Appendix D
Examples of Logs, Checklists, Calculations.

a. General: The logs and checklists in this appendix are provided as examples. Projects and service providers typically have existing forms that they use. Records can be kept in any convenient paper and/or electronic form with redundancy. Field checklists for well maintenance treatment should include at least the information asked for in the example. It may be useful to divide checklists into specialty topics, for example, separate pumping test, mechanical development, chemical dosing, and chemical treatment forms. The pumping test analysis diagrams provided are generated from a pumping test analysis computer program.

b. Calculations: A copy of Appendix 11.L of Driscoll (1986) is provided for calculation of volumes in well casings and screens. Generally, screen pipe size volume x 1.5 is a safe volume figure to use for treatment chemicals in maintenance. To calculate acid in pounds:

(1) Dry: well volume (WV) x 8.3 (convert water volume to lb) x (% acid/%active acid).
Example for a 10 % solution: 110 gal x 8.3 x (0.10/0.75) = 121.73 lb

(2) Liquid (gal): (WV x % acid)/(% available acid in solution).
Example for a 10 % solution from 84 % available acid stock:
110 gal x 0.10/0.84 = 13 gal of stock chemical

Note: Chemical suppliers may list acid solutions by weight. Suppliers can provide the specific gravity or weight per volume of the stock solution needed.

c. Plates D-1 through D-13 are examples of logs and checklists to help collect and organize data. The checklists are presented as aids but are not all-inclusive since each site has site-specific data.

EXTRACTION WELL PUMPING TEST DATA

CONTRACT DACW45-92-C-0156
OTT/STORY/CORDOVA SUPERFUND SITE
NORTH MUSKEGON, MICHIGAN

WELL:	DATE:

DRAWDOWN AND FLOW MEASUREMENTS

TIME	ELAPSED TIME (min)	METER READING (gal)	DEPTH TO WATER (ft) FILTER PACK	DEPTH TO WATER (ft) INNER REHAB WELL	DEPTH TO WATER (ft) SATELLITE WELL	DEPTH TO WATER (ft) SATELLITE WELL	DEPTH TO WATER (ft) ADJACENT WELL

OTHER DATA

TOTAL PUMPED (gal)	TOTAL TEST DURATION (min)	AVERAGE FLOW RATE (gpm)	FINAL DRAWDOWN (ft)
SPECIFIC CAPACITY (gpm/ft)	FLOW METER IDENTIFICATION NUMBER	WELL WATER pH AFTER TEST	FINAL WATER TEMP. (°F)
WELL DEPTH BEFORE TEST (ft)	WELL DEPTH AFTER TEST (ft)	SAND IN DISCHARGE ? (YES or NO)	SAND CONCENTRATION (ppm)
AS-BUILT SPECIFIC CAPICITY (gpm/ft)	AS-BUILT WATER TABLE (ft. msl)	DATE INSTALLED (ORIGINAL)	

REMARKS

_____ DATE

_____ SIGNATURE OF QUALITY CONTROL REPRESENTATIVE

Plate D-1

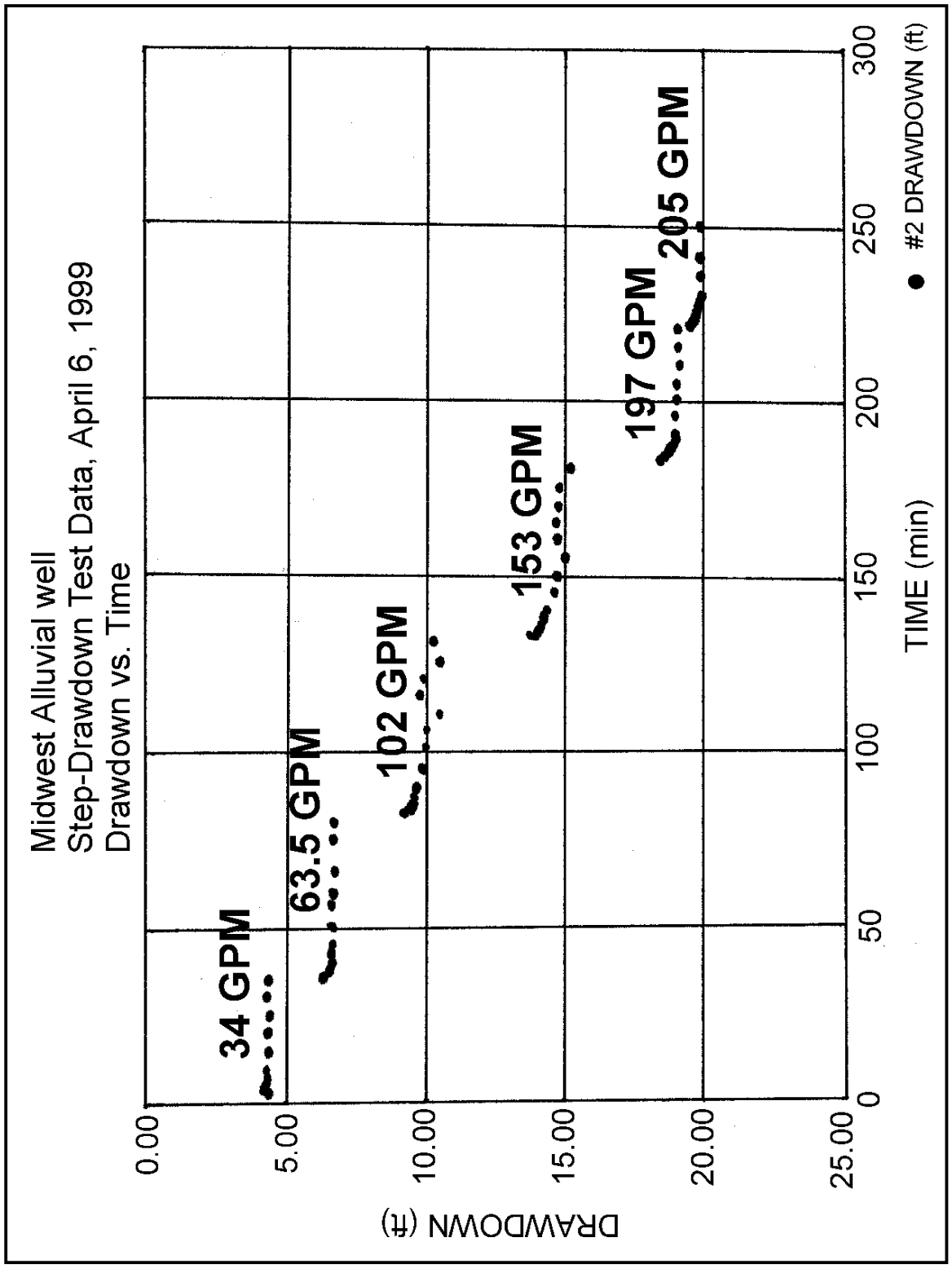

Midwest Alluvial well
Step-Drawdown Test Data, April 6, 1999
Drawdown vs. Time
34 GPM
63.5 GPM
102 GPM
153 GPM
197 GPM
205 GPM
DRAWDOWN (ft)
0.00
5.00
10.00
15.00
20.00
25.00
0
50
100
150
200
250
300
TIME (min)
#2 DRAWDOWN (ft)

