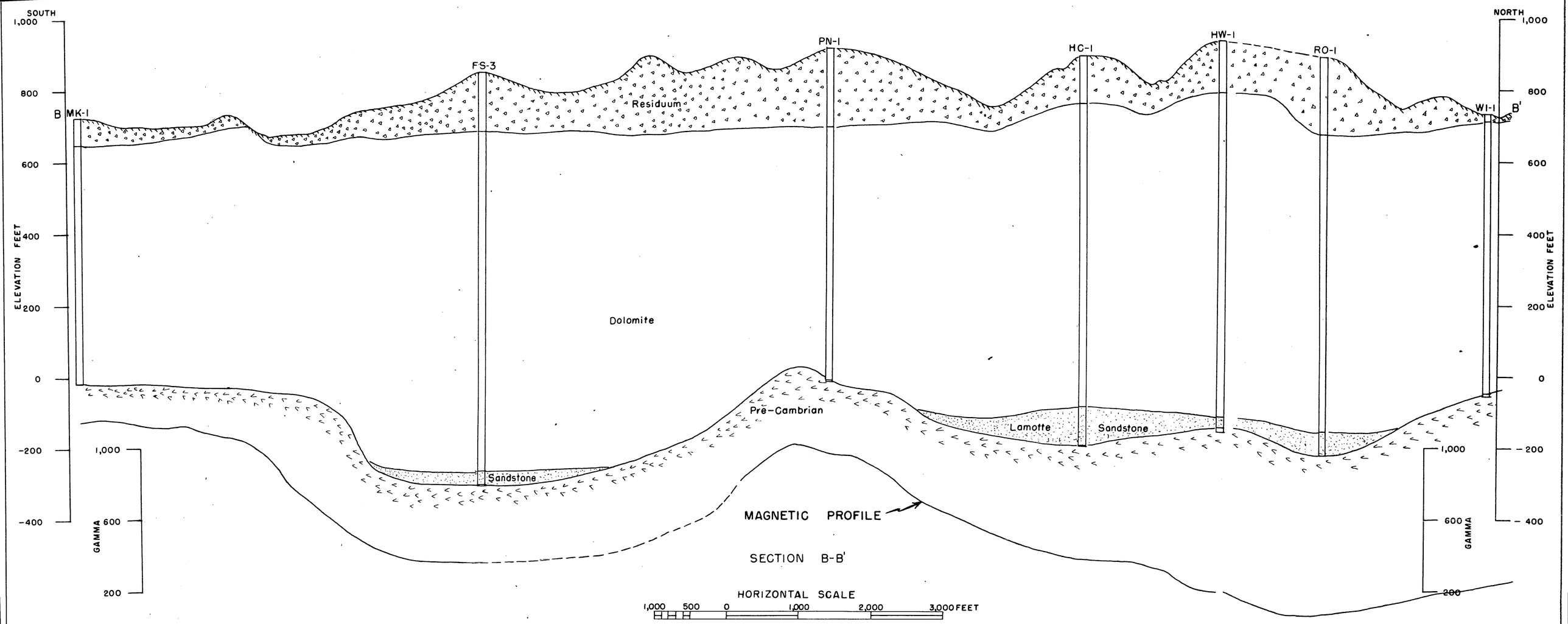
We are pleased to submit herewith on behalf of National Lead Company, St. Louis Smelting and Refining Division, additional information to supplement the application for exploration, Docket No. DMEA-3571.

Very truly yours,

Carlton H. Rose

CHR:mlg

Enclosure



NATIONAL LEAD COMPANY
ST. LOUIS SMELTING & REFINING DIVISION
Fredericktown, Missouri

Figure 4

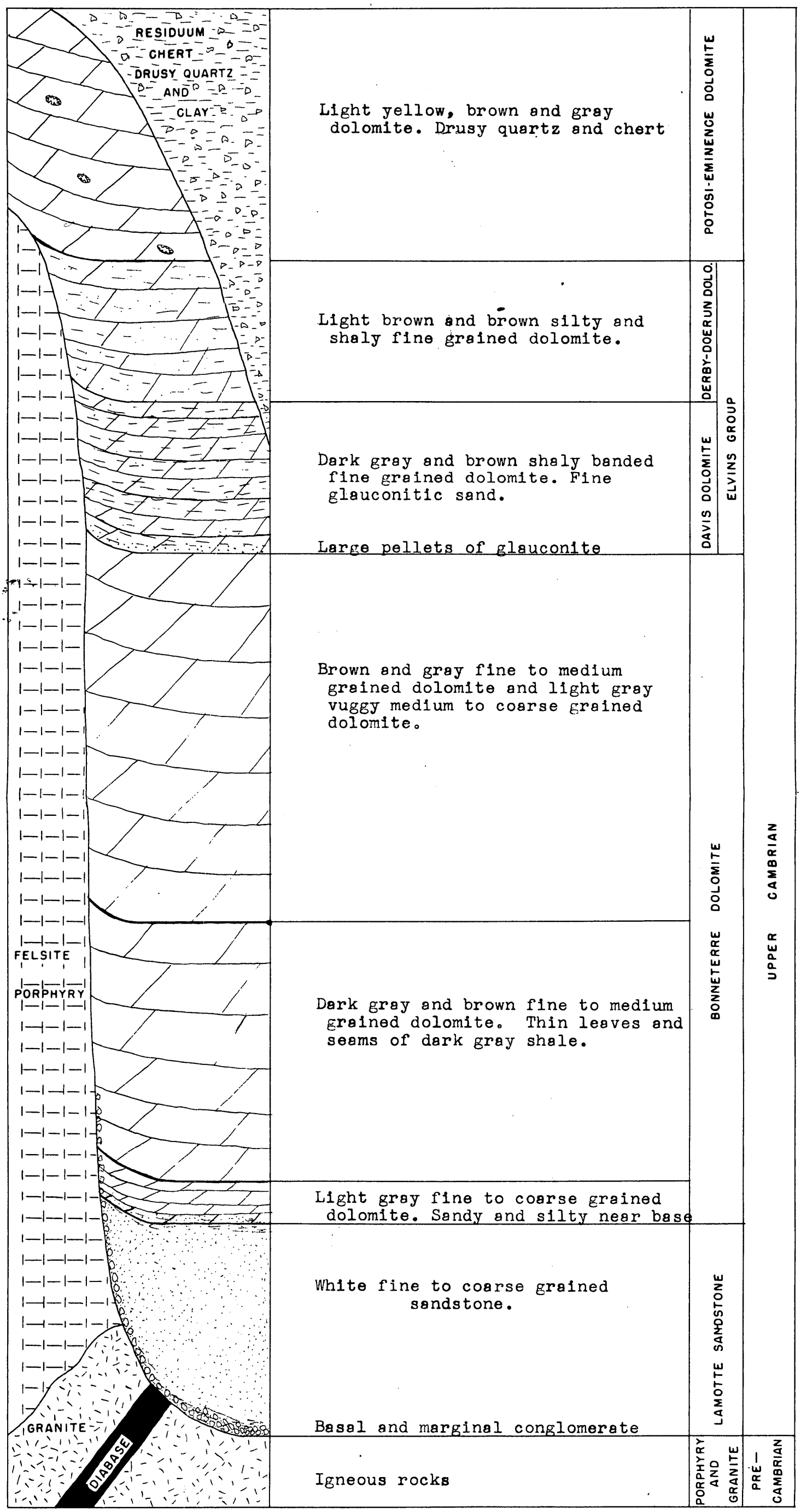


Figure 6. COLUMNAR SECTION CASTOR-LIBERTY AREA

Fig. 6

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING & REFINING DIVISION
Fredericktown, Missouri

