ERM-Northeast

FINAL REMEDIAL INVESTIGATION
VAN DER HORST CORPORATION SITE
PLANT NO. 2
SITE NO. 9-05-022
OLEAN, CATTARAUGUS COUNTY

APPENDICES
VOLUME II OF II

JULY 1992

SUBMITTED TO:

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS WASTE REMEDIATION
ALBANY, NEW YORK 12233

SUBMITTED BY:

ERM-NORTHEAST, INC.
5500 MAIN STREET
WILLIAMSVILLE, NEW YORK 14221

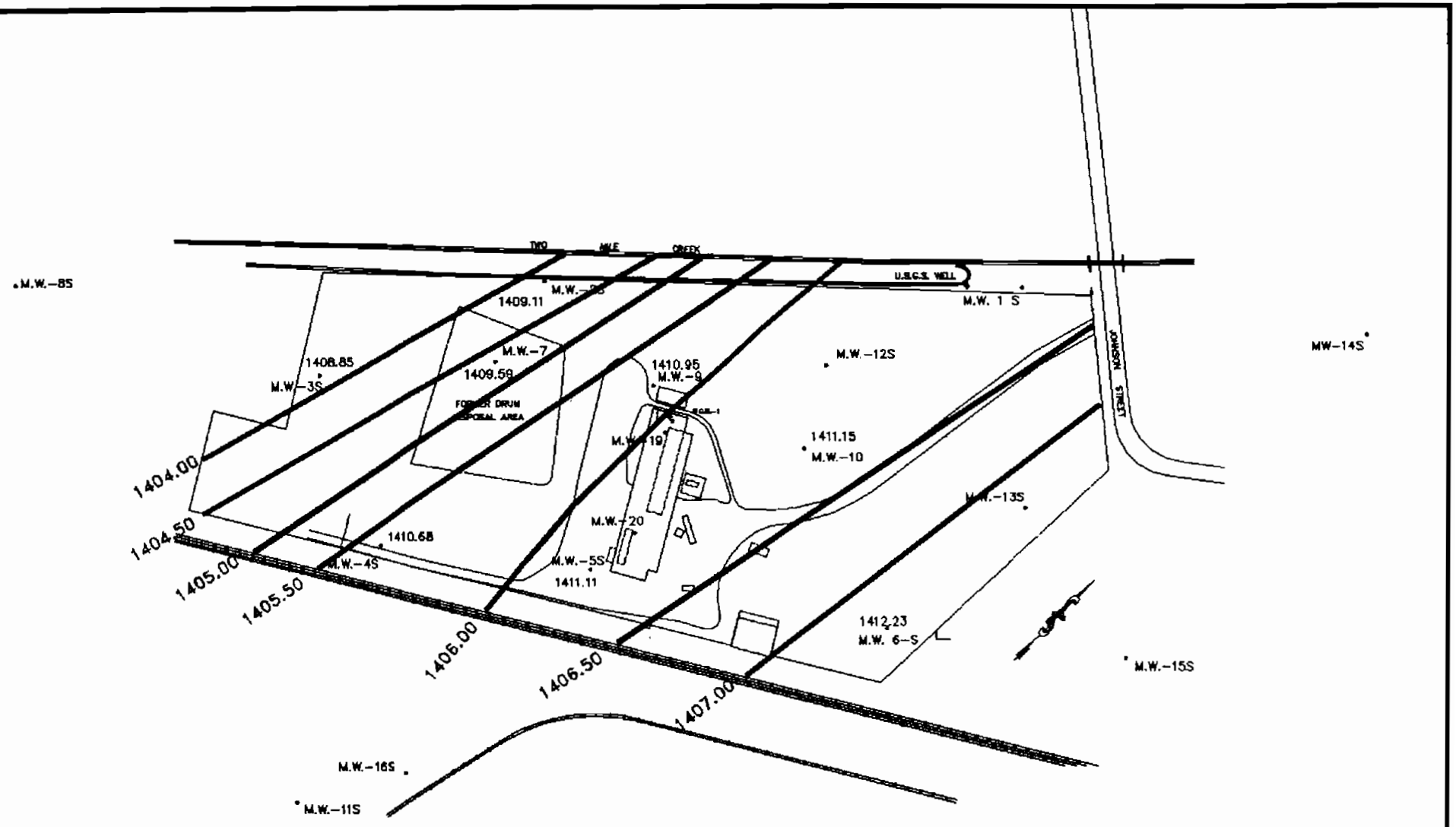
ERM-Northeast

LIST OF APPENDICES

Note: Phase II Field Data was previously submitted as a separate volume in February, 1992

LIST OF VOLUMES

APPENDIX A
GROUND WATER CONTOUR MAPS



LEGEND

• – MONITORING WELLS

1404.00 — GROUND WATER ELEVATION (ft)

0' 100' 200' 400'

SCALE

TITLE

VAN DER HORST PLANT 2
GROUND WATER CONTOURS FOR
SHALLOW MONITORING WELLS ON
MAY 10, 1990

PREPARED FOR

NYSDEC

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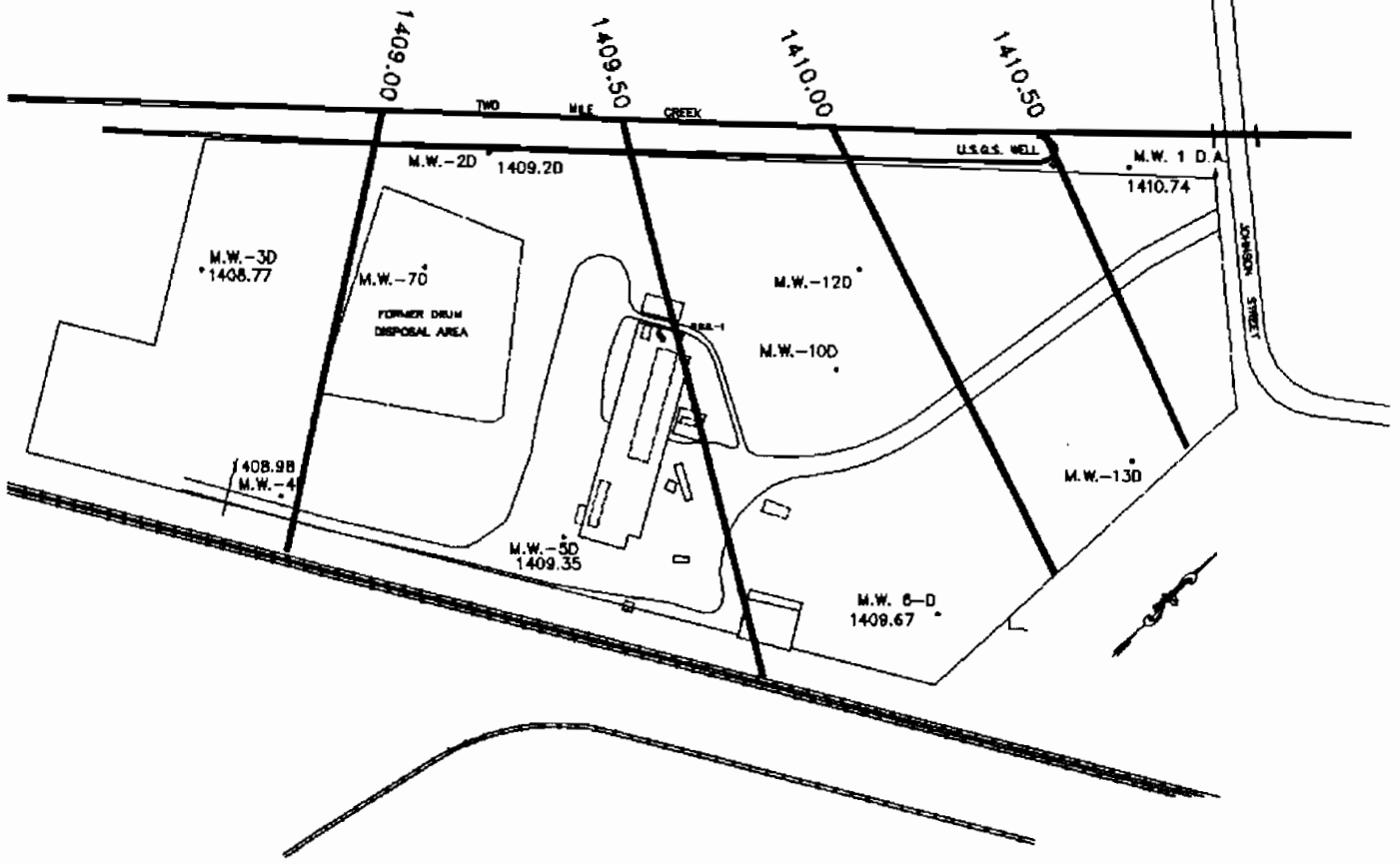
Environmental Resources Management

DATE

FIGURE



LEGEND

• – MONITORING WELLS

1404.00 ═══ GROUND WATER ELEVATION (ft)

0' 100' 200' 400'

SCALE

TITLE

VAN DER HORST PLANT 2
GROUND WATER CONTOURS FOR
DEEP MONITORING WELLS ON
MAY 10, 1990

PREPARED FOR

NYSDEC

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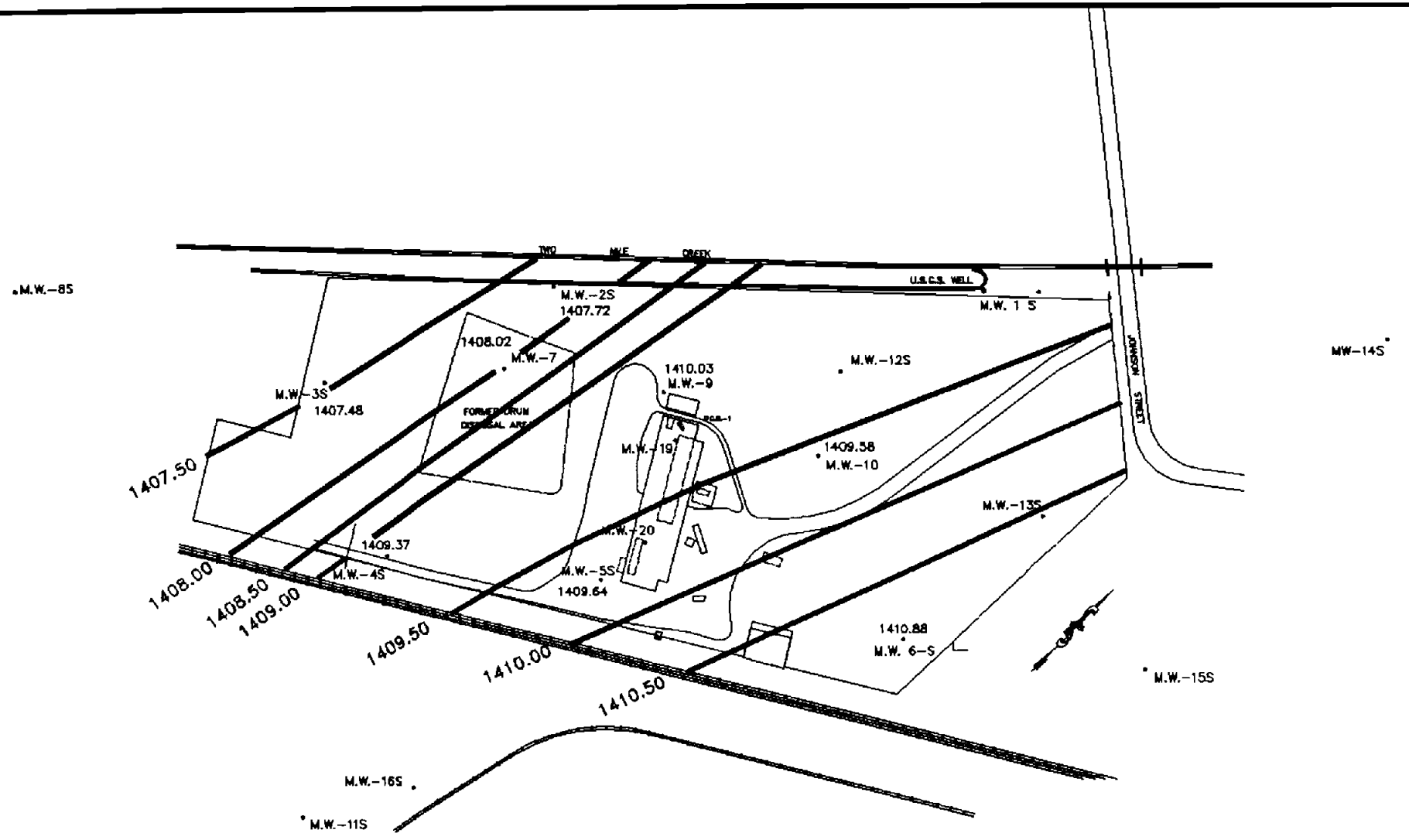
Environmental Resources Management

DATE

FIGURE



LEGEND

• – MONITORING WELLS

1404.00 ═══ GROUND WATER ELEVATION (ft)

0' 100' 200' 400'

SCALE

TITLE

VAN DER HORST PLANT 2
GROUND WATER CONTOURS FOR
SHALLOW MONITORING WELLS ON
JULY 17, 1990

PREPARED FOR

NYSDEC

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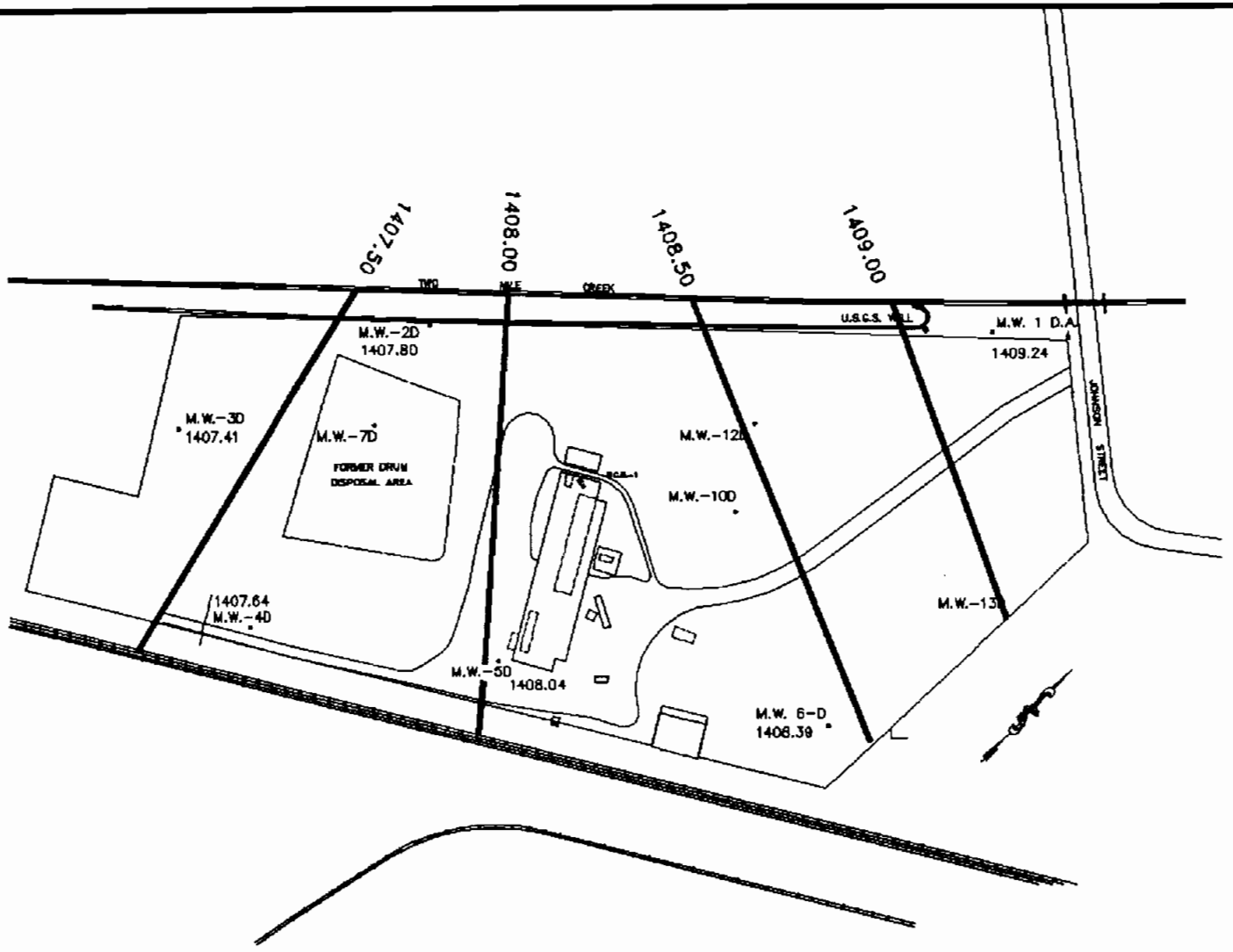
Environmental Resources Management

DATE

FIGURE



LEGEND

• – MONITORING WELLS

1404.00 ═══ GROUND WATER ELEVATION (ft)

0' 100' 200' 400'

SCALE

TITLE

VAN DER HORST PLANT 2
GROUND WATER CONTOURS FOR
DEEP MONITORING WELLS ON
JULY 17, 1990

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Environmental Resources Management

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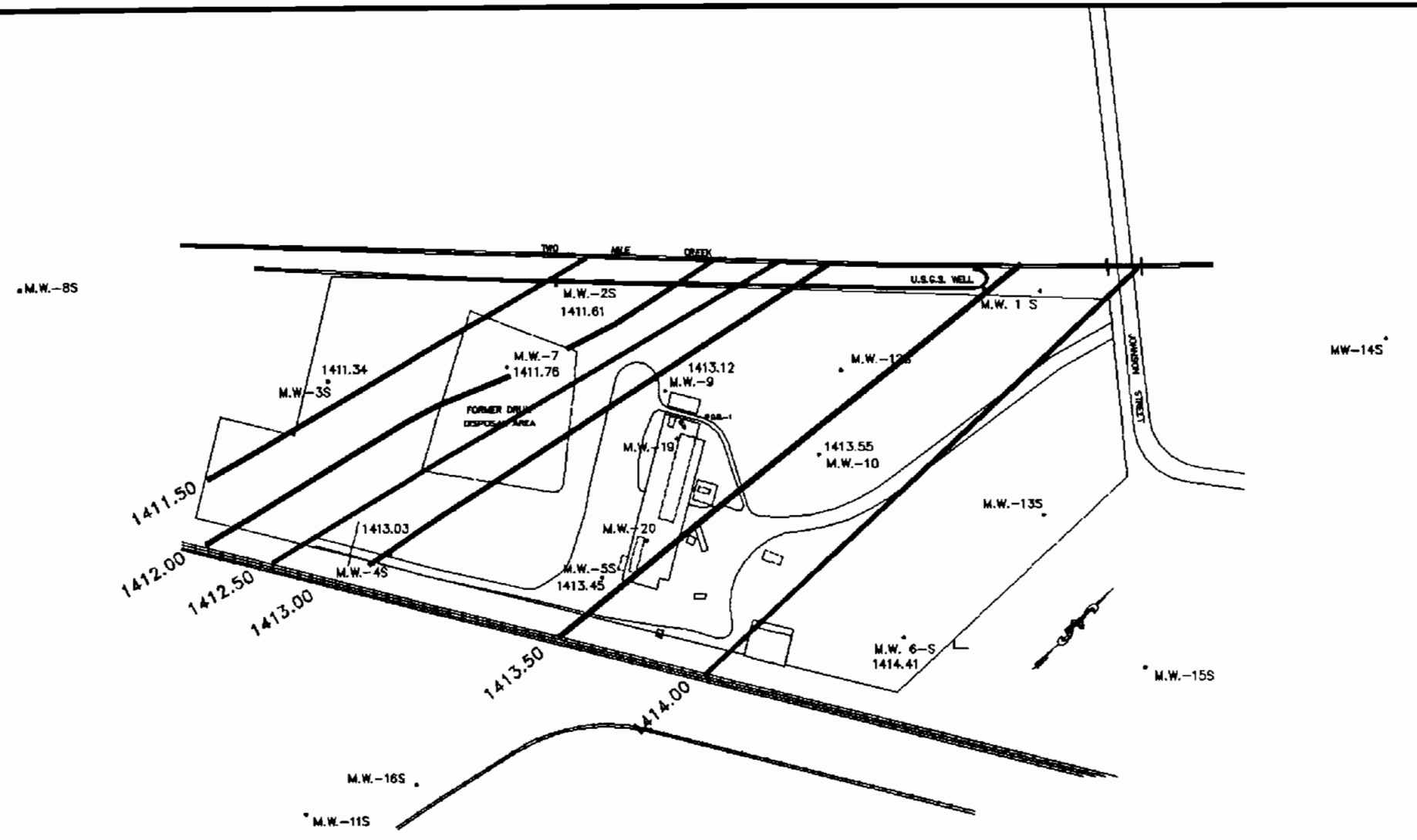
FIGURE



