R-009-204.37

5115

SUMMARY OF ONGOING SOUTH PLUME ZONE EVALUATIONS

02/01/94

DOE-0814-94
DOE-FN/EPA
11
LETTER
OU5

Department of Energy
Fernald Environmental Management Project
P.O. Box 398705
Cincinnati, Ohio 45239-8705
(513) 738-6357

FEB 01 1994
DOE-0814-94

Mr. James A. Saric, Remedial Project Director
U.S. Environmental Protection Agency
Region V - 5HRE-8J
77 W. Jackson Boulevard
Chicago, Illinois 60604-3590

Mr. Graham E. Mitchell, Project Manager
Ohio Environmental Protection Agency
40 South Main Street
Dayton, Ohio 45402-2086

Dear Mr. Saric and Mr. Mitchell:

SUMMARY OF ONGOING SOUTH PLUME CAPTURE ZONE EVALUATIONS

As part of the December 21, 1993 Technical Information Exchange (TIE) meeting with the Ohio Environmental Protection Agency (OEPA) and the United States Environmental Protection Agency (U.S. EPA), the Fernald Environmental Management Project (FEMP) representatives presented preliminary analytical results and a hydraulic capture zone assessment for the South Plume groundwater recovery system. At the meeting, it was agreed that the FEMP would provide ongoing analytical and hydraulic monitoring information on a routine basis as it becomes available. The purpose of this letter is to formally transmit the information presented at the TIE meeting, and to summarize the ongoing assessment activities the FEMP is initiating to further evaluate system performance and potential influences on the Paddys Run Road Site (PRRS) contaminant plume.

The preliminary results obtained from the ongoing evaluations will be provided to the OEPA and the U.S. EPA via an informal weekly fax and will be further explained during the OEPA-requested weekly South Plume meetings to be held via conference call.

Overview of Current Situation

The five-well South Plume groundwater recovery system began operation on August 27, 1993, with system extraction rates of 2000 gpm (400 gpm per well). Weekly water quality samples and water level measurements were collected from area monitoring wells throughout the month of September, in accordance with the approved Design, Monitoring, and Evaluation Program Plan (DMEPP). Beginning in October, the sampling frequency was adjusted to monthly for the remainder of the first quarter in accordance with the DMEPP. On December 1, 1993, a portion of the analytical results for the September and October

sampling were received from the off-site contract laboratory, at which time total arsenic values (invalidated) were found to be trending upward in several of the monitoring wells south of the extraction well network. Utilizing the existing EPA approved DMEPP as a management tool, the decision was made by the Fernald Environmental Restoration Management Corporation (FERMCO) to reduce the pumping rates to 1500 gpm (300 gpm per well). The Department of Energy, Fernald Field Office (DOE-FN) verbally notified the OEPA and the U.S. EPA prior to reducing the pumping rates on December 3, 1993. Before throttling back the pumps to 300 gpm, pressure transducers and data loggers were installed in the following wells to monitor changes in water levels in the wells:

Well 2002	Well 2128
Well 2548	Well 2549
Well 2625	Well 2636
Well 2899	Well 2900

During the first quarter of operation, the DMEPP requires a monthly monitoring program. However, because of the upward arsenic trends noted from the first data set, the FEMP increased the frequency of water level and water quality sampling for arsenic to weekly in select locations and is using the on-site FEMP laboratory to provide faster (7 to 10 day) turnaround as opposed to the 4 to 6 week turnaround from the off-site contract laboratories. The off-site contract laboratories will still continue to be used for all scheduled DMEPP sampling events. The following locations are being sampled on a weekly basis for total and dissolved arsenic:

Well 2128	Well 2900
Well 2548	Well 3924
Well 2625	Well 3925
Well 2636	SWRB Valve House

This weekly sampling frequency was initiated on December 15, 1993. While the first formal report of the DMEPP monitoring results and possible system refinements is to be issued in April 1994, the FEMP also plans to submit weekly faxed updates on the new data to the OEPA and the U.S. EPA.