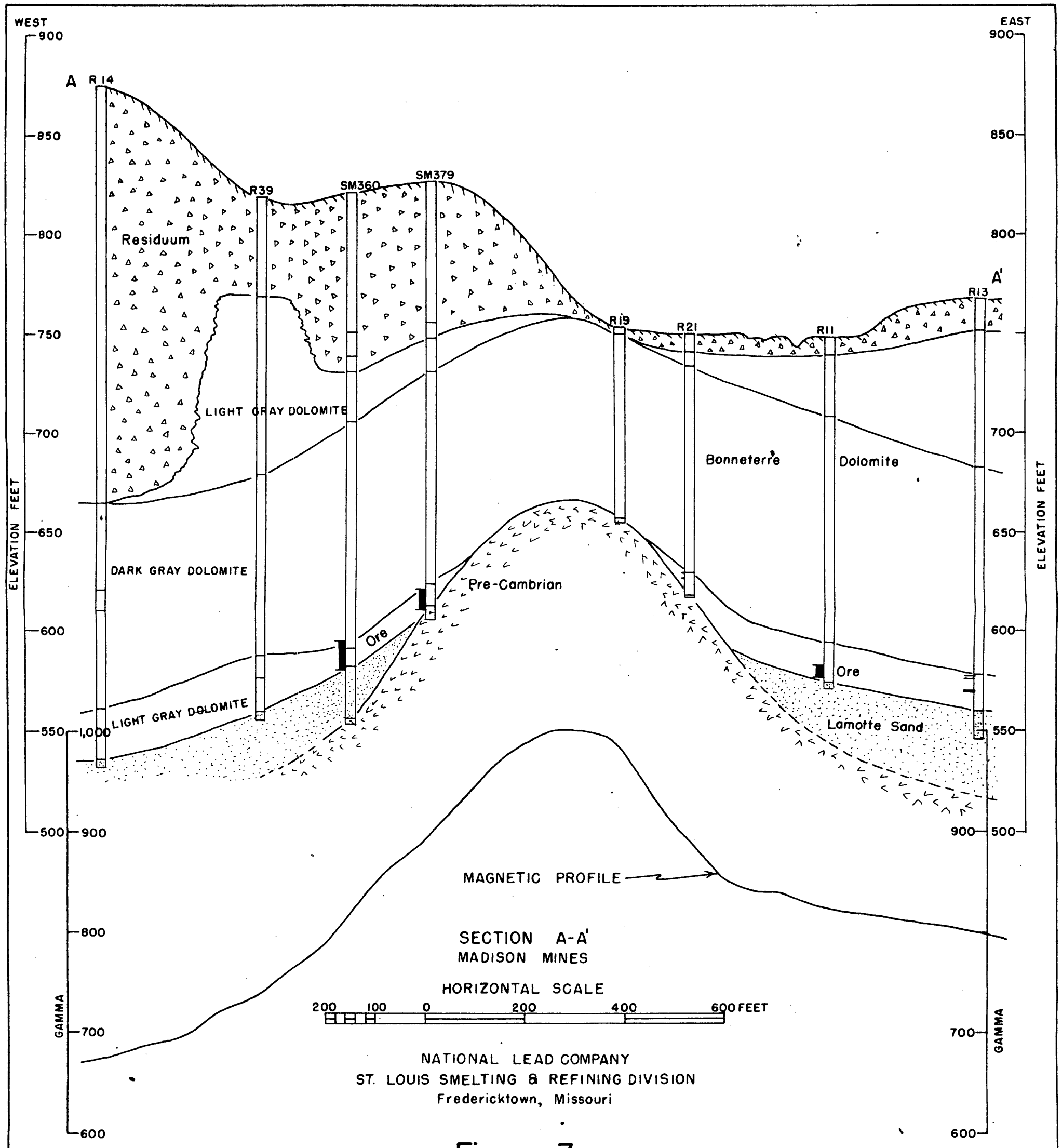

WEST
EAST
A
A'
R14
R39
SM360
SM379
R19
R21
R11
R13
Residuum
LIGHT GRAY DOLOMITE
DARK GRAY DOLOMITE
LIGHT GRAY DOLOMITE
Bonneterre
Dolomite
Pre-Cambrian
Ore
Ore
Lamotte Sand
ELEVATION FEET
900
850
800
750
700
650
600
550
500
1,000
900
800
700
600
GAMMA
MAGNETIC PROFILE
SECTION A-A'
MADISON MINES
HORIZONTAL SCALE
200 100 0 200 400 600 FEET
NATIONAL LEAD COMPANY
ST. LOUIS SMELTING & REFINING DIVISION
Fredericktown, Missouri

Figure 3

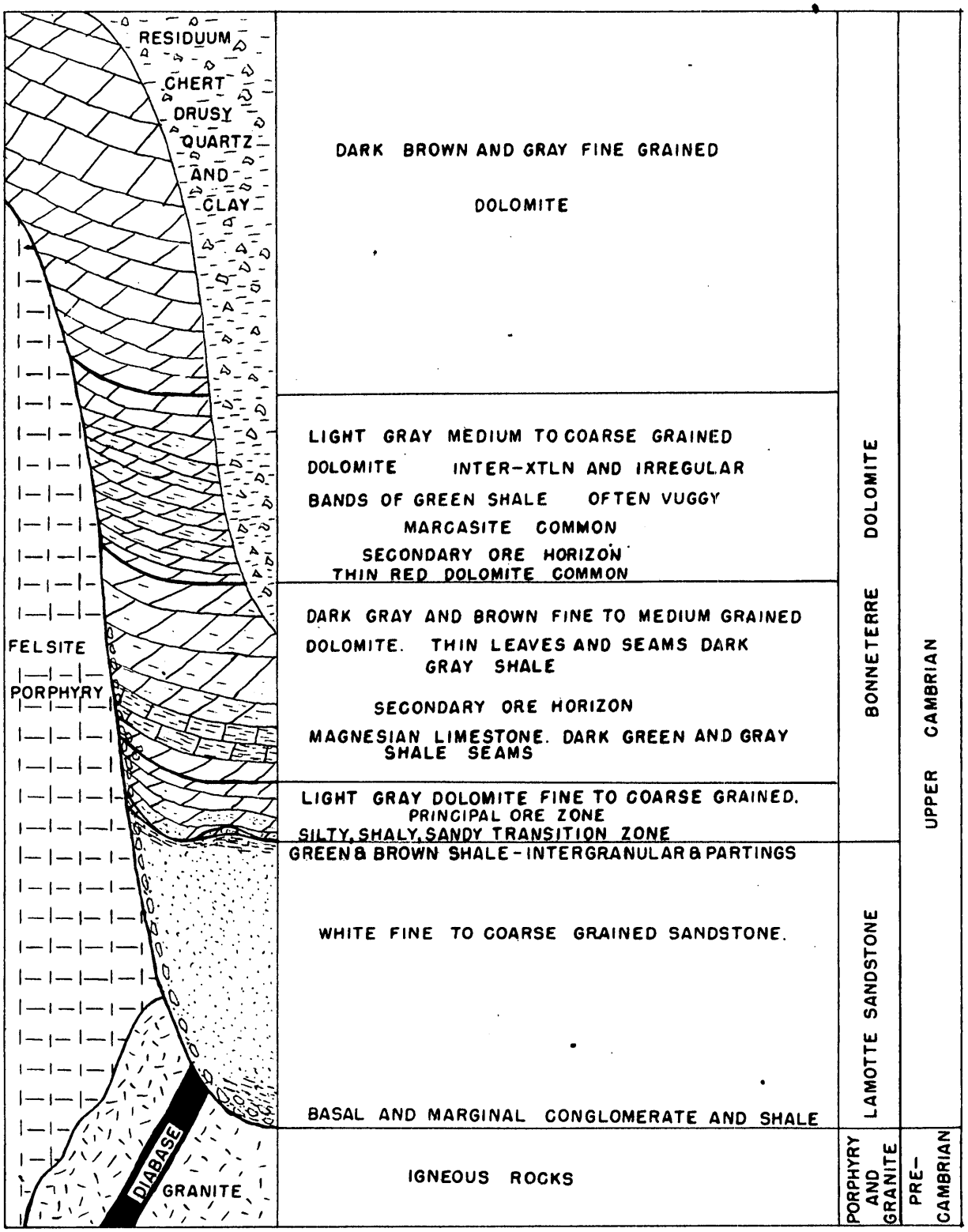
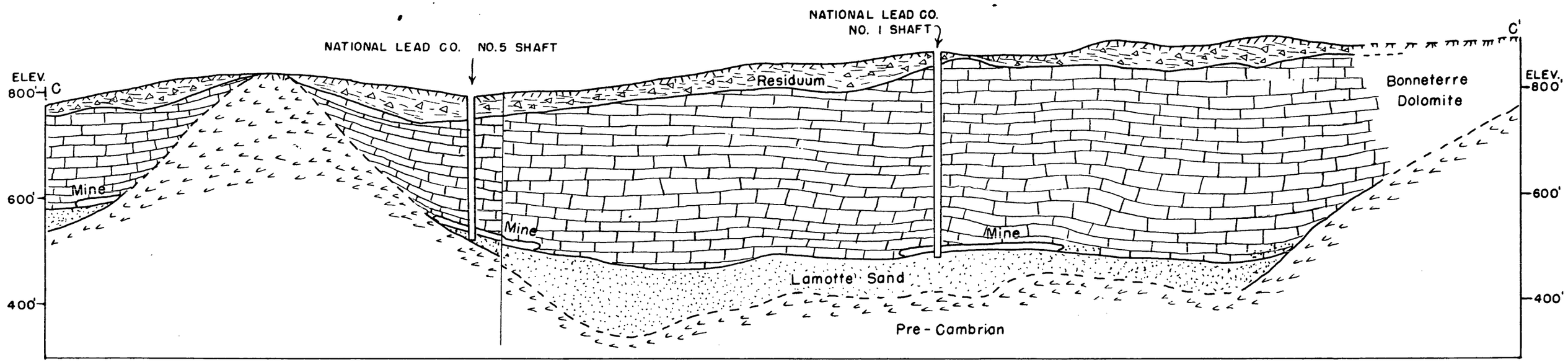