Plate D-2

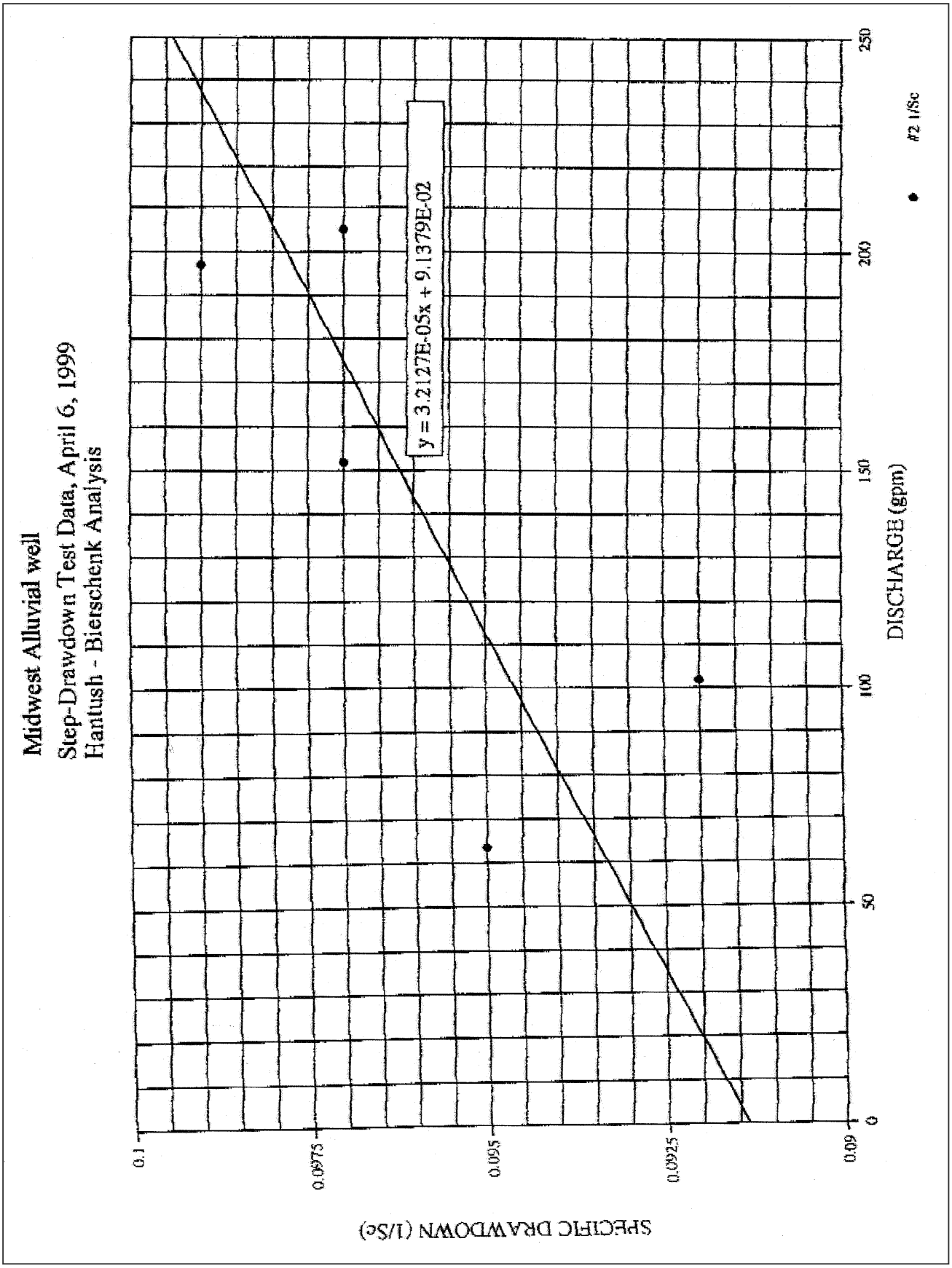

Midwest Alluvial well
Step-Drawdown Test Data, April 6, 1999
Hantush - Bierschenk Analysis
y = 3.2127E-05x + 9.1379E-02
#2 1/Sc
DISCHARGE (gpm)
SPECIFIC DRAWDOWN (1/Sc)
0.1
0.0975
0.095
0.0925
0.09
0
50
100
150
200
250

