

JUL 15 1982

27-39/DLS/82/7/9/0

- 1 -

Distribution

NMSS r/f

WM r/f

WMLL r/f

DOCKET 27-39

PDR

LPDR

JBMartin

REBrowning

DLSiefken

EFHawkins

RDSmith

JAShaffner

RLessy, ELD

BMenczer, IE-REG. III

BChasnoff, IL St.

P. Gustafson

PDR

Return to
WRM
623-55

DOCKET 27-39

MEMORANDUM FOR: Edward F. Hawkins, Section Leader
Low-Level Waste Licensing Branch
Division of Waste Management

FROM: David L. Siefken
Low-Level Waste Licensing Branch
Division of Waste Management

SUBJECT: NOTES OF STEERING COMMITTEE MEETING FOR SHEFFIELD
TRITIUM MIGRATION STUDY, Thursday, June 10, 1982

ATTENDEES: David Ed, IL. Dept. Nuclear Safety
Tom Borecki, State of IL., Attorney General's Office
Tom Johnson, IL. State Geological Survey
Tim Larson, IL. State Geological Survey
Buck Foster, U.S. Geological Survey
Rick Healy, U.S. Geological Survey
Ron Gaynor, US Ecology
Walt Hipscher, US Ecology
Jim Grant, US Ecology
David L. Siefken, U.S. Nuclear Regulatory Commission

PURPOSE: The purpose of the meeting was to discuss the results of the
Phase I studies and to finalize plans for the Phase II studies.

DISCUSSION: The meeting began with distribution of the June 7 progress
report (Attachment A) and a presentation of the results of the Phase I
study. Information provided by Buck Foster, USGS, is attached as follows:

- Exhibit 1 - May 10 tritium concentrations (nCi/l)
- Exhibit 2 - Thickness of pebbly sand unit
- Exhibit 3 - Altitude of top of pebbly sand unit
- Exhibit 4 - Altitude of top of Pennsylvanian bedrock
- Exhibit 5 - 12 - Well logs for 8 Phase I wells
- Exhibit 13 - USGS letter reporting tritium concentrations (5/10)
- Exhibit 14 - USGS tritium concentrations (5/20)
- Exhibit 15 - Ground-water levels (5/20)
- Exhibit 16 - Equipotential map

OFC : : : : : : :
 NAME : : : : : : :
 DATE : 82/07/13 : : : : : : :

JUL 15 1982

In addition, the USGS provided results of particle-size analysis, clay mineral analyses, carbonate mineral content, and cation exchange capacity for selected samples collected during the drilling of the 17 off-site wells under B-6967 (see Exhibit 17).

Tim Larson, USGS, discussed the preliminary results of electrical resistivity and temperature surveys performed as part of the Phase I studies. Problems in funding this work have prevented finalizing the results and preparing detailed interpretations of the data. Preliminary electrical resistivity data is plotted on Exhibit 18.

The results of the Phase I studies indicate that the tritium plume is restricted to a narrow area bounded to the north by wells 536, MOW-1, 576, 581 and the site supply well and to the south by wells 577, 578, 579, and 584. Tritium is present in wells 580, 563, 583, and 578. These wells form a line trending northeastward from trench 23.

The potentiometric surface map, temperature survey, and electrical resistivity survey are interpreted to support transport of the tritium in the narrow plume originating in the vicinity of trenches 23, 24, and 25C. However, additional data is needed to further refine the extent and source of the tritium. Therefore, the locations of 8 additional wells were finalized for the Phase II studies (Exhibit 19). A tentative schedule for Phase II is attached (Exhibit 20).

In addition to the Phase II wells, US Ecology agreed to pull the pump on the site well so that the USGS can measure the static water level and run borehole geophysical logs to define the stratigraphy at that location. The pitless adapter will be modified, if needed, to permit future water level measurements.

Original Signed By

David L. Siefken
Low-Level Waste Licensing Branch
Division of Waste Management

Enclosure:
As stated

OFFICE :	WMLL	:	:	:	:	:
NAME :	DLSiefken:db	:	:	:	:	:
DATE :	82/07/13	:	:	:	:	:



1" = 100'

Map 70
Tritium Levels (US Ecology)
(nCi/l)