TIE Meeting Summary

At the December 21, 1993 TIE meeting, FEMP representatives presented the results of the capture zone analysis and groundwater flow patterns for the recovery system operating at both the 2000 gpm and the 1500 gpm flow rates. The following figures and tables from the presentation are included with this letter:

- Total arsenic trends in monitoring wells (Figure 1)
- Summary of analytical data available to date (Table 1)
- Natural groundwater flow directions prior to pumping (Figure 2)
- Capture zone delineation and groundwater flow directions for 2000 gpm pumping -- September (Figure 3)

- Capture zone delineation and groundwater flow directions for 2000 gpm pumping -- October (Figure 4)

- Capture zone delineation and groundwater flow directions for the reduced (1500 gpm) pumping (Figure 5)

- Overlay of the 20 parts-per-billion total uranium contour interval on the 1500 gpm capture zone (Figure 6)

The results summarized on these figures indicate that the 20 parts-per-billion (ppb) contour interval is being successfully intercepted by the South Plume extraction well network, at both the 2000 gpm and the reduced (1500 gpm) pumping rate. The capture zone extends approximately 450 feet south of the extraction well network, and is situated upgradient of the PRRS plume as indicated in the PRRS Draft Remedial Investigation Report. The degree to which groundwater flow directions south of the capture zone (in the area of the PRRS plume) are being influenced by the pumping is being evaluated further through ongoing efforts by technical staff at the FEMP. This evaluation is necessary to ensure that DOE/FERMCO are following the agreement outlined in the South Plume Explanation of Significant differences document. The agreement between DOE and OEPA identified that the South Plume extraction wells would not affect the PRRS plume. Information regarding the pumping effects (if any) will be discussed in both the weekly faxed update and the weekly OEPA conference call.

Planned Assessment Activities

In response to the arsenic trends observed in the initial data set and the suggestions offered at the TIE meeting, the FEMP is initiating the following actions:

1. Continued monitoring of arsenic on a weekly basis, for both total and dissolved concentrations

2. Continued water level monitoring on a weekly basis

3. Adding the ten piezometers installed in the vicinity of Extraction Well No. 3927 to the water level monitoring program

4. Identifying additional existing wells in the vicinity of the Paddys Run Road Site (south and southwest of the capture zone) which will be included in the existing water level monitoring program

5. Performing additional modeling runs to examine the effect of varying flow rates on the extent and location of the capture zone, and flow patterns downgradient of the capture zone

6. Evaluating the possibility of using the FEMP's KV groundwater flow meters to provide independent confirmation of groundwater flow directions and the extent of capture

7. Further assessment of the western boundary of the 20ppb total uranium contour south of Willey Road

8. Ongoing assessment to identifying possible modifications to the extraction system to address the possible effects (if any) on the flow patterns downgradient of the capture zone and associated impact on the PRRS plume

We will continue to share the results of these evaluations with the OEPA on a weekly basis until otherwise notified. If you or your staff have any questions concerning our efforts, please contact Pete J. Yerace at (513) 648-3161 or Kathi Nickel at (513) 648-3166.