TITLE

VAN DER HORST PLANT 2
GROUND WATER CONTOURS FOR
SHALLOW MONITORING WELLS ON
JANUARY 4, 1991

PREPARED FOR

NYSDEC

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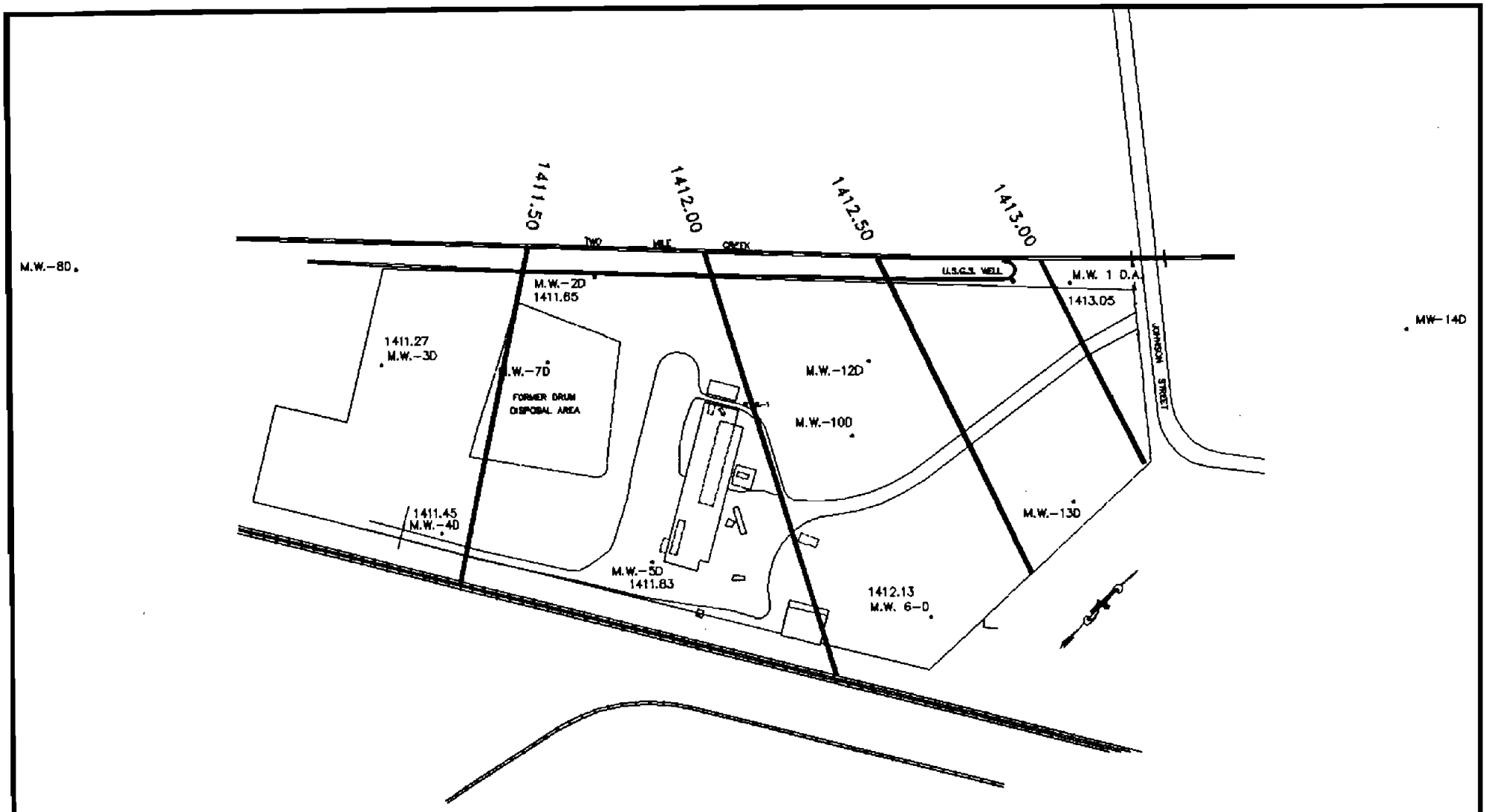
DATE

FIGURE



LEGEND

• – MONITORING WELLS

1404.00 ═══ GROUND WATER ELEVATION (ft)

0' 100' 200' 400'

SCALE

TITLE

VAN DER HORST PLANT 2
GROUND WATER CONTOURS FOR
DEEP MONITORING WELLS ON
JANUARY 4, 1991

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NYSDEC

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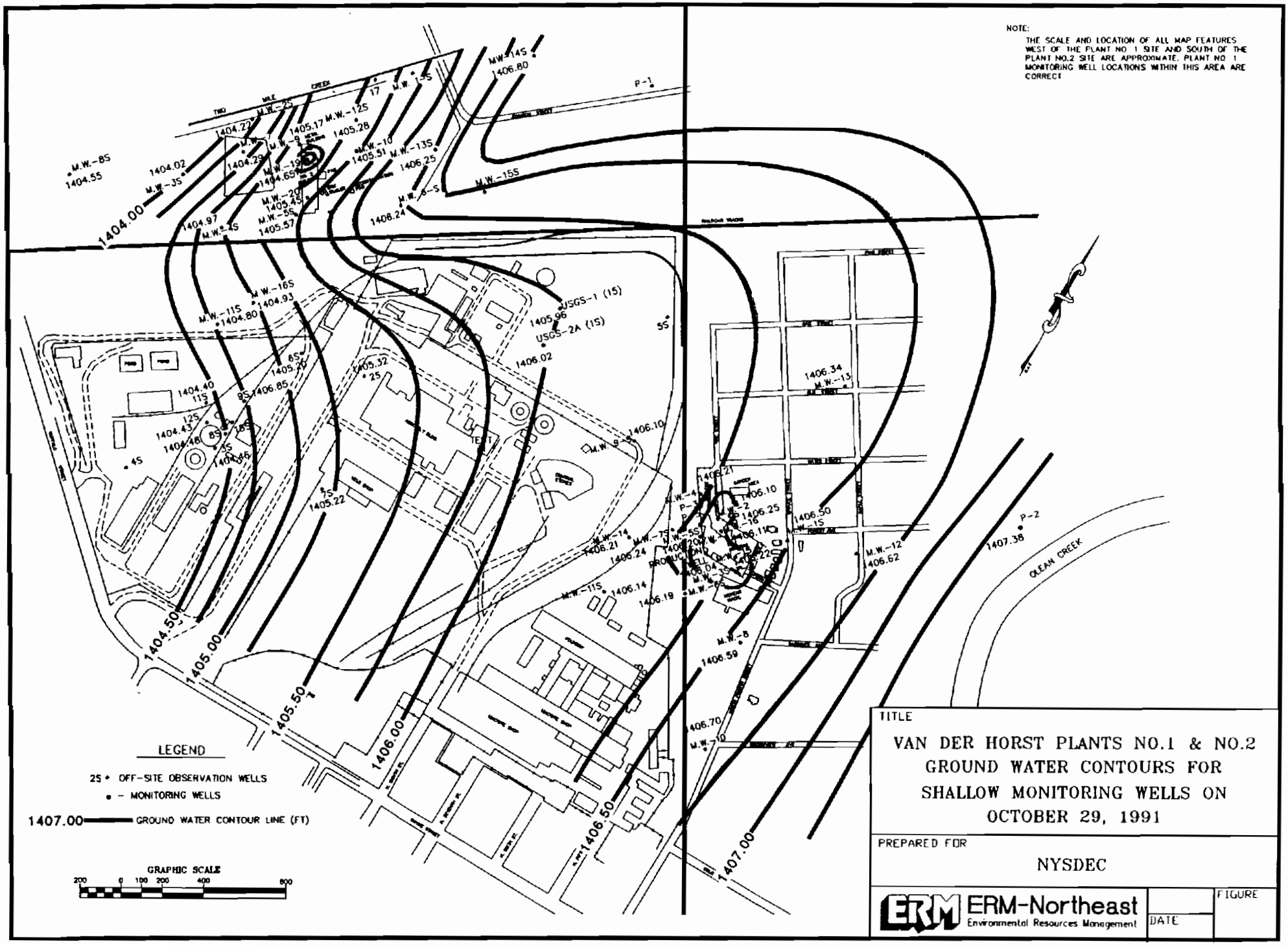
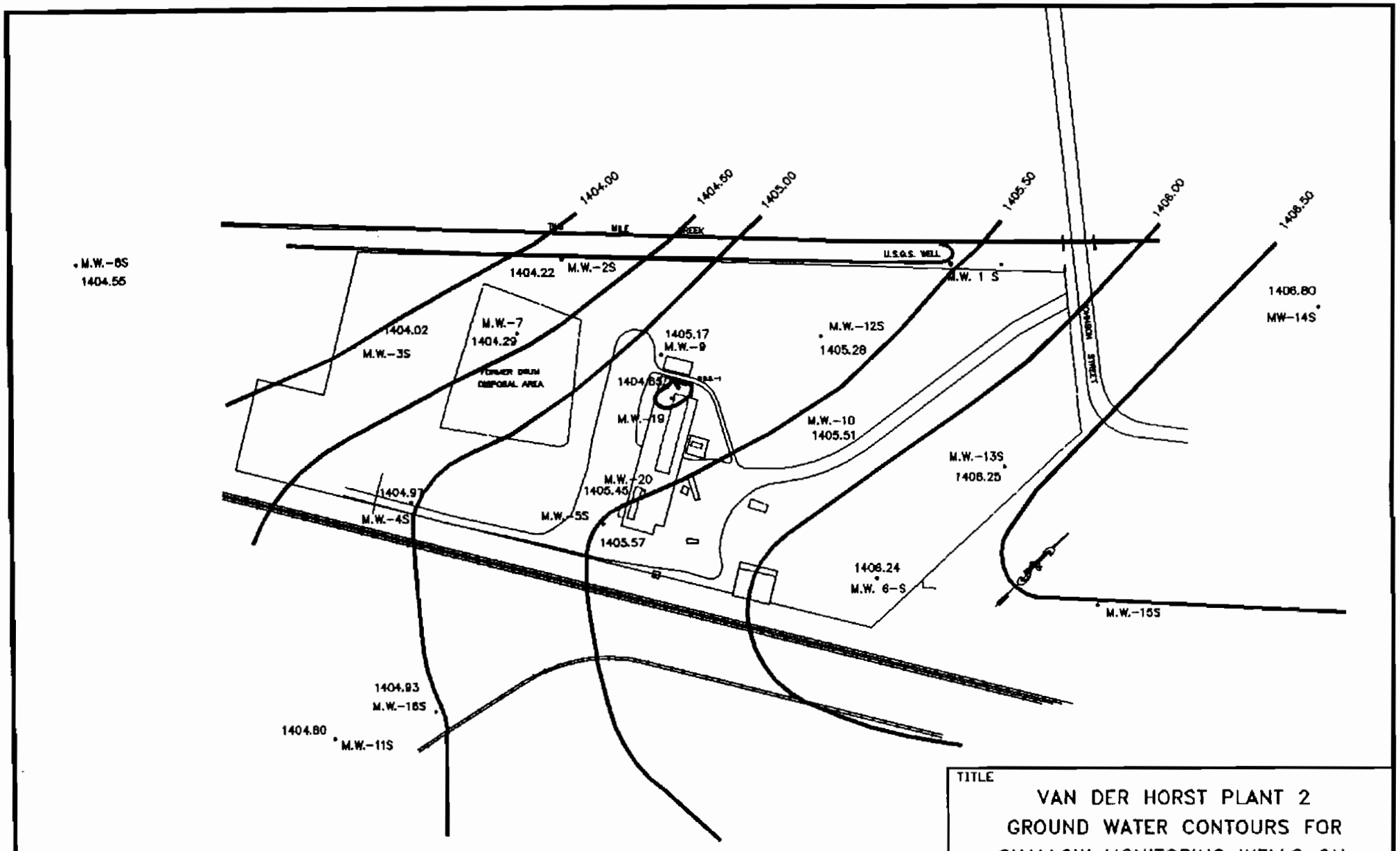
FIGURE


NOTE:
THE SCALE AND LOCATION OF ALL MAP FEATURES WEST OF THE PLANT NO 1 SITE AND SOUTH OF THE PLANT NO.2 SITE ARE APPROXIMATE. PLANT NO 1 MONITORING WELL LOCATIONS WITHIN THIS AREA ARE CORRECT
LEGEND
25 • OFF-SITE OBSERVATION WELLS
• - MONITORING WELLS
1407.00 GROUND WATER CONTOUR LINE (FT)
GRAPHIC SCALE
200 0 100 200 400 800
TITLE
VAN DER HORST PLANTS NO.1 & NO.2
GROUND WATER CONTOURS FOR
SHALLOW MONITORING WELLS ON
OCTOBER 29, 1991
PREPARED FOR
NYSDEC
ERM-Northeast
Environmental Resources Management
DATE
FIGURE
1404.00
1404.50
1405.00
1405.50
1406.00
1406.50
1407.00
P-1
P-2
CLEAN CREEK
USGS-1 (1S)
USGS-2A (1S)
PRODUCTION WELL



LEGEND

• – MONITORING WELLS

1405.00 —— GROUND WATER ELEVATION (FT)

0' 100' 200' 400'

SCALE

TITLE

VAN DER HORST PLANT 2
GROUND WATER CONTOURS FOR
SHALLOW MONITORING WELLS ON
OCTOBER 29, 1991

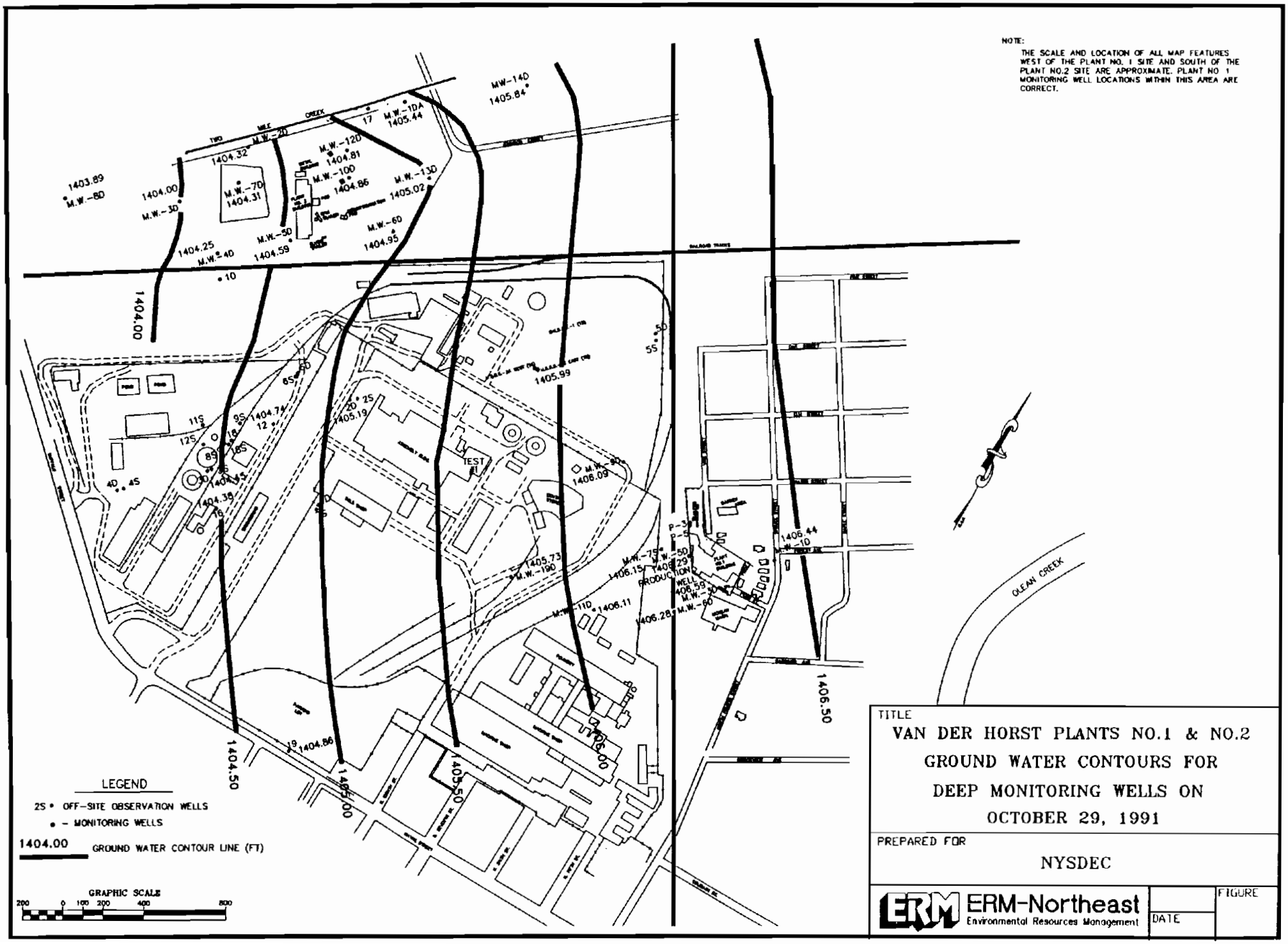
PREPARED FOR

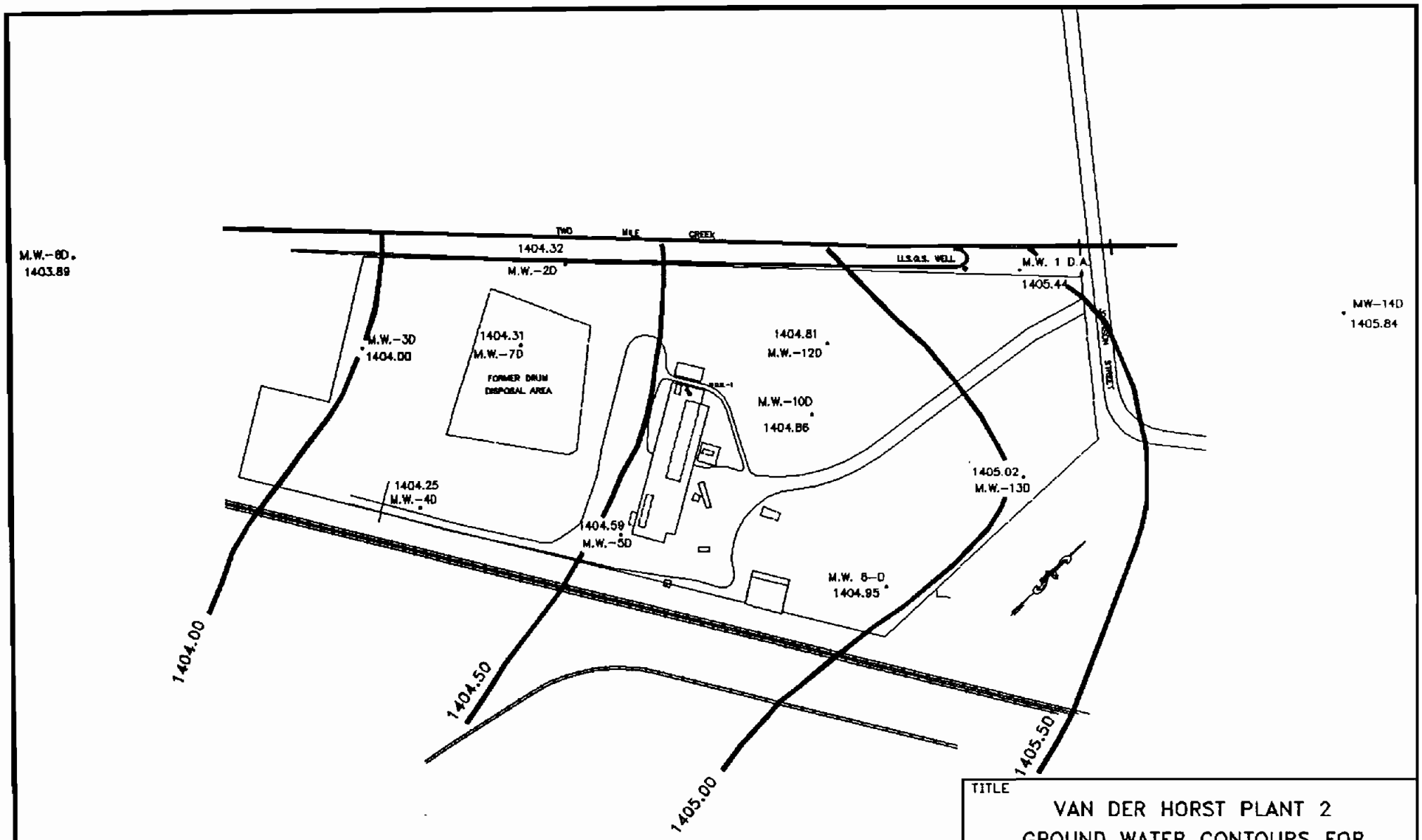
NYSDEC

ERM ERM-Northeast
Environmental Resources Management

DATE

FIGURE


NOTE:
THE SCALE AND LOCATION OF ALL MAP FEATURES WEST OF THE PLANT NO. 1 SITE AND SOUTH OF THE PLANT NO.2 SITE ARE APPROXIMATE. PLANT NO 1 MONITORING WELL LOCATIONS WITHIN THIS AREA ARE CORRECT.
LEGEND
2S • OFF-SITE OBSERVATION WELLS
• - MONITORING WELLS
1404.00 GROUND WATER CONTOUR LINE (FT)
GRAPHIC SCALE
200 0 100 200 400 800
OLEAN CREEK
TEST
PRODUCTION WELL
TITLE
VAN DER HORST PLANTS NO.1 & NO.2
GROUND WATER CONTOURS FOR
DEEP MONITORING WELLS ON
OCTOBER 29, 1991
PREPARED FOR
NYSDEC
ERM-Northeast
Environmental Resources Management
DATE
FIGURE



TITLE

VAN DER HORST PLANT 2
GROUND WATER CONTOURS FOR
DEEP MONITORING WELLS ON
OCTOBER 29, 1991

PREPARED FOR

NYSDEC

ERM ERM-Northeast
Environmental Resources Management

DATE

FIGURE

APPENDIX B
RECOVERY WELL SIMULATION DATA

WALTON PUMPING TEST MODEL FOR PLANT NO. 2 SINGLE RECOVERY WELL

DATA BASE: PUMPING 25 GPM FOR 1 YEAR

AQUIFER HORIZ. HYDR. COND. (GPD/SQ FT)= 108.00
AQUIFER VERT. HYDR. COND. (GPD/SQ FT)= 108.000
AQUIFER THICKNESS (FT)= 60.00
ARTESIAN AQUIFER STORATIVITY (DIM)= 1.50000-02
WATER TABLE STORATIVITY (DIM)= 0.2000
PRODUCT. WELL EFFECTIVE RADIUS (FT)= 0.500
TOP OF AQUIFER DEPTH (FT)= 0.00
BASE OF AQUIFER DEPTH (FT)= 60.00
INITIAL WATER LEVEL DEPTH (FT)= 0.00
INFINITE AQUIFER SYSTEM

COMPUTATION RESULTS:

PRODUCTION WELL DISCHARGE RATE (GPM)= 25.00

TIME-DRAWDOWN OR WATER LEVEL VALUES (FT)

	SELECTED DISTANCES (FT)					
TIME(MIN)	0.50	79.24	199.05	500.00	1255.94	3154.79
0.14	0.48	0.00	0.00	0.00	0.00	0.00
0.23	0.69	0.00	0.00	0.00	0.00	0.00
0.36	0.98	0.00	0.00	0.00	0.00	0.00
0.57	1.32	0.00	0.00	0.00	0.00	0.00
0.91	1.72	0.00	0.00	0.00	0.00	0.00
1.44	2.13	0.00	0.00	0.00	0.00	0.00
2.28	2.53	0.00	0.00	0.00	0.00	0.00
3.62	2.90	0.00	0.00	0.00	0.00	0.00
5.73	3.21	0.00	0.00	0.00	0.00	0.00
9.09	3.49	0.00	0.00	0.00	0.00	0.00
14.40	3.74	0.01	0.00	0.00	0.00	0.00
22.82	3.96	0.02	0.00	0.00	0.00	0.00
36.17	4.16	0.05	0.00	0.00	0.00	0.00
57.33	4.35	0.10	0.00	0.00	0.00	0.00
90.86	4.51	0.16	0.00	0.00	0.00	0.00
144.00	4.66	0.23	0.01	0.00	0.00	0.00
228.22	4.80	0.30	0.02	0.00	0.00	0.00
361.71	4.92	0.38	0.03	0.00	0.00	0.00
573.27	5.03	0.45	0.04	0.00	0.00	0.00
908.58	5.14	0.53	0.07	0.00	0.00	0.00
1440.00	5.25	0.61	0.09	0.00	0.00	0.00
2282.25	5.36	0.70	0.13	0.00	0.00	0.00
3617.12	5.49	0.81	0.19	0.00	0.00	0.00
5732.74	5.64	0.93	0.27	0.01	0.00	0.00
9085.79	5.80	1.08	0.37	0.03	0.00	0.00
14400.00	5.99	1.24	0.50	0.06	0.00	0.00
22822.47	6.18	1.41	0.64	0.11	0.00	0.00
36171.17	6.39	1.60	0.81	0.20	0.01	0.00
57327.44	6.61	1.80	0.99	0.31	0.02	0.00
90857.87	6.83	2.00	1.18	0.45	0.05	0.00
144000.03	7.05	2.20	1.37	0.61	0.10	0.00
228224.66	7.28	2.41	1.57	0.79	0.18	0.01
361711.72	7.51	2.62	1.78	0.97	0.30	0.02
525600.00	7.70	2.79	1.95	1.13	0.41	0.04