Plate D-3

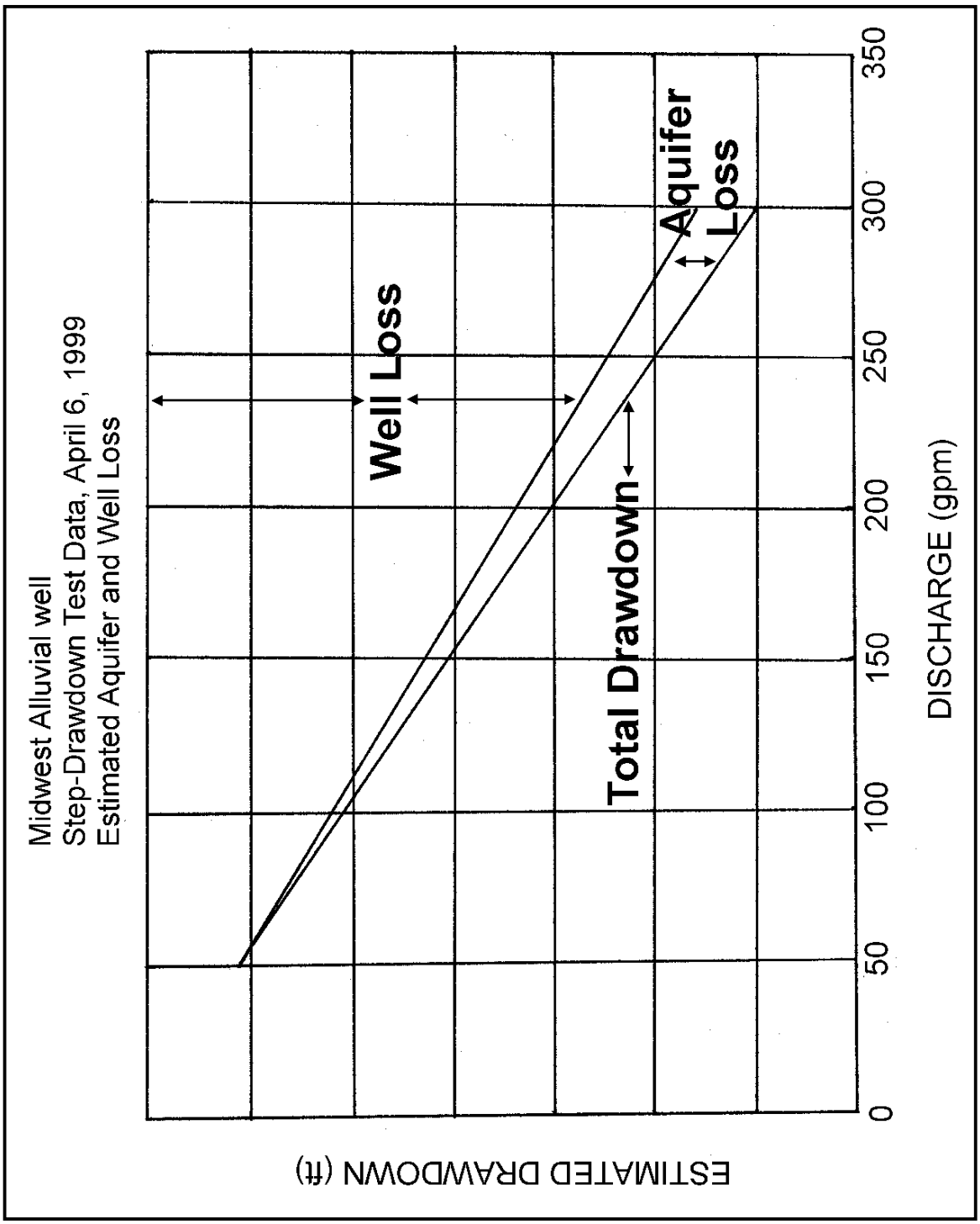

Midwest Alluvial well
Step-Drawdown Test Data, April 6, 1999
Estimated Aquifer and Well Loss
Well Loss
Aquifer Loss
Total Drawdown
ESTIMATED DRAWDOWN (ft)
DISCHARGE (gpm)
0
50
100
150
200
250
300
350

Plate D-4

Volume of Water in Casing or Hole*

Diameter of casing or hole (in)**	Gallons per foot of water column**	Cubic feet per foot of water column**	Liters per meter of water column**	Cublic meters per meter of water column**
2	0.163	0.0218	2.024	2.02×10^{-3}
4	0.653	0.873	8.11	8.11×10^{-3}
5	1.02	0.1364	12.67	12.67×10^{-3}
6	1.469	0.1963	18.24	18.24×10^{-3}
7	2	0.2673	24.84	24.84×10^{-3}
8	2.611	0.3491	32.43	32.43×10^{-3}
10	4.08	0.5454	50.67	50.67×10^{-3}
11	4.937	0.66	61.31	61.31×10^{-3}
12	5.875	0.7854	72.96	72.96×10^{-3}
14	8	1.069	99.35	99.35×10^{-3}
16	10.44	1.396	129.65	129.65×10^{-3}
18	13.22	1.767	164.18	164.18×10^{-3}
20	16.32	2.182	202.68	202.68×10^{-3}
24	23.5	3.142	291.85	291.85×10^{-3}
34	47.16	6.305	585.68	585.68×10^{-3}
36	52.88	7.069	656.72	656.72×10^{-3}

* After Driscoll (1986) Appendix 11.L.
** 1 in = 25.4 mm.
1 gallon = 3.785 L.
1 meter = 3.281 ft.
1 gallon water weighs 8.33 lb = 3.785 kg.
1 L water weighs 1 kg = 2.205 lb.
1 gallon per ft of depth = 12.419 L per ft of depth
1 gallon per m of depth = 12.419×10^{-3} cubic m per m of depth.

EXTRACTION, INJECTION, AND MONITORING WELLS
12/16/99

Introduction

This checklist is meant to evaluate the adequacy of maintenance of the extraction and monitoring wells on site. The adequacy of the extraction system should be evaluated using the Ground Water Extraction Subsurface Performance Checklist. The adequacy of the monitoring network should be evaluated using the Environmental Monitoring Checklist.

References

EM 1110-1-4000 Monitor Well Design, Installation, and Documentation at HTRW Sites
ETL 1110-1-201 Ground Water Extraction

Current Operating Conditions and/or Configuration

Record any deviations from as-builts _____
_____
_____

Adequacy of Operations and Maintenance:

Wellheads Protected from Standing Surface Water? ____
Is there settlement around the well (i.e. due to inadequate compaction or aquifer consolidation)? ____
Above-ground wellheads painted and clearly labeled? ____
Vault covers and vaults in good repair and clearly labeled? ____
Wellhead enclosures painted, well maintained, and clearly labeled? ____
Are concrete pads around the well in good condition? ____
Has there been physical damage to the well? ____
Is there evidence for frost heave/jacking of the protective casing or well casing? ____
Is there a regular program for evaluating the performance of the well (check specific capacity and accumulated sediment)? ____
Is there evidence of degradation of well performance? ____
What was the original specific capacity and how does it compare to the current capacity?
Is there a regular program to evaluate down hole conditions (e.g., camera survey) ____
Have BART tests or other bacteriological tests been utilized to evaluate biofouling? ____
For injection wells only, has the treated/injection water been tested for the potential to cause inorganic precipitation? ____
Is there a regular well maintenance program? ____
If so, What is the well maintenance protocol: _____
_____
Can the prescribed well maintenance be carried out given the layout of the well and the available personnel and equipment? ____
When was the well last developed and when will it be redeveloped? ____
Is there evidence of well or drop pipe corrosion? ____
Is there an up-to-date logbook for recording performance & maintenance for each extraction well? ____
How many gallons of water has the well pumped since it was installed? ____
Is there a maintenance schedule for the pump and how is it documented? ____
Has there been excessive pump wear noticed due to sediments? ____
Are all of the flow meters/totalizers in good working order? ____
Is there an inventory of appropriate spare parts for the pumps and related equipment? ____
Is there evidence suggesting the lines between the wells and the plant are occluded? ____