Sincerely,

Jack R. Craig
Fernald Remedial Action
Project Manager

FN:Nickel

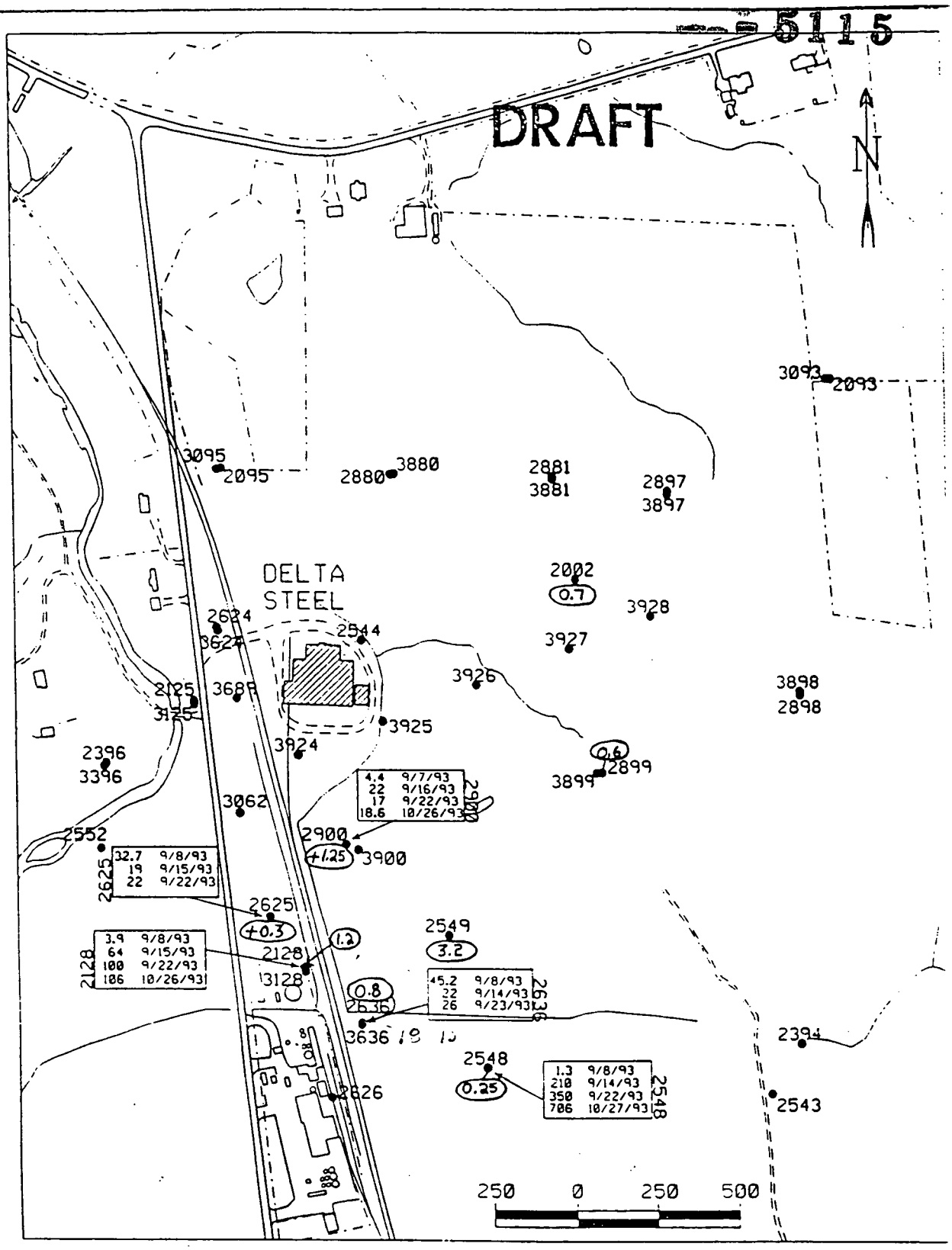
Enclosure: As Stated

cc w/enc:

J. J. Fiore, EM-42, TREV
K. A. Hayes, EM-424, TREV
B. Barwick, USEPA-V, AT-18J
J. Kwasniewski, OEPA-Columbus
P. Harris, OEPA-Dayton
M. Profitt, OEPA-Dayton
T. Schneider, OEPA-Dayton
P. J. Yerace, DOE-FN
J. Michaels, PRC
L. August, GeoTrans
AR Coordinator, FERMCO

cc w/o enc:

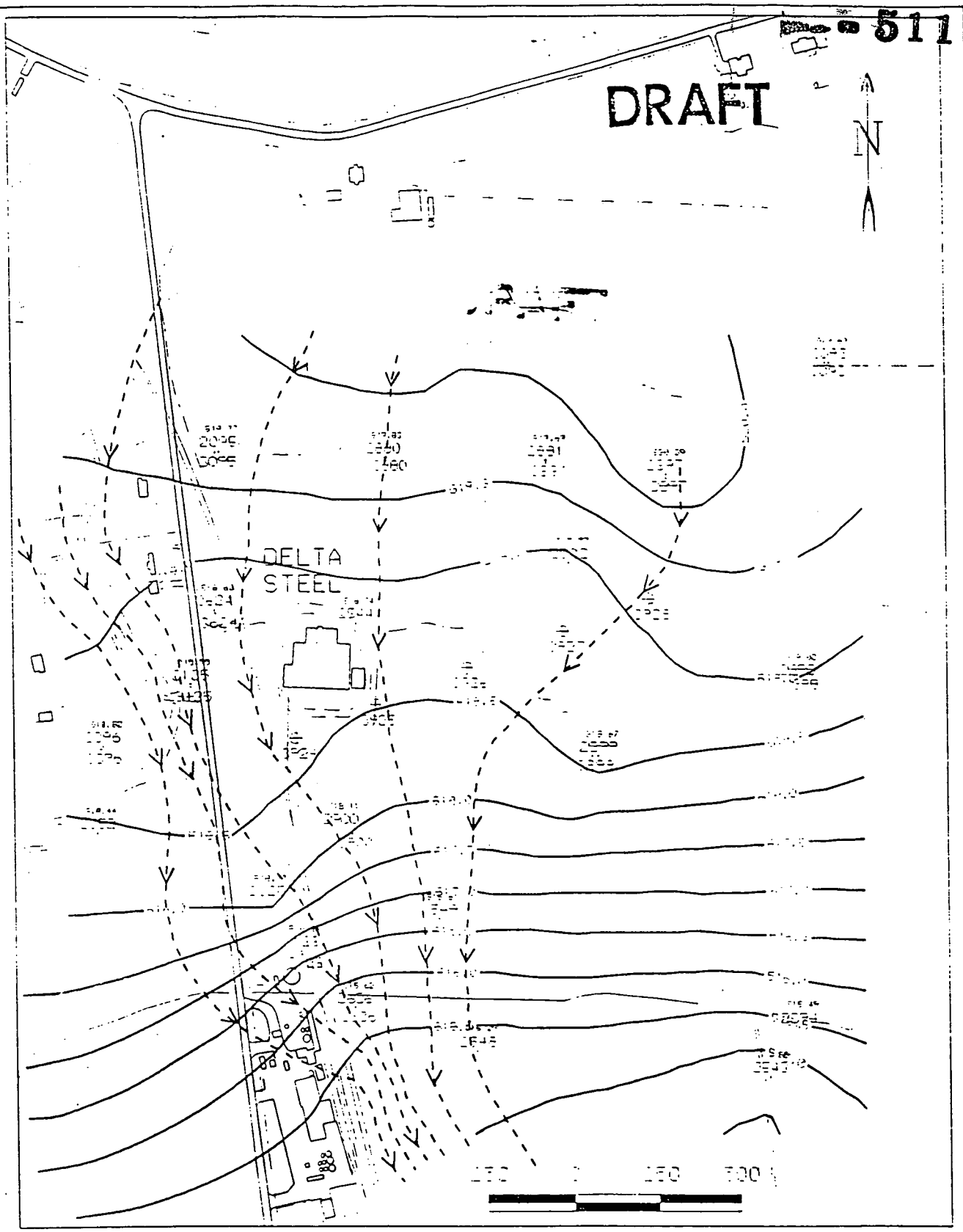
R. L. Glenn, Parsons
P. F. Clay, FERMCO/52-2
K. L. Alkema, FERMCO/65-2
J. W. Thiesing, FERMCO
D. J. Brettschneider, FERMCO/52-5