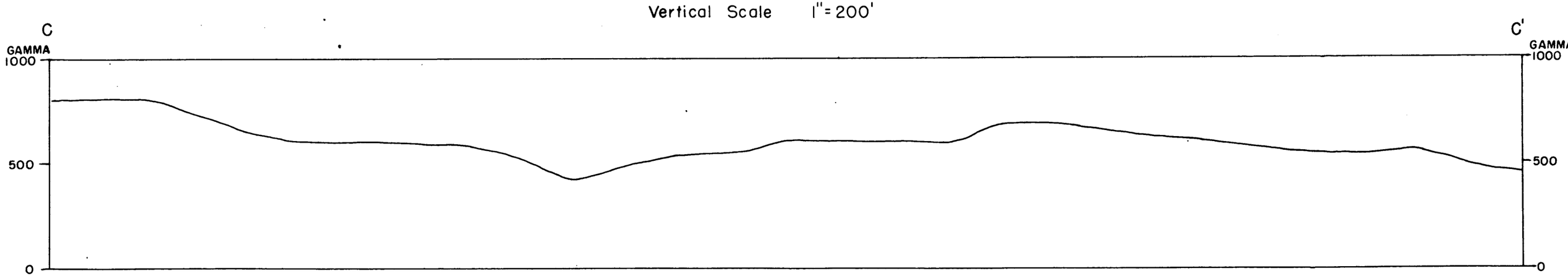
Figure 5. COLUMNAR SECTION MADISON MINES

Fig. 5

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING & REFINING DIVISION
Fredericktown, Missouri



SECTION C-C
Horizontal Scale 1" = 500'
Vertical Scale 1" = 200'



MAGNETIC PROFILE
Horizontal Scale 1" = 500'
Vertical Scale 1" = 500 gammas

Fig. 3A

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING & REFINING DIVISION
Fredericktown, Missouri