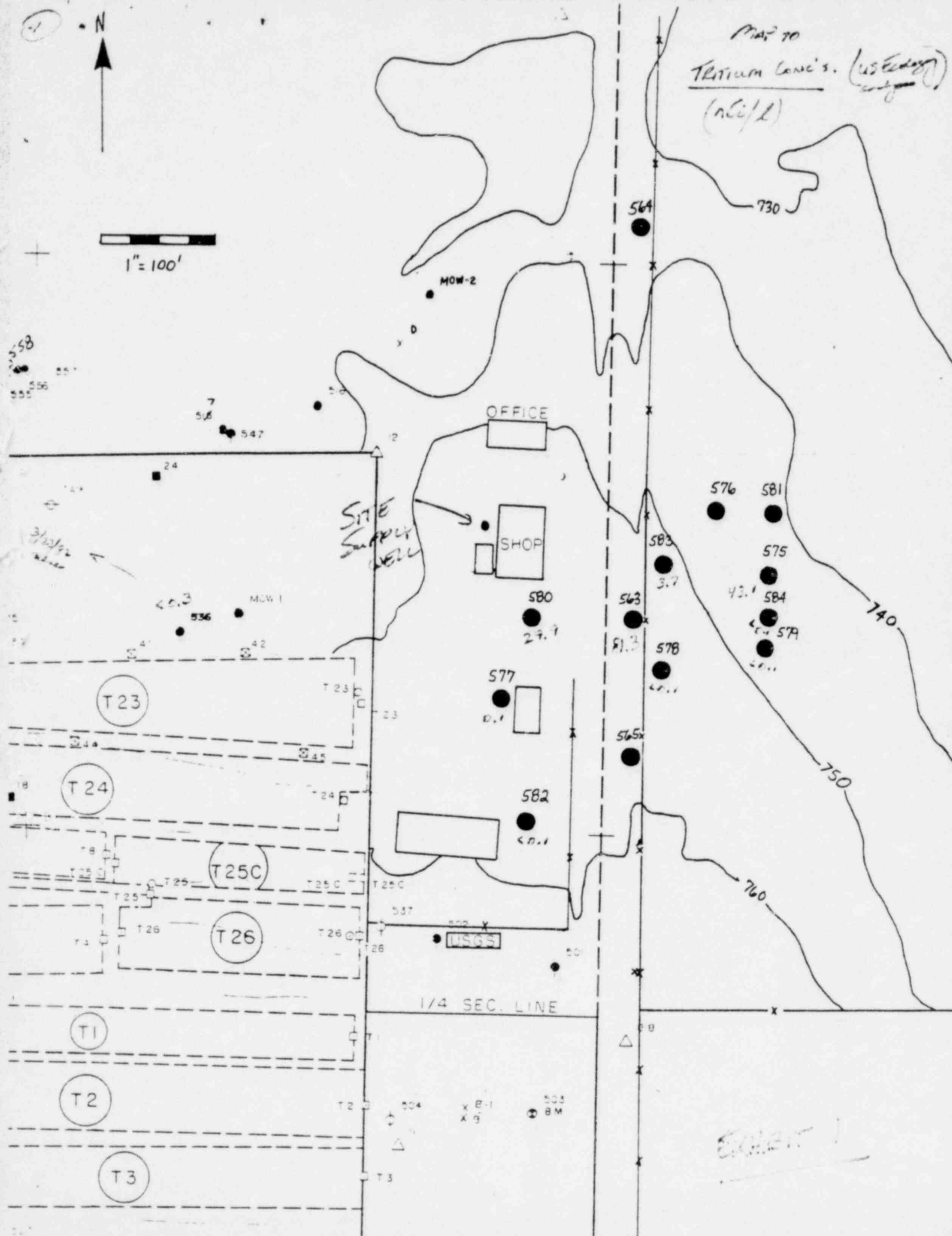


EXHIBIT 1

Thickness of Pebbly Sand

well no. 1