ARSENIC CONCENTRATIONS IN SELECTED WELLS OF THE SOUTH PLUME AREA

ARSENIC VALUES REPORTED IN MICRO-GRAMS PER LITER

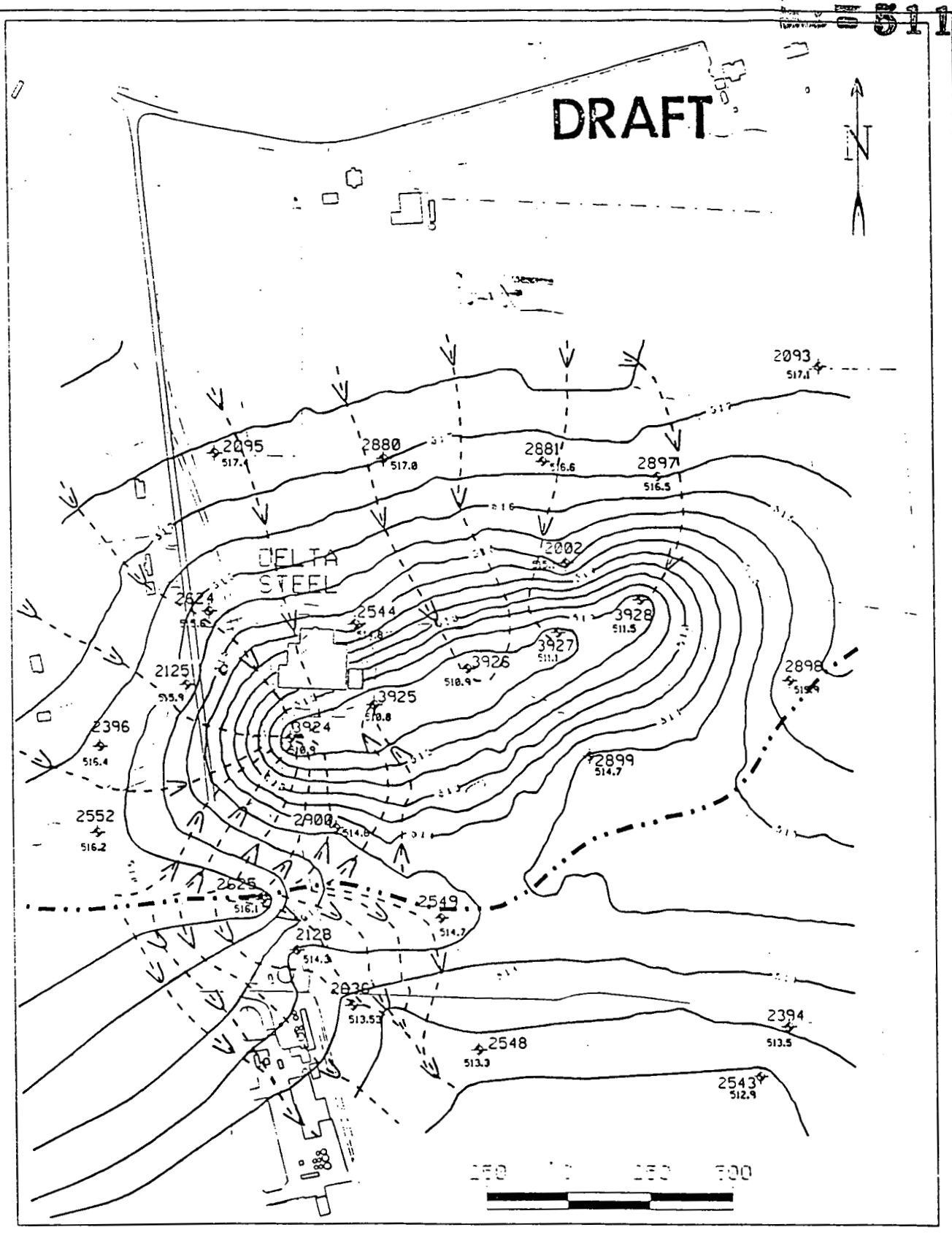
(0.7) = NET RISE (in feet) OF WATER COLUMN