TIME AFTER PUMPING STARTED(MIN)=%525600.00

DISTANCE-DRAWDOWN OR WATER LEVEL VALUES AT END OF PUMPING PERIOD

NODE NO	RADIUS(FT)	DRAWDOWN OR WATER LEVEL (FT)
2	0.50	7.70
3	0.79	7.24
4	1.26	6.78
5	1.99	6.32
6	3.15	5.87
7	5.00	5.42
8	7.92	4.97
9	12.56	4.53
10	19.91	4.09
11	31.55	3.65
12	50.00	3.22
13	79.24	2.79
14	125.59	2.37
15	199.05	1.95
16	315.48	1.54
17	500.00	1.13
18	792.45	0.75
19	1255.94	0.41
20	1990.54	0.16
21	3154.79	0.04
22	5000.00	0.00

```
MODFLOW SINGLE RECOVERY WELL SIMULATION AT VAN DER HORST PLANT NO. 2

        RECOVERY WELL IS PUMPED AT 25 GPM FOR 1 YEAR



1                    U.S. GEOLOGICAL SURVEY MODULAR FINITE-DIFFERENCE GROUND-WATER MODEL
0Predicted Drawdown for 1 Recovery Well at Van Der Horst Plant 2
    1 LAYERS        50 ROWS        50 COLUMNS
   1 STRESS PERIOD(S) IN SIMULATION
 MODEL TIME UNIT IS MINUTES
0I/O UNITS:
 ELEMENT OF IUNIT:  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
         I/O UNIT: 11 12  0  0  0  0  0  0 19  0  0 22  0  0  0  0  0  0  0  0  0  0  0  0
0BAS1 -- BASIC MODEL PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT  1
 ARRAYS RHS AND BUFF WILL SHARE MEMORY.
 START HEAD WILL BE SAVED
    22604 ELEMENTS IN X ARRAY ARE USED BY BAS
    22604 ELEMENTS OF X ARRAY USED OUT OF  100000
0BCF1 -- BLOCK-CENTERED FLOW PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT 11
 TRANSIENT SIMULATION
      LAYER  AQUIFER TYPE
      ------------------
         1        1
     7501 ELEMENTS IN X ARRAY ARE USED BY BCF
    30105 ELEMENTS OF X ARRAY USED OUT OF  100000
0WEL1 -- WELL PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM 12
 MAXIMUM OF    1 WELLS
        4 ELEMENTS IN X ARRAY ARE USED FOR WELLS
    30109 ELEMENTS OF X ARRAY USED OUT OF  100000
0SIP1 -- STRONGLY IMPLICIT PROCEDURE SOLUTION PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT 19
 MAXIMUM OF 100 ITERATIONS ALLOWED FOR CLOSURE
  5 ITERATION PARAMETERS
    10405 ELEMENTS IN X ARRAY ARE USED BY SIP
    40514 ELEMENTS OF X ARRAY USED OUT OF  100000
1Predicted Drawdown for 3 Recovery Wells at Van Der Horst Plant 2
0


                                          BOUNDARY ARRAY FOR LAYER  1 WILL BE READ ON UNIT  1 USING FORMAT: (40I2)
                                    -------------------------------------------------------------------------------

       1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
      41 42 43 44 45 46 47 48 49 50
 .................................................................................................................................
0 1  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1
     -1 -1 -1 -1 -1 -1 -1 -1 -1 -1
0 2  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
      1  1  1  1  1  1  1  1  1 -1
0 3  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
      1  1  1  1  1  1  1  1  1 -1
0 4  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
      1  1  1  1  1  1  1  1  1 -1
0 5  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
      1  1  1  1  1  1  1  1  1 -1
0 6  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
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0 7  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
      1  1  1  1  1  1  1  1  1 -1
0 8  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
```

```
          1  1  1  1  1  1  1  1  1 -1
0  9  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
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0 10  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
          1  1  1  1  1  1  1  1  1 -1
0 11  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
          1  1  1  1  1  1  1  1  1 -1
0 12  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
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0 13  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
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0 14  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
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0 15  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
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0 16  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
          1  1  1  1  1  1  1  1  1 -1
0 17  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
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0 18  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
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0 19  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
          1  1  1  1  1  1  1  1  1 -1
0 20  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
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0 21  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
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0 22  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
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0 24  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
          1  1  1  1  1  1  1  1  1 -1
0 25  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
          1  1  1  1  1  1  1  1  1 -1
0 26  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
          1  1  1  1  1  1  1  1  1 -1
0 27  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
          1  1  1  1  1  1  1  1  1 -1
0 28  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
          1  1  1  1  1  1  1  1  1 -1
0 29  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
          1  1  1  1  1  1  1  1  1 -1
0 30  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
          1  1  1  1  1  1  1  1  1 -1
0 31  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
          1  1  1  1  1  1  1  1  1 -1
0 32  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
          1  1  1  1  1  1  1  1  1 -1
0 33  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
          1  1  1  1  1  1  1  1  1 -1
0 34  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
          1  1  1  1  1  1  1  1  1 -1
0 35  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
          1  1  1  1  1  1  1  1  1 -1
0 36  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
          1  1  1  1  1  1  1  1  1 -1
0 37  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
          1  1  1  1  1  1  1  1  1 -1
0 38  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
```

```
        1  1  1  1  1  1  1  1 -1
0 39 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
        1  1  1  1  1  1  1  1 -1
0 40 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
        1  1  1  1  1  1  1  1 -1
0 41 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
        1  1  1  1  1  1  1  1 -1
0 42 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
        1  1  1  1  1  1  1  1 -1
0 43 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
        1  1  1  1  1  1  1  1 -1
0 44 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
        1  1  1  1  1  1  1  1 -1
0 45 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
        1  1  1  1  1  1  1  1 -1
0 46 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
        1  1  1  1  1  1  1  1 -1
0 47 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
        1  1  1  1  1  1  1  1 -1
0 48 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
        1  1  1  1  1  1  1  1 -1
0 49 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
        1  1  1  1  1  1  1  1 -1
0 50 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1
       -1 -1 -1 -1 -1 -1 -1 -1 -1 -1

0AQUIFER HEAD WILL BE SET TO  100.00     AT ALL NO-FLOW NODES (IBOUND=0).
0                                                    INITIAL HEAD =   100.0000     FOR LAYER  1
0HEAD PRINT FORMAT IS FORMAT NUMBER   4    DRAWDOWN PRINT FORMAT IS FORMAT NUMBER   4
0HEADS WILL BE SAVED ON UNIT 56    DRAWDOWNS WILL BE SAVED ON UNIT 57
0OUTPUT CONTROL IS SPECIFIED EVERY TIME STEP
0                                          COLUMN TO ROW ANISOTROPY =   1.000000
0                                                          DELR =   50.00000
0                                                          DELC =   50.00000
0                                              PRIMARY STORAGE COEF =   .2000000     FOR LAYER  1
0                                             HYD. COND. ALONG ROWS =   .1000000E-01 FOR LAYER  1
0                                                          BOTTOM =   40.00000     FOR LAYER  1
0


                                                  SOLUTION BY THE STRONGLY IMPLICIT PROCEDURE
                                                  -------------------------------------------
0                                           MAXIMUM ITERATIONS ALLOWED FOR CLOSURE =      100
                                                       ACCELERATION PARAMETER =     1.0000
                                                HEAD CHANGE CRITERION FOR CLOSURE =     .10000E-03
                                                SIP HEAD CHANGE PRINTOUT INTERVAL =        1
0                                               CALCULATE ITERATION PARAMETERS FROM MODEL CALCULATED WSEED
1                                              STRESS PERIOD NO.   1, LENGTH =   525600.0
                                               ------------------------------------------


                                              NUMBER OF TIME STEPS =     5


                                               MULTIPLIER FOR DELT =     1.500


                                            INITIAL TIME STEP SIZE =   39855.93

0            1 WELLS

                                           LAYER    ROW    COL    STRESS RATE    WELL NO.
                                           ----------------------------------------------
                                             1      30     25     -3.3500           1

0AVERAGE SEED =  .00098696
 MINIMUM SEED =  .00098696
```

```
0
    5 ITERATION PARAMETERS CALCULATED FROM AVERAGE SEED:

            .0000000E+00   .8227546E+00   .9685841E+00   .9944317E+00   .9990131E+00
0
    20 ITERATIONS FOR TIME STEP   1 IN STRESS PERIOD  1
0MAXIMUM HEAD CHANGE FOR EACH ITERATION:
0 HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE
LAYER,ROW,COL

-------------------------------------------------------------------------------------------------------------------------------
--
   -1.995     (  1, 30, 25)  -.6024     (  1, 31, 24)  -.5001     (  1, 30, 25)  -.2778     (  1, 27, 27)  -.8116E-01 (  1, 21,
23)
    .1355E-01 (  1, 25, 27)   .2038E-01 (  1, 26, 28)   .1272E-01 (  1, 25, 30)   .7311E-02 (  1, 29, 34)  -.3710E-02 (  1, 24,
30)
   -.8419E-03 (  1, 19, 25)  -.1113E-02 (  1, 19, 25)  -.1035E-02 (  1, 20, 26)   .6832E-03 (  1, 25, 30)  -.5561E-03 (  1, 30,
25)
   -.1306E-03 (  1, 24, 30)  -.2058E-03 (  1, 24, 30)  -.1210E-03 (  1, 25, 30)   .1098E-03 (  1, 30, 25)   .6627E-04 (  1, 25,
30)
0
0HEAD/DRAWDOWN PRINTOUT FLAG = 0     TOTAL BUDGET PRINTOUT FLAG = 0     CELL-BY-CELL FLOW TERM FLAG = 0
0OUTPUT FLAGS FOR EACH LAYER:
          HEAD    DRAWDOWN  HEAD  DRAWDOWN
 LAYER  PRINTOUT  PRINTOUT  SAVE    SAVE
 ----------------------------------------
    1       0         0       0       0
    16 ITERATIONS FOR TIME STEP   2 IN STRESS PERIOD  1
0MAXIMUM HEAD CHANGE FOR EACH ITERATION:
0 HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE
LAYER,ROW,COL

-------------------------------------------------------------------------------------------------------------------------------
--
   -.6525E-01 (  1, 30, 25)  -.9485E-01 (  1, 30, 25)  -.1721     (  1, 30, 25)  -.1888     (  1, 30, 25)  -.5644E-01 (  1, 21,
21)
    .1884E-02 (  1, 26, 29)   .3311E-02 (  1, 26, 29)   .5177E-02 (  1, 28, 27)   .4493E-02 (  1, 32, 31)   .1294E-02 (  1, 25,
41)
    .1566E-03 (  1, 19, 35)   .2789E-03 (  1, 19, 36)   .4158E-03 (  1, 19, 36)  -.2447E-03 (  1, 36, 32)  -.2108E-03 (  1, 30,
25)
   -.2644E-04 (  1, 25, 30)
0
0HEAD/DRAWDOWN PRINTOUT FLAG = 0     TOTAL BUDGET PRINTOUT FLAG = 0     CELL-BY-CELL FLOW TERM FLAG = 0
0OUTPUT FLAGS FOR EACH LAYER:
          HEAD    DRAWDOWN  HEAD  DRAWDOWN
 LAYER  PRINTOUT  PRINTOUT  SAVE    SAVE
 ----------------------------------------
    1       0         0       0       0
    16 ITERATIONS FOR TIME STEP   3 IN STRESS PERIOD  1
0MAXIMUM HEAD CHANGE FOR EACH ITERATION:
0 HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE
LAYER,ROW,COL

-------------------------------------------------------------------------------------------------------------------------------
--
   -.1250E-01 (  1, 30, 25)  -.2974E-01 (  1, 30, 25)  -.7672E-01 (  1, 30, 25)  -.1233     (  1, 30, 25)  -.6041E-01 (  1, 30,
25)
    .1621E-02 (  1, 48, 48)   .2407E-02 (  1, 45, 45)   .2707E-02 (  1, 44, 43)   .5424E-02 (  1, 30, 28)  -.1510E-02 (  1, 26,
24)
   -.1035E-03 (  1, 38, 37)  -.1861E-03 (  1, 37, 36)  -.4612E-03 (  1, 36, 35)   .2582E-03 (  1, 15, 37)  -.1430E-03 (  1, 24,
```

```
30)
    .1292E-04 (  1, 31, 39)
0
OHEAD/DRAWDOWN PRINTOUT FLAG = 0     TOTAL BUDGET PRINTOUT FLAG = 0     CELL-BY-CELL FLOW TERM FLAG = 0
OOUTPUT FLAGS FOR EACH LAYER:
          HEAD     DRAWDOWN  HEAD  DRAWDOWN
 LAYER  PRINTOUT  PRINTOUT  SAVE    SAVE
 -------------------------------------
    1       0         0       0       0
    16 ITERATIONS FOR TIME STEP   4 IN STRESS PERIOD  1
OMAXIMUM HEAD CHANGE FOR EACH ITERATION:
O HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE
LAYER,ROW,COL

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--
   -.4627E-02 (  1, 30, 25)  -.1213E-01 (  1, 30, 25)  -.3618E-01 (  1, 30, 25)  -.7216E-01 (  1, 30, 25)  -.4662E-01 (  1, 30,
25)
    .1277E-02 (  1, 48, 48)   .1932E-02 (  1, 45, 45)   .2214E-02 (  1, 43, 43)   .4842E-02 (  1, 30, 28)  -.1715E-02 (  1, 26,
24)
   -.1124E-03 (  1, 39, 38)  -.2034E-03 (  1, 38, 37)  -.4923E-03 (  1, 37, 36)   .3319E-03 (  1, 15, 36)  -.2041E-03 (  1, 23,
29)
    .1751E-04 (  1, 32, 40)
0
OHEAD/DRAWDOWN PRINTOUT FLAG = 0     TOTAL BUDGET PRINTOUT FLAG = 0     CELL-BY-CELL FLOW TERM FLAG = 0
OOUTPUT FLAGS FOR EACH LAYER:
          HEAD     DRAWDOWN  HEAD  DRAWDOWN
 LAYER  PRINTOUT  PRINTOUT  SAVE    SAVE
 -------------------------------------
    1       0         0       0       0
    11 ITERATIONS FOR TIME STEP   5 IN STRESS PERIOD  1
OMAXIMUM HEAD CHANGE FOR EACH ITERATION:
O HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE
LAYER,ROW,COL

-----------------------------------------------------------------------------------------------------------------------
--
   -.1775E-02 (  1, 30, 25)  -.4775E-02 (  1, 29, 25)  -.1523E-01 (  1, 28, 25)  -.3462E-01 (  1, 28, 25)  -.2673E-01 (  1, 30,
25)
    .7383E-03 (  1, 48, 48)   .1152E-02 (  1, 45, 45)   .1364E-02 (  1, 43, 43)   .3236E-02 (  1, 30, 29)  -.1294E-02 (  1, 25,
24)
   -.7995E-04 (  1, 38, 37)
0
OHEAD/DRAWDOWN PRINTOUT FLAG = 1     TOTAL BUDGET PRINTOUT FLAG = 1     CELL-BY-CELL FLOW TERM FLAG = 0
OOUTPUT FLAGS FOR EACH LAYER:
          HEAD     DRAWDOWN  HEAD  DRAWDOWN
 LAYER  PRINTOUT  PRINTOUT  SAVE    SAVE
 -------------------------------------
    1       1         1       1       1
1                    HEAD IN LAYER  1 AT END OF TIME STEP  5 IN STRESS PERIOD  1
           ---------------------------------------------------------------------


          1       2       3       4       5       6       7       8       9      10      11      12      13      14      15
         16      17      18      19      20      21      22      23      24      25      26      27      28      29      30
         31      32      33      34      35      36      37      38      39      40      41      42      43      44      45
         46      47      48      49      50
 ...........................................................................................................................
0  1   100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00
       100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00
       100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00
```

	100.00	100.00	100.00	100.00	100.00											
0 2	100.00	100.00	100.00	99.99	99.99	99.99	99.99	99.99	99.99	99.98	99.98	99.98	99.98	99.98	99.98	
	99.97	99.97	99.97	99.97	99.97	99.97	99.97	99.97	99.97	99.97	99.97	99.97	99.97	99.97	99.97	
	99.97	99.97	99.97	99.97	99.98	99.98	99.98	99.98	99.98	99.98	99.98	99.99	99.99	99.99	99.99	
	99.99	99.99	100.00	100.00	100.00											
0 3	100.00	100.00	99.99	99.99	99.99	99.98	99.98	99.97	99.97	99.97	99.96	99.96	99.96	99.96	99.95	
	99.95	99.95	99.94	99.94	99.94	99.94	99.94	99.94	99.94	99.94	99.94	99.94	99.94	99.94	99.94	
	99.94	99.94	99.95	99.95	99.95	99.95	99.96	99.96	99.96	99.97	99.97	99.97	99.98	99.98	99.98	
	99.99	99.99	99.99	100.00	100.00											
0 4	100.00	99.99	99.99	99.98	99.98	99.97	99.97	99.96	99.96	99.95	99.95	99.94	99.94	99.93	99.93	
	99.92	99.92	99.92	99.91	99.91	99.91	99.91	99.91	99.91	99.91	99.91	99.91	99.91	99.91	99.91	
	99.91	99.92	99.92	99.92	99.93	99.93	99.93	99.94	99.94	99.95	99.95	99.96	99.96	99.97	99.97	
	99.98	99.98	99.99	99.99	100.00											
0 5	100.00	99.99	99.99	99.98	99.97	99.96	99.96	99.95	99.94	99.94	99.93	99.92	99.92	99.91	99.90	
	99.90	99.89	99.89	99.88	99.88	99.88	99.88	99.87	99.87	99.87	99.87	99.87	99.88	99.88	99.88	
	99.88	99.89	99.89	99.90	99.90	99.91	99.91	99.92	99.92	99.93	99.94	99.94	99.95	99.96	99.96	
	99.97	99.98	99.99	99.99	100.00											
0 6	100.00	99.99	99.98	99.97	99.96	99.95	99.95	99.94	99.93	99.92	99.91	99.90	99.89	99.89	99.88	
	99.87	99.87	99.86	99.85	99.85	99.85	99.84	99.84	99.84	99.84	99.84	99.84	99.84	99.85	99.85	
	99.85	99.86	99.86	99.87	99.88	99.88	99.89	99.90	99.91	99.91	99.92	99.93	99.94	99.95	99.96	
	99.96	99.97	99.98	99.99	100.00											
0 7	100.00	99.99	99.98	99.97	99.96	99.94	99.93	99.92	99.91	99.90	99.89	99.88	99.87	99.86	99.85	
	99.85	99.84	99.83	99.82	99.82	99.81	99.81	99.81	99.81	99.81	99.81	99.81	99.81	99.81	99.82	
	99.82	99.83	99.83	99.84	99.85	99.86	99.87	99.88	99.89	99.90	99.91	99.92	99.93	99.94	99.95	
	99.96	99.97	99.98	99.99	100.00											
0 8	100.00	99.99	99.97	99.96	99.95	99.94	99.92	99.91	99.90	99.88	99.87	99.86	99.85	99.84	99.83	
	99.82	99.81	99.80	99.79	99.79	99.78	99.78	99.77	99.77	99.77	99.77	99.77	99.77	99.78	99.78	
	99.79	99.80	99.80	99.81	99.82	99.83	99.84	99.85	99.87	99.88	99.89	99.90	99.91	99.93	99.94	
	99.95	99.96	99.98	99.99	100.00											
0 9	100.00	99.99	99.97	99.96	99.94	99.93	99.91	99.90	99.88	99.87	99.85	99.84	99.83	99.81	99.80	
	99.79	99.78	99.77	99.76	99.75	99.75	99.74	99.74	99.73	99.73	99.73	99.74	99.74	99.74	99.75	
	99.76	99.77	99.77	99.78	99.80	99.81	99.82	99.83	99.85	99.86	99.87	99.89	99.90	99.91	99.93	
	99.94	99.96	99.97	99.99	100.00											
0 10	100.00	99.98	99.97	99.95	99.93	99.92	99.90	99.88	99.87	99.85	99.83	99.82	99.80	99.79	99.77	
	99.76	99.75	99.74	99.73	99.72	99.71	99.70	99.70	99.70	99.69	99.69	99.70	99.70	99.71	99.71	
	99.72	99.73	99.74	99.75	99.77	99.78	99.80	99.81	99.82	99.84	99.86	99.87	99.89	99.90	99.92	
	99.94	99.95	99.97	99.98	100.00											
0 11	100.00	99.98	99.96	99.94	99.92	99.91	99.89	99.87	99.85	99.83	99.81	99.80	99.78	99.76	99.75	
	99.73	99.72	99.70	99.69	99.68	99.67	99.66	99.66	99.66	99.65	99.65	99.66	99.66	99.67	99.68	
	99.69	99.70	99.71	99.72	99.74	99.75	99.77	99.79	99.80	99.82	99.84	99.86	99.87	99.89	99.91	
	99.93	99.95	99.96	99.98	100.00											
0 12	100.00	99.98	99.96	99.94	99.92	99.90	99.87	99.85	99.83	99.81	99.79	99.77	99.75	99.73	99.72	
	99.70	99.68	99.67	99.65	99.64	99.63	99.62	99.62	99.61	99.61	99.61	99.62	99.62	99.63	99.64	
	99.65	99.66	99.68	99.69	99.71	99.73	99.74	99.76	99.78	99.80	99.82	99.84	99.86	99.88	99.90	
	99.92	99.94	99.96	99.98	100.00											
0 13	100.00	99.98	99.95	99.93	99.91	99.89	99.86	99.84	99.82	99.79	99.77	99.75	99.73	99.71	99.69	
	99.67	99.65	99.63	99.61	99.60	99.59	99.58	99.57	99.57	99.57	99.57	99.57	99.58	99.59	99.60	
	99.61	99.62	99.64	99.66	99.68	99.70	99.72	99.74	99.76	99.78	99.80	99.83	99.85	99.87	99.89	
	99.91	99.93	99.96	99.98	100.00											
0 14	100.00	99.98	99.95	99.93	99.90	99.88	99.85	99.82	99.80	99.77	99.75	99.73	99.70	99.68	99.65	
	99.63	99.61	99.59	99.57	99.56	99.54	99.53	99.53	99.52	99.52	99.52	99.52	99.53	99.54	99.55	
	99.57	99.59	99.60	99.62	99.65	99.67	99.69	99.71	99.74	99.76	99.79	99.81	99.83	99.86	99.88	
	99.91	99.93	99.95	99.98	100.00											
0 15	100.00	99.97	99.95	99.92	99.89	99.86	99.84	99.81	99.78	99.76	99.73	99.70	99.67	99.65	99.62	
	99.60	99.57	99.55	99.53	99.51	99.50	99.48	99.48	99.47	99.47	99.47	99.47	99.48	99.49	99.51	
	99.53	99.54	99.57	99.59	99.61	99.64	99.66	99.69	99.71	99.74	99.77	99.79	99.82	99.85	99.87	
	99.90	99.92	99.95	99.97	100.00											
0 16	100.00	99.97	99.94	99.91	99.88	99.85	99.82	99.80	99.77	99.74	99.71	99.68	99.65	99.62	99.59	
	99.56	99.53	99.51	99.49	99.46	99.45	99.43	99.42	99.41	99.41	99.41	99.42	99.43	99.44	99.46	
	99.48	99.50	99.53	99.55	99.58	99.61	99.63	99.66	99.69	99.72	99.75	99.78	99.81	99.83	99.86	