1/14

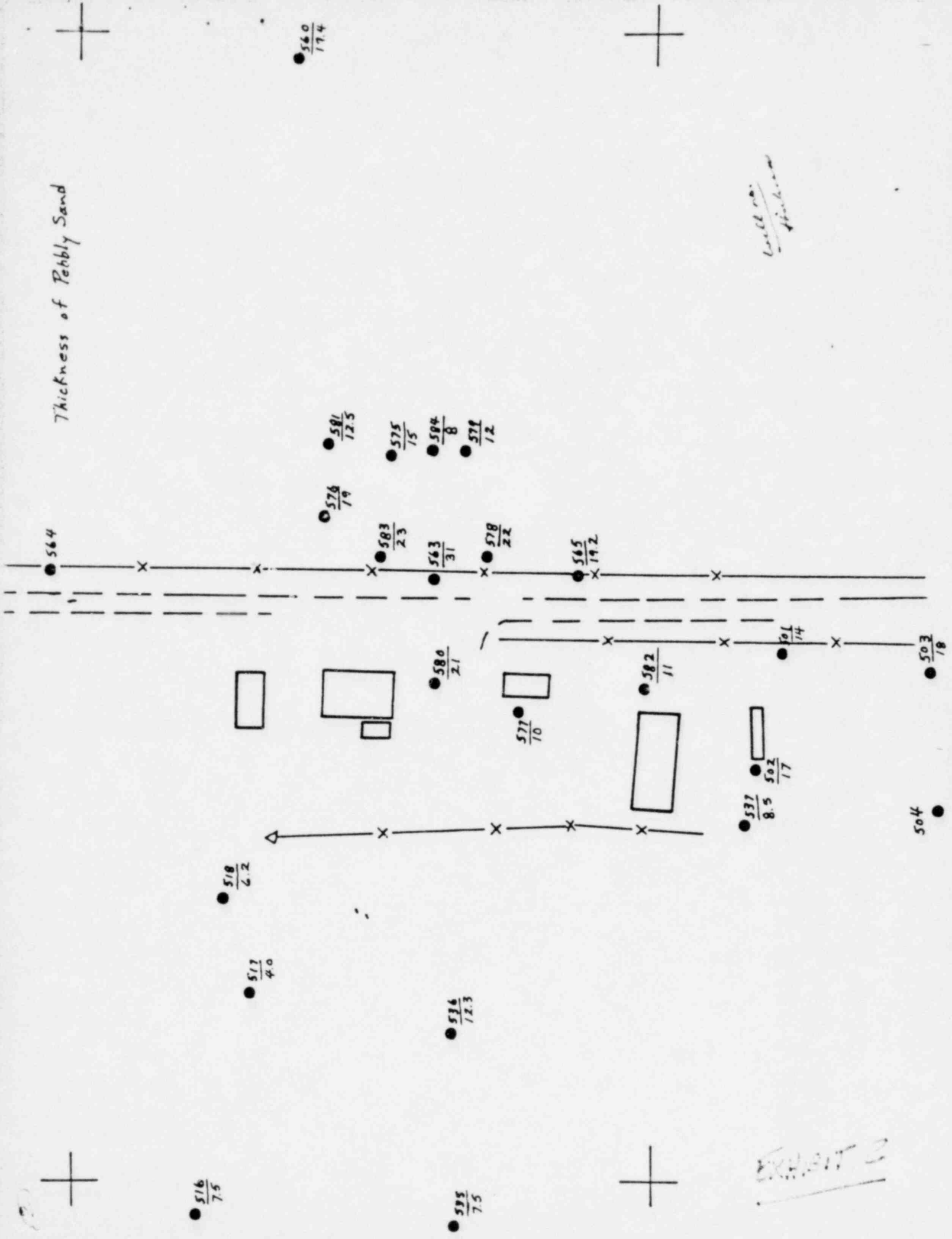
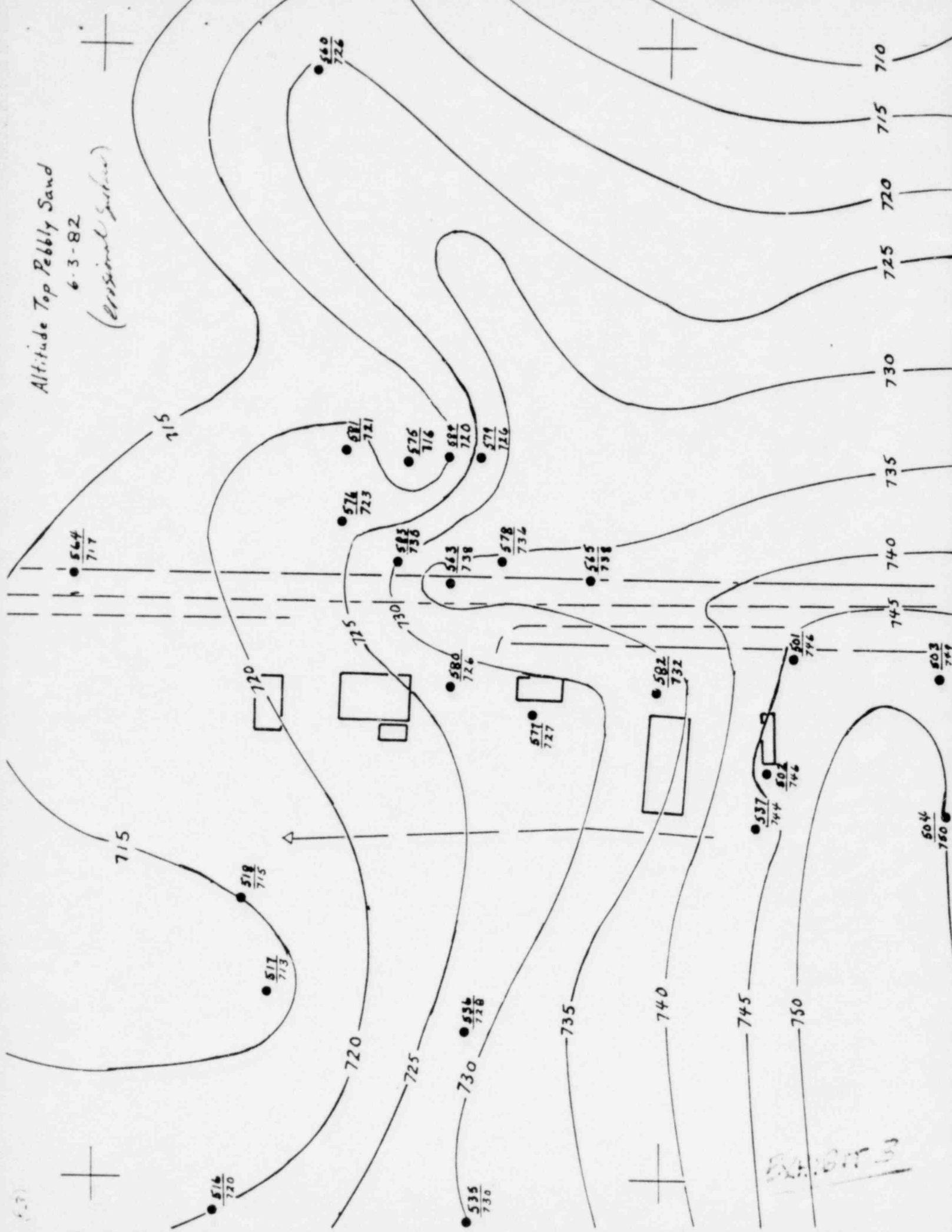