Plate D-6

Problems to Watch For

Well siltation (fine material enters the well and settles to the bottom, ultimately occluding the screen) *Solution: periodic sounding of the well and bailing the sediment when it reaches a certain height above the bottom cap.*
Well encrustation or fouling (common problem, scale or biological growth forms on well screen, reducing open area and increasing water entrance velocities, typically manifested by reduced specific capacity of the well). *Solution: periodic rehabilitation when the specific capacity decreases to a predetermined level according to a protocol appropriate for the cause of the reduced capacity.*
Physical damage to the well due to frost, vehicles, vandalism (can limit or prevent use of the well, compromise integrity of the well and allow contaminated surface water to migrate to the subsurface). *Solution: inspection and repair. Severe damage can require well replacement. Damaged well must be decommissioned in accordance with state requirements.*
Excess sand/turbidity production even after extensive redevelopment (due to corrosion, inadequate design of filter pack and/or screen). *Solution: well replacement. Other alternatives (e.g., selective pressure grouting of an affected zone or blank casing / small-slot screen inserts) could be considered for very expensive/deep wells but may not result in adequate well performance.*

Process Monitoring

Not Applicable

Alternatives for Possible Cost Savings

Extraction Wells:
Consider the following alternative
- Extraction trenches (have increased intake area, lower entrance velocities.
- Treatment walls or wells (see Ground Water Extraction Technology checklist)

Monitoring Wells
- Buried Sensors
- SeaMIST
- Direct Push Probes

Plate D-6

Facility/Project Name	Local Grid Location of Well ☐ N. ____ m. ☐ S. ____ m. ☐ E. ☐ W.	Well Number
Facility License, Permit or Monitoring Number	Grid Origin Location Lat. ____ ____ ____ Long. ____ ____ ____ or	Date Well Installed (Start)
Type of Protective Cover: Above-Ground ☐ Flush-To-Ground ☐	St. Plane ____ m. N. ____ m. E.	Date Well Installed (Completed)
Well Distance From Waste/Source Boundary	Section Location of Waste/Source ___¼ of ___¼ of Sec. ___ T. ___ N.R. ___ ☐ E. ☐ W.	Well Installed By: (Person's Name & Firm)
Maximum Depth of Frost Penetration (estimated)	Location of Well Relative to Waste/Source u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known	

Note: Use top of casing (TOC) for all depth measurements.

A. Protective casing, top elevation ____ m. MSL
B. Well casing, top elevation ____ m. MSL
C. Land surface elevation ____ m. MSL
D. Surface seal, bottom ____ m. TOC or ____ m. MSL

16. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

17. Sieve analysis attached? ☐ Yes ☐ No

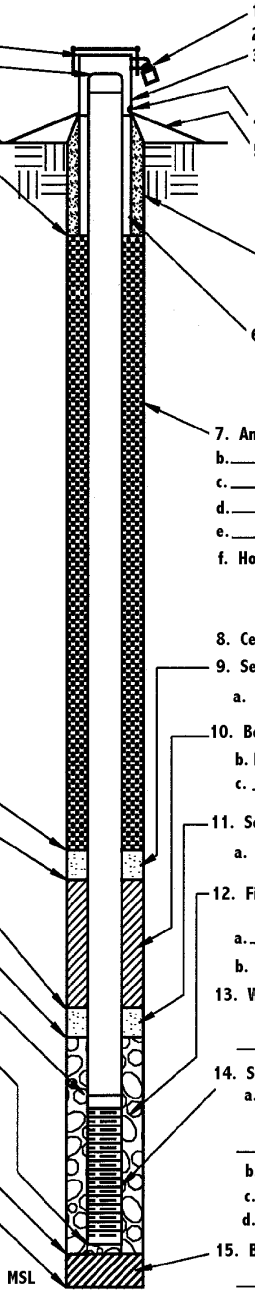
18. Drilling method used: Rotary ☐ Hollow Stem Auger ☐ ____ Other ☐

19. Drilling fluid used: Water ☐ Air ☐ Drilling Mud ☐ None ☐

20. Drilling additives used? ☐ Yes ☐ No
Describe ____

21. Source of water (attach analysis):
____

E. Secondary filter, top ____ m. TOC or ____ m. MSL
F. Bentonite seal, top ____ m. TOC or ____ m. MSL
G. Secondary filter, top ____ m. TOC or ____ m. MSL
H. Primary filter, top ____ m. TOC or ____ m. MSL
I. Screen joint, top ____ m. TOC or ____ m. MSL
J. Well bottom ____ m. TOC or ____ m. MSL
K. Filter pack, bottom ____ m. TOC or ____ m. MSL
L. Borehole, bottom ____ m. TOC or ____ m. MSL
M. Borehole, diameter ____ mm.
N. O.D. well casing ____ mm.
O. I.D. well casing ____ mm.
P. 24-hr water level after completion ____ m. TOC or ____ m. MSL