	99.89	99.92	99.95	99.97	100.00											
0 17	100.00	99.97	99.94	99.91	99.88	99.84	99.81	99.78	99.75	99.72	99.68	99.65	99.62	99.59	99.55	
	99.52	99.49	99.46	99.44	99.41	99.39	99.38	99.36	99.35	99.35	99.35	99.36	99.37	99.39	99.41	
	99.43	99.46	99.48	99.51	99.54	99.57	99.61	99.64	99.67	99.70	99.73	99.76	99.79	99.82	99.85	
	99.88	99.91	99.94	99.97	100.00											
0 18	100.00	99.97	99.93	99.90	99.87	99.83	99.80	99.77	99.73	99.70	99.66	99.62	99.59	99.55	99.52	
	99.48	99.45	99.42	99.39	99.36	99.33	99.31	99.30	99.29	99.29	99.29	99.30	99.31	99.33	99.35	
	99.38	99.41	99.44	99.47	99.51	99.54	99.58	99.61	99.65	99.68	99.71	99.75	99.78	99.81	99.84	
	99.88	99.91	99.94	99.97	100.00											
0 19	100.00	99.97	99.93	99.90	99.86	99.82	99.79	99.75	99.71	99.68	99.64	99.60	99.56	99.52	99.48	
	99.44	99.40	99.37	99.33	99.30	99.27	99.25	99.23	99.22	99.21	99.22	99.23	99.24	99.27	99.29	
	99.32	99.36	99.39	99.43	99.47	99.51	99.55	99.58	99.62	99.66	99.70	99.73	99.77	99.80	99.84	
	99.87	99.90	99.93	99.97	100.00											
0 20	100.00	99.96	99.93	99.89	99.85	99.81	99.78	99.74	99.70	99.66	99.62	99.57	99.53	99.49	99.44	
	99.40	99.36	99.31	99.27	99.24	99.20	99.17	99.15	99.14	99.13	99.14	99.15	99.17	99.20	99.23	
	99.27	99.31	99.35	99.39	99.43	99.47	99.52	99.56	99.60	99.64	99.68	99.72	99.75	99.79	99.83	
	99.86	99.90	99.93	99.97	100.00											
0 21	100.00	99.96	99.92	99.88	99.85	99.81	99.76	99.72	99.68	99.64	99.59	99.55	99.50	99.45	99.41	
	99.36	99.31	99.26	99.21	99.17	99.13	99.09	99.07	99.05	99.05	99.05	99.07	99.09	99.12	99.16	
	99.21	99.25	99.30	99.35	99.39	99.44	99.49	99.53	99.58	99.62	99.66	99.70	99.74	99.78	99.82	
	99.86	99.89	99.93	99.96	100.00											
0 22	100.00	99.96	99.92	99.88	99.84	99.80	99.75	99.71	99.67	99.62	99.57	99.52	99.47	99.42	99.37	
	99.31	99.26	99.20	99.15	99.10	99.05	99.01	98.97	98.95	98.95	98.95	98.97	99.00	99.04	99.09	
	99.14	99.20	99.25	99.30	99.36	99.41	99.46	99.51	99.56	99.60	99.65	99.69	99.73	99.77	99.81	
	99.85	99.89	99.93	99.96	100.00											
0 23	100.00	99.96	99.92	99.88	99.83	99.79	99.74	99.70	99.65	99.60	99.55	99.50	99.45	99.39	99.33	
	99.27	99.21	99.15	99.08	99.02	98.96	98.91	98.87	98.84	98.83	98.84	98.87	98.91	98.96	99.01	
	99.08	99.14	99.20	99.26	99.32	99.38	99.43	99.49	99.54	99.58	99.63	99.68	99.72	99.76	99.80	
	99.84	99.88	99.92	99.96	100.00											
0 24	100.00	99.96	99.91	99.87	99.83	99.78	99.74	99.69	99.64	99.59	99.54	99.48	99.42	99.36	99.30	
	99.23	99.16	99.09	99.01	98.94	98.87	98.80	98.75	98.71	98.70	98.71	98.74	98.80	98.86	98.93	
	99.01	99.08	99.15	99.22	99.29	99.35	99.41	99.46	99.52	99.57	99.62	99.67	99.71	99.76	99.80	
	99.84	99.88	99.92	99.96	100.00											
0 25	100.00	99.96	99.91	99.87	99.82	99.78	99.73	99.68	99.63	99.58	99.52	99.46	99.40	99.33	99.27	
	99.19	99.11	99.03	98.94	98.86	98.77	98.68	98.61	98.56	98.54	98.55	98.60	98.68	98.76	98.85	
	98.94	99.02	99.10	99.18	99.25	99.32	99.38	99.44	99.50	99.56	99.61	99.66	99.70	99.75	99.79	
	99.84	99.88	99.92	99.96	100.00											
0 26	100.00	99.96	99.91	99.87	99.82	99.77	99.72	99.67	99.62	99.56	99.51	99.45	99.38	99.31	99.24	
	99.16	99.07	98.98	98.88	98.77	98.66	98.55	98.45	98.37	98.34	98.37	98.44	98.54	98.66	98.77	
	98.87	98.97	99.06	99.15	99.23	99.30	99.37	99.43	99.49	99.54	99.60	99.65	99.70	99.74	99.79	
	99.83	99.88	99.92	99.96	100.00											
0 27	100.00	99.95	99.91	99.86	99.82	99.77	99.72	99.67	99.61	99.56	99.50	99.43	99.37	99.29	99.21	
	99.13	99.03	98.93	98.82	98.69	98.55	98.41	98.26	98.13	98.07	98.13	98.26	98.40	98.55	98.69	
	98.81	98.92	99.03	99.12	99.20	99.28	99.35	99.42	99.48	99.54	99.59	99.64	99.69	99.74	99.79	
	99.83	99.87	99.92	99.96	100.00											
0 28	100.00	99.95	99.91	99.86	99.81	99.77	99.72	99.66	99.61	99.55	99.49	99.42	99.36	99.28	99.20	
	99.11	99.01	98.90	98.77	98.62	98.46	98.26	98.05	97.83	97.69	97.83	98.04	98.26	98.45	98.62	
	98.76	98.89	99.00	99.10	99.19	99.27	99.34	99.41	99.47	99.53	99.59	99.64	99.69	99.74	99.78	
	99.83	99.87	99.92	99.96	100.00											
0 29	100.00	99.95	99.91	99.86	99.81	99.77	99.71	99.66	99.61	99.55	99.49	99.42	99.35	99.27	99.19	
	99.10	98.99	98.87	98.74	98.58	98.38	98.14	97.83	97.44	97.04	97.43	97.83	98.14	98.38	98.57	
	98.73	98.87	98.98	99.09	99.18	99.26	99.34	99.41	99.47	99.53	99.59	99.64	99.69	99.74	99.78	
	99.83	99.87	99.92	99.96	100.00											
0 30	100.00	99.95	99.91	99.86	99.81	99.77	99.72	99.66	99.61	99.55	99.49	99.42	99.35	99.27	99.19	
	99.09	98.99	98.87	98.73	98.56	98.36	98.09	97.70	97.04	95.55	97.04	97.70	98.09	98.35	98.56	
	98.72	98.86	98.98	99.08	99.18	99.26	99.34	99.41	99.47	99.53	99.59	99.64	99.69	99.74	99.78	
	99.83	99.87	99.92	99.96	100.00											
0 31	100.00	99.96	99.91	99.86	99.82	99.77	99.72	99.67	99.61	99.55	99.49	99.43	99.36	99.28	99.20	
	99.10	99.00	98.88	98.75	98.59	98.39	98.15	97.84	97.45	97.05	97.45	97.84	98.15	98.39	98.58	
	98.74	98.88	98.99	99.10	99.19	99.27	99.34	99.41	99.48	99.54	99.59	99.64	99.69	99.74	99.79	

	99.83	99.87	99.92	99.96	100.00											
0 32	100.00	99.96	99.91	99.87	99.82	99.77	99.72	99.67	99.62	99.56	99.50	99.44	99.37	99.30	99.21	
	99.13	99.03	98.91	98.79	98.64	98.48	98.28	98.07	97.85	97.71	97.85	98.07	98.28	98.47	98.64	
	98.78	98.91	99.02	99.12	99.20	99.28	99.36	99.42	99.49	99.54	99.60	99.65	99.70	99.75	99.79	
	99.83	99.88	99.92	99.96	100.00											
0 33	100.00	99.96	99.91	99.87	99.82	99.78	99.73	99.68	99.63	99.57	99.52	99.45	99.39	99.32	99.24	
	99.16	99.06	98.96	98.85	98.72	98.59	98.44	98.29	98.16	98.11	98.16	98.29	98.44	98.58	98.72	
	98.84	98.95	99.06	99.15	99.23	99.31	99.38	99.44	99.50	99.56	99.61	99.66	99.71	99.75	99.80	
	99.84	99.88	99.92	99.96	100.00											
0 34	100.00	99.96	99.92	99.87	99.83	99.79	99.74	99.69	99.64	99.59	99.53	99.47	99.41	99.34	99.27	
	99.19	99.11	99.02	98.92	98.81	98.70	98.59	98.49	98.41	98.38	98.41	98.49	98.59	98.70	98.81	
	98.91	99.01	99.10	99.18	99.26	99.33	99.40	99.46	99.52	99.57	99.62	99.67	99.72	99.76	99.80	
	99.84	99.88	99.92	99.96	100.00											
0 35	100.00	99.96	99.92	99.88	99.84	99.79	99.75	99.70	99.66	99.61	99.55	99.50	99.44	99.37	99.31	
	99.24	99.16	99.08	99.00	98.91	98.82	98.74	98.66	98.61	98.59	98.61	98.66	98.73	98.82	98.90	
	98.99	99.07	99.15	99.23	99.30	99.36	99.43	99.48	99.54	99.59	99.64	99.68	99.73	99.77	99.81	
	99.85	99.89	99.93	99.96	100.00											
0 36	100.00	99.96	99.92	99.88	99.84	99.80	99.76	99.72	99.67	99.62	99.57	99.52	99.47	99.41	99.35	
	99.28	99.22	99.15	99.08	99.00	98.93	98.87	98.81	98.78	98.76	98.78	98.81	98.87	98.93	99.00	
	99.07	99.14	99.21	99.28	99.34	99.40	99.46	99.51	99.56	99.61	99.65	99.70	99.74	99.78	99.82	
	99.86	99.89	99.93	99.96	100.00											
0 37	100.00	99.96	99.93	99.89	99.85	99.81	99.77	99.73	99.69	99.65	99.60	99.55	99.50	99.45	99.39	
	99.34	99.28	99.22	99.15	99.09	99.04	98.99	98.95	98.92	98.91	98.92	98.95	98.99	99.04	99.09	
	99.15	99.21	99.27	99.33	99.39	99.44	99.49	99.54	99.59	99.63	99.67	99.71	99.75	99.79	99.83	
	99.86	99.90	99.93	99.97	100.00											
0 38	100.00	99.97	99.93	99.90	99.86	99.82	99.79	99.75	99.71	99.67	99.63	99.58	99.54	99.49	99.44	
	99.39	99.34	99.28	99.23	99.18	99.14	99.10	99.07	99.05	99.04	99.05	99.06	99.10	99.13	99.18	
	99.23	99.28	99.33	99.38	99.43	99.48	99.53	99.57	99.61	99.66	99.69	99.73	99.77	99.80	99.84	
	99.87	99.90	99.94	99.97	100.00											
0 39	100.00	99.97	99.94	99.90	99.87	99.84	99.80	99.77	99.73	99.69	99.65	99.61	99.57	99.53	99.49	
	99.44	99.40	99.35	99.31	99.27	99.23	99.20	99.17	99.16	99.15	99.16	99.17	99.20	99.23	99.26	
	99.30	99.35	99.39	99.44	99.48	99.52	99.56	99.60	99.64	99.68	99.72	99.75	99.79	99.82	99.85	
	99.88	99.91	99.94	99.97	100.00											
0 40	100.00	99.97	99.94	99.91	99.88	99.85	99.82	99.79	99.75	99.72	99.68	99.65	99.61	99.57	99.53	
	99.50	99.46	99.42	99.38	99.35	99.32	99.29	99.27	99.26	99.25	99.26	99.27	99.29	99.31	99.34	
	99.38	99.41	99.45	99.49	99.53	99.57	99.60	99.64	99.67	99.71	99.74	99.77	99.80	99.83	99.86	
	99.89	99.92	99.95	99.97	100.00											
0 41	100.00	99.97	99.95	99.92	99.89	99.86	99.84	99.81	99.78	99.75	99.71	99.68	99.65	99.62	99.58	
	99.55	99.52	99.48	99.45	99.42	99.40	99.38	99.36	99.35	99.35	99.35	99.36	99.38	99.40	99.42	
	99.45	99.48	99.51	99.54	99.58	99.61	99.64	99.67	99.70	99.74	99.76	99.79	99.82	99.85	99.87	
	99.90	99.93	99.95	99.98	100.00											
0 42	100.00	99.98	99.95	99.93	99.90	99.88	99.85	99.83	99.80	99.77	99.75	99.72	99.69	99.66	99.63	
	99.60	99.57	99.55	99.52	99.50	99.48	99.46	99.45	99.44	99.43	99.44	99.44	99.46	99.47	99.49	
	99.52	99.54	99.57	99.60	99.63	99.65	99.68	99.71	99.74	99.76	99.79	99.81	99.84	99.86	99.89	
	99.91	99.93	99.96	99.98	100.00											
0 43	100.00	99.98	99.96	99.94	99.91	99.89	99.87	99.85	99.82	99.80	99.78	99.75	99.73	99.70	99.68	
	99.65	99.63	99.61	99.59	99.57	99.55	99.54	99.52	99.52	99.52	99.52	99.52	99.53	99.55	99.56	
	99.58	99.60	99.63	99.65	99.67	99.70	99.72	99.75	99.77	99.79	99.82	99.84	99.86	99.88	99.90	
	99.92	99.94	99.96	99.98	100.00											
0 44	100.00	99.98	99.96	99.95	99.93	99.91	99.89	99.87	99.85	99.83	99.81	99.79	99.77	99.75	99.73	
	99.71	99.69	99.67	99.65	99.63	99.62	99.61	99.60	99.59	99.59	99.59	99.60	99.61	99.62	99.63	
	99.65	99.66	99.68	99.70	99.72	99.74	99.76	99.78	99.80	99.82	99.84	99.86	99.88	99.90	99.91	
	99.93	99.95	99.97	99.98	100.00											
0 45	100.00	99.98	99.97	99.95	99.94	99.92	99.91	99.89	99.87	99.86	99.84	99.82	99.81	99.79	99.77	
	99.76	99.74	99.72	99.71	99.70	99.69	99.68	99.67	99.67	99.67	99.67	99.67	99.68	99.69	99.70	
	99.71	99.72	99.74	99.75	99.77	99.79	99.80	99.82	99.83	99.85	99.87	99.88	99.90	99.91	99.93	
	99.94	99.96	99.97	99.99	100.00											
0 46	100.00	99.99	99.98	99.96	99.95	99.94	99.93	99.91	99.90	99.89	99.87	99.86	99.85	99.83	99.82	
	99.81	99.79	99.78	99.77	99.76	99.75	99.75	99.74	99.74	99.74	99.74	99.74	99.74	99.75	99.76	
	99.77	99.78	99.79	99.80	99.82	99.83	99.84	99.85	99.87	99.88	99.89	99.91	99.92	99.93	99.94	

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          99.95   99.97   99.98   99.99  100.00
 0 47    100.00   99.99   99.98   99.97   99.96   99.95   99.94   99.93   99.92   99.91   99.90   99.89   99.88   99.87   99.86
          99.85   99.85   99.84   99.83   99.82   99.82   99.81   99.81   99.80   99.80   99.80   99.81   99.81   99.81   99.82
          99.83   99.84   99.84   99.85   99.86   99.87   99.88   99.89   99.90   99.91   99.92   99.93   99.94   99.95   99.96
          99.97   99.97   99.98   99.99  100.00
 0 48    100.00   99.99   99.99   99.98   99.98   99.97   99.96   99.96   99.95   99.94   99.94   99.93   99.92   99.92   99.91
          99.90   99.90   99.89   99.89   99.88   99.88   99.87   99.87   99.87   99.87   99.87   99.87   99.87   99.88   99.88
          99.89   99.89   99.90   99.90   99.91   99.91   99.92   99.93   99.93   99.94   99.95   99.95   99.96   99.97   99.97
          99.98   99.98   99.99   99.99  100.00
 0 49    100.00  100.00   99.99   99.99   99.99   99.98   99.98   99.98   99.97   99.97   99.97   99.96   99.96   99.96   99.95
          99.95   99.95   99.95   99.94   99.94   99.94   99.94   99.94   99.94   99.94   99.94   99.94   99.94   99.94   99.94
          99.94   99.95   99.95   99.95   99.95   99.96   99.96   99.96   99.97   99.97   99.97   99.98   99.98   99.98   99.99
          99.99   99.99   99.99  100.00  100.00
 0 50    100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00
         100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00
         100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00  100.00
         100.00  100.00  100.00  100.00  100.00
0HEAD WILL BE SAVED ON UNIT 56 AT END OF TIME STEP  5, STRESS PERIOD  1
1                  DRAWDOWN IN LAYER  1 AT END OF TIME STEP  5 IN STRESS PERIOD  1
            ----------------------------------------------------------------------