EXHIBIT 2

Altitude Top Pebbly Sand

6-3-82

(Cross-section Survey)

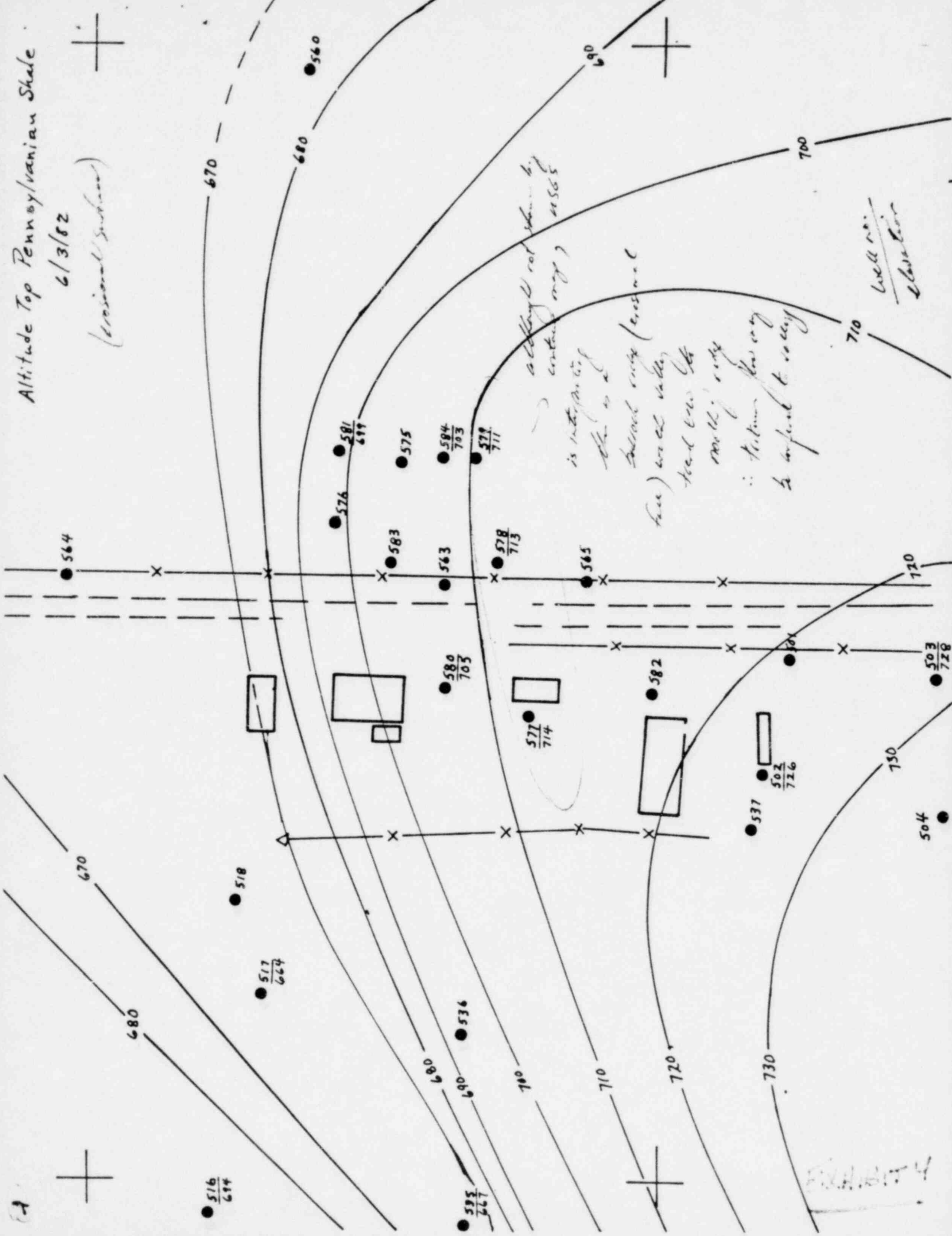


52.617 5

Altitude Top Pennsylvanian Shale

6/3/82

(original section)



although not shown by
contour map, 18565
is interpreted
the as a
broad ridge (erosional
face) and valley
head was the
north side of
it. ∴ bottom flow may
be inferred to valley

well no.
2 location

EXHIBIT 4

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No.