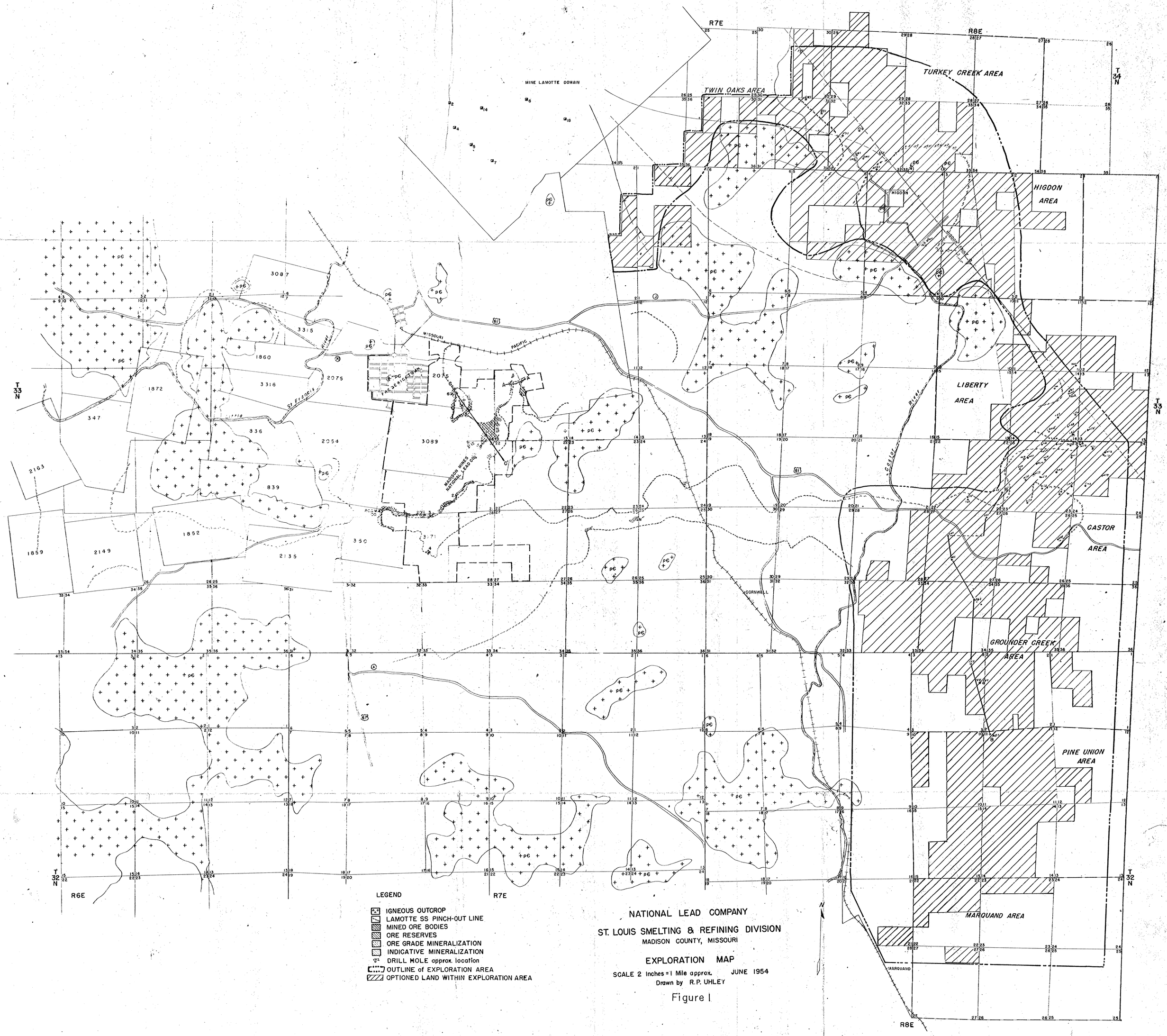
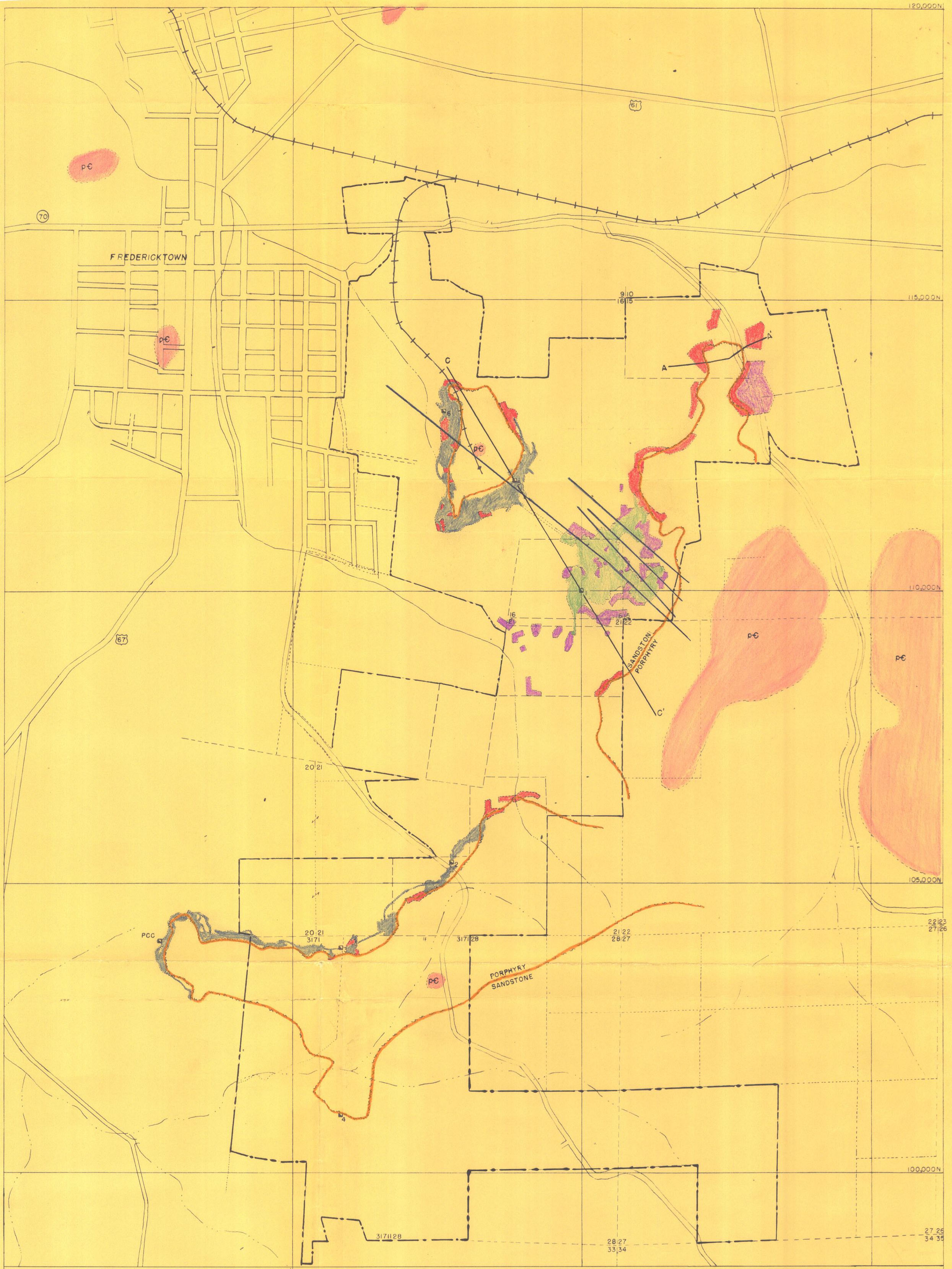

R7E
R8E
T 34 N
T 33 N
T 32 N
R6E
MINE LAMOTTE DOMAIN
TWIN OAKS AREA
TURKEY CREEK AREA
HIGDON AREA
LIBERTY AREA
CASTOR AREA
GROUNDER CREEK AREA
PINE UNION AREA
MARQUAND AREA
FREDERICKTOWN
MISSOURI PACIFIC
MADISON MINES NATIONAL LEAD CO.
St. Francis River
Castor River
Higdon Branch
GORNWALL
MARQUAND
LEGEND
IGNEOUS OUTCROP
LAMOTTE SS PINCH-OUT LINE
MINED ORE BODIES
ORE RESERVES
ORE GRADE MINERALIZATION
INDICATIVE MINERALIZATION
DRILL HOLE approx. location
OUTLINE of EXPLORATION AREA
OPTIONED LAND WITHIN EXPLORATION AREA
NATIONAL LEAD COMPANY
ST. LOUIS SMELTING & REFINING DIVISION
MADISON COUNTY, MISSOURI
EXPLORATION MAP
SCALE 2 Inches = 1 Mile approx.
JUNE 1954
Drawn by R.P. UHLEY