            1       2       3       4       5       6       7       8       9      10      11      12      13      14      15
           16      17      18      19      20      21      22      23      24      25      26      27      28      29      30
           31      32      33      34      35      36      37      38      39      40      41      42      43      44      45
           46      47      48      49      50
 ......................................................................................................................................
 0  1       .00     .00     .00     .00     .00     .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .00
 0  2       .00     .00     .00     .01     .01     .01     .01     .01     .01     .02     .02     .02     .02     .02     .02
            .03     .03     .03     .03     .03     .03     .03     .03     .03     .03     .03     .03     .03     .03     .03
            .03     .03     .03     .03     .02     .02     .02     .02     .02     .02     .02     .01     .01     .01     .01
            .01     .01     .00     .00     .00
 0  3       .00     .00     .01     .01     .01     .02     .02     .03     .03     .03     .04     .04     .04     .04     .05
            .05     .05     .06     .06     .06     .06     .06     .06     .06     .06     .06     .06     .06     .06     .06
            .06     .06     .05     .05     .05     .05     .04     .04     .04     .03     .03     .03     .02     .02     .02
            .01     .01     .01     .00     .00
 0  4       .00     .01     .01     .02     .02     .03     .03     .04     .04     .05     .05     .06     .06     .07     .07
            .08     .08     .08     .09     .09     .09     .09     .09     .09     .09     .09     .09     .09     .09     .09
            .09     .08     .08     .08     .07     .07     .07     .06     .06     .05     .05     .04     .04     .03     .03
            .02     .02     .01     .01     .00
 0  5       .00     .01     .01     .02     .03     .04     .04     .05     .06     .06     .07     .08     .08     .09     .10
            .10     .11     .11     .12     .12     .12     .12     .13     .13     .13     .13     .13     .12     .12     .12
            .12     .11     .11     .10     .10     .09     .09     .08     .08     .07     .06     .06     .05     .04     .04
            .03     .02     .01     .01     .00
 0  6       .00     .01     .02     .03     .04     .05     .05     .06     .07     .08     .09     .10     .11     .11     .12
            .13     .13     .14     .15     .15     .15     .16     .16     .16     .16     .16     .16     .16     .15     .15
            .15     .14     .14     .13     .12     .12     .11     .10     .09     .09     .08     .07     .06     .05     .04
            .04     .03     .02     .01     .00
 0  7       .00     .01     .02     .03     .04     .06     .07     .08     .09     .10     .11     .12     .13     .14     .15
            .15     .16     .17     .18     .18     .19     .19     .19     .19     .19     .19     .19     .19     .19     .18
            .18     .17     .17     .16     .15     .14     .13     .12     .11     .10     .09     .08     .07     .06     .05
            .04     .03     .02     .01     .00
 0  8       .00     .01     .03     .04     .05     .06     .08     .09     .10     .12     .13     .14     .15     .16     .17
            .18     .19     .20     .21     .21     .22     .22     .23     .23     .23     .23     .23     .23     .22     .22
            .21     .20     .20     .19     .18     .17     .16     .15     .13     .12     .11     .10     .09     .07     .06
            .05     .04     .02     .01     .00
 0  9       .00     .01     .03     .04     .06     .07     .09     .10     .12     .13     .15     .16     .17     .19     .20
            .21     .22     .23     .24     .25     .25     .26     .26     .27     .27     .27     .26     .26     .26     .25
```

	.24	.23	.23	.22	.20	.19	.18	.17	.15	.14	.13	.11	.10	.09	.07
	.06	.04	.03	.01	.00										
0 10	.00	.02	.03	.05	.07	.08	.10	.12	.13	.15	.17	.18	.20	.21	.23
	.24	.25	.26	.27	.28	.29	.30	.30	.30	.31	.31	.30	.30	.29	.29
	.28	.27	.26	.25	.23	.22	.20	.19	.18	.16	.14	.13	.11	.10	.08
	.06	.05	.03	.02	.00										
0 11	.00	.02	.04	.06	.08	.09	.11	.13	.15	.17	.19	.20	.22	.24	.25
	.27	.28	.30	.31	.32	.33	.34	.34	.34	.35	.35	.34	.34	.33	.32
	.31	.30	.29	.28	.26	.25	.23	.21	.20	.18	.16	.14	.13	.11	.09
	.07	.05	.04	.02	.00										
0 12	.00	.02	.04	.06	.08	.10	.13	.15	.17	.19	.21	.23	.25	.27	.28
	.30	.32	.33	.35	.36	.37	.38	.38	.39	.39	.39	.38	.38	.37	.36
	.35	.34	.32	.31	.29	.27	.26	.24	.22	.20	.18	.16	.14	.12	.10
	.08	.06	.04	.02	.00										
0 13	.00	.02	.05	.07	.09	.11	.14	.16	.18	.21	.23	.25	.27	.29	.31
	.33	.35	.37	.39	.40	.41	.42	.43	.43	.43	.43	.43	.42	.41	.40
	.39	.38	.36	.34	.32	.30	.28	.26	.24	.22	.20	.17	.15	.13	.11
	.09	.07	.04	.02	.00										
0 14	.00	.02	.05	.07	.10	.12	.15	.18	.20	.23	.25	.27	.30	.32	.35
	.37	.39	.41	.43	.44	.46	.47	.47	.48	.48	.48	.48	.47	.46	.45
	.43	.41	.40	.38	.35	.33	.31	.29	.26	.24	.21	.19	.17	.14	.12
	.09	.07	.05	.02	.00										
0 15	.00	.03	.05	.08	.11	.14	.16	.19	.22	.24	.27	.30	.33	.35	.38
	.40	.43	.45	.47	.49	.50	.52	.52	.53	.53	.53	.53	.52	.51	.49
	.47	.46	.43	.41	.39	.36	.34	.31	.29	.26	.23	.21	.18	.15	.13
	.10	.08	.05	.03	.00										
0 16	.00	.03	.06	.09	.12	.15	.18	.20	.23	.26	.29	.32	.35	.38	.41
	.44	.47	.49	.51	.54	.55	.57	.58	.59	.59	.59	.58	.57	.56	.54
	.52	.50	.47	.45	.42	.39	.37	.34	.31	.28	.25	.22	.19	.17	.14
	.11	.08	.05	.03	.00										
0 17	.00	.03	.06	.09	.12	.16	.19	.22	.25	.28	.32	.35	.38	.41	.45
	.48	.51	.54	.56	.59	.61	.62	.64	.65	.65	.65	.64	.63	.61	.59
	.57	.54	.52	.49	.46	.43	.39	.36	.33	.30	.27	.24	.21	.18	.15
	.12	.09	.06	.03	.00										
0 18	.00	.03	.07	.10	.13	.17	.20	.23	.27	.30	.34	.38	.41	.45	.48
	.52	.55	.58	.61	.64	.67	.69	.70	.71	.71	.71	.70	.69	.67	.65
	.62	.59	.56	.53	.49	.46	.42	.39	.35	.32	.29	.25	.22	.19	.16
	.12	.09	.06	.03	.00										
0 19	.00	.03	.07	.10	.14	.18	.21	.25	.29	.32	.36	.40	.44	.48	.52
	.56	.60	.63	.67	.70	.73	.75	.77	.78	.79	.78	.77	.76	.73	.71
	.68	.64	.61	.57	.53	.49	.45	.42	.38	.34	.30	.27	.23	.20	.16
	.13	.10	.07	.03	.00										
0 20	.00	.04	.07	.11	.15	.19	.22	.26	.30	.34	.38	.43	.47	.51	.56
	.60	.64	.69	.73	.76	.80	.83	.85	.86	.87	.86	.85	.83	.80	.77
	.73	.69	.65	.61	.57	.53	.48	.44	.40	.36	.32	.28	.25	.21	.17
	.14	.10	.07	.03	.00										
0 21	.00	.04	.08	.12	.15	.19	.24	.28	.32	.36	.41	.45	.50	.55	.59
	.64	.69	.74	.79	.83	.87	.91	.93	.95	.95	.95	.93	.91	.88	.84
	.79	.75	.70	.65	.61	.56	.51	.47	.42	.38	.34	.30	.26	.22	.18
	.14	.11	.07	.04	.00										
0 22	.00	.04	.08	.12	.16	.20	.25	.29	.33	.38	.43	.48	.53	.58	.63
	.69	.74	.80	.85	.90	.95	.99	1.03	1.05	1.05	1.05	1.03	1.00	.96	.91
	.86	.80	.75	.70	.64	.59	.54	.49	.44	.40	.35	.31	.27	.23	.19
	.15	.11	.07	.04	.00										
0 23	.00	.04	.08	.12	.17	.21	.26	.30	.35	.40	.45	.50	.55	.61	.67
	.73	.79	.85	.92	.98	1.04	1.09	1.13	1.16	1.17	1.16	1.13	1.09	1.04	.99
	.92	.86	.80	.74	.68	.62	.57	.51	.46	.42	.37	.32	.28	.24	.20
	.16	.12	.08	.04	.00										
0 24	.00	.04	.09	.13	.17	.22	.26	.31	.36	.41	.46	.52	.58	.64	.70
	.77	.84	.91	.99	1.06	1.13	1.20	1.25	1.29	1.30	1.29	1.26	1.20	1.14	1.07

	.99	.92	.85	.78	.71	.65	.59	.54	.48	.43	.38	.33	.29	.24	.20
	.16	.12	.08	.04	.00										
0 25	.00	.04	.09	.13	.18	.22	.27	.32	.37	.42	.48	.54	.60	.67	.73
	.81	.89	.97	1.06	1.14	1.23	1.32	1.39	1.44	1.46	1.45	1.40	1.32	1.24	1.15
	1.06	.98	.90	.82	.75	.68	.62	.56	.50	.44	.39	.34	.30	.25	.21
	.16	.12	.08	.04	.00										
0 26	.00	.04	.09	.13	.18	.23	.28	.33	.38	.44	.49	.55	.62	.69	.76
	.84	.93	1.02	1.12	1.23	1.34	1.45	1.55	1.63	1.66	1.63	1.56	1.46	1.34	1.23
	1.13	1.03	.94	.85	.77	.70	.63	.57	.51	.46	.40	.35	.30	.26	.21
	.17	.12	.08	.04	.00										
0 27	.00	.05	.09	.14	.18	.23	.28	.33	.39	.44	.50	.57	.63	.71	.79
	.87	.97	1.07	1.18	1.31	1.45	1.59	1.74	1.87	1.93	1.87	1.74	1.60	1.45	1.31
	1.19	1.08	.97	.88	.80	.72	.65	.58	.52	.46	.41	.36	.31	.26	.21
	.17	.13	.08	.04	.00										
0 28	.00	.05	.09	.14	.19	.23	.28	.34	.39	.45	.51	.58	.64	.72	.80
	.89	.99	1.10	1.23	1.38	1.54	1.74	1.95	2.17	2.31	2.17	1.96	1.74	1.55	1.38
	1.24	1.11	1.00	.90	.81	.73	.66	.59	.53	.47	.41	.36	.31	.26	.22
	.17	.13	.08	.04	.00										
0 29	.00	.05	.09	.14	.19	.23	.29	.34	.39	.45	.51	.58	.65	.73	.81
	.90	1.01	1.13	1.26	1.42	1.62	1.86	2.17	2.56	2.96	2.57	2.17	1.86	1.62	1.43
	1.27	1.13	1.02	.91	.82	.74	.66	.59	.53	.47	.41	.36	.31	.26	.22
	.17	.13	.08	.04	.00										
0 30	.00	.05	.09	.14	.19	.23	.28	.34	.39	.45	.51	.58	.65	.73	.81
	.91	1.01	1.13	1.27	1.44	1.64	1.91	2.30	2.96	4.45	2.96	2.30	1.91	1.65	1.44
	1.28	1.14	1.02	.92	.82	.74	.66	.59	.53	.47	.41	.36	.31	.26	.22
	.17	.13	.08	.04	.00										
0 31	.00	.04	.09	.14	.18	.23	.28	.33	.39	.45	.51	.57	.64	.72	.80
	.90	1.00	1.12	1.25	1.41	1.61	1.85	2.16	2.55	2.95	2.55	2.16	1.85	1.61	1.42
	1.26	1.12	1.01	.90	.81	.73	.66	.59	.52	.46	.41	.36	.31	.26	.21
	.17	.13	.08	.04	.00										
0 32	.00	.04	.09	.13	.18	.23	.28	.33	.38	.44	.50	.56	.63	.70	.79
	.87	.97	1.09	1.21	1.36	1.52	1.72	1.93	2.15	2.29	2.15	1.93	1.72	1.53	1.36
	1.22	1.09	.98	.88	.80	.72	.64	.58	.51	.46	.40	.35	.30	.25	.21
	.17	.12	.08	.04	.00										
0 33	.00	.04	.09	.13	.18	.22	.27	.32	.37	.43	.48	.55	.61	.68	.76
	.84	.94	1.04	1.15	1.28	1.41	1.56	1.71	1.84	1.89	1.84	1.71	1.56	1.42	1.28
	1.16	1.05	.94	.85	.77	.69	.62	.56	.50	.44	.39	.34	.29	.25	.20
	.16	.12	.08	.04	.00										
0 34	.00	.04	.08	.13	.17	.21	.26	.31	.36	.41	.47	.53	.59	.66	.73
	.81	.89	.98	1.08	1.19	1.30	1.41	1.51	1.59	1.62	1.59	1.51	1.41	1.30	1.19
	1.09	.99	.90	.82	.74	.67	.60	.54	.48	.43	.38	.33	.28	.24	.20
	.16	.12	.08	.04	.00										
0 35	.00	.04	.08	.12	.16	.21	.25	.30	.34	.39	.45	.50	.56	.63	.69
	.76	.84	.92	1.00	1.09	1.18	1.26	1.34	1.39	1.41	1.39	1.34	1.27	1.18	1.10
	1.01	.93	.85	.77	.70	.64	.57	.52	.46	.41	.36	.32	.27	.23	.19
	.15	.11	.07	.04	.00										
0 36	.00	.04	.08	.12	.16	.20	.24	.28	.33	.38	.43	.48	.53	.59	.65
	.72	.78	.85	.92	1.00	1.07	1.13	1.19	1.22	1.24	1.22	1.19	1.13	1.07	1.00
	.93	.86	.79	.72	.66	.60	.54	.49	.44	.39	.35	.30	.26	.22	.18
	.14	.11	.07	.04	.00										
0 37	.00	.04	.07	.11	.15	.19	.23	.27	.31	.35	.40	.45	.50	.55	.61
	.66	.72	.78	.85	.91	.96	1.01	1.05	1.08	1.09	1.08	1.05	1.01	.96	.91
	.85	.79	.73	.67	.61	.56	.51	.46	.41	.37	.33	.29	.25	.21	.17
	.14	.10	.07	.03	.00										
0 38	.00	.03	.07	.10	.14	.18	.21	.25	.29	.33	.37	.42	.46	.51	.56
	.61	.66	.72	.77	.82	.86	.90	.93	.95	.96	.95	.94	.90	.87	.82
	.77	.72	.67	.62	.57	.52	.47	.43	.39	.34	.31	.27	.23	.20	.16
	.13	.10	.06	.03	.00										
0 39	.00	.03	.06	.10	.13	.16	.20	.23	.27	.31	.35	.39	.43	.47	.51
	.56	.60	.65	.69	.73	.77	.80	.83	.84	.85	.84	.83	.80	.77	.74

```
          .70   .65   .61   .56   .52   .48   .44   .40   .36   .32   .28   .25   .21   .18   .15
          .12   .09   .06   .03   .00
 0 40     .00   .03   .06   .09   .12   .15   .18   .21   .25   .28   .32   .35   .39   .43   .47
          .50   .54   .58   .62   .65   .68   .71   .73   .74   .75   .74   .73   .71   .69   .66
          .62   .59   .55   .51   .47   .43   .40   .36   .33   .29   .26   .23   .20   .17   .14
          .11   .08   .05   .03   .00
 0 41     .00   .03   .05   .08   .11   .14   .16   .19   .22   .25   .29   .32   .35   .38   .42
          .45   .48   .52   .55   .58   .60   .62   .64   .65   .65   .65   .64   .62   .60   .58
          .55   .52   .49   .46   .42   .39   .36   .33   .30   .26   .24   .21   .18   .15   .13
          .10   .07   .05   .02   .00
 0 42     .00   .02   .05   .07   .10   .12   .15   .17   .20   .23   .25   .28   .31   .34   .37
          .40   .43   .45   .48   .50   .52   .54   .55   .56   .57   .56   .56   .54   .53   .51
          .48   .46   .43   .40   .37   .35   .32   .29   .26   .24   .21   .19   .16   .14   .11
          .09   .07   .04   .02   .00
 0 43     .00   .02   .04   .06   .09   .11   .13   .15   .18   .20   .22   .25   .27   .30   .32
          .35   .37   .39   .41   .43   .45   .46   .48   .48   .48   .48   .48   .47   .45   .44
          .42   .40   .37   .35   .33   .30   .28   .25   .23   .21   .18   .16   .14   .12   .10
          .08   .06   .04   .02   .00
 0 44     .00   .02   .04   .05   .07   .09   .11   .13   .15   .17   .19   .21   .23   .25   .27
          .29   .31   .33   .35   .37   .38   .39   .40   .41   .41   .41   .40   .39   .38   .37
          .35   .34   .32   .30   .28   .26   .24   .22   .20   .18   .16   .14   .12   .10   .09
          .07   .05   .03   .02   .00
 0 45     .00   .02   .03   .05   .06   .08   .09   .11   .13   .14   .16   .18   .19   .21   .23
          .24   .26   .28   .29   .30   .31   .32   .33   .33   .33   .33   .33   .32   .31   .30
          .29   .28   .26   .25   .23   .21   .20   .18   .17   .15   .13   .12   .10   .09   .07
          .06   .04   .03   .01   .00
 0 46     .00   .01   .02   .04   .05   .06   .07   .09   .10   .11   .13   .14   .15   .17   .18
          .19   .21   .22   .23   .24   .25   .25   .26   .26   .26   .26   .26   .26   .25   .24
          .23   .22   .21   .20   .18   .17   .16   .15   .13   .12   .11   .09   .08   .07   .06
          .05   .03   .02   .01   .00
 0 47     .00   .01   .02   .03   .04   .05   .06   .07   .08   .09   .10   .11   .12   .13   .14
          .15   .15   .16   .17   .18   .18   .19   .19   .20   .20   .20   .19   .19   .19   .18
          .17   .16   .16   .15   .14   .13   .12   .11   .10   .09   .08   .07   .06   .05   .04
          .03   .03   .02   .01   .00
 0 48     .00   .01   .01   .02   .02   .03   .04   .04   .05   .06   .06   .07   .08   .08   .09
          .10   .10   .11   .11   .12   .12   .13   .13   .13   .13   .13   .13   .13   .12   .12
          .11   .11   .10   .10   .09   .09   .08   .07   .07   .06   .05   .05   .04   .03   .03
          .02   .02   .01   .01   .00
 0 49     .00   .00   .01   .01   .01   .02   .02   .02   .03   .03   .03   .04   .04   .04   .05
          .05   .05   .05   .06   .06   .06   .06   .06   .06   .06   .06   .06   .06   .06   .06
          .06   .05   .05   .05   .05   .04   .04   .04   .03   .03   .03   .02   .02   .02   .01
          .01   .01   .01   .00   .00
 0 50     .00   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
          .00   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
          .00   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
          .00   .00   .00   .00   .00
 ODRAWDOWN WILL BE SAVED ON UNIT 57 AT END OF TIME STEP  5, STRESS PERIOD  1
 0


                          VOLUMETRIC BUDGET FOR ENTIRE MODEL AT END OF TIME STEP  5 IN STRESS PERIOD  1
                          ------------------------------------------------------------------------------
 0                  CUMULATIVE VOLUMES      L**3                      RATES FOR THIS TIME STEP      L**3/T
                    ------------------                                ------------------------

                         IN:                                               IN:
                         ---                                               ---
                           STORAGE =     .46400E+06                          STORAGE =     .18259
                     CONSTANT HEAD =     .12967E+07                    CONSTANT HEAD =     3.1673
                             WELLS =     .00000                                WELLS =     .00000
```

0	TOTAL IN =	.17607E+07		TOTAL IN =	3.3499
0	OUT:			OUT:	
	----			----	
	STORAGE =	.00000		STORAGE =	.00000
	CONSTANT HEAD =	.00000		CONSTANT HEAD =	.00000
	WELLS =	.17608E+07		WELLS =	3.3500
0	TOTAL OUT =	.17608E+07		TOTAL OUT =	3.3500
0	IN - OUT =	-29.875		IN - OUT =	-.96798E-04
0	PERCENT DISCREPANCY =	-.00		PERCENT DISCREPANCY =	-.00

0

TIME SUMMARY AT END OF TIME STEP 5 IN STRESS PERIOD 1

	SECONDS	MINUTES	HOURS	DAYS	YEARS
TIME STEP LENGTH	.121062E+08	201771.	3362.84	140.118	.383624
STRESS PERIOD TIME	.315360E+08	525600.	8760.00	365.000	.999316
TOTAL SIMULATION TIME	.315360E+08	525600.	8760.00	365.000	.999316

1

```
MODFLOW 3 RECOVERY WELL SIMULATION AT VAN DER HORST PLANT NO. 2

        EACH RECOVERY WELL PUMPED AT 25 GPM FOR 1 YEAR



1                    U.S. GEOLOGICAL SURVEY MODULAR FINITE-DIFFERENCE GROUND-WATER MODEL
0Predicted Drawdown for 3 Recovery Wells at Van Der Horst Plant 2
    1 LAYERS        50 ROWS        50 COLUMNS
   1 STRESS PERIOD(S) IN SIMULATION
 MODEL TIME UNIT IS MINUTES
0I/O UNITS:
 ELEMENT OF IUNIT:  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
         I/O UNIT: 11 12  0  0  0  0  0  0 19  0  0 22  0  0  0  0  0  0  0  0  0  0  0  0
0BAS1 -- BASIC MODEL PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT  1
 ARRAYS RHS AND BUFF WILL SHARE MEMORY.
 START HEAD WILL BE SAVED
    22604 ELEMENTS IN X ARRAY ARE USED BY BAS
    22604 ELEMENTS OF X ARRAY USED OUT OF  100000
0BCF1 -- BLOCK-CENTERED FLOW PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT 11
 TRANSIENT SIMULATION
      LAYER  AQUIFER TYPE
      -------------------
         1         1
     7501 ELEMENTS IN X ARRAY ARE USED BY BCF
    30105 ELEMENTS OF X ARRAY USED OUT OF  100000
0WEL1 -- WELL PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM 12
 MAXIMUM OF    3 WELLS
       12 ELEMENTS IN X ARRAY ARE USED FOR WELLS
    30117 ELEMENTS OF X ARRAY USED OUT OF  100000
0SIP1 -- STRONGLY IMPLICIT PROCEDURE SOLUTION PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT 19
 MAXIMUM OF 100 ITERATIONS ALLOWED FOR CLOSURE
  5 ITERATION PARAMETERS
    10405 ELEMENTS IN X ARRAY ARE USED BY SIP
    40522 ELEMENTS OF X ARRAY USED OUT OF  100000
1Predicted Drawdown for 3 Recovery Wells at Van Der Horst Plant 2
0


                                        BOUNDARY ARRAY FOR LAYER  1 WILL BE READ ON UNIT  1 USING FORMAT: (40I2)
                                    ---------------------------------------------------------------------------------------------

       1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
      41 42 43 44 45 46 47 48 49 50
 ...................................................................................................................................
0  1  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1
      -1 -1 -1 -1 -1 -1 -1 -1 -1 -1
0  2  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
       1  1  1  1  1  1  1  1  1 -1
0  3  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
       1  1  1  1  1  1  1  1  1 -1
0  4  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
       1  1  1  1  1  1  1  1  1 -1
0  5  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
       1  1  1  1  1  1  1  1  1 -1
0  6  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
       1  1  1  1  1  1  1  1  1 -1
0  7  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
       1  1  1  1  1  1  1  1  1 -1
```

```
0  8 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0  9 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 10 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 11 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 12 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 13 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 14 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 15 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 16 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 17 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 18 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 19 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 20 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 21 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 22 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 23 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 24 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 25 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 26 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 27 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 28 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 29 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 30 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 31 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 32 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 33 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 34 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 35 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 36 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
0 37 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
     1  1  1  1  1  1  1  1  1 -1
```

```
 0 38  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
        1  1  1  1  1  1  1  1  1 -1
 0 39  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
        1  1  1  1  1  1  1  1  1 -1
 0 40  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
        1  1  1  1  1  1  1  1  1 -1
 0 41  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
        1  1  1  1  1  1  1  1  1 -1
 0 42  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
        1  1  1  1  1  1  1  1  1 -1
 0 43  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
        1  1  1  1  1  1  1  1  1 -1
 0 44  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
        1  1  1  1  1  1  1  1  1 -1
 0 45  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
        1  1  1  1  1  1  1  1  1 -1
 0 46  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
        1  1  1  1  1  1  1  1  1 -1
 0 47  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
        1  1  1  1  1  1  1  1  1 -1
 0 48  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
        1  1  1  1  1  1  1  1  1 -1
 0 49  -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
        1  1  1  1  1  1  1  1  1 -1
 0 50  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1
       -1 -1 -1 -1 -1 -1 -1 -1 -1 -1
0AQUIFER HEAD WILL BE SET TO  100.00     AT ALL NO-FLOW NODES (IBOUND=0).
0                                                              INITIAL HEAD =   100.0000     FOR LAYER  1
0HEAD PRINT FORMAT IS FORMAT NUMBER   4    DRAWDOWN PRINT FORMAT IS FORMAT NUMBER   4
0HEADS WILL BE SAVED ON UNIT 56    DRAWDOWNS WILL BE SAVED ON UNIT 57
0OUTPUT CONTROL IS SPECIFIED EVERY TIME STEP
0                                                    COLUMN TO ROW ANISOTROPY =   1.000000
0                                                                      DELR =   50.00000
0                                                                      DELC =   50.00000
0                                                       PRIMARY STORAGE COEF =   .2000000     FOR LAYER  1
0                                                     HYD. COND. ALONG ROWS =   .1000000E-01 FOR LAYER  1
0                                                                    BOTTOM =   40.00000     FOR LAYER  1
0