1. Cap and lock? ☐ Yes ☐ No
2. Protective posts? ☐ Yes ☐ No
3. Protective casing:
a. Inside diameter: ____ mm.
b. Length: ____ m.
4. Drainage port(s) ☐ Yes ☐ No
5. Surface seal:
a. Cap: Gravel blanket ☐ Bentonite ☐ Concrete ☐ ____ Other ☐
b. Annular space seal: Bentonite ☐ Cement ☐ ____ Other ☐
6. Material between well casing and protective casing: Bentonite ☐ Cement ☐ ____ Other ☐
7. Annular space seal: a. Granular Bentonite ☐
b. ____ Lbs/gal mud weight .. Bentonite-sand slurry ☐
c. ____ Lbs/gal mud weight ..... Bentonite slurry ☐
d. ____ % Bentonite ..... Bentonite-cement grout ☐
e. ____ m^3 volume added for any of the above
f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☐
8. Centralizers ☐ Yes ☐ No
9. Secondary Filter ☐ Yes ☐ No
a. Volume added ____ m^3 ____ Bags/Size
10. Bentonite seal: a. Bentonite granules ☐
b. ☐ ¼in. ☐ ⅜in. ☐ ½in. Bentonite pellets ☐
c. ____ Other ☐
11. Secondary Filter ☐ Yes ☐ No
a. Volume added ____ m^3 ____ Bags/Size
12. Filter pack material: Manufacturer, product name & mesh size
a. ____
b. Volume added ____ m^3 ____ Bags/Size
13. Well casing: Flush threaded PVC schedule 40 ☐ Flush threaded PVC schedule 80 ☐ ____ Other ☐
14. Screen material: ____
a. Screen type: Factory cut ☐ Continuous slot ☐ ____ Other ☐
b. Manufacturer ____
c. Slot size: 0. ____ in.
d. Slotted length: ____ m.
15. Backfill material (below filter pack): None ☐ ____ Other ☐

Plate D-7

EXTRACTION WELL CLEANING DATA
CONTRACT DACW45-92-C-0156
OTT/STORY/CORDOVA SUPERFUND SITE
NORTH MUSKEGON, MICHIGAN

EXTRACTION WELL	INITIAL DEPTH (FT)	AS-BUILT DEPTH (FT)	DATE

ACID TREATMENTS

ACID BLEND				
BACKGROUND WATER TEMP (• F)		BACKGROUND WATER pH		

								STARTING ACID		END 10' ZONE
ZONE WORK PERFORMED	START TIME	END TIME	START WELL DEPTH (FT)	ACID BLEND VOL. (GAL)	pH	TEMP. (• F)	PRESS (PSI)	pH	WELL DEPTH (FT)	TEMP. (• F)

REMARKS

_____ DATE

_____ SIGNATURE OF QUALITY CONTROL REPRESENTATIVE

Plate D-8

EXTRACTION WELL DEVELOPMENT DATA
CONTRACT DACW45-92-C-0156
OTT/STORY/CORDOVA SUPERFUND SITE
NORTH MUSKEGON, MICHIGAN

EXTRACTION WELL	INITIAL DEPTH (FT)	AS-BUILT DEPTH (FT)	DATE

ACID TREATMENTS

ACID BLEND			
BACKGROUND WATER TEMP (°F)		BACKGROUND WATER pH	

SURGING DATA

ZONE WORKED PERFORMED	START TIME	END TIME	STARTING DEPTH (FT)	ENDING DEPTH (FT)	ENDING pH

WELL DEPTH BEFORE (FT)		WELL DEPTH AFTER (FT)		FINAL WATER pH	

REMARKS

_____ DATE

_____ SIGNATURE OF QUALITY CONTROL REPRESENTATIVE

Plate D-9

WELL SERVICE RECORD

Job designation _____ **Date started** _____

Customer _____ **Date finished** _____

Job address _____ **City** _____ **State** _____

Work performed _____

Personnel _____

Checklist

__Surface facility inspection __Pump test __Pump removal, service, reset __Well pumping test (pre-) Type of test:: _____

__Mechanical well redevelopment Type: _____ __Well pumping test (post) Type of test: _____

__Chemical well treatment Type: _____

__Additional service Type: _____

Describe equipment used _____

Well: _____ Dimensions and capacities

Construction date		Well Depth		Casing diameter	
Original yield		Pump type		Screen slot size (state units)	
Current yield		Casing material		Screen diameter	
Original Q/s		Screen material		Screen length	
Q/s before action (@ what gpm)		Q/s after action @		Filter pack description	

Activity

Action description	Time interval	Dimensions	Notes/comments:

Sheet _1_ of ___

Signature and date (print name and title):

WELLS CONTRACTING LP ***Groundwater Contractors***
345 Pumphoist Circle/St. Joseph, OH 46001/740-555-5555

WELL SERVICE RECORD

Job designation	Oil City routine maintenance		**Date started**	7/22/1999	
Customer	Oil City Properties LLC		**Date finished**	7/24/1999	
Job address	666 Lucky Ln	**City**	Sweetwater	**State**	WV

Work performed Scheduled well cleaning and pump service
Personnel Jeff Friederhorst, foreman; Ken Wells, journeyman

Checklist

__Surface facility inspection	**__Pump test**	**__Pump removal, service, reset**	**__Well pumping test (pre-)**	**Type of test::**	
__Mechanical well redevelopment	**Type:**	Surge and pump	**__Well pumping test (post)**	**Type of test:**	Specific capacity
__Chemical well treatment	**Type:**	Acetic + CB4	10 % sol.		
__Additional service	**Type:**	Fixed faulty	controller		
Describe equipment used		Surge block w/	pump		

Well: South pumping array PW-15 **Dimensions and capacities**

Construction date	5/1990	Well Depth	95 ft	Casing diameter	8 _
Original yield	127 gpm	Pump type	Goulds 50L	Screen slot size (state units)	0.040 in
Current yield	118 gpm	Casing material	PVC	Screen diameter	6 _
Original Q/s	13 gpm/ft	Screen material	315 stainless	Screen length	20.5 ft
Q/s before action (@ what gpm)	10 gpm/ft	Q/s after action @	12 gpm/ft	Filter pack description	3-in annular r. 0.060 silica

Activity

Action description	Time interval	Dimensions	Notes/comments:	
Checked equipment, power	13:15-13:45		All nominal	
Checked records, talked to site supervisor	13:45-14:00		Nothing new	
Pulled pump	14:00-14:30	45 ft of line	Covered in iron	bacteria
Steam clean pump	14:40-16:00		Cleaned up good	
Run in surge	14:40-15:00	In screen		
Run block	15:00-16:00	5 ft interval	7 min per section	
Shut down				
Start up surge	7:30			
Mix chemicals	7:40-9:00		60 gal H2O, 7 gal	84% acetic + .5 gal CB4 + 1 lb sulfamic
Pump in load	9:00-9:15			
Start on PW-18				
Surge	12:30-14:30			

Sheet 1 of __
Signature and date (print name and title):