Figure I



MADISON MINES

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING & REFINING DIVISION
MADISON COUNTY, MISSOURI

SCALE 1:12,000

1000 500 0 1000 2000 3000 FEET

LEGEND

N

LAMOTTE SANDSTONE PINCH-OUT LINE

ORE DEPOSITS

CONTACT — NON-CONTACT

MINED AREAS

ORE RESERVES

PRE-CAMBRIAN OUTCROPS

SHAFTS — FAULTS

NATIONAL LEAD CO. OWNED & LEASED PROPERTY

Figure 2

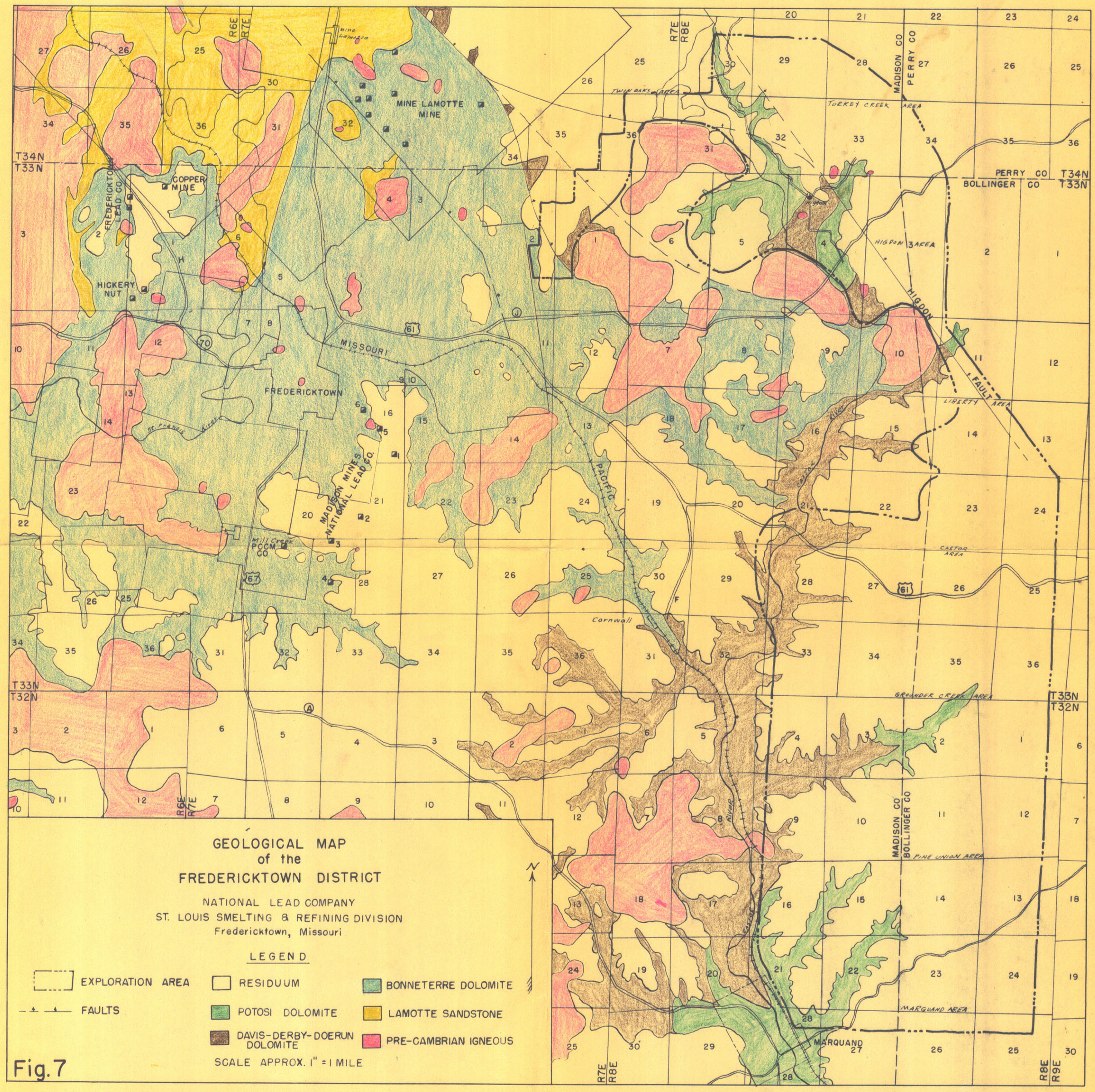

GEOLOGICAL MAP
of the
FREDERICKTOWN DISTRICT
NATIONAL LEAD COMPANY
ST. LOUIS SMELTING & REFINING DIVISION
Fredericktown, Missouri
LEGEND
EXPLORATION AREA
FAULTS
RESIDUUM
POTOSI DOLOMITE
DAVIS-DERBY-DOERUN DOLOMITE
BONNETERRE DOLOMITE
LAMOTTE SANDSTONE
PRE-CAMBRIAN IGNEOUS
SCALE APPROX. 1" = 1 MILE
N
MINE LAMOTTE MINE
COPPER MINE
HICKERY NUT
FREDERICKTOWN
MADISON MINES NATIONAL LEAD CO.
FREDERICKTOWN LEAD CO.
MISSOURI PACIFIC
St. Francis River
Mill Creek
POOM CO
Cornwall
TWIN OAKS AREA
TURKEY CREEK AREA
HIGDON AREA
HIGDON
FAULT AREA
LIBERTY AREA
CASTOR AREA
GROUNDER CREEK AREA
PINE UNION AREA
MARQUAND AREA
MARQUAND
MADISON CO
PERRY CO
BOLLINGER CO
T34N
T33N
T32N
R6E
R7E
R8E
R9E

Fig. 7

Fig.8

EXPLORATION MAP

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING & REFINING DIVISION
Fredericktown, Missouri
Scale: 1"=1,000'

LIBERTY AREA

CASTOR AREA

GROUNDER CREEK AREA

PINE UNION AREA

MARQUAND AREA

MADISON CO.
STE. GENEVIEVE CO.

BOLLINGER CO.
MADISON CO.

MARQUAND

CASTOR RIVER

LEGEND

AREAL GEOLOGY

- RESIDUUM
- Op POTOSI DOLOMITE
- Cd DAVIS-DERBY-DOERUN DOLOMITE
- Cb BONNETERRE DOLOMITE
- pC PRE-CAMBRIAN IGNEOUS

SUBSURFACE GEOLOGY

- LAMOTTE SANDSTONE PINCH-OUT-LINE (INFERRED)
- CONTOURS ON TOP OF LAMOTTE SAND
  Contour interval-100'
- PN-1 DRILL HOLE & NO.

MAGNETICS

- 400 ISOGAM LINES-Contour Interval-150 Gammas
- OUTLINE of EXPLORATION AREA
- OUTLINE of SUB-AREAS

EXPLORATION MAP

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING & REFINING DIVISION
Fredericktown, Missouri
Scale: 1"=1,000'

Fig.8

Fig.8

EXPLORATION MAP

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING & REFINING DIVISION
Fredericktown, Missouri
Scale: 1" = 1,000'

LIBERTY AREA

CASTOR AREA

GROUNDER CREEK AREA

PINE UNION AREA

MARQUAND AREA

MARQUAND

CASTOR RIVER

MADISON CO.
BOLLINGER CO.

LEGEND

AREAL GEOLOGY

- RESIDUUM
- Op POTOSI DOLOMITE
- Od DAVIS-DERBY-DOERUN DOLOMITE
- Ob BONNETERRE DOLOMITE
- pC PRE-CAMBRIAN IGNEOUS

SUBSURFACE GEOLOGY

- LAMOTTE SANDSTONE PINCH-OUT-LINE (INFERRED)
- CONTOURS ON TOP OF LAMOTTE SAND Contour interval = 100'
- PN-1 DRILL HOLE & NO.