                                                       SOLUTION BY THE STRONGLY IMPLICIT PROCEDURE
                                                       -------------------------------------------
0                                               MAXIMUM ITERATIONS ALLOWED FOR CLOSURE =       100
                                                             ACCELERATION PARAMETER =     1.0000
                                                    HEAD CHANGE CRITERION FOR CLOSURE =     .10000E-03
                                                    SIP HEAD CHANGE PRINTOUT INTERVAL =        1
0                                                   CALCULATE ITERATION PARAMETERS FROM MODEL CALCULATED WSEED
1                                                  STRESS PERIOD NO.   1, LENGTH =   525600.0
                                                   ----------------------------------------------

                                                   NUMBER OF TIME STEPS =     5

                                                    MULTIPLIER FOR DELT =     1.500

                                                 INITIAL TIME STEP SIZE =   39855.93
0           3 WELLS
                                               LAYER     ROW     COL     STRESS RATE    WELL NO.
                                               ---------------------------------------------
                                                 1       30      25      -3.3500           1
                                                 1       23      28      -3.3500           2
```

```
                                                  1      26     22     -3.3500          3
 AVERAGE SEED =  .00098696
  MINIMUM SEED =  .00098696
0
    5 ITERATION PARAMETERS CALCULATED FROM AVERAGE SEED:

            .0000000E+00   .8227546E+00   .9685841E+00   .9944317E+00   .9990131E+00
0
    20 ITERATIONS FOR TIME STEP   1 IN STRESS PERIOD  1
 MAXIMUM HEAD CHANGE FOR EACH ITERATION:
 HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL
 ---------------------------------------------------------------------------------------------------------------------------------
   -2.010     (  1, 26, 22)  -.7555     (  1, 24, 27)  -1.015     (  1, 28, 24)  -.8114     (  1, 26, 26)  -.1909     (  1, 31, 32)
    .2336E-01 (  1, 31, 20)   .3187E-01 (  1, 32, 20)   .3081E-01 (  1, 23, 28)   .1321E-01 (  1, 27, 33)  -.6418E-02 (  1, 23, 29)
   -.1394E-02 (  1, 28, 34)  -.1875E-02 (  1, 28, 34)  -.1381E-02 (  1, 28, 34)  -.1219E-02 (  1, 21, 19)  -.8720E-03 (  1, 26, 25)
   -.1908E-03 (  1, 23, 29)  -.2770E-03 (  1, 22, 29)  -.2074E-03 (  1, 23, 28)   .1327E-03 (  1, 28, 24)  -.9702E-04 (  1, 33, 29)
0
 HEAD/DRAWDOWN PRINTOUT FLAG = 0     TOTAL BUDGET PRINTOUT FLAG = 0     CELL-BY-CELL FLOW TERM FLAG = 0
 OUTPUT FLAGS FOR EACH LAYER:
          HEAD    DRAWDOWN  HEAD  DRAWDOWN
 LAYER  PRINTOUT  PRINTOUT  SAVE    SAVE
 ----------------------------------------
    1       0         0       0       0
    16 ITERATIONS FOR TIME STEP   2 IN STRESS PERIOD  1
 MAXIMUM HEAD CHANGE FOR EACH ITERATION:
 HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL
 ---------------------------------------------------------------------------------------------------------------------------------
   -.1032     (  1, 26, 22)  -.2063     (  1, 26, 25)  -.4340     (  1, 27, 24)  -.5323     (  1, 26, 25)  -.1764     (  1, 26, 22)
    .7826E-02 (  1, 27, 23)   .8444E-02 (  1, 28, 24)   .1334E-01 (  1, 26, 26)   .1375E-01 (  1, 29, 29)  -.3638E-02 (  1, 26, 26)
    .3582E-03 (  1, 17, 34)   .7016E-03 (  1, 16, 35)   .9497E-03 (  1, 17, 35)   .5781E-03 (  1, 14, 38)  -.3361E-03 (  1, 28, 23)
   -.3042E-04 (  1, 25, 26)
0
 HEAD/DRAWDOWN PRINTOUT FLAG = 0     TOTAL BUDGET PRINTOUT FLAG = 0     CELL-BY-CELL FLOW TERM FLAG = 0
 OUTPUT FLAGS FOR EACH LAYER:
          HEAD    DRAWDOWN  HEAD  DRAWDOWN
 LAYER  PRINTOUT  PRINTOUT  SAVE    SAVE
 ----------------------------------------
    1       0         0       0       0
    16 ITERATIONS FOR TIME STEP   3 IN STRESS PERIOD  1
 MAXIMUM HEAD CHANGE FOR EACH ITERATION:
 HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL
 ---------------------------------------------------------------------------------------------------------------------------------
   -.3361E-01 (  1, 27, 24)  -.8441E-01 (  1, 26, 25)  -.2220     (  1, 27, 25)  -.3671     (  1, 26, 25)  -.1889     (  1, 26, 22)
    .6183E-02 (  1, 27, 23)   .6938E-02 (  1, 45, 45)  -.8355E-02 (  1, 43, 19)   .1658E-01 (  1, 29, 28)  -.5196E-02 (  1, 27, 27)
   -.3934E-03 (  1, 25, 25)  -.6088E-03 (  1, 38, 37)  -.1521E-02 (  1, 36, 35)   .8243E-03 (  1, 15, 37)  -.4986E-03 (  1, 23, 30)
    .4938E-04 (  1, 31, 39)
0
 HEAD/DRAWDOWN PRINTOUT FLAG = 0     TOTAL BUDGET PRINTOUT FLAG = 0     CELL-BY-CELL FLOW TERM FLAG = 0
 OUTPUT FLAGS FOR EACH LAYER:
          HEAD    DRAWDOWN  HEAD  DRAWDOWN
 LAYER  PRINTOUT  PRINTOUT  SAVE    SAVE
 ----------------------------------------
    1       0         0       0       0
    16 ITERATIONS FOR TIME STEP   4 IN STRESS PERIOD  1
 MAXIMUM HEAD CHANGE FOR EACH ITERATION:
 HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL
 ---------------------------------------------------------------------------------------------------------------------------------
   -.1439E-01 (  1, 26, 24)  -.3807E-01 (  1, 26, 25)  -.1128     (  1, 27, 25)  -.2260     (  1, 25, 26)  -.1497     (  1, 26, 22)
    .4127E-02 (  1, 28, 24)   .5870E-02 (  1, 45, 45)   .7029E-02 (  1, 43, 43)   .1542E-01 (  1, 29, 29)  -.5959E-02 (  1, 28, 28)
   -.3991E-03 (  1, 25, 25)  -.7099E-03 (  1, 37, 37)  -.1719E-02 (  1, 36, 36)   .1073E-02 (  1, 15, 37)  -.6708E-03 (  1, 23, 31)
```

```
    .6983E-04 (  1, 31, 39)
0
0HEAD/DRAWDOWN PRINTOUT FLAG = 0     TOTAL BUDGET PRINTOUT FLAG = 0     CELL-BY-CELL FLOW TERM FLAG = 0
0OUTPUT FLAGS FOR EACH LAYER:
          HEAD    DRAWDOWN  HEAD  DRAWDOWN
 LAYER  PRINTOUT  PRINTOUT  SAVE    SAVE
 ----------------------------------------
    1       0         0       0       0
    16 ITERATIONS FOR TIME STEP   5 IN STRESS PERIOD  1
0MAXIMUM HEAD CHANGE FOR EACH ITERATION:
0 HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL
 ---------------------------------------------------------------------------------------------------------------------------------
   -.5912E-02 (  1, 26, 24)  -.1592E-01 (  1, 26, 25)  -.4992E-01 (  1, 26, 25)  -.1128     (  1, 25, 26)  -.8846E-01 (  1, 26, 22)
   -.2536E-02 (  1, 23, 28)   .3642E-02 (  1, 45, 45)   .4438E-02 (  1, 43, 43)   .1070E-01 (  1, 32, 32)  -.4600E-02 (  1, 28, 28)
   -.2967E-03 (  1, 37, 37)  -.5397E-03 (  1, 37, 37)  -.1325E-02 (  1, 36, 36)   .9407E-03 (  1, 15, 37)  -.5978E-03 (  1, 22, 30)
    .6035E-04 (  1, 31, 39)
0
0HEAD/DRAWDOWN PRINTOUT FLAG = 1     TOTAL BUDGET PRINTOUT FLAG = 1     CELL-BY-CELL FLOW TERM FLAG = 0
0OUTPUT FLAGS FOR EACH LAYER:
          HEAD    DRAWDOWN  HEAD  DRAWDOWN
 LAYER  PRINTOUT  PRINTOUT  SAVE    SAVE
 ----------------------------------------
    1       1         1       1       1
1                   HEAD IN LAYER  1 AT END OF TIME STEP  5 IN STRESS PERIOD  1
           ---------------------------------------------------------------------


           1     2     3     4     5     6     7     8     9    10    11    12    13    14    15
          16    17    18    19    20    21    22    23    24    25    26    27    28    29    30
          31    32    33    34    35    36    37    38    39    40    41    42    43    44    45
          46    47    48    49    50
 ---------------------------------------------------------------------------------------------------------------------------------
0  1   100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00
       100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00
       100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00
       100.00 100.00 100.00 100.00 100.00
0  2   100.00  99.99  99.99  99.98  99.97  99.97  99.96  99.95  99.95  99.94  99.93  99.93  99.92  99.91  99.91
        99.90  99.90  99.89  99.89  99.88  99.88  99.88  99.88  99.87  99.87  99.87  99.87  99.88  99.88  99.88
        99.88  99.89  99.89  99.90  99.90  99.91  99.91  99.92  99.93  99.93  99.94  99.95  99.95  99.96  99.97
        99.97  99.98  99.99  99.99 100.00
0  3   100.00  99.99  99.97  99.96  99.95  99.93  99.92  99.90  99.89  99.88  99.86  99.85  99.84  99.83  99.81
        99.80  99.79  99.78  99.77  99.77  99.76  99.75  99.75  99.75  99.75  99.75  99.75  99.75  99.75  99.76
        99.77  99.77  99.78  99.79  99.80  99.81  99.83  99.84  99.85  99.87  99.88  99.89  99.91  99.92  99.93
        99.95  99.96  99.97  99.99 100.00
0  4   100.00  99.98  99.96  99.94  99.92  99.90  99.88  99.86  99.84  99.82  99.80  99.78  99.76  99.74  99.72
        99.70  99.69  99.67  99.66  99.65  99.64  99.63  99.62  99.62  99.62  99.62  99.62  99.62  99.63  99.64
        99.65  99.66  99.67  99.69  99.70  99.72  99.74  99.76  99.78  99.80  99.82  99.84  99.86  99.88  99.90
        99.92  99.94  99.96  99.98 100.00
0  5   100.00  99.97  99.94  99.92  99.89  99.86  99.84  99.81  99.78  99.75  99.73  99.70  99.68  99.65  99.63
        99.60  99.58  99.56  99.54  99.53  99.51  99.50  99.49  99.49  99.48  99.48  99.49  99.49  99.50  99.51
        99.53  99.54  99.56  99.58  99.60  99.63  99.65  99.68  99.70  99.73  99.76  99.78  99.81  99.84  99.86
        99.89  99.92  99.95  99.97 100.00
0  6   100.00  99.97  99.93  99.90  99.86  99.83  99.79  99.76  99.72  99.69  99.66  99.62  99.59  99.56  99.53
        99.50  99.47  99.45  99.42  99.40  99.39  99.37  99.36  99.35  99.35  99.35  99.35  99.36  99.37  99.38
        99.40  99.42  99.45  99.47  99.50  99.53  99.56  99.59  99.63  99.66  99.69  99.73  99.76  99.80  99.83
        99.86  99.90  99.93  99.97 100.00
0  7   100.00  99.96  99.92  99.88  99.83  99.79  99.75  99.71  99.67  99.63  99.59  99.55  99.51  99.47  99.43
        99.40  99.36  99.33  99.30  99.28  99.26  99.24  99.22  99.21  99.21  99.21  99.21  99.22  99.23  99.25
        99.27  99.30  99.33  99.36  99.40  99.43  99.47  99.51  99.55  99.59  99.63  99.67  99.71  99.75  99.80
        99.84  99.88  99.92  99.96 100.00
0  8   100.00  99.95  99.90  99.85  99.81  99.76  99.71  99.66  99.61  99.56  99.52  99.47  99.42  99.38  99.33
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	99.29	99.25	99.21	99.18	99.15	99.12	99.10	99.08	99.07	99.06	99.06	99.07	99.08	99.09	99.12
	99.14	99.17	99.21	99.25	99.29	99.33	99.38	99.42	99.47	99.52	99.57	99.62	99.67	99.71	99.76
	99.81	99.86	99.91	99.95	100.00										
0 9	100.00	99.94	99.89	99.83	99.78	99.72	99.67	99.61	99.55	99.50	99.44	99.39	99.33	99.28	99.23
	99.18	99.13	99.09	99.05	99.01	98.98	98.95	98.93	98.92	98.91	98.91	98.91	98.93	98.95	98.97
	99.01	99.04	99.08	99.13	99.18	99.23	99.28	99.34	99.39	99.45	99.50	99.56	99.62	99.67	99.73
	99.78	99.84	99.89	99.95	100.00										
0 10	100.00	99.94	99.88	99.81	99.75	99.69	99.62	99.56	99.50	99.43	99.37	99.31	99.25	99.18	99.12
	99.07	99.01	98.96	98.91	98.87	98.83	98.80	98.78	98.76	98.75	98.75	98.75	98.77	98.79	98.82
	98.86	98.91	98.96	99.01	99.07	99.13	99.19	99.25	99.31	99.38	99.44	99.50	99.57	99.63	99.69
	99.76	99.82	99.88	99.94	100.00										
0 11	100.00	99.93	99.86	99.79	99.72	99.65	99.58	99.51	99.44	99.37	99.30	99.23	99.15	99.09	99.02
	98.95	98.89	98.83	98.77	98.72	98.68	98.64	98.61	98.59	98.58	98.58	98.59	98.60	98.63	98.67
	98.71	98.76	98.82	98.88	98.95	99.02	99.09	99.16	99.23	99.30	99.38	99.45	99.52	99.59	99.66
	99.73	99.80	99.86	99.93	100.00										
0 12	100.00	99.92	99.85	99.77	99.69	99.62	99.54	99.46	99.38	99.30	99.22	99.14	99.06	98.98	98.91
	98.83	98.76	98.69	98.63	98.57	98.52	98.47	98.44	98.41	98.40	98.40	98.41	98.43	98.46	98.50
	98.55	98.62	98.68	98.75	98.83	98.91	98.99	99.07	99.15	99.23	99.31	99.39	99.47	99.55	99.63
	99.70	99.78	99.85	99.93	100.00										
0 13	100.00	99.92	99.83	99.75	99.67	99.58	99.50	99.41	99.32	99.23	99.15	99.06	98.97	98.88	98.79
	98.71	98.63	98.55	98.47	98.41	98.35	98.29	98.25	98.22	98.21	98.20	98.21	98.24	98.28	98.33
	98.39	98.46	98.54	98.62	98.71	98.80	98.89	98.98	99.07	99.16	99.25	99.34	99.42	99.51	99.59
	99.68	99.76	99.84	99.92	100.00										
0 14	100.00	99.91	99.82	99.73	99.64	99.55	99.45	99.36	99.26	99.17	99.07	98.97	98.87	98.78	98.68
	98.58	98.49	98.40	98.31	98.24	98.17	98.10	98.06	98.02	98.00	97.99	98.00	98.03	98.08	98.14
	98.21	98.29	98.38	98.48	98.58	98.68	98.79	98.89	98.99	99.09	99.19	99.28	99.38	99.47	99.56
	99.65	99.74	99.83	99.91	100.00										
0 15	100.00	99.90	99.81	99.71	99.61	99.51	99.41	99.31	99.21	99.10	99.00	98.89	98.78	98.67	98.56
	98.45	98.35	98.24	98.15	98.05	97.97	97.90	97.84	97.80	97.77	97.77	97.78	97.81	97.86	97.93
	98.02	98.12	98.22	98.34	98.45	98.57	98.68	98.80	98.91	99.02	99.12	99.23	99.33	99.43	99.53
	99.63	99.72	99.81	99.91	100.00										
0 16	100.00	99.90	99.79	99.69	99.59	99.48	99.37	99.26	99.15	99.04	98.92	98.80	98.68	98.56	98.44
	98.32	98.20	98.08	97.97	97.86	97.77	97.69	97.62	97.56	97.53	97.52	97.53	97.56	97.63	97.71
	97.82	97.93	98.06	98.19	98.32	98.45	98.58	98.70	98.83	98.95	99.06	99.18	99.29	99.39	99.50
	99.60	99.70	99.80	99.90	100.00										
0 17	100.00	99.89	99.78	99.67	99.56	99.45	99.33	99.22	99.10	98.97	98.85	98.72	98.59	98.45	98.32
	98.18	98.05	97.91	97.78	97.66	97.55	97.45	97.37	97.30	97.26	97.24	97.25	97.29	97.37	97.47
	97.60	97.74	97.89	98.04	98.19	98.33	98.48	98.62	98.75	98.88	99.01	99.13	99.24	99.36	99.47
	99.58	99.69	99.79	99.90	100.00										
0 18	100.00	99.89	99.77	99.65	99.54	99.42	99.30	99.17	99.04	98.91	98.77	98.64	98.49	98.35	98.19
	98.04	97.89	97.74	97.59	97.45	97.32	97.20	97.10	97.02	96.96	96.93	96.94	96.98	97.08	97.21
	97.37	97.54	97.71	97.89	98.06	98.22	98.38	98.53	98.68	98.82	98.95	99.08	99.21	99.33	99.44
	99.56	99.67	99.78	99.89	100.00										
0 19	100.00	99.88	99.76	99.64	99.51	99.39	99.26	99.13	98.99	98.85	98.71	98.56	98.40	98.24	98.07
	97.90	97.73	97.56	97.39	97.22	97.07	96.93	96.81	96.71	96.64	96.59	96.58	96.63	96.75	96.92
	97.12	97.33	97.53	97.74	97.93	98.11	98.29	98.45	98.61	98.76	98.90	99.04	99.17	99.30	99.42
	99.54	99.66	99.77	99.89	100.00										
0 20	100.00	99.88	99.75	99.62	99.49	99.36	99.23	99.09	98.95	98.80	98.64	98.48	98.31	98.14	97.95
	97.76	97.57	97.37	97.18	96.98	96.80	96.64	96.50	96.38	96.28	96.20	96.16	96.19	96.36	96.59
	96.86	97.11	97.36	97.59	97.81	98.01	98.20	98.38	98.55	98.71	98.86	99.00	99.14	99.27	99.40
	99.52	99.64	99.76	99.88	100.00										
0 21	100.00	99.87	99.74	99.61	99.48	99.34	99.20	99.05	98.90	98.75	98.58	98.41	98.23	98.04	97.84
	97.63	97.41	97.18	96.95	96.73	96.52	96.33	96.17	96.03	95.90	95.77	95.65	95.63	95.89	96.24
	96.59	96.91	97.20	97.47	97.70	97.92	98.13	98.32	98.49	98.66	98.82	98.97	99.11	99.25	99.38
	99.51	99.63	99.76	99.88	100.00										
0 22	100.00	99.87	99.73	99.60	99.46	99.32	99.17	99.02	98.87	98.70	98.53	98.35	98.16	97.95	97.73
	97.50	97.26	97.00	96.73	96.46	96.20	95.98	95.81	95.67	95.51	95.31	95.04	94.77	95.33	95.89
	96.35	96.74	97.07	97.36	97.62	97.85	98.06	98.26	98.45	98.62	98.78	98.94	99.09	99.23	99.36
	99.50	99.62	99.75	99.88	100.00										
0 23	100.00	99.86	99.73	99.59	99.45	99.30	99.15	99.00	98.84	98.67	98.49	98.30	98.09	97.88	97.64