Plate D-11

HTRW DRILLING LOG	DISTRICT	HOLE NUMBER
1. COMPANY NAME	2. DRILLING SUBCONTRACTOR	SHEET SHEETS OF

3. PROJECT	4. LOCATION
5. NAME OF DRILLER	6. MANUFACTURER'S DESIGNATION OF DRILL
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	8. HOLE LOCATION
	9. SURFACE ELEVATION
	10. DATE STARTED / 11. DATE COMPLETED
12. OVERBURDEN THICKNESS	15. DEPTH GROUNDWATER ENCOUNTERED
13. DEPTH DRILLED INTO ROCK	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED
14. TOTAL DEPTH OF HOLE	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

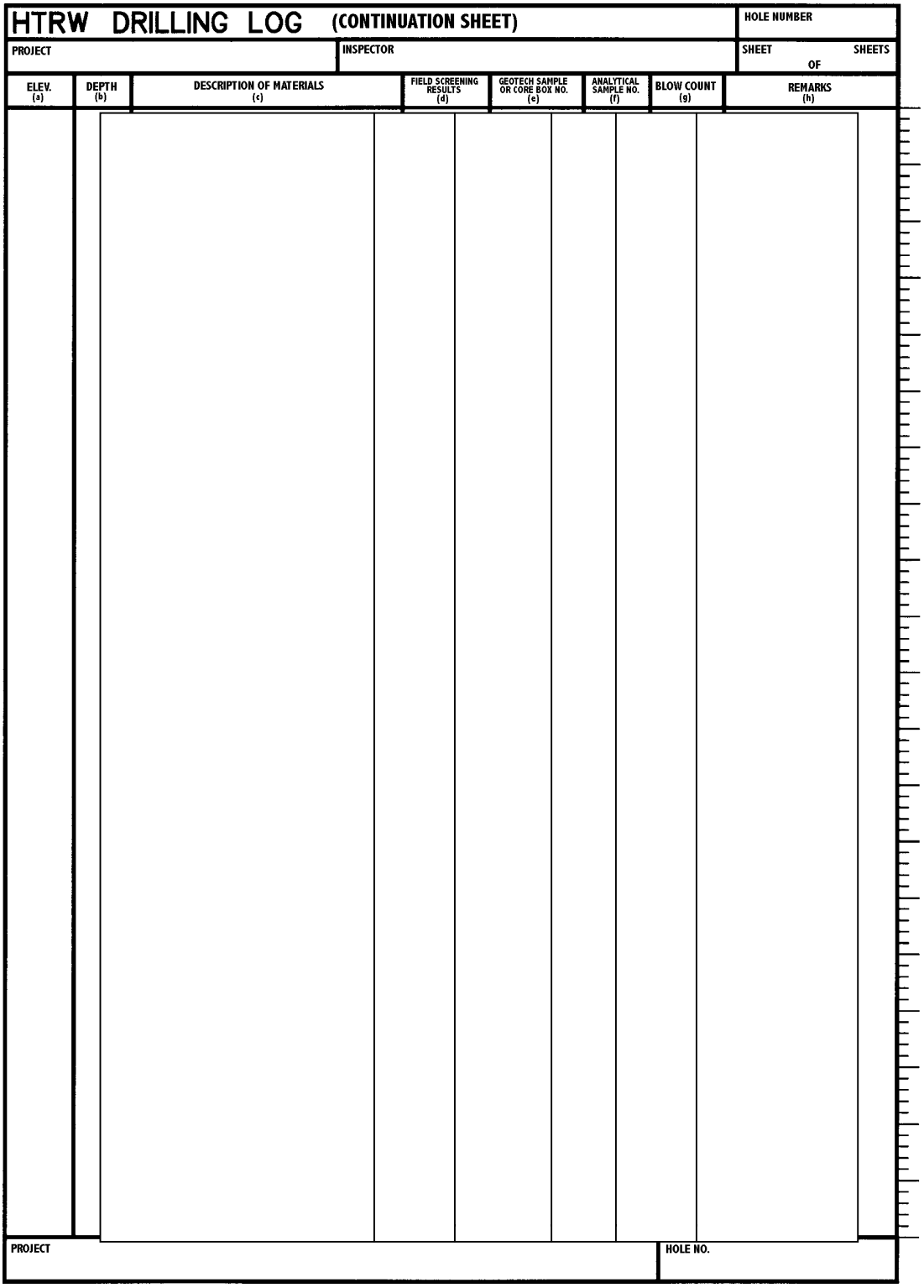
22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.

Sheet 1 of 2

Plate D-12



HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER

PROJECT

INSPECTOR

SHEET SHEETS OF

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)

PROJECT

HOLE NO.

ENG FORM 5056A-R, AUG 94

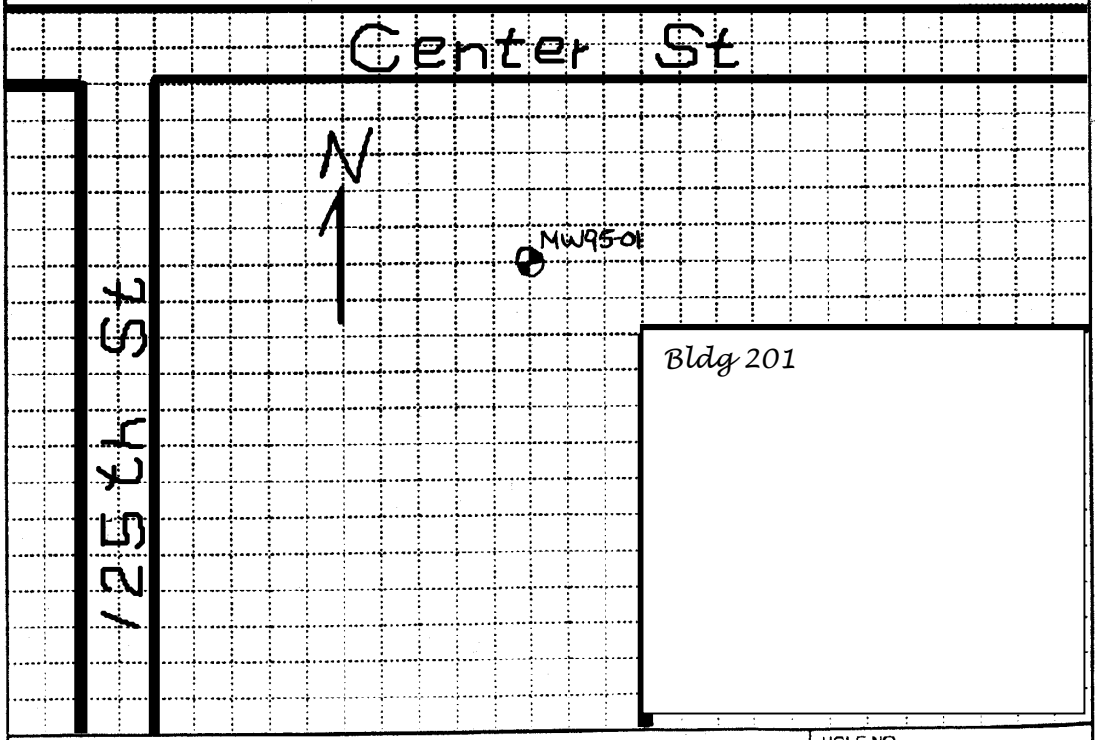
(Proponent: CECW-EG)