PRE-PUMPING GROUNDWATER
ELEVATIONS FOR AUGUST 27 1993

——— CONSTANT HEAD LINES
- - - - - - FLOW LINES

FIGURE 2



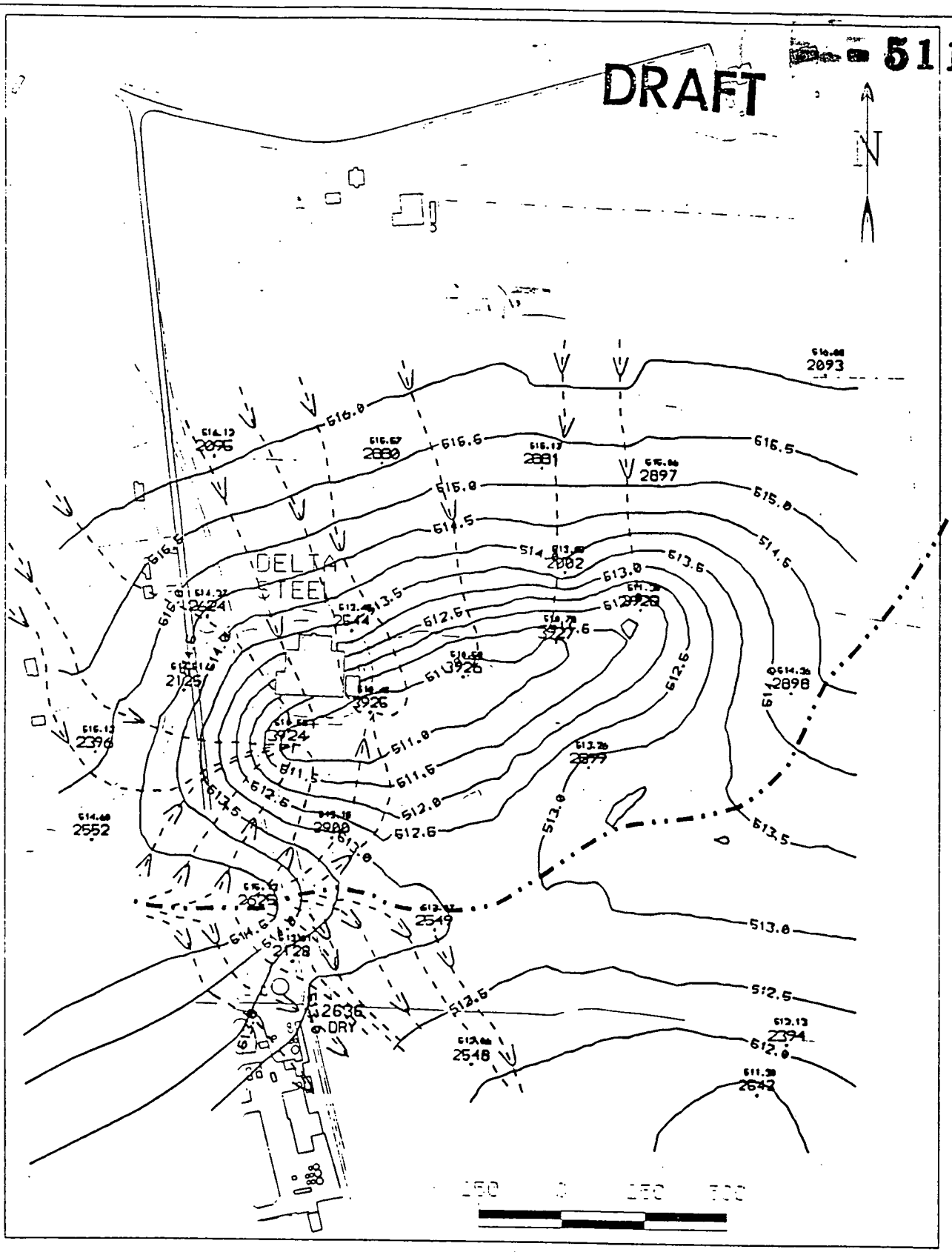
GROUNDWATER ELEVATIONS
SEPTEMBER 21 1993
PUMPING RATE = 400gpm

CONSTANT HEAD LINES
FLOW LINES
FLOW DIVIDE

007

FIGURE 3

DRAFT



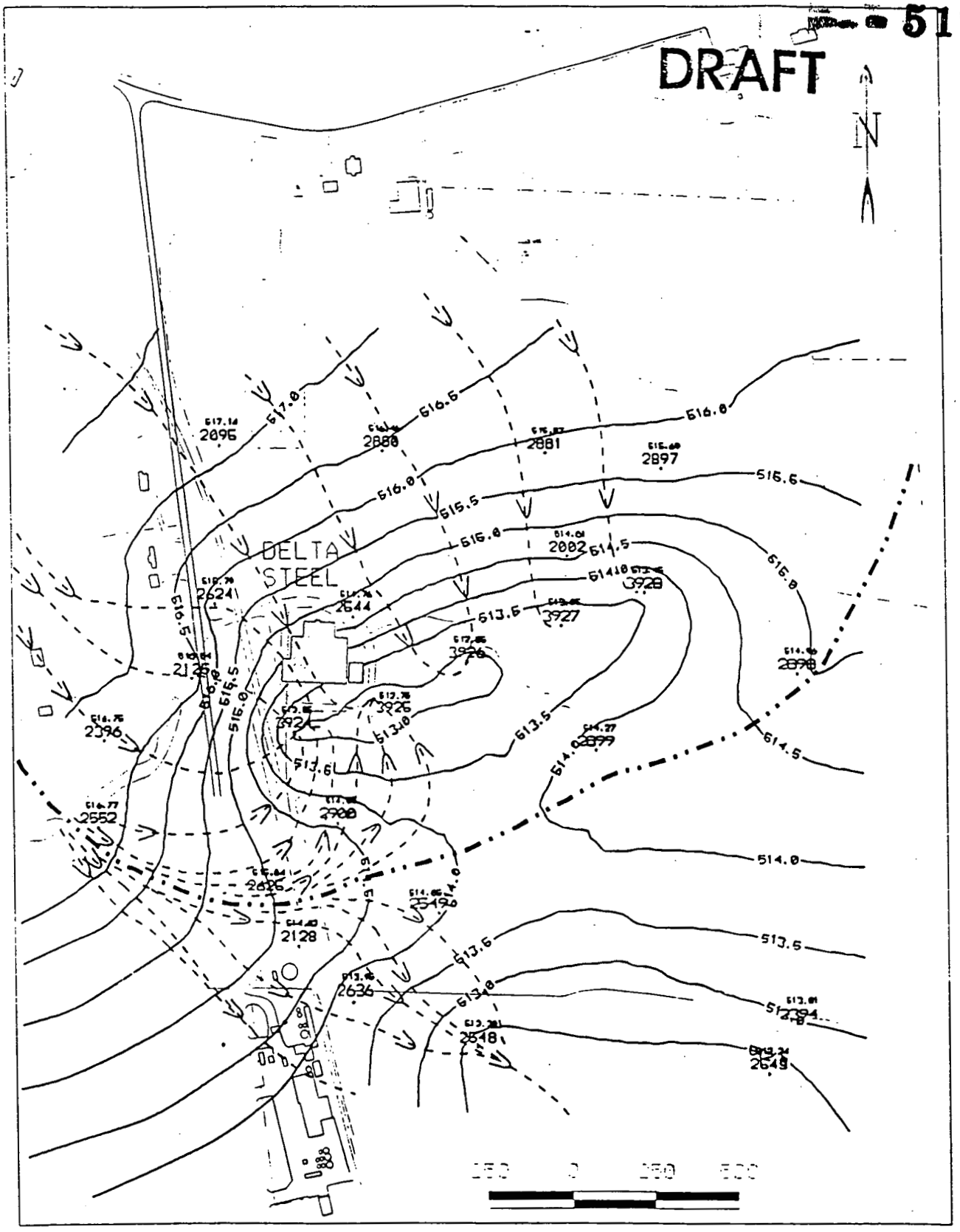
GROUNDWATER ELEVATIONS
OCTOBER 25 1993
PUMPING RATE = 400gpm

CONSTANT HEAD LINES
FLOW LINES
FLOW DIVIDE

008

FIGURE 4

DRAFT

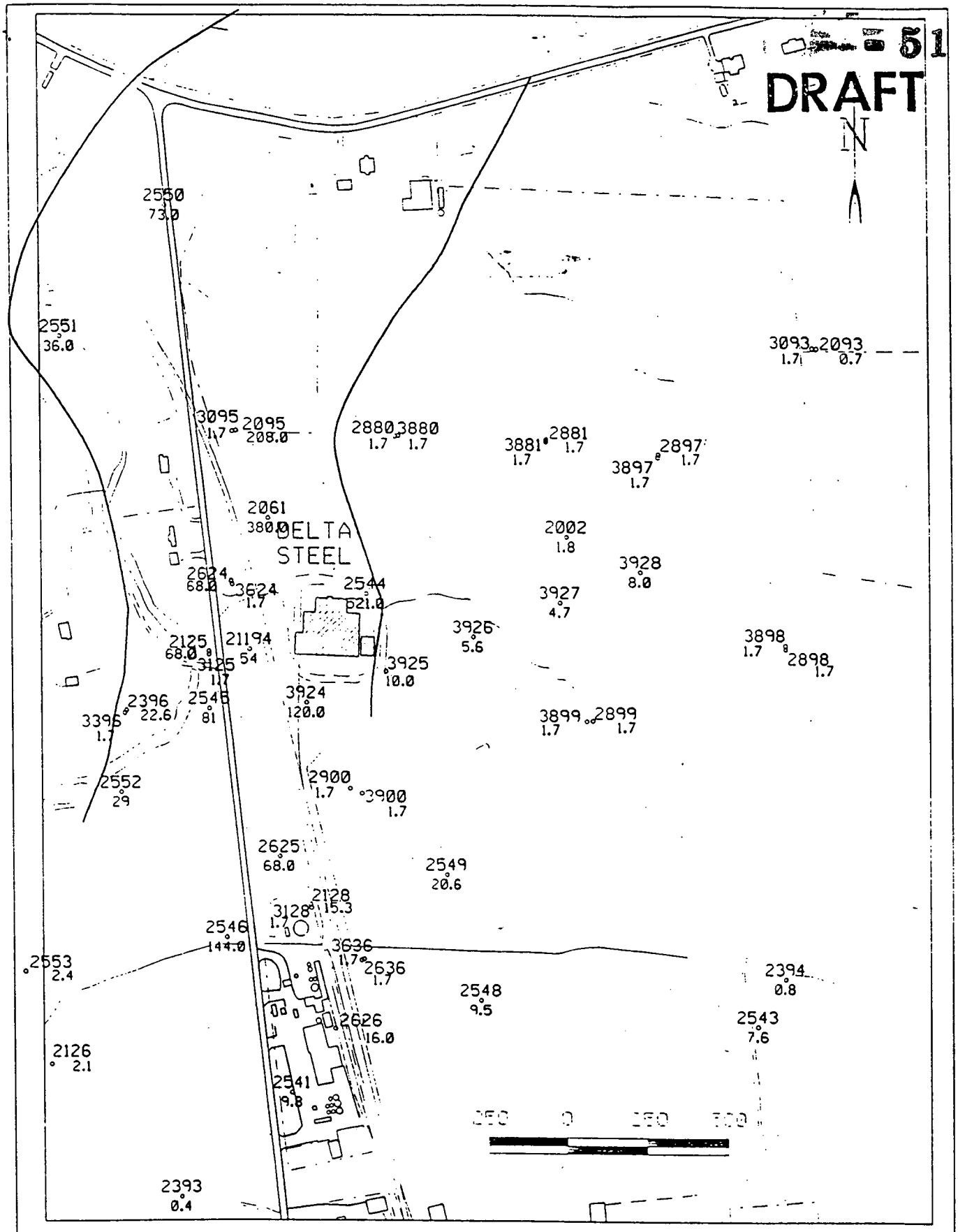


GROUNDWATER ELEVATIONS
DECEMBER 10 1993
PUMPING RATE = 300gpm

CONSTANT HEAD LINES
FLOW LINES
FLOW DIVIDE

FIGURE 5

DRAFT



MAXIMUM MEASURED TOTAL U

010

> 20ppb

FIGURE 6

DRAFT

TABLE I

Well #	Date	Arsenic (ug/L)	Potassium (ug/L)	Sodium (ug/L)	Total Phosphorous (ug/L)	Cumene (ug/L)	EPA 8240
2128	9-08-93	3.9			3100	ND	ND
2128	9-15-93	64	16000	35000	4600		