MAGNETICS

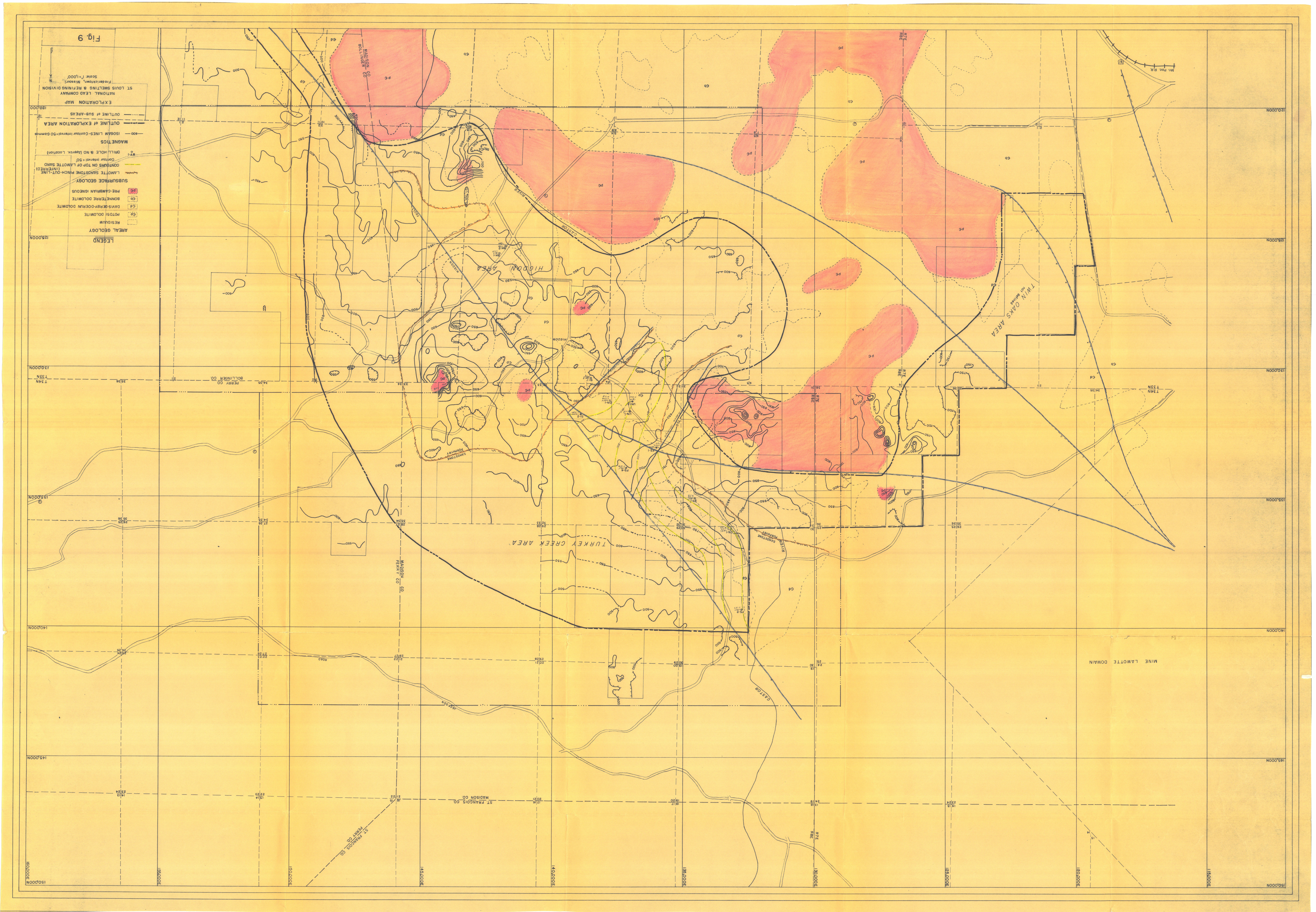
- —600— ISOGAM LINES-Contour Interval = 50 Gammas
- OUTLINE of EXPLORATION AREA
- OUTLINE of SUB-AREAS

PROVISIONAL DRILL HOLE

EXPLORATION MAP

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING & REFINING DIVISION
Fredericktown, Missouri
Scale: 1" = 1,000'

Fig.8


LEGEND
AREAL GEOLOGY
RESIDUUM
Gp POTOSI DOLOMITE
Gd DAVIS-DERBY-DOERUN DOLOMITE
Gb BONNETERRE DOLOMITE
pG PRE-CAMBRIAN IGNEOUS
SUBSURFACE GEOLOGY
LAMOTTE SANDSTONE PINCH-OUT-LINE (INFERRED)
CONTOURS ON TOP OF LAMOTTE SAND
Contour Interval = 50'
BY1 DRILL HOLE & NO (Approx. Location)
MAGNETICS
600 ISOGAM LINES-Contour Interval=50 Gammas
OUTLINE of EXPLORATION AREA
OUTLINE of SUB-AREAS
EXPLORATION MAP
NATIONAL LEAD COMPANY
ST. LOUIS SMELTING & REFINING DIVISION
Fredericktown, Missouri
Scale: 1"=1,000'
N
Fig. 9
HIGDON AREA
TURKEY CREEK AREA
TWIN OAKS AREA
MINE LAMOTTE DOMAIN
MADISON CO
BOLLINGER CO
PERRY CO
ST FRANCOIS CO
SANDSTONE QUARRY
CASTOR
RIVER
ROAD
R7E
R8E
T34N
T33N
T32N
T31N
T30N
T29N
T28N
T27N
T26N
T25N
T24N
T23N
T22N
T21N
T20N
T19N
T18N
T17N
T16N
T15N
T14N
T13N
T12N
T11N
T10N
T9N
T8N
T7N
T6N
T5N
T4N
T3N
T2N
T1N
150,000N
145,000N
140,000N
135,000N
130,000N
125,000N
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150,000E
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140,000E
135,000E
130,000E
125,000E
120,000E
115,000E