Plate D-12

HTRW DRILLING LOG	DISTRICT OMAHA	HOLE NUMBER MW95-01
1. COMPANY NAME CONTRACTING FIRM, INC.	2. DRILL SUBCONTRACTOR SUBCONTRACT DRILLERS, INC	SHEET 1 OF 3 SHEETS
3. PROJECT BIG SUPERFUND SITE	4. LOCATION Site A	
5. NAME OF DRILLER JOE SUPER DRILLER	6. MANUFACTURER'S DESIGNATION OF DRILL CME-75 Milwaukee Heavy Duty Drill Rig	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT CME-75, using 4 1/4" hollow stem augers, 3" O.D. Stainless Steel split-spoons (chemical and geotech), bullet bit (outer) drag bit (inner)	8. HOLE LOCATION See Map Below	
	9. SURFACE ELEVATION Not Yet Available	
	10. DATE STARTED 8-6-95	11. DATE COMPLETED 8-7-95
12. OVERBURDEN THICKNESS 12.0'	15. DEPTH GROUNDWATER ENCOUNTERED 5.0'	
13. DEPTH DRILLED INTO ROCK ϕ	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED 4.5' TOC ~72 hours (in well)	
14. TOTAL DEPTH OF HOLE 12.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED ϕ	UNDISTURBED ϕ	19. TOTAL NUMBER OF CORE BOXES ϕ			
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY ϕ %
			BTEX 4x40z	TRPH 2x80z	Lead 2x80z	
22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL 8-6-92	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR Field Geologist		

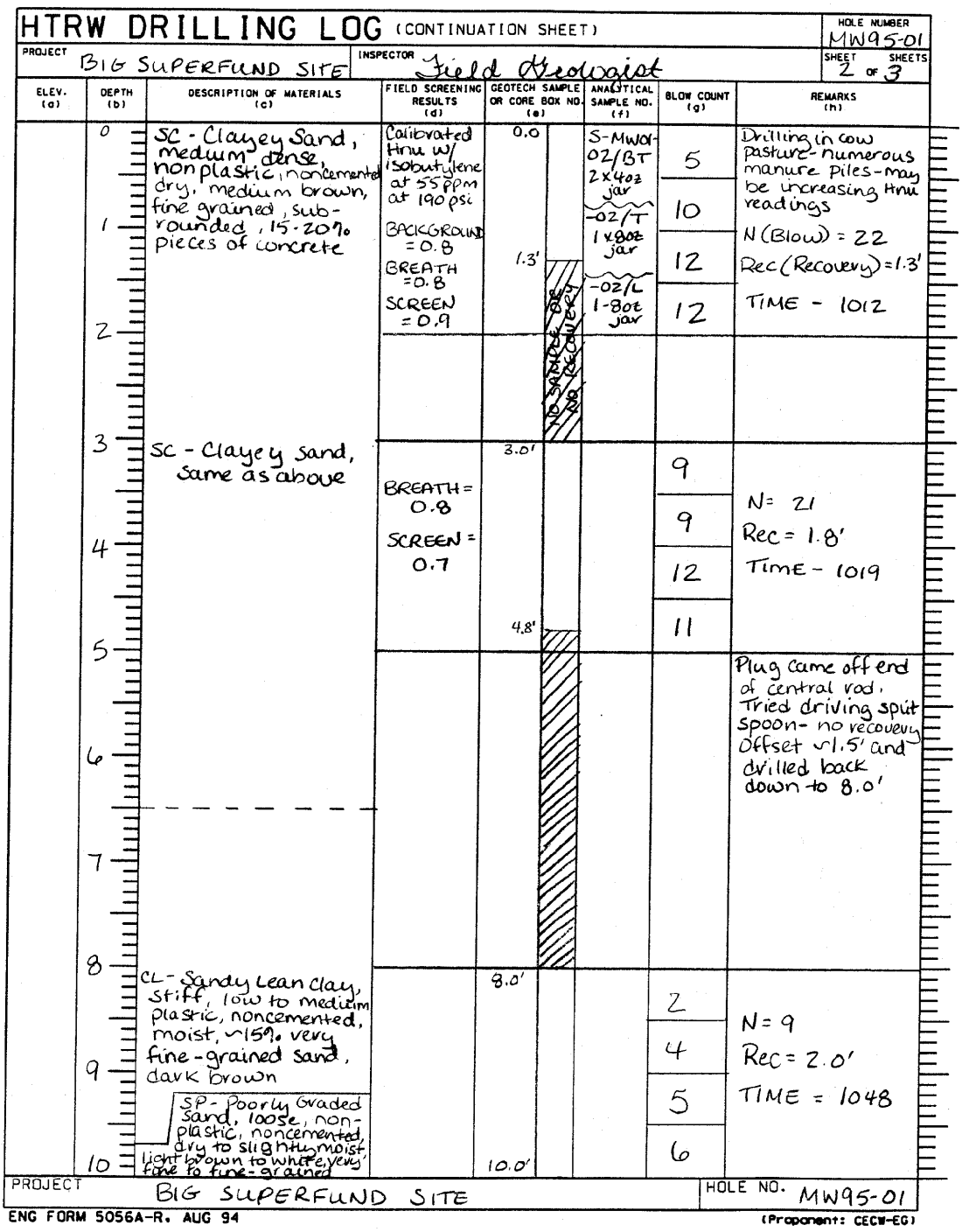
LOCATION SKETCH/COMMENTS SCALE: 1" = 20'



PROJECT BIG SUPERFUND SITE HOLE NO. MW95-01

ENG FORM 5056-R, AUG 94 (Proponent: CECW-EG)