Well No. 579

Altitude Land Surface 748.83 Altitude Top Casing 751.83

Formation	Member	Depth (ft.)	Altitude (ft.)	Thickness (ft.)	Lithology	Water Level (ft.)	Trition (in./L)	Remarks
Peoria Loess		0	748.83	12.0	Silt, massive, small pebbles, olive brown to olive yellow			
Glastford Formation	Toulon Member	12.0	736.83	18.0	Fine to Coarse Sand with gravel, well-sorted to poorly-sorted, yellow to brownish-yellow			
Glastford Formation	Hulick Till	30.0	718.83	8.0	Silty clay, massive, pebbly, iron stains, brown to gray			
Penn. Shale		38.0	710.83		Silty clay, micaceous, blue/gray			
						33.2	.61.4	

EXHIBIT 7

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Well No. 580 Altitude Land Surface 749.90 Altitude Top Casing 752.90

Formation	Member	Depth (ft.)	Altitude (ft.)	Thickness (ft.)	Lithology	Water Level (ft.)	Tritium (nCi/L)	Remarks
Fill		0	749.90	5.0	clayey silt, pebbly yellowish-brown			
Peoria Loess		5.0	744.90	17.0	silt, massive, some iron stains, brown			
Glastford Formation	Rochester Till	22.0	727.90	2.0	clayey silt, massive, pebbles, iron stains common, grayish-brown			
Glastford Formation	Toulon Member	24.0	725.90	21.0	Fine to coarse sand with lenses of gravel, yellow to brownish-yellow			
Penn. shale		45.0	704.90		silty clay, some sand micaceous, blue gray			
						39.2	54±.5	

EXHIBIT 8

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No. _____

Well No. 581

Altitude Land Surface 743.46

Altitude Top Casing 746.46

Formation	Member	Depth (ft.)	Altitude (ft.)	Thickness (ft.)	Lithology	Water Level (ft.)	Tritium (nCi/L)	Remarks
Peoria Loess		0	743.46	22.0	Silt, massive, some iron stains, brown			
Glasford Formation	Toupin Member	22.0	721.46	13.0	Fine to coarse sand with gravel, poorly- sorted to well-sorted, yellow to brownish-yellow			
Teneriffe silt		35.0	768.46		Silty clay, massive, numerous pebbles, gray to brownish-gray			

EXHIBIT 9

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No.

Well No. 582

Altitude Land Surface 758.57 Altitude Top Casing 761.57

Formation	Member	Depth (ft.)	Altitude (ft.)	Thickness (ft.)	Lithology	Water Level (ft.)	Tritium (nCi/L)	Remarks
Fill		0	758.57	4.5	Clayey silt, pebbly Yellowish-brown			
Peoria Loess		4.5	754.07	18.5	silt, massive, some iron stains brown			
Glaston Formation	Radnor Till	23.0	735.57	3.5	Clayey silt, massive, Pebbles, iron stains common, gray			
Glaston Formation	Toulon Member	26.5	732.07	14.5	Fine to coarse sand with lenses of gravel, yellow to brownish-yellow			
						35.2	.4 ± .4	

EXHIBIT 10

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No.

Well No. 584

Altitude Land Surface

Altitude Top Casing

Formation	Member	Depth (ft.)	Altitude (ft.)	Thickness (ft.)	Lithology	Water Level (ft.)	T. tian (in./c)	Remarks
Peoria Loess		0	747.61	7.0	Silt, massive, small pebbles, olive brown to olive yellow			
Parkland sand		7.0	740.61	3.0	Fine to medium sand, yellow			
Glasford Formation	Toulon Member	10 10.0	737.61	29.0	Fine to coarse sand with gravel, yellow to brownish-yellow			
Glasford Formation	Hulick Till	39.0	708.61		Silty clay, massive, pebbly, iron stains, brown to gray			
						38.2	.7±.4	

EXHIBIT 12



United States Department of the Interior

GEOLOGICAL SURVEY

Champaign County Bank Plaza
4th Floor
102 East Main Street
Urbana, IL 61801
June 1, 1982

Walt Hipsher
U.S. Ecology, Inc.
P.O. Box 7246
9200 Shelbyville Road
Suite 526
Louisville, KY 40207

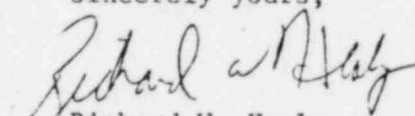
Dear Walt:

Following are the results from samples taken May 10, 1982 from the new wells at the Sheffield site:

<u>Well Number</u>	<u>Conc of Tritium in Water (Pico Curies/liter)</u>	<u>nci/l</u>
577	600 ± 400	0.6 ± 0.4
578	<400	< 0.4
579	600 ± 400	0.6 ± 0.4
580	54000 ± 500	54.0 ± 0.5
582	400 ± 400	0.4 ± 0.4
583	5600 ± 400	5.6 ± 0.4
584	700 ± 400	0.7 ± 0.4

FOR THE DISTRICT CHIEF

Sincerely yours,


Richard W. Healy
Hydrologist

RWH:mv

EXHIBIT 13

Water Samples taken 5-20-82

Well #	Tritium in Water Conc (pCi/L)	nCi/L
577	<400 ±400	<0.4
578	700 ± 400	0.7 ± 0.4
579	500 ± 400	0.5 ± 0.4
580	3500 ± 400	3.5 ± 0.4
581	400 ± 400	0.4 ± 0.4
582	<400	<0.4
583	6200 ± 400	6.2 ± 0.4
584	700 ± 400	0.7 ± 0.4