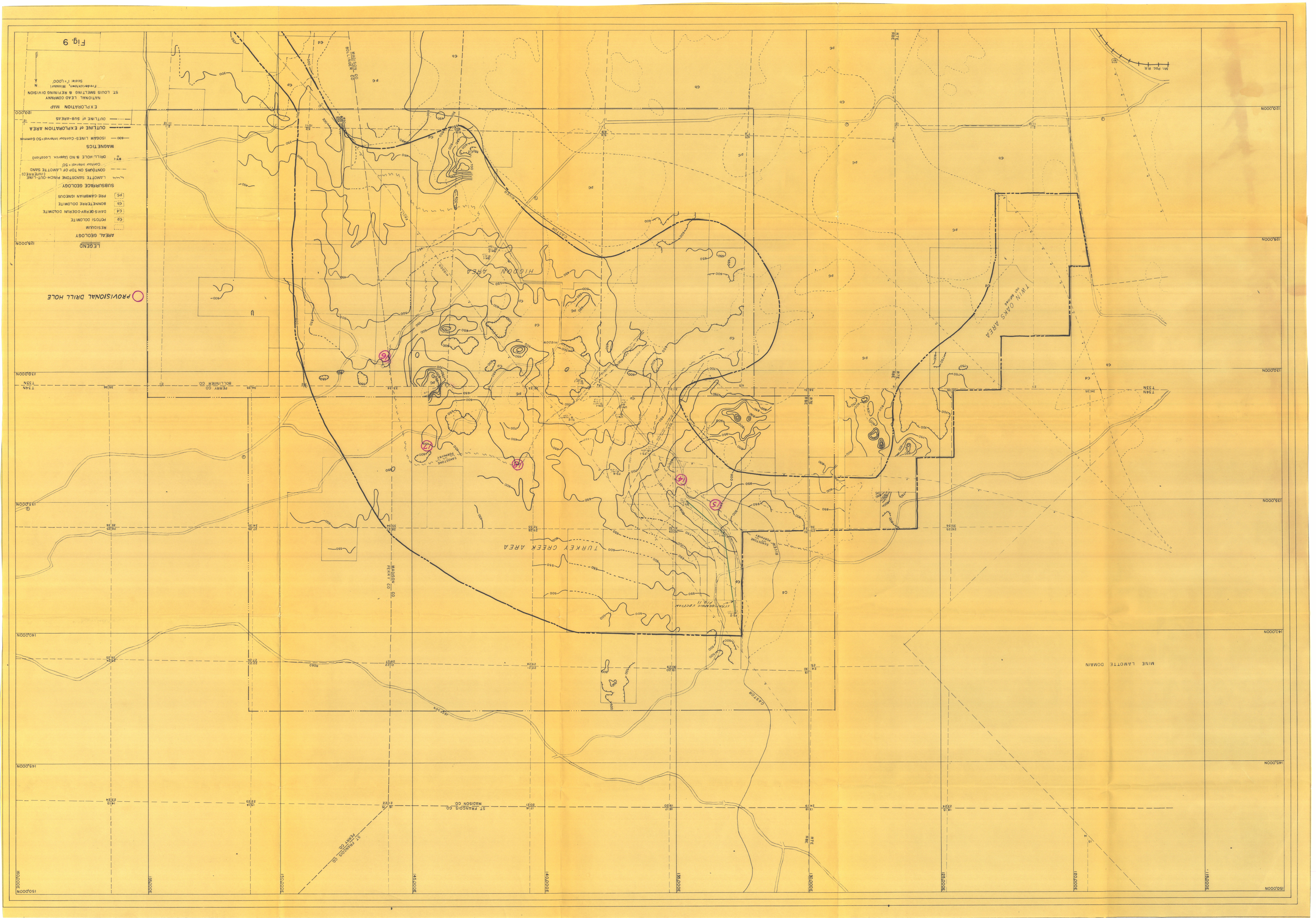
Fig. 9
EXPLORATION MAP
NATIONAL LEAD COMPANY
ST. LOUIS SMELTING & REFINING DIVISION
Fredericktown, Missouri
Scale 1"=1,000'
N
LEGEND
AREAL GEOLOGY
RESIDUUM
POTOSI DOLOMITE
BONNETERRE DOLOMITE
DAVIS-GRAY-COERUN DOLOMITE
PRE-CAMBRIAN IGNEOUS
SUBSURFACE GEOLOGY
LAMOTTE SANDSTONE PINCH-OUT-LINE (INFERRED)
CONTOURS ON TOP OF LAMOTTE SAND
Contour interval = 50'
DRILL HOLE & NO (Approx. Location)
MAGNETICS
ISOGAM LINES-Contour Interval=50 Gammas
OUTLINE of SUB-AREAS
OUTLINE of EXPLORATION AREA
PROVISIONAL DRILL HOLE
HIDDEN AREA
TURKEY CREEK AREA
TWIN OAKS AREA
MINE LAMOTTE DOMAIN
MADISON CO
BOLLINGER CO
PERRY CO
ST FRANCOIS CO
MO PAC R.R.
T34N
T33N
R7E
R8E
R9E
R10E
R11E
R12E
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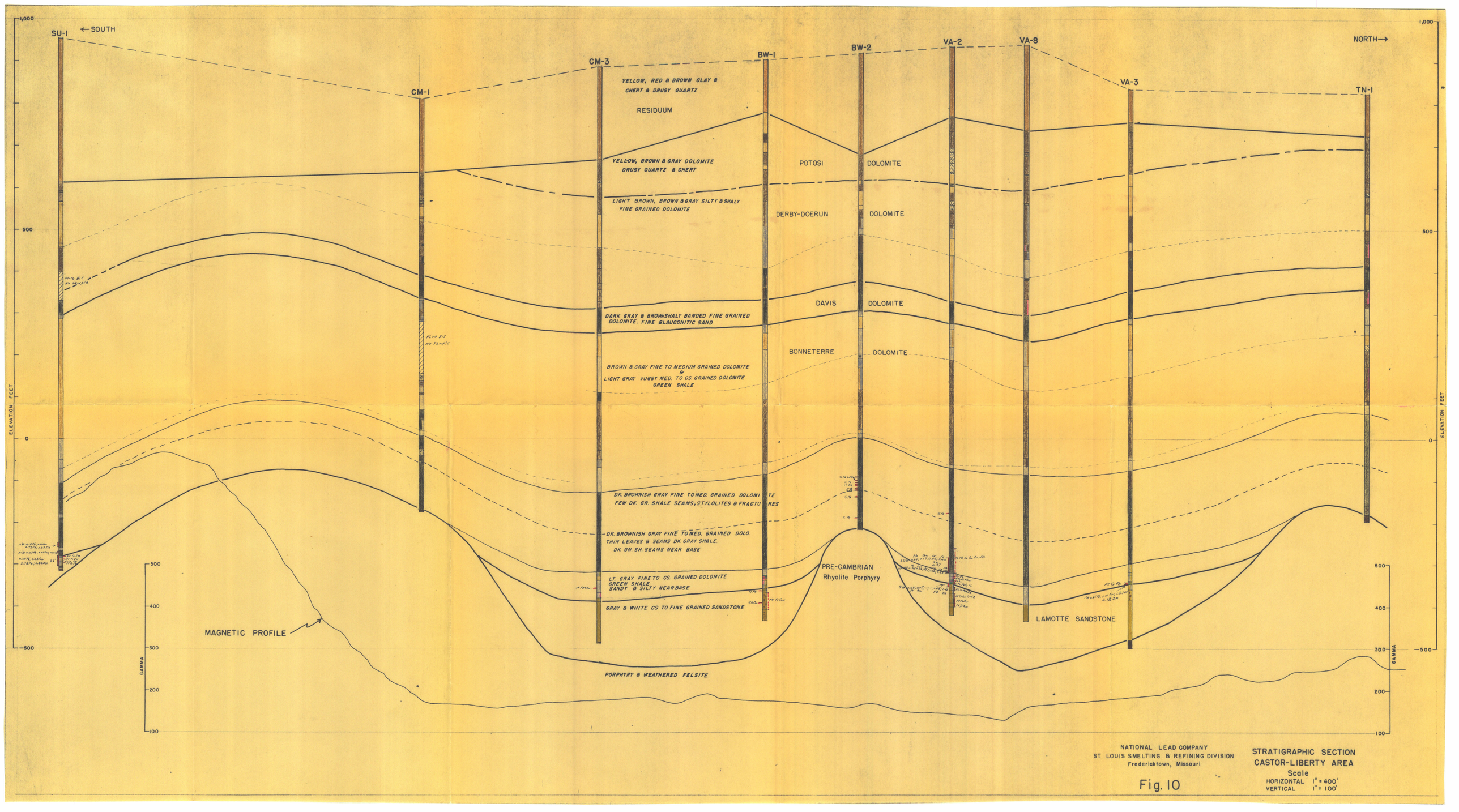
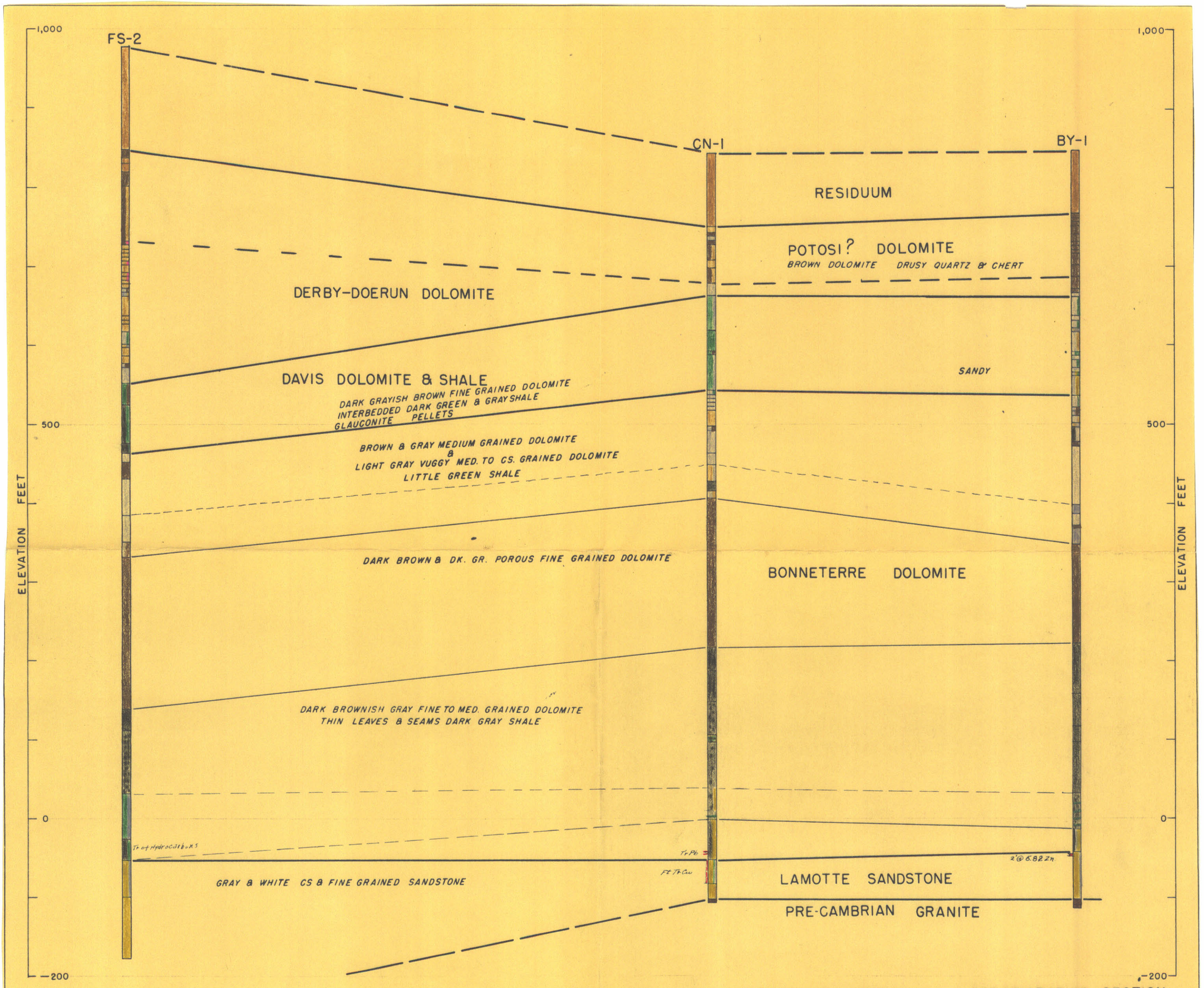