2128	9-22-93	100	18000	34000	4900		
2128	10-26-93	106, ND(F)	9600, 1900F	43400, 40600F	ND	ND	*
2548	9-08-93	1.3			1500	ND	ND
2548	9-14-93	210	25000	32000	6200		
2548	9-22-93	350	40000	35000	5400		
2548	10-27-93	706, ND(F)	21000, 4100F	34900, 32500F	ND	ND	*
2625	9-08-93	32.7			11000	ND	ND
2625	9-15-93	19	6000	35000	2500		
2625	9-22-93	22	6000	44000	2200		
2636	9-08-93	45.2			39000	ND	ND
2636	9-14-93	22	130000	56000	150000		
2636	9-23-93	26	140000	57000	170000		
2880	9-30-93					ND	ND
2881	9-30-93					ND	ND
2898	9-08-93	1			60		
2898	9-15-93	ND	ND	18000	50		
2898	9-22-93	ND	ND	17000	ND		
2898	10-29-93	ND	4200, 4700F		ND	ND	*
2899	9-07-93	1			ND		
2899	9-14-93	ND	ND	13000	ND		
2899	9-22-93	ND	ND	13000	ND		
2899	9-30-93					ND	ND
2900	9-07-93	4.4			270		
2900	9-16-93	23	6000	28000	960		
2900	9-22-93	17	ND	26000	940		