	97.39	97.11	96.82	96.50	96.17	95.85	95.59	95.43	95.31	95.17	94.93	94.41	93.03	94.77	95.62
	96.18	96.61	96.97	97.28	97.55	97.79	98.02	98.22	98.41	98.59	98.76	98.92	99.07	99.21	99.35
	99.49	99.62	99.75	99.87	100.00										
0 24	100.00	99.86	99.72	99.58	99.44	99.29	99.14	98.98	98.81	98.64	98.45	98.25	98.04	97.81	97.57
	97.29	96.99	96.65	96.28	95.86	95.43	95.08	94.99	94.97	94.93	94.82	94.62	94.41	95.03	95.64
	96.14	96.56	96.92	97.23	97.51	97.76	97.99	98.20	98.39	98.57	98.74	98.90	99.06	99.20	99.34
	99.48	99.61	99.74	99.87	100.00										
0 25	100.00	99.86	99.72	99.58	99.43	99.28	99.13	98.97	98.80	98.62	98.43	98.23	98.01	97.77	97.51
	97.22	96.90	96.53	96.09	95.57	94.94	94.29	94.47	94.66	94.76	94.80	94.83	94.94	95.31	95.76
	96.18	96.57	96.91	97.22	97.49	97.74	97.97	98.18	98.38	98.56	98.73	98.89	99.05	99.20	99.34
	99.48	99.61	99.74	99.87	100.00										
0 26	100.00	99.86	99.72	99.58	99.43	99.28	99.12	98.96	98.79	98.61	98.42	98.21	97.99	97.75	97.48
	97.19	96.85	96.46	95.99	95.37	94.45	92.64	93.95	94.42	94.64	94.80	94.96	95.18	95.51	95.88
	96.26	96.61	96.94	97.23	97.50	97.75	97.97	98.18	98.38	98.56	98.73	98.89	99.05	99.20	99.34
	99.48	99.61	99.74	99.87	100.00										
0 27	100.00	99.86	99.72	99.58	99.43	99.28	99.12	98.96	98.79	98.61	98.42	98.21	97.99	97.75	97.48
	97.19	96.85	96.47	96.02	95.47	94.81	94.12	94.26	94.43	94.58	94.78	95.04	95.33	95.66	96.01
	96.35	96.68	96.99	97.27	97.53	97.77	97.99	98.20	98.39	98.57	98.74	98.90	99.05	99.20	99.34
	99.48	99.61	99.74	99.87	100.00										
0 28	100.00	99.86	99.72	99.58	99.43	99.28	99.13	98.97	98.80	98.62	98.43	98.23	98.01	97.77	97.51
	97.23	96.91	96.54	96.13	95.67	95.18	94.74	94.55	94.45	94.45	94.72	95.07	95.43	95.78	96.13
	96.46	96.77	97.06	97.33	97.58	97.81	98.02	98.22	98.41	98.59	98.76	98.91	99.06	99.21	99.35
	99.48	99.62	99.75	99.87	100.00										
0 29	100.00	99.86	99.72	99.58	99.44	99.29	99.14	98.98	98.82	98.64	98.46	98.26	98.05	97.82	97.57
	97.30	96.99	96.66	96.30	95.90	95.49	95.09	94.75	94.38	94.05	94.57	95.09	95.53	95.92	96.26
	96.58	96.87	97.15	97.40	97.64	97.86	98.07	98.26	98.44	98.62	98.78	98.93	99.08	99.22	99.36
	99.49	99.62	99.75	99.88	100.00										
0 30	100.00	99.87	99.73	99.59	99.45	99.31	99.16	99.00	98.84	98.67	98.49	98.30	98.10	97.88	97.64
	97.39	97.11	96.81	96.49	96.14	95.78	95.40	94.96	94.28	92.77	94.41	95.19	95.69	96.08	96.42
	96.72	97.00	97.25	97.49	97.72	97.93	98.13	98.31	98.49	98.65	98.81	98.96	99.10	99.24	99.37
	99.50	99.63	99.76	99.88	100.00										
0 31	100.00	99.87	99.74	99.60	99.47	99.33	99.18	99.03	98.88	98.71	98.54	98.36	98.16	97.96	97.74
	97.50	97.25	96.98	96.70	96.40	96.08	95.75	95.39	94.98	94.60	95.07	95.55	95.96	96.30	96.61
	96.88	97.14	97.38	97.60	97.81	98.01	98.19	98.37	98.54	98.69	98.84	98.99	99.13	99.26	99.39
	99.52	99.64	99.76	99.88	100.00										
0 32	100.00	99.87	99.74	99.62	99.48	99.35	99.21	99.06	98.91	98.76	98.59	98.42	98.24	98.05	97.85
	97.63	97.40	97.17	96.92	96.66	96.40	96.13	95.88	95.64	95.52	95.70	95.99	96.28	96.56	96.82
	97.07	97.30	97.51	97.72	97.91	98.09	98.27	98.43	98.59	98.74	98.89	99.03	99.16	99.29	99.41
	99.53	99.65	99.77	99.89	100.00										
0 33	100.00	99.88	99.75	99.63	99.50	99.37	99.24	99.10	98.96	98.81	98.66	98.50	98.33	98.15	97.96
	97.77	97.57	97.36	97.14	96.93	96.71	96.51	96.32	96.19	96.14	96.23	96.40	96.61	96.83	97.05
	97.26	97.46	97.66	97.84	98.02	98.19	98.35	98.51	98.66	98.80	98.93	99.07	99.19	99.32	99.43
	99.55	99.67	99.78	99.89	100.00										
0 34	100.00	99.88	99.76	99.65	99.52	99.40	99.27	99.14	99.01	98.87	98.73	98.57	98.42	98.26	98.09
	97.91	97.73	97.55	97.37	97.18	97.01	96.85	96.72	96.63	96.61	96.66	96.78	96.93	97.10	97.28
	97.46	97.64	97.81	97.97	98.14	98.29	98.44	98.59	98.72	98.86	98.99	99.11	99.23	99.35	99.46
	99.57	99.68	99.79	99.89	100.00										
0 35	100.00	99.89	99.78	99.66	99.55	99.43	99.31	99.19	99.06	98.93	98.80	98.66	98.52	98.37	98.22
	98.06	97.90	97.74	97.59	97.43	97.29	97.17	97.07	97.01	96.99	97.03	97.11	97.23	97.36	97.51
	97.66	97.81	97.96	98.11	98.26	98.40	98.53	98.67	98.80	98.92	99.04	99.16	99.27	99.38	99.49
	99.59	99.70	99.80	99.90	100.00										
0 36	100.00	99.89	99.79	99.68	99.57	99.46	99.35	99.24	99.12	99.00	98.87	98.75	98.62	98.48	98.35
	98.21	98.07	97.93	97.80	97.67	97.56	97.46	97.38	97.34	97.33	97.35	97.41	97.50	97.61	97.73
	97.85	97.99	98.12	98.25	98.38	98.51	98.63	98.75	98.87	98.99	99.10	99.21	99.31	99.42	99.52
	99.62	99.71	99.81	99.91	100.00										
0 37	100.00	99.90	99.80	99.70	99.60	99.50	99.39	99.29	99.18	99.07	98.95	98.84	98.72	98.60	98.48
	98.35	98.23	98.11	98.00	97.90	97.80	97.72	97.66	97.63	97.62	97.64	97.69	97.75	97.84	97.94
	98.05	98.16	98.27	98.39	98.50	98.62	98.73	98.84	98.95	99.06	99.16	99.26	99.36	99.45	99.55
	99.64	99.73	99.82	99.91	100.00										
0 38	100.00	99.91	99.82	99.72	99.63	99.53	99.44	99.34	99.24	99.14	99.04	98.93	98.82	98.72	98.61

	98.50	98.39	98.29	98.19	98.11	98.03	97.96	97.92	97.89	97.88	97.90	97.93	97.99	98.06	98.14
	98.23	98.33	98.42	98.53	98.63	98.73	98.83	98.93	99.03	99.13	99.22	99.31	99.40	99.49	99.58
	99.67	99.75	99.83	99.92	100.00										
0 39	100.00	99.92	99.83	99.75	99.66	99.57	99.48	99.39	99.30	99.21	99.12	99.02	98.93	98.83	98.74
	98.64	98.55	98.46	98.38	98.30	98.24	98.19	98.15	98.12	98.12	98.13	98.16	98.21	98.26	98.33
	98.41	98.49	98.57	98.66	98.75	98.84	98.93	99.02	99.11	99.20	99.28	99.37	99.45	99.53	99.61
	99.69	99.77	99.85	99.92	100.00										
0 40	100.00	99.92	99.85	99.77	99.69	99.61	99.53	99.45	99.37	99.28	99.20	99.11	99.03	98.95	98.86
	98.78	98.70	98.62	98.55	98.49	98.44	98.39	98.36	98.34	98.34	98.35	98.37	98.41	98.46	98.51
	98.58	98.65	98.72	98.80	98.87	98.95	99.03	99.11	99.19	99.27	99.35	99.42	99.50	99.57	99.65
	99.72	99.79	99.86	99.93	100.00										
0 41	100.00	99.93	99.86	99.79	99.72	99.65	99.58	99.50	99.43	99.36	99.28	99.21	99.13	99.06	98.99
	98.91	98.85	98.78	98.72	98.67	98.62	98.59	98.56	98.55	98.54	98.55	98.57	98.60	98.64	98.68
	98.74	98.80	98.86	98.93	99.00	99.06	99.13	99.21	99.28	99.34	99.41	99.48	99.55	99.62	99.68
	99.75	99.81	99.87	99.94	100.00										
0 42	100.00	99.94	99.88	99.81	99.75	99.69	99.62	99.56	99.49	99.43	99.36	99.30	99.23	99.17	99.11
	99.05	98.99	98.93	98.88	98.84	98.80	98.77	98.75	98.74	98.73	98.74	98.75	98.78	98.81	98.85
	98.90	98.94	99.00	99.06	99.11	99.17	99.23	99.30	99.36	99.42	99.48	99.54	99.60	99.66	99.72
	99.77	99.83	99.89	99.94	100.00										
0 43	100.00	99.95	99.89	99.84	99.78	99.73	99.67	99.61	99.56	99.50	99.45	99.39	99.33	99.28	99.23
	99.17	99.12	99.08	99.04	99.00	98.97	98.94	98.92	98.91	98.91	98.92	98.93	98.95	98.98	99.01
	99.05	99.09	99.13	99.18	99.23	99.28	99.33	99.39	99.44	99.49	99.54	99.60	99.65	99.70	99.75
	99.80	99.85	99.90	99.95	100.00										
0 44	100.00	99.95	99.91	99.86	99.81	99.77	99.72	99.67	99.62	99.57	99.53	99.48	99.43	99.39	99.34
	99.30	99.26	99.22	99.18	99.15	99.13	99.11	99.09	99.08	99.08	99.09	99.10	99.11	99.13	99.16
	99.19	99.23	99.26	99.30	99.34	99.39	99.43	99.48	99.52	99.57	99.61	99.65	99.70	99.74	99.79
	99.83	99.87	99.91	99.96	100.00										
0 45	100.00	99.96	99.92	99.88	99.84	99.80	99.76	99.73	99.69	99.65	99.61	99.57	99.53	99.49	99.45
	99.42	99.39	99.36	99.33	99.30	99.28	99.27	99.25	99.25	99.25	99.25	99.26	99.27	99.29	99.31
	99.33	99.36	99.39	99.42	99.46	99.49	99.53	99.56	99.60	99.64	99.68	99.71	99.75	99.79	99.82
	99.86	99.89	99.93	99.96	100.00										
0 46	100.00	99.97	99.94	99.91	99.88	99.84	99.81	99.78	99.75	99.72	99.69	99.66	99.62	99.60	99.57
	99.54	99.51	99.49	99.47	99.45	99.43	99.42	99.41	99.41	99.40	99.41	99.41	99.42	99.44	99.45
	99.47	99.49	99.52	99.54	99.57	99.60	99.62	99.65	99.68	99.71	99.74	99.77	99.80	99.83	99.86
	99.89	99.91	99.94	99.97	100.00										
0 47	100.00	99.98	99.95	99.93	99.91	99.88	99.86	99.84	99.81	99.79	99.77	99.74	99.72	99.70	99.68
	99.66	99.64	99.62	99.60	99.59	99.58	99.57	99.56	99.56	99.56	99.56	99.56	99.57	99.58	99.59
	99.61	99.62	99.64	99.66	99.68	99.70	99.72	99.74	99.76	99.78	99.81	99.83	99.85	99.87	99.89
	99.91	99.94	99.96	99.98	100.00										
0 48	100.00	99.98	99.97	99.95	99.94	99.92	99.91	99.89	99.87	99.86	99.84	99.83	99.81	99.80	99.79
	99.77	99.76	99.75	99.74	99.73	99.72	99.71	99.71	99.71	99.71	99.71	99.71	99.72	99.72	99.73
	99.74	99.75	99.76	99.77	99.79	99.80	99.81	99.83	99.84	99.86	99.87	99.89	99.90	99.91	99.93
	99.94	99.96	99.97	99.99	100.00										
0 49	100.00	99.99	99.98	99.98	99.97	99.96	99.95	99.95	99.94	99.93	99.92	99.91	99.91	99.90	99.89
	99.89	99.88	99.87	99.87	99.86	99.86	99.86	99.86	99.85	99.85	99.85	99.86	99.86	99.86	99.87
	99.87	99.87	99.88	99.89	99.89	99.90	99.91	99.91	99.92	99.93	99.94	99.94	99.95	99.96	99.96
	99.97	99.98	99.99	99.99	100.00										
0 50	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
	100.00	100.00	100.00	100.00	100.00										

OHEAD WILL BE SAVED ON UNIT 56 AT END OF TIME STEP 5, STRESS PERIOD 1

1 DRAWDOWN IN LAYER 1 AT END OF TIME STEP 5 IN STRESS PERIOD 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
46	47	48	49	50										

0	1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
		.00	.00	.00	.00	.00										
0	2	.00	.01	.01	.02	.03	.03	.04	.05	.05	.06	.07	.07	.08	.09	.09
		.10	.10	.11	.11	.12	.12	.12	.12	.13	.13	.13	.13	.12	.12	.12
		.12	.11	.11	.10	.10	.09	.09	.08	.07	.07	.06	.05	.05	.04	.03
		.03	.02	.01	.01	.00										
0	3	.00	.01	.03	.04	.05	.07	.08	.10	.11	.12	.14	.15	.16	.17	.19
		.20	.21	.22	.23	.23	.24	.25	.25	.25	.25	.25	.25	.25	.25	.24
		.23	.23	.22	.21	.20	.19	.17	.16	.15	.13	.12	.11	.09	.08	.07
		.05	.04	.03	.01	.00										
0	4	.00	.02	.04	.06	.08	.10	.12	.14	.16	.18	.20	.22	.24	.26	.28
		.30	.31	.33	.34	.35	.36	.37	.38	.38	.38	.38	.38	.38	.37	.36
		.35	.34	.33	.31	.30	.28	.26	.24	.22	.20	.18	.16	.14	.12	.10
		.08	.06	.04	.02	.00										
0	5	.00	.03	.06	.08	.11	.14	.16	.19	.22	.25	.27	.30	.32	.35	.37
		.40	.42	.44	.46	.47	.49	.50	.51	.51	.52	.52	.51	.51	.50	.49
		.47	.46	.44	.42	.40	.37	.35	.32	.30	.27	.24	.22	.19	.16	.14
		.11	.08	.05	.03	.00										
0	6	.00	.03	.07	.10	.14	.17	.21	.24	.28	.31	.34	.38	.41	.44	.47
		.50	.53	.55	.58	.60	.61	.63	.64	.65	.65	.65	.65	.64	.63	.62
		.60	.58	.55	.53	.50	.47	.44	.41	.37	.34	.31	.27	.24	.20	.17
		.14	.10	.07	.03	.00										
0	7	.00	.04	.08	.12	.17	.21	.25	.29	.33	.37	.41	.45	.49	.53	.57
		.60	.64	.67	.70	.72	.74	.76	.78	.79	.79	.79	.79	.78	.77	.75
		.73	.70	.67	.64	.60	.57	.53	.49	.45	.41	.37	.33	.29	.25	.20
		.16	.12	.08	.04	.00										
0	8	.00	.05	.10	.15	.19	.24	.29	.34	.39	.44	.48	.53	.58	.62	.67
		.71	.75	.79	.82	.85	.88	.90	.92	.93	.94	.94	.93	.92	.91	.88
		.86	.83	.79	.75	.71	.67	.62	.58	.53	.48	.43	.38	.33	.29	.24
		.19	.14	.09	.05	.00										
0	9	.00	.06	.11	.17	.22	.28	.33	.39	.45	.50	.56	.61	.67	.72	.77
		.82	.87	.91	.95	.99	1.02	1.05	1.07	1.08	1.09	1.09	1.09	1.07	1.05	1.03
		.99	.96	.92	.87	.82	.77	.72	.66	.61	.55	.50	.44	.38	.33	.27
		.22	.16	.11	.05	.00										
0	10	.00	.06	.12	.19	.25	.31	.38	.44	.50	.57	.63	.69	.75	.82	.88
		.93	.99	1.04	1.09	1.13	1.17	1.20	1.22	1.24	1.25	1.25	1.25	1.23	1.21	1.18
		1.14	1.09	1.04	.99	.93	.87	.81	.75	.69	.62	.56	.50	.43	.37	.31
		.24	.18	.12	.06	.00										
0	11	.00	.07	.14	.21	.28	.35	.42	.49	.56	.63	.70	.77	.84	.91	.98
		1.05	1.11	1.17	1.23	1.28	1.32	1.36	1.39	1.41	1.42	1.42	1.41	1.40	1.37	1.33
		1.29	1.24	1.18	1.12	1.05	.98	.91	.84	.77	.70	.62	.55	.48	.41	.34
		.27	.20	.14	.07	.00										
0	12	.00	.08	.15	.23	.31	.38	.46	.54	.62	.70	.78	.86	.94	1.02	1.09
		1.17	1.24	1.31	1.37	1.43	1.48	1.53	1.56	1.59	1.60	1.60	1.59	1.57	1.54	1.50
		1.45	1.38	1.32	1.25	1.17	1.09	1.01	.93	.85	.77	.69	.61	.53	.45	.37
		.30	.22	.15	.07	.00										
0	13	.00	.08	.17	.25	.33	.42	.50	.59	.68	.77	.85	.94	1.03	1.12	1.21
		1.29	1.37	1.45	1.53	1.59	1.65	1.71	1.75	1.78	1.79	1.80	1.79	1.76	1.72	1.67
		1.61	1.54	1.46	1.38	1.29	1.20	1.11	1.02	.93	.84	.75	.66	.58	.49	.41
		.32	.24	.16	.08	.00										
0	14	.00	.09	.18	.27	.36	.45	.55	.64	.74	.83	.93	1.03	1.13	1.22	1.32
		1.42	1.51	1.60	1.69	1.76	1.83	1.90	1.94	1.98	2.00	2.01	2.00	1.97	1.92	1.86
		1.79	1.71	1.62	1.52	1.42	1.32	1.21	1.11	1.01	.91	.81	.72	.62	.53	.44
		.35	.26	.17	.09	.00										
0	15	.00	.10	.19	.29	.39	.49	.59	.69	.79	.90	1.00	1.11	1.22	1.33	1.44
		1.55	1.65	1.76	1.85	1.95	2.03	2.10	2.16	2.20	2.23	2.23	2.22	2.19	2.14	2.07
		1.98	1.88	1.78	1.66	1.55	1.43	1.32	1.20	1.09	.98	.88	.77	.67	.57	.47
		.37	.28	.19	.09	.00										

0 16	.00	.10	.21	.31	.41	.52	.63	.74	.85	.96	1.08	1.20	1.32	1.44	1.56
	1.68	1.80	1.92	2.03	2.14	2.23	2.31	2.38	2.44	2.47	2.48	2.47	2.44	2.37	2.29
	2.18	2.07	1.94	1.81	1.68	1.55	1.42	1.30	1.17	1.05	.94	.82	.71	.61	.50
	.40	.30	.20	.10	.00										
0 17	.00	.11	.22	.33	.44	.55	.67	.78	.90	1.03	1.15	1.28	1.41	1.55	1.68
	1.82	1.95	2.09	2.22	2.34	2.45	2.55	2.63	2.70	2.74	2.76	2.75	2.71	2.63	2.53
	2.40	2.26	2.11	1.96	1.81	1.67	1.52	1.38	1.25	1.12	.99	.87	.76	.64	.53
	.42	.31	.21	.10	.00										
0 18	.00	.11	.23	.35	.46	.58	.70	.83	.96	1.09	1.23	1.36	1.51	1.65	1.81
	1.96	2.11	2.26	2.41	2.55	2.68	2.80	2.90	2.98	3.04	3.07	3.06	3.02	2.92	2.79
	2.63	2.46	2.29	2.11	1.94	1.78	1.62	1.47	1.32	1.18	1.05	.92	.79	.67	.56
	.44	.33	.22	.11	.00										
0 19	.00	.12	.24	.36	.49	.61	.74	.87	1.01	1.15	1.29	1.44	1.60	1.76	1.93
	2.10	2.27	2.44	2.61	2.78	2.93	3.07	3.19	3.29	3.36	3.41	3.42	3.37	3.25	3.08
	2.88	2.67	2.47	2.26	2.07	1.89	1.71	1.55	1.39	1.24	1.10	.96	.83	.70	.58
	.46	.34	.23	.11	.00										
0 20	.00	.12	.25	.38	.51	.64	.77	.91	1.05	1.20	1.36	1.52	1.69	1.86	2.05
	2.24	2.43	2.63	2.82	3.02	3.20	3.36	3.50	3.62	3.72	3.80	3.84	3.81	3.64	3.41
	3.14	2.89	2.64	2.41	2.19	1.99	1.80	1.62	1.45	1.29	1.14	1.00	.86	.73	.60
	.48	.36	.24	.12	.00										
0 21	.00	.13	.26	.39	.52	.66	.80	.95	1.10	1.25	1.42	1.59	1.77	1.96	2.16
	2.37	2.59	2.82	3.05	3.27	3.48	3.67	3.83	3.97	4.10	4.23	4.35	4.37	4.11	3.76
	3.41	3.09	2.80	2.53	2.30	2.08	1.87	1.68	1.51	1.34	1.18	1.03	.89	.75	.62
	.49	.37	.24	.12	.00										
0 22	.00	.13	.27	.40	.54	.68	.83	.98	1.13	1.30	1.47	1.65	1.84	2.05	2.27
	2.50	2.74	3.00	3.27	3.54	3.80	4.02	4.19	4.33	4.49	4.69	4.96	5.23	4.67	4.11
	3.65	3.26	2.93	2.64	2.38	2.15	1.94	1.74	1.55	1.38	1.22	1.06	.91	.77	.64
	.50	.38	.25	.12	.00										
0 23	.00	.14	.27	.41	.55	.70	.85	1.00	1.16	1.33	1.51	1.70	1.91	2.12	2.36
	2.61	2.89	3.18	3.50	3.83	4.15	4.41	4.57	4.69	4.83	5.07	5.59	6.97	5.23	4.38
	3.82	3.39	3.03	2.72	2.45	2.21	1.98	1.78	1.59	1.41	1.24	1.08	.93	.79	.65
	.51	.38	.25	.13	.00										
0 24	.00	.14	.28	.42	.56	.71	.86	1.02	1.19	1.36	1.55	1.75	1.96	2.19	2.43
	2.71	3.01	3.35	3.72	4.14	4.57	4.92	5.01	5.03	5.07	5.18	5.38	5.59	4.97	4.36
	3.86	3.44	3.08	2.77	2.49	2.24	2.01	1.80	1.61	1.43	1.26	1.10	.94	.80	.66
	.52	.39	.26	.13	.00										
0 25	.00	.14	.28	.42	.57	.72	.87	1.03	1.20	1.38	1.57	1.77	1.99	2.23	2.49
	2.78	3.10	3.47	3.91	4.43	5.06	5.71	5.53	5.34	5.24	5.20	5.17	5.06	4.69	4.24
	3.82	3.43	3.09	2.78	2.51	2.26	2.03	1.82	1.62	1.44	1.27	1.11	.95	.80	.66
	.52	.39	.26	.13	.00										
0 26	.00	.14	.28	.42	.57	.72	.88	1.04	1.21	1.39	1.58	1.79	2.01	2.25	2.52
	2.81	3.15	3.54	4.01	4.63	5.55	7.36	6.05	5.58	5.36	5.20	5.04	4.82	4.49	4.12
	3.74	3.39	3.06	2.77	2.50	2.25	2.03	1.82	1.62	1.44	1.27	1.11	.95	.80	.66
	.52	.39	.26	.13	.00										
0 27	.00	.14	.28	.42	.57	.72	.88	1.04	1.21	1.39	1.58	1.79	2.01	2.25	2.52
	2.81	3.15	3.53	3.98	4.53	5.19	5.88	5.74	5.57	5.42	5.22	4.96	4.67	4.34	3.99
	3.65	3.32	3.01	2.73	2.47	2.23	2.01	1.80	1.61	1.43	1.26	1.10	.95	.80	.66
	.52	.39	.26	.13	.00										
0 28	.00	.14	.28	.42	.57	.72	.87	1.03	1.20	1.38	1.57	1.77	1.99	2.23	2.49
	2.77	3.09	3.46	3.87	4.33	4.82	5.26	5.45	5.55	5.55	5.28	4.93	4.57	4.22	3.87
	3.54	3.23	2.94	2.67	2.42	2.19	1.98	1.78	1.59	1.41	1.24	1.09	.94	.79	.65
	.52	.38	.25	.13	.00										
0 29	.00	.14	.28	.42	.56	.71	.86	1.02	1.18	1.36	1.54	1.74	1.95	2.18	2.43
	2.70	3.01	3.34	3.70	4.10	4.51	4.91	5.25	5.62	5.95	5.43	4.91	4.47	4.08	3.74
	3.42	3.13	2.85	2.60	2.36	2.14	1.93	1.74	1.56	1.38	1.22	1.07	.92	.78	.64
	.51	.38	.25	.12	.00										
0 30	.00	.13	.27	.41	.55	.69	.84	1.00	1.16	1.33	1.51	1.70	1.90	2.12	2.36
	2.61	2.89	3.19	3.51	3.86	4.22	4.60	5.04	5.72	7.23	5.59	4.81	4.31	3.92	3.58
	3.28	3.00	2.75	2.51	2.28	2.07	1.87	1.69	1.51	1.35	1.19	1.04	.90	.76	.63
	.50	.37	.24	.12	.00										