NATIONAL LEAD COMPANY
ST. LOUIS SMELTING & REFINING DIVISION
Fredericktown, Missouri

Fig. 10

STRATIGRAPHIC SECTION
CASTOR-LIBERTY AREA

Scale
HORIZONTAL 1" = 400'
VERTICAL 1" = 100'



NATIONAL LEAD COMPANY
ST. LOUIS SMELTING & REFINING DIVISION
Fredericktown, Missouri

Fig. 11

STRATIGRAPHIC SECTION
TURKEY CREEK AREA

Scale
HORIZONTAL 1" = 400'
VERTICAL 1" = 100'

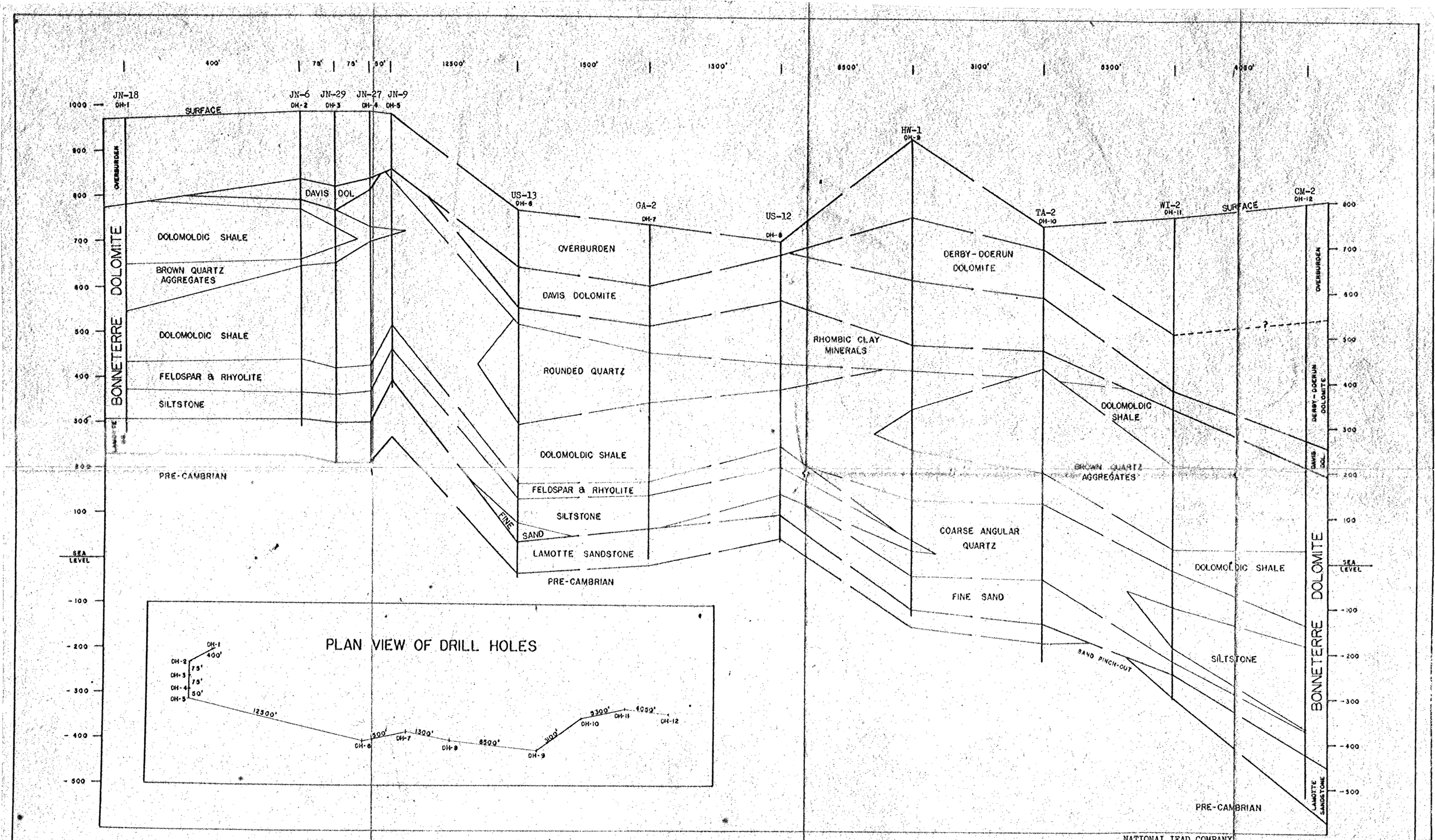


PLATE 2 - INSOLUBLE RESIDUE CROSS-SECTION

NATIONAL LEAD COMPANY
St. Louis Smelting & Refining Division
Fredericktown, Missouri

FIG. 12

Print from:
Wuestner, Charles E.R., 1952, The Lithology and Insoluble Residue Zones of the Bonneterre Dolomite, Washington University, St. Louis, Unpublished Thesis.

NATIONAL LEAD COMPANY
ST. LOUIS SMELTING AND REFINING DIVISION
FREDERICKTOWN, MISSOURI
TOPOGRAPHY OF FREDERICKTOWN AREA
Approx. Scale: 2" = 1 Mile
Print from photocopy of USGS Topographic Maps of Higdon, Marquand, Coldwater and Fredericktown Quadrangles.
Approximate outline of proposed exploration area.
FIG. 13