Plate D-13



HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER MW95-01

PROJECT BIG SUPERFUND SITE

INSPECTOR Field Geologist

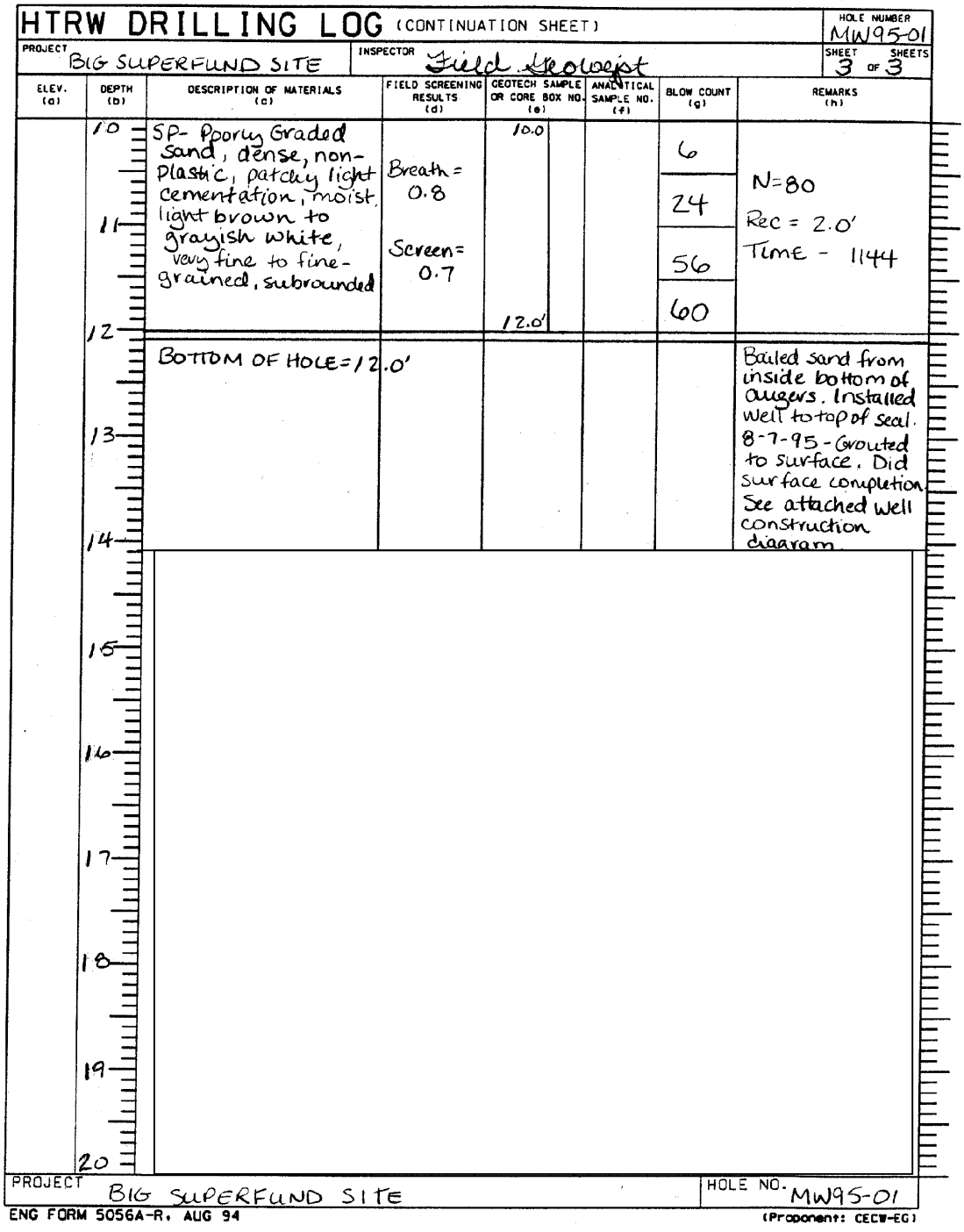
SHEET 2 OF 3 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	0	SC - Clayey Sand, medium dense, nonplastic, noncemented, dry, medium brown, fine grained, sub-rounded, 15-20% pieces of concrete	Calibrated Hnu w/ Isobutylene at 55 ppm at 190 psi BACKGROUND = 0.8 BREATH = 0.8 SCREEN = 0.9	0.0	S-MW01-02/BT 2x4oz jar	5	Drilling in cow pasture - numerous manure piles - may be increasing Hnu readings
	1				-02/T 1x8oz jar	10	N (Blow) = 22
				1.3'		12	Rec (Recovery) = 1.3'
	2			10 SAND CORE NO RECOVERY	-02/L 1-8oz jar	12	TIME - 1012
	3	SC - Clayey Sand, same as above		3.0'		9	
			BREATH = 0.8			9	N = 21
	4		SCREEN = 0.7			12	Rec = 1.8'
				4.8'		11	TIME - 1019
	5						Plug came off end of central rod. Tried driving split spoon - no recovery. Offset ~1.5' and drilled back down to 8.0'
	6						
	7						
	8	CL - Sandy Lean Clay, stiff, low to medium plastic, noncemented, moist, ~15% very fine-grained sand, dark brown		8.0'		2	
						4	N = 9
	9	SP - Poorly Graded Sand, loose, non-plastic, noncemented, dry to slightly moist, light brown to white, very fine to fine-grained				5	Rec = 2.0'
							TIME = 1048
	10			10.0'		6	

PROJECT BIG SUPERFUND SITE HOLE NO. MW95-01

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

Plate D-13



HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW95-01

PROJECT: BIG SUPERFUND SITE

INSPECTOR: Field Geologist

SHEET 3 OF 3 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	10	SP- Poorly Graded Sand, dense, non-plastic, patchy light cementation, moist, light brown to grayish white, very fine to fine-grained, subrounded	Breath = 0.8 Screen = 0.7	10.0 12.0'		6 24 56 60	N=80 Rec = 2.0' Time - 1144
	12	BOTTOM OF HOLE = 12.0'					Bailed sand from inside bottom of augers. Installed well to top of seal. 8-7-95 - Grouted to surface. Did surface completion. See attached well construction diagram.
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						

PROJECT: BIG SUPERFUND SITE

HOLE NO. MW95-01

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

Sheet 3 of 3

Plate D-13