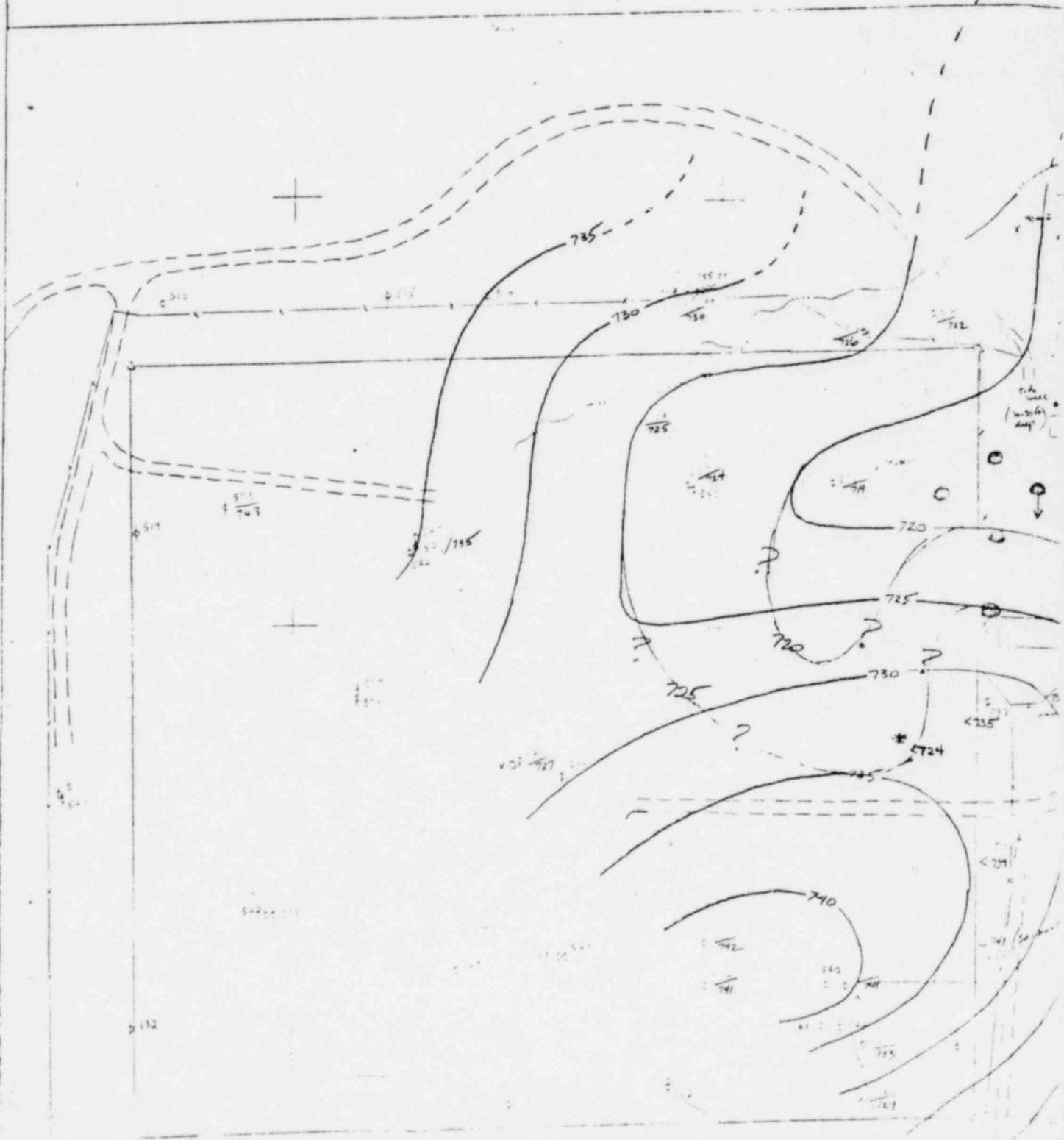
EXHIBIT 19

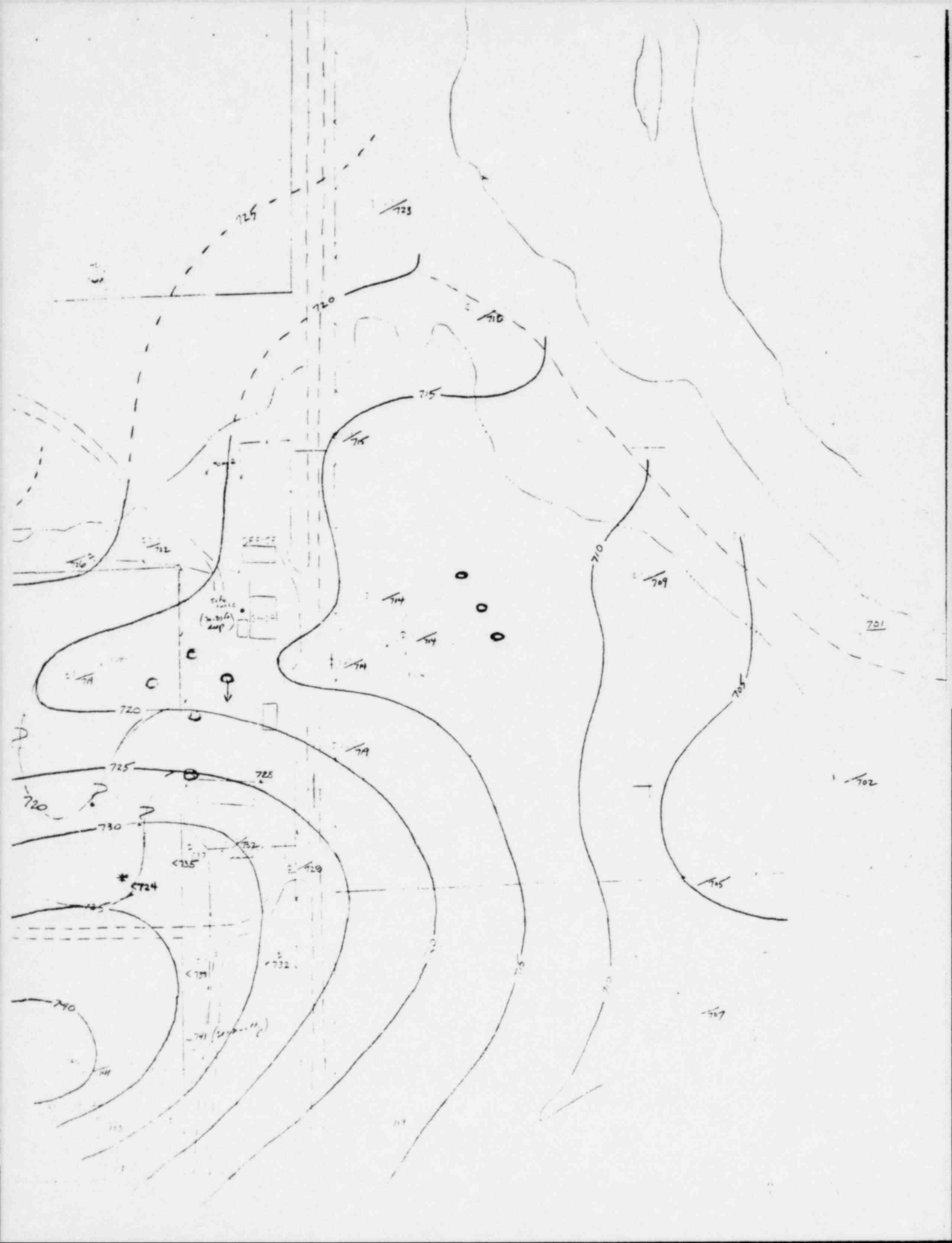
Ground-Water Level Elevations
5/20/82

well	Water Level
578	712.
579	719
580	715
581	714
582	728
583	715

EQUIPOTENTIAL MAP
SHOWS ALTITUDE OF WATER LEVELS

EXHIBIT K





Sample No.	% of Total Sample		Clay Minerals (% of Total)			Carbonate Minerals (%)			Cation Exchange Capacity	Remarks
	%		Expansible	Illite	Non-expandable	Calcium	Magnesium	C of U ₂ Oxide		
	Clay	Silt								
84-90	45.3	9.5	5.4			0.37	0.91	0.46	10.3	
11-12						1.61	0.56	8.39	5.5	Probably calcareous nature of soil
100-102					2.0					
1-1	5.8	28.4	4.5		2.0					
1-10										
1-11	7.7	4.0	11.2		1.0	1.15	0.70	1.14	4.0	Very silty soil - low Ca ⁺⁺
1-12					1.0					
1-13	5.8	11.5	11.6	1.1		5.04	3.75	1.61	3.6	Probably calcareous nature of soil
2-1	6.8	11.7	11.8	1.7	1.7					
2-2										
2-3	0	4.3	13.2	1.3		0.51	2.04	0.85	5.7	
11-1	0	9.63	3.0	1.2		2.71	1.88	1.1	5.0	
11-110										
11-111	0.4	11.5	11.4	1.1	1.5	3.55	1.66	1.52	15.6	
11-112										
11-113	3.6	11.0	11.1	1.1	1.0	3.19	0.73	2.97	6.1	
11-114										
11-115	1.9	11.0	11.1	1.1	1.0	3.07	0.15	4.11	9.4	
11-116										
11-117	1.9	11.3	11.0	1.1	1.0	2.21	1.05	1.17	16.2	Very silty soil
11-118										

11-118

Date	Sample No.	(% of Total Sample)		Sieve Analysis (% on total)			Cationic Materials (%)			Station Exchange Capacity	Remarks	Notes
		Coarse	Fine	Expendable	Filterable	Residue on Sieve	Cation	Non-cation	C/M Ratio			
10-17	30-51	0	69.2	158	13.5	42	41	17				10-17
10-17	40-72	0	27.6	52	9.4	38	12	15				10-17
10-17	30-51	64.3	44.3	3.3	13.1	15	56	29				10-17
10-17	40-72								5.7%	1.51	0.77	11.1
10-17	30-51	0.3	5.6	41	5.6	7	62	51				10-17
10-17	40-72	0	0.1	5.4	4.8	15	54	51				10-17
10-17	30-51	0	1.0	5.5	4.5	42	36	11				10-17
10-17	40-72	1.9	0.7	2.1	1.1	6	79	15				10-17
10-17	30-51	3.0	9.6	2.1	1.2	5	78	12				10-17
10-17	40-72	6.4	33.2	2.1	1.3	29	51	17				10-17
10-17	30-51								4.2%	0.37	10.81	7.1
10-17	40-72	0	3.8	73.1	15.1	22	47	29				10-17
10-17	30-51	0	5.2	39.4	3.8	11	73	11				10-17
10-17	40-72	4.9	34.7	4.5	5.1	3	61	7				10-17
10-17	30-51	13.7	36.7	35.2	34.2	5	60	35				10-17
10-17	40-72	0	3.4	25.2	13.1	25	71	18				10-17
10-17	30-51	0	7.5	3.2	6.6	4	76	13				10-17
10-17	40-72	33.3	73.0	1.1	2.2	1	1	1				10-17