2900	9-30-93					ND	ND
2900	10-26-93	18.6, ND(F)	3800, 2600F	27900, 27000F	ND	ND	*
3128	9-08-93	1			ND	ND	ND
3128	9-23-93	ND	ND	12000	ND		
3128	10-26-93	ND	3200, 3300F	13500, 14700F		ND	ND
3636	9-08-93	2.3			230	ND	ND
3636	9-14-93	ND	ND	12000	120		
3636	9-22-93	ND	ND	13000			
3636	10-27-93	ND	3500, 3500F	15100, 14900F	ND	ND	ND
3898	9-08-93	3.3			340		
3898	9-15-93	ND	ND	7000	100		
3898	9-22-93	ND	ND	8000	70		
3899	9-08-93	1			830		
3899	9-14-93	ND	ND	10000	240		
3899	9-22-93	ND	ND	11000	110		
3899	10-27-93	ND	3300, 3400F	14600, 12.700F	ND		
3900	9-07-93	2.8			60		
3900	9-16-93	ND	ND	6000	60		
3900	9-22-93	ND	ND	5000	ND		
3928	9-16-93	ND	ND	11000	ND		

ND = No detection
F = Filtered

* EPA 8240 – Analytes Detected

2898	10-29-93	Toluene = 2.9 ug/L
2128	10-26-93	Toluene = 1.3 ug/L
2548	10-27-93	Toluene = 1.8 ug/L
2900	10-26-93	Toluene = 2.4 ug/L