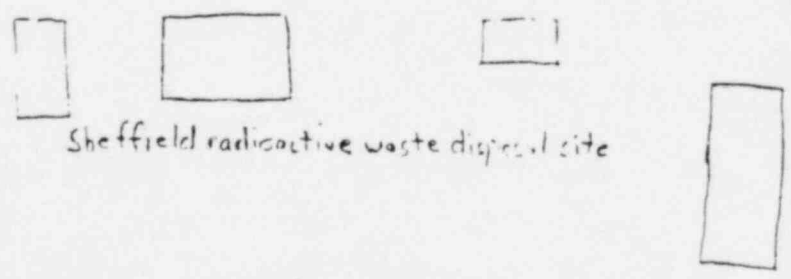
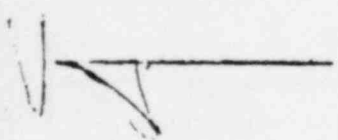
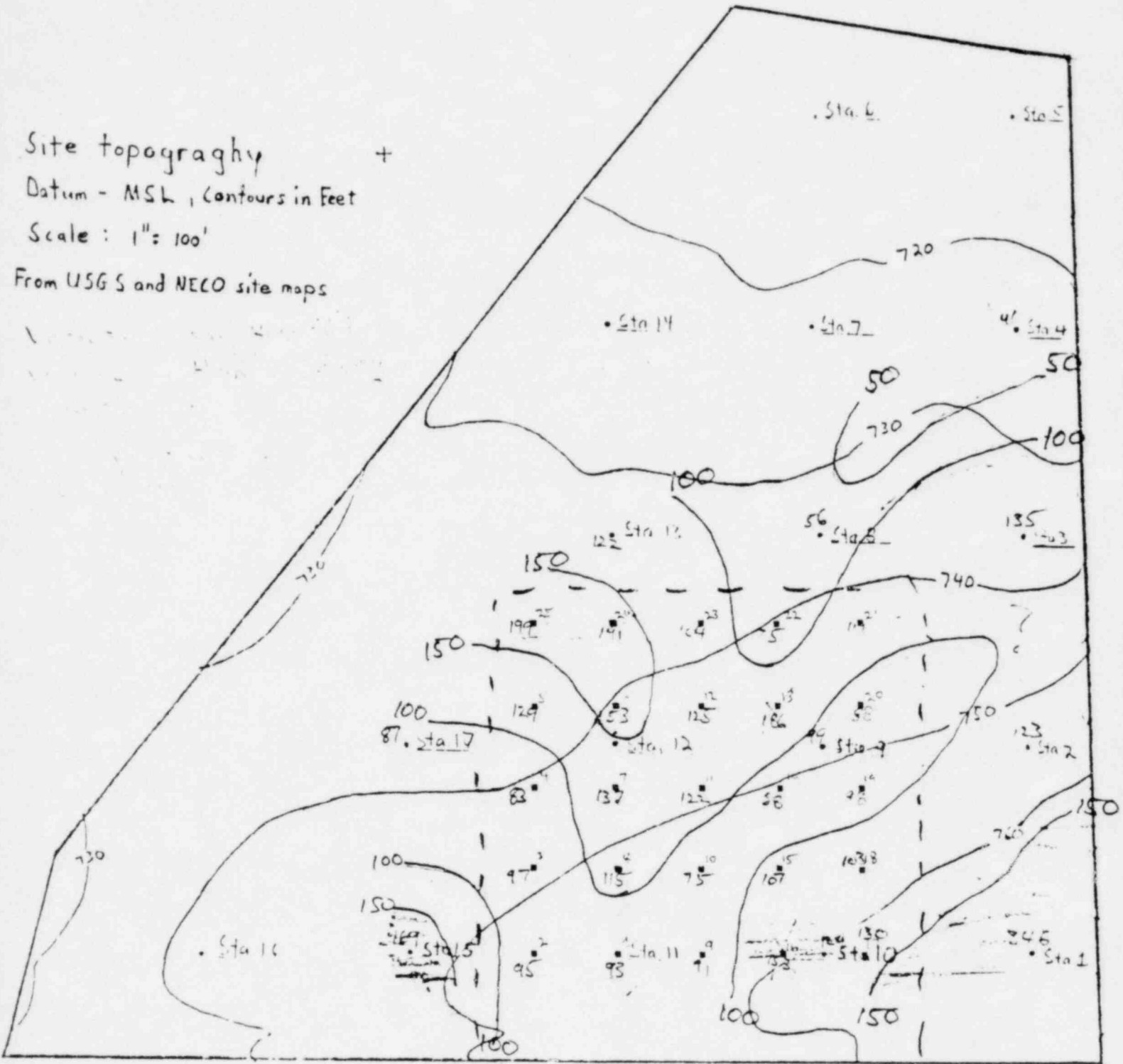
f - Configuration base drilling

Sample	% of Total Sample		CATIONIC MATERIALS (%)				ANIONIC MATERIALS (%)		Cation Exchange Capacity	Remarks
	Organic	Inorganic	Expendable	Illite	Montmorillonite	Illite	Montmorillonite	C/M ₁ Ratio		
100	53.8	46.2	5	60	35	2.71	0.28	9.68	3.5	
101	54.0	46.0	5	52	43					
102	6.4	93.6	56	31	15					
103	43.0	57.0	15	42	37					
104	18.8	81.2	10	51	31	1.07	3.33	3.36	16.7	
105	0	100	1	51	40					
106			24	50	16					
107			63	25	12					
108	0.2	99.8	23	52	21					
109			41	40	2					
110			6	63	31					
111			26	51	23					
112	34	66	3	56	31	4.71	3.43	1.77		
113	13	87	0	63	37					
114	9.9	90.1	1	52	12					
115	6.2	93.8	2.2	30	17					

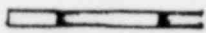
Sample No.	Clay Minerals (% of Total Sample)				Clay Minerals (% of Total)				Carbonate Minerals (%)			Cation Exchange Capacity	Remarks	Analytical Notes
	Smect	Sand	Silt	Clay	Expansibles	Illite	Kaolinite + Chlorite	Calcium	Magnesium	Colloidal Fraction				
571	0	16.4	48.0	35.6	64	32	4	3.66	0.40	9.15	4.5		Ready for 1/2% titration (by m)	Less Fanning Sand Tons in Member "
571	0	20.3	21.2	8.5	42	40	18							"
571	4.7	9.7	17	1.7	15	65	20							"
571	7.5	32.0	33.4	27.1	10	63	27							"
571	0	1.3	61.2	37.5	64	25	11							Point
572	0.2	85.3	4.3	10.2	47	37	14							Point
573	17.3	67.3	8.0	7.4	4	65	31							Point
573	0	10.0	66.1	23.9	35	47	36							Point
573	0.4	4.5	61.9	33.2	78	14	8							Point
573	2.6	8.6	53.6	36.2	46	31	15							Point
573	0.8	73.8	18.8	6.6	16	60	24							Point
573	50.4	36.1	16.8	7.4										Point
573								1.61	0.71	3.27	5.3			"
573								5.73	1.72	3.18	12.6			X-ray diffraction shows Calcite

Date	Sample	% of Total Sample			CATIONIC CATIONS (%)				Exchange Capacity	Remarks	Stratigraphic Unit Name	
		Ca	Mg	Other	Ca	Mg	Other	Co/Mo Ratio				
5/4	10-72	0	5.4	68.5	36.1	6.5	34	11			Till	
5/4	104-106	0	34.1	50.0	15.9	5.6	28	16			"	
5/4	354-356	69.8	14.2	9.8	6.2						Toulon Member	
5/4	356-358								1.83	0.23	7.96	"
5/4	352-354	39.9	39.7	12.5	7.9	6	65	39				"
5/4	472-474	81.5	5.0	9.6	3.9							"

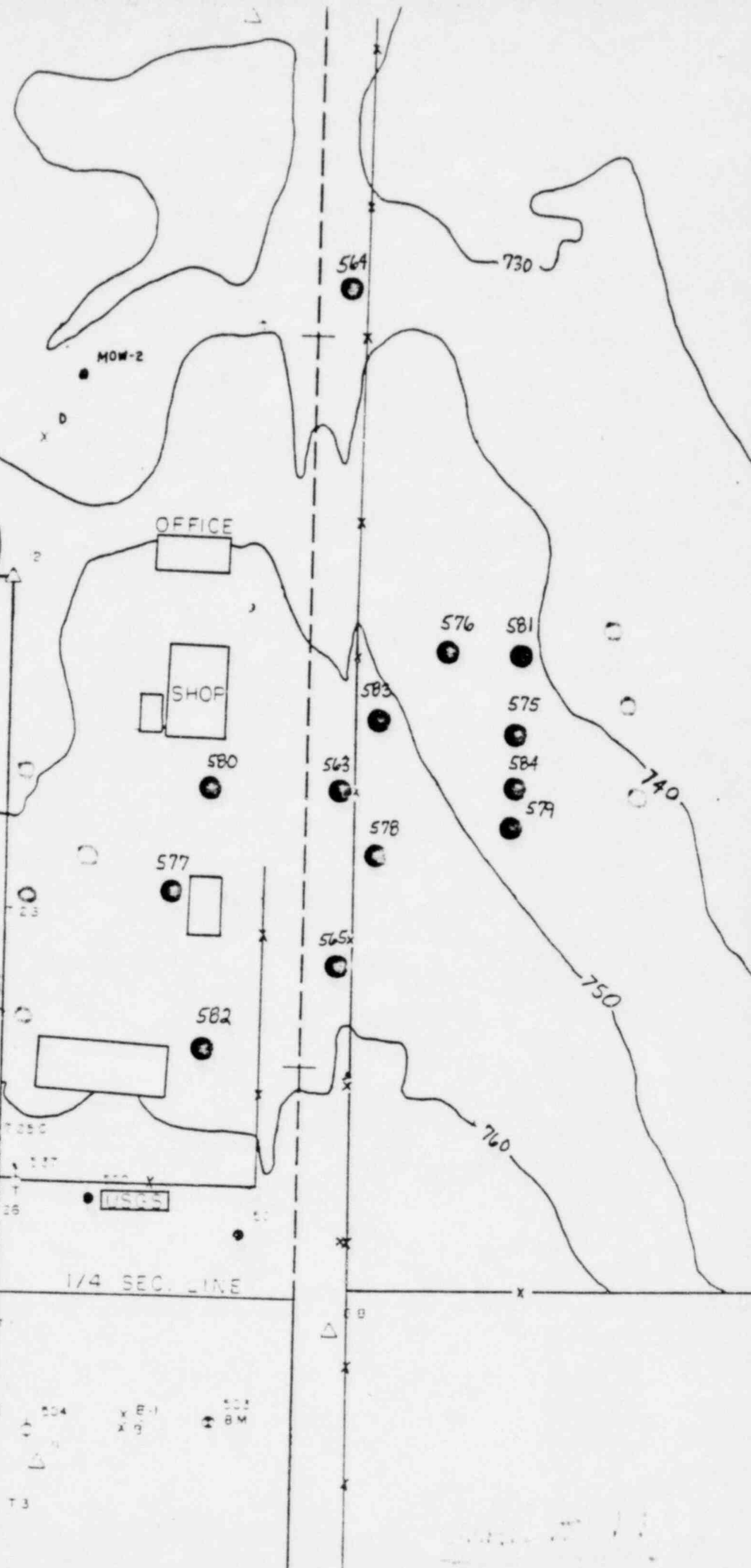
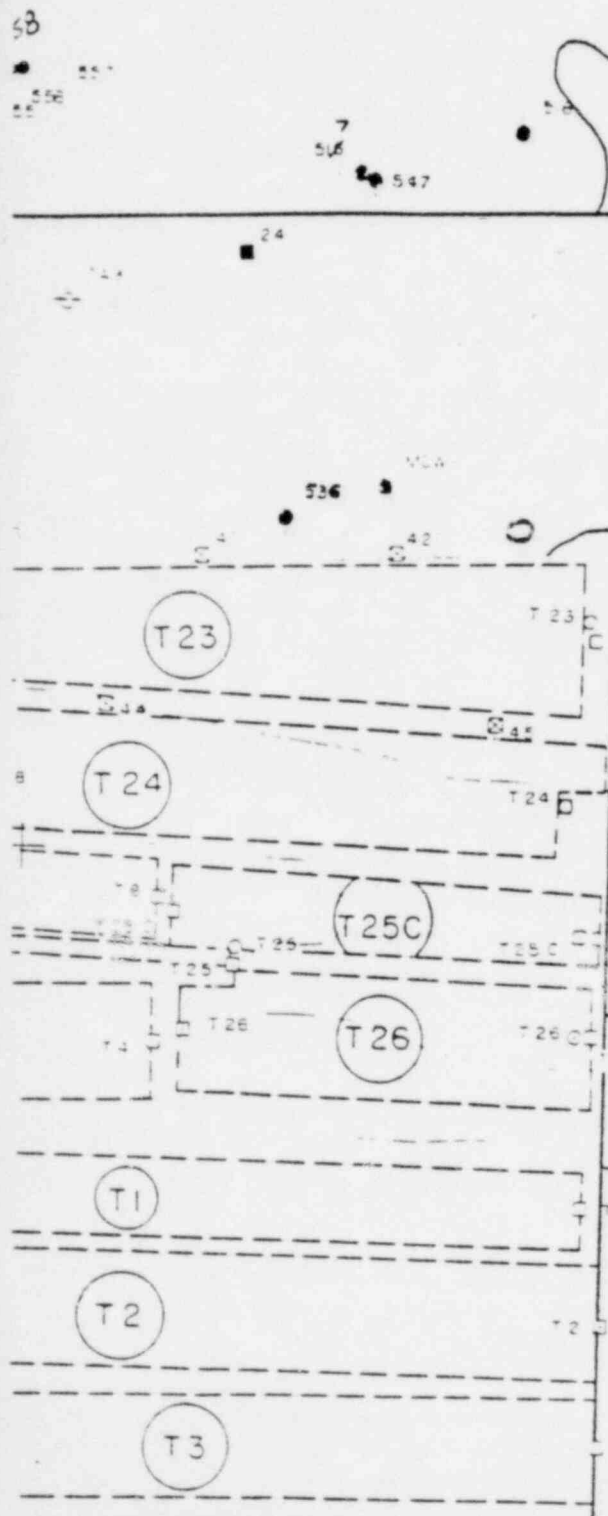
Site topography +
 Datum - MSL, Contours in Feet
 Scale: 1" = 100'
 From USGS and NECO site maps



USGS



1" = 100'



MOW-2

OFFICE

SHOP

HOUSE

1/4 SEC. LINE

504 X B-1 X 3 502 BM

TENTATIVE SCHEDULE - PHASE 2

- July 12 - mobilize drilling rig
- July 26 - complete installation of wells
- July 30 - complete development of wells
measure water levels
collect water samples
complete gamma-ray logging of all wells (33)
and site supply well
- August 1 - complete reports on temperature and resistivity surveys
- August 9 - complete laboratory analyses on 1st set of water samples
- August 16 - complete laboratory analyses of soil samples
- August 26 - meeting of steering committee to discuss phase 2 results