0 31	.00	.13	.26	.40	.53	.67	.82	.97	1.12	1.29	1.46	1.64	1.84	2.04	2.26
	2.50	2.75	3.02	3.30	3.60	3.92	4.25	4.61	5.02	5.40	4.93	4.45	4.04	3.70	3.39
	3.12	2.86	2.62	2.40	2.19	1.99	1.81	1.63	1.46	1.31	1.16	1.01	.87	.74	.61
	.48	.36	.24	.12	.00										
0 32	.00	.13	.26	.38	.52	.65	.79	.94	1.09	1.24	1.41	1.58	1.76	1.95	2.15
	2.37	2.60	2.83	3.08	3.34	3.60	3.87	4.12	4.36	4.48	4.30	4.01	3.72	3.44	3.18
	2.93	2.70	2.49	2.28	2.09	1.91	1.73	1.57	1.41	1.26	1.11	.97	.84	.71	.59
	.47	.35	.23	.11	.00										
0 33	.00	.12	.25	.37	.50	.63	.76	.90	1.04	1.19	1.34	1.50	1.67	1.85	2.04
	2.23	2.43	2.64	2.86	3.07	3.29	3.49	3.68	3.81	3.86	3.77	3.60	3.39	3.17	2.95
	2.74	2.54	2.34	2.16	1.98	1.81	1.65	1.49	1.34	1.20	1.07	.93	.81	.68	.57
	.45	.33	.22	.11	.00										
0 34	.00	.12	.24	.35	.48	.60	.73	.86	.99	1.13	1.27	1.43	1.58	1.74	1.91
	2.09	2.27	2.45	2.63	2.82	2.99	3.15	3.28	3.37	3.39	3.34	3.22	3.07	2.90	2.72
	2.54	2.36	2.19	2.03	1.86	1.71	1.56	1.41	1.28	1.14	1.01	.89	.77	.65	.54
	.43	.32	.21	.11	.00										
0 35	.00	.11	.22	.34	.45	.57	.69	.81	.94	1.07	1.20	1.34	1.48	1.63	1.78
	1.94	2.10	2.26	2.41	2.57	2.71	2.83	2.93	2.99	3.01	2.97	2.89	2.77	2.64	2.49
	2.34	2.19	2.04	1.89	1.74	1.60	1.47	1.33	1.20	1.08	.96	.84	.73	.62	.51
	.41	.30	.20	.10	.00										
0 36	.00	.11	.21	.32	.43	.54	.65	.76	.88	1.00	1.13	1.25	1.38	1.52	1.65
	1.79	1.93	2.07	2.20	2.33	2.44	2.54	2.62	2.66	2.67	2.65	2.59	2.50	2.39	2.27
	2.15	2.01	1.88	1.75	1.62	1.49	1.37	1.25	1.13	1.01	.90	.79	.69	.58	.48
	.38	.29	.19	.09	.00										
0 37	.00	.10	.20	.30	.40	.50	.61	.71	.82	.93	1.05	1.16	1.28	1.40	1.52
	1.65	1.77	1.89	2.00	2.10	2.20	2.28	2.34	2.37	2.38	2.36	2.31	2.25	2.16	2.06
	1.95	1.84	1.73	1.61	1.50	1.38	1.27	1.16	1.05	.94	.84	.74	.64	.55	.45
	.36	.27	.18	.09	.00										
0 38	.00	.09	.18	.28	.37	.47	.56	.66	.76	.86	.96	1.07	1.18	1.28	1.39
	1.50	1.61	1.71	1.81	1.89	1.97	2.04	2.08	2.11	2.12	2.10	2.07	2.01	1.94	1.86
	1.77	1.67	1.58	1.47	1.37	1.27	1.17	1.07	.97	.87	.78	.69	.60	.51	.42
	.33	.25	.17	.08	.00										
0 39	.00	.08	.17	.25	.34	.43	.52	.61	.70	.79	.88	.98	1.07	1.17	1.26
	1.36	1.45	1.54	1.62	1.70	1.76	1.81	1.85	1.88	1.88	1.87	1.84	1.79	1.74	1.67
	1.59	1.51	1.43	1.34	1.25	1.16	1.07	.98	.89	.80	.72	.63	.55	.47	.39
	.31	.23	.15	.08	.00										
0 40	.00	.08	.15	.23	.31	.39	.47	.55	.63	.72	.80	.89	.97	1.05	1.14
	1.22	1.30	1.38	1.45	1.51	1.56	1.61	1.64	1.66	1.66	1.65	1.63	1.59	1.54	1.49
	1.42	1.35	1.28	1.20	1.13	1.05	.97	.89	.81	.73	.65	.58	.50	.43	.35
	.28	.21	.14	.07	.00										
0 41	.00	.07	.14	.21	.28	.35	.42	.50	.57	.64	.72	.79	.87	.94	1.01
	1.09	1.15	1.22	1.28	1.33	1.38	1.41	1.44	1.45	1.46	1.45	1.43	1.40	1.36	1.32
	1.26	1.20	1.14	1.07	1.00	.94	.87	.79	.72	.66	.59	.52	.45	.38	.32
	.25	.19	.13	.06	.00										
0 42	.00	.06	.12	.19	.25	.31	.38	.44	.51	.57	.64	.70	.77	.83	.89
	.95	1.01	1.07	1.12	1.16	1.20	1.23	1.25	1.26	1.27	1.26	1.25	1.22	1.19	1.15
	1.10	1.06	1.00	.94	.89	.83	.77	.70	.64	.58	.52	.46	.40	.34	.28
	.23	.17	.11	.06	.00										
0 43	.00	.05	.11	.16	.22	.27	.33	.39	.44	.50	.55	.61	.67	.72	.77
	.83	.88	.92	.96	1.00	1.03	1.06	1.08	1.09	1.09	1.08	1.07	1.05	1.02	.99
	.95	.91	.87	.82	.77	.72	.67	.61	.56	.51	.46	.40	.35	.30	.25
	.20	.15	.10	.05	.00										
0 44	.00	.05	.09	.14	.19	.23	.28	.33	.38	.43	.47	.52	.57	.61	.66
	.70	.74	.78	.82	.85	.87	.89	.91	.92	.92	.91	.90	.89	.87	.84
	.81	.77	.74	.70	.66	.61	.57	.52	.48	.43	.39	.35	.30	.26	.21
	.17	.13	.09	.04	.00										
0 45	.00	.04	.08	.12	.16	.20	.24	.27	.31	.35	.39	.43	.47	.51	.55
	.58	.61	.64	.67	.70	.72	.73	.75	.75	.75	.75	.74	.73	.71	.69
	.67	.64	.61	.58	.54	.51	.47	.44	.40	.36	.32	.29	.25	.21	.18
	.14	.11	.07	.04	.00										

```
0 46      .00    .03    .06    .09    .12    .16    .19    .22    .25    .28    .31    .34    .38    .40    .43
          .46    .49    .51    .53    .55    .57    .58    .59    .59    .60    .59    .59    .58    .56    .55
          .53    .51    .48    .46    .43    .40    .38    .35    .32    .29    .26    .23    .20    .17    .14
          .11    .09    .06    .03    .00
0 47      .00    .02    .05    .07    .09    .12    .14    .16    .19    .21    .23    .26    .28    .30    .32
          .34    .36    .38    .40    .41    .42    .43    .44    .44    .44    .44    .44    .43    .42    .41
          .39    .38    .36    .34    .32    .30    .28    .26    .24    .22    .19    .17    .15    .13    .11
          .09    .06    .04    .02    .00
0 48      .00    .02    .03    .05    .06    .08    .09    .11    .13    .14    .16    .17    .19    .20    .21
          .23    .24    .25    .26    .27    .28    .29    .29    .29    .29    .29    .29    .28    .28    .27
          .26    .25    .24    .23    .21    .20    .19    .17    .16    .14    .13    .11    .10    .09    .07
          .06    .04    .03    .01    .00
0 49      .00    .01    .02    .02    .03    .04    .05    .05    .06    .07    .08    .09    .09    .10    .11
          .11    .12    .13    .13    .14    .14    .14    .14    .15    .15    .15    .14    .14    .14    .13
          .13    .13    .12    .11    .11    .10    .09    .09    .08    .07    .06    .06    .05    .04    .04
          .03    .02    .01    .01    .00
0 50      .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
          .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
          .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
          .00    .00    .00    .00    .00
0DRAWDOWN WILL BE SAVED ON UNIT 57 AT END OF TIME STEP  5, STRESS PERIOD  1
0


                              VOLUMETRIC BUDGET FOR ENTIRE MODEL AT END OF TIME STEP  5 IN STRESS PERIOD  1
                              ---------------------------------------------------------------------------
0                   CUMULATIVE VOLUMES      L**3                                    RATES FOR THIS TIME STEP      L**3/T
                    ------------------                                              ------------------------

                         IN:                                                                  IN:
                         ---                                                                  ---
                           STORAGE =     .14189E+07                                             STORAGE =     .57819
                     CONSTANT HEAD =     .38633E+07                                       CONSTANT HEAD =    9.4717
                             WELLS =     .00000                                                   WELLS =     .00000
0                         TOTAL IN =     .52822E+07                                            TOTAL IN =    10.050
0                       OUT:                                                                OUT:
                        ----                                                                ----
                           STORAGE =     .00000                                                 STORAGE =     .00000
                     CONSTANT HEAD =     .00000                                           CONSTANT HEAD =     .00000
                             WELLS =     .52823E+07                                               WELLS =    10.050
0                        TOTAL OUT =     .52823E+07                                           TOTAL OUT =    10.050
0                         IN - OUT =   -45.500                                                 IN - OUT =  -.88692E-04
0             PERCENT DISCREPANCY =                  .00                           PERCENT DISCREPANCY =                  .00



0


          TIME SUMMARY AT END OF TIME STEP  5 IN STRESS PERIOD  1
                                    SECONDS        MINUTES         HOURS          DAYS           YEARS
                                 ---------------------------------------------------------------------------
      TIME STEP LENGTH           .121062E+08    201771.        3362.84        140.118        .383624
    STRESS PERIOD TIME           .315360E+08    525600.        8760.00        365.000        .999316
 TOTAL SIMULATION TIME           .315360E+08    525600.        8760.00        365.000        .999316
1
```

APPENDIX C
QA/QC LABORATORY DATA REVIEW

20220.1

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1809

Contract Number: Q89-188R

Sample Identifications:

B-19(2-4')	SS-66
B-19(4-6')	SS-66 Matrix Spike
B-19(6-8')	SS-66 Matrix Duplicate
B-19(8-10')	SS-67
B-19(10-12')	SS-68
B-19(12-14')	SS-69
B-19(14-16')	Field Duplicate-6
B-36(2-4')	Field Blank-3
B-36(18-20')	

METHODOLOGY

Analyses were performed in accordance with New York State Analytical Services Protocol, 1989.

GENERAL COMMENTS

Comments pertain to data on one or all pages of this report.

The enclosed data has been reported utilizing data qualifiers as defined on the Inorganic Data Comment Page.

Results of the analysis of soils are corrected for moisture content and reported on a dry weight basis.

INORGANIC DATA

The extra zzzzz's found on the form 14's of the flame Inorganic Data represent the rezeroing on the instrument after each sample

"I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or her designee, as verified by the following signature."

Kenneth C. Malinowski /KPK

Kenneth C. Malinowski

10/28/91

Date

DATA VALIDATION REVIEW FOR VAN DER HORST PLANT 2 - PHASE IV
ERM-NORTHEAST PROJECT NUMBER 164.005
RECRA ENVIRONMENTAL, INC. CASE NO. 1809, SDG NO. B-19 (2-4)

Deliverables:

The Sample Data Summary Package and the Sample Data Package contain all required deliverables as stipulated under the 1989 ASP Superfund category for all volatile, semi-volatile, pesticide/PCB, and metal analyses, except as noted in this review.

INORGANIC ANALYSES

Holding Times:

All samples were prepared and analyzed within required holding times.

Initial and Continuing Calibration Verification:

All percent recovery results for all analytes were within proper QC limits for both the initial and continuing calibration verification standards.

Blanks:

All blanks (initial calibration, continuing calibration and preparation) contain less than the CRDL of all analytes.

CRDL Standard for AA and ICP:

Initial and final CRDL standards were analyzed with the frequency prescribed by NYSDEC CLP criteria and all exhibited acceptable recoveries.

ICP Interference Check Sample Analysis:

All initial and final ICS results are within the $\pm 20\%$ control limit.

Spiked Sample Analysis:

Matrix spike sample SS-66 recoveries for arsenic (-81.2%), barium (52.7%), chromium (32.8%), lead (64.6%), and manganese (39.3%) were all outside the NYSDEC CLP QC limits of 75% to 125% recovery. Per

CLP criteria all sample results for these analytes have been properly flagged with an "N" indicating these variances. All results are considered estimated and possibly biased low. Negative results for arsenic should be rejected due to 0% recovery of that element. For the post digested spike analysis, the wrong sample result was listed. This was manually corrected on Form VB.

Laboratory Duplicate Sample Analysis:

All laboratory duplicate analyses were in compliance with 20% NYSDEC CLP QC limit.

Laboratory Control Sample Analysis:

All LCS recoveries were within the established control limits.

ICP Serial Dilution Results:

All ICP serial dilution RPDs were within the NYSDEC QC limits.

AA Analysis:

All required flame and furnace AA QC was performed. Method of Standard Addition (MSA) analyses were performed on the following samples for arsenic: SS-66, SS-67, and SS-68. MSA was also performed on B191214, B191416, B1924, B1946, B1968, B19810 and B3624 for lead. The MSA correlation coefficients for SS-66, B191214, B191416, B1946 and B19810 were greater than or equal to 0.995, per NYSDEC CLP QC requirements. The remaining five samples had correlation coefficients less than 0.995 and were appropriately flagged with a "+" per NYSDEC CLP QC limits. Flag results in these samples "J".

The sample result for B191012 was incorrectly reported as 42.3 as opposed to 40.3 as calculated.

I certify that the results detailed in this validation report are true and correct to the best of my knowledge and professional ability.

Signed: Douglas A. Wolf
Douglas A. Wolf

Dated: 1-24-92

20401.1

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1809

SDG Number: RSS-41R

Contract Number: Q89-188R

Sample Identifications: RSS-41R
RSS-41R MATRIX SPIKE
RSS-41R MATRIX DUPLICATE

METHODOLOGY

Analyses were performed in accordance with New York State 1989 Analytical Services protocol.

GENERAL COMMENTS

Comments pertain to data on one or all pages of this report.

Results have been reported utilizing standard qualifiers (Q) as defined on the Inorganic Data Comment Page.

Results of the analysis of soils are corrected for moisture content and reported on a dry weight basis.

INORGANIC DATA

The extra ZZZZZ's found on the Form 14's of the Flame Inorganic Data represent the rezeroing of the instrument after each sample.

"Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or her designee, as verified by the following signature."

Kenneth C. Malinowski

11/20/91
Date

DATA VALIDATION REVIEW FOR VAN DER HORST PLANT 2 - PHASE IV
ERM-NORTHEAST PROJECT NUMBER 164.005
RECRA ENVIRONMENTAL, INC. CASE NO. 1809, SDG RSS-41R

Deliverables:

The Sample Data Summary Package and the Sample Data Package contain all required deliverables as stipulated under the 1989 ASP Superfund category for all metal analyses, except as noted in this review.

INORGANIC ANALYSES

Holding Times:

All samples were prepared and analyzed within required holding times.

Initial and Continuing Calibration Verification:

All percent recovery results for all analytes were within proper QC limits for both the initial and continuing calibration verification standards. However, CCV-2 was omitted from Form IIA. This error was manually corrected.

Blanks:

All blanks (initial calibration, continuing calibration and preparation) contain less than the CRDL of all analytes.

CRDL Standard for AA and ICP:

Initial and final CRDL standards were analyzed with the frequency prescribed by NYSDEC CLP criteria and all exhibited acceptable recoveries.

ICP Interference Check Sample Analysis:

All initial and final ICS results are within the $\pm 20\%$ control limit.

Spiked Sample Analysis:

Matrix spike sample (RSS-41R) recoveries for arsenic (30.7%), barium (196.9%), lead (176%) and zinc (194%) were all outside the NYSDEC CLP QC limits of 75% to 125% recovery. Per CLP criteria all sample results for these analytes have been properly flagged with an "N" indicating these variances. Arsenic results are considered estimated and possibly biased low. Sample results for other four analytes are considered estimated and possibly biased high. The matrix spike recovery for manganese (150.2%) was also outside the limit of 75-125% recovery, however, since the initial sample results were greater than four times the spiking level the recovery results are not used to qualify this sample datum. Post digestion spike analysis was performed as required for barium, chromium, lead and zinc.

Laboratory Duplicate Sample Analysis:

Laboratory duplicate analysis of RSS-41R met the compliance RPD limit of 20% for all metals analyzed as required per NYSDEC CLP criteria, however, the duplicate analysis for arsenic along with the RPD were incorrectly reported on Form VI-N. This was manually corrected and was within the 20% RPD limit.

Laboratory Control Sample Analysis:

All LCS recoveries were within the established control limits.

ICP Serial Dilution Results:

All ICP serial dilution RPDs were within the NYSDEC QC limits.

Furnace AA Analysis:

All required furnace AA QC was performed. Method of standard addition (MSA) was required for arsenic determination and also for arsenic duplicate sample analysis. The correlation coefficients from MSA complied with NYSDEC CLP requirements and were greater than 0.995.

I certify that the results detailed in this validation report are true and correct to the best of my knowledge and professional ability.

Signed: Douglas A. Wolf
Douglas A. Wolf

Dated: 1-24-92

20366.1

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1809

SDG Number: W-23

Contract Number: Q89-188R

Sample Identifications: W-23
W-24
W-25
W-26
W-27
W-28
W-29
W-30
W-31
W-32
DUP-15A

METHODOLOGY

Analyses were performed in accordance with New York State 1989 Analytical Services Protocol.

GENERAL COMMENTS

Comments pertain to data on one or all pages of this report.

Results have been reported utilizing standard qualifiers (Q) as defined on the Inorganic Data Comment Pages.

INORGANIC DATA

No deviations from protocol were observed during analyses.

DATA VALIDATION REVIEW FOR VAN DER HORST PLANT 2 - PHASE IV
ERM-NORTHEAST PROJECT NUMBER 164.005
RECRA ENVIRONMENTAL, INC. CASE NO. 1809, SDG NO. W-23

Deliverables:

The Sample Data Summary Package and the Sample Data Package contain all required deliverables as stipulated under the 1989 ASP Superfund category for metal analyses, except as noted in this review.

INORGANIC ANALYSES

Holding Times:

All samples were prepared and analyzed within required holding times.

Initial and Continuing Calibration Verification:

All percent recovery results for all analytes were within proper QC limits for both the initial and continuing calibration verification standards. Continuing calibration verifications for barium and manganese by ICP were incorrectly transcribed onto Form 2A. This was manually corrected. The initial calibration verification for manganese by ICP was incorrectly transcribed onto Form 2A. This was also manually corrected.

Blanks:

All blanks (initial calibration, continuing calibration and preparation) contain less than the CRDL of all analytes. In the furnace analysis of lead, CCB-4 and CCB-5 were performed but were not listed on Form 3. These were manually corrected. The preparation blank for lead by flame AA was incorrectly transcribed onto Form 3. This was manually corrected.

CRDL Standard for AA and ICP:

Initial and final CRDL standards were analyzed with the frequency prescribed by NYSDEC CLP criteria.

ICP Interference Check Sample Analysis:

All initial and final ICS results are within the $\pm 20\%$ control limit.

Spiked Sample Analysis:

No spike sample analysis was performed due to amended protocols.

Laboratory Duplicate Sample Analysis:

No duplicate sample analysis was performed due to amended protocols.

Laboratory Control Sample Analysis:

All LCS recoveries were within the established control limits, except the LCSS for lead by flame AA which was performed but not listed on Form 7. Therefore lead results by flame AA cannot be qualified.

ICP Serial Dilution Results:

All ICP serial dilution RPDs were within the NYSDEC QC limits.

Furnace AA Analysis:

All required furnace AA QC was performed. Method of Standard Addition (MSA) analyses were performed on W-26 for arsenic and W-25 and W-32 for lead. All MSA correlation coefficients were greater than or equal to 0.995, per NYSDEC CLP QC requirements. The MSA Form (Form VIII) was not included in the SDG. The results were tabulated and inserted in the SDG.

Other QC Issues:

Due to the lack of any QC sample data (spikes, duplicates) all sample results should be considered estimated and flagged "J".

I certify that the results detailed in this validation report are true and correct to the best of my knowledge and professional ability.

Signed: Douglas A. Wolf

Douglas A. Wolf

Dated: 1-27-92

20307.1

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1809

SDG Number: DUST-1

Contract Number: Q89-188R

Sample Identifications:
DUST-1
DUST-2
DUST-3
DUST-3 MATRIX SPIKE
DUST-3 MATRIX DUPLICATE
DUST-4
DUST-5
DUST-6
DUST-7
DUST-8
DUST-9
DUST-10
DUST-11
DUST-12
DUST-13
DUST-14
DUST-15

METHODOLOGY

Analyses were performed in accordance with 1989 New York State Analytical Services Protocol.

GENERAL COMMENTS

Comments pertain to data on one or all pages of this report.

The enclosed results are reported utilizing standard data qualifiers (Q) as defined on the attached Inorganic Data Comment Page.

DATA VALIDATION REVIEW FOR VAN DER HORST PLANT 2 - PHASE IV
ERM-NORTHEAST PROJECT NUMBER 164.005
RECRA ENVIRONMENTAL, INC. CASE NO. 1809, SDG NO. DUST-1

Deliverables:

The Sample Data Summary Package and the Sample Data Package contain all required deliverables as stipulated under the 1989 ASP Superfund category for all metal analyses, except as noted in this review.

INORGANIC ANALYSES

Holding Times:

All samples were prepared and analyzed within required holding times.

Initial and Continuing Calibration Verification:

All percent recovery results for all analytes were within proper QC limits for both the initial and continuing calibration verification standards. The continuing calibration verification for ICP analysis of chromium, barium and manganese (CC V-1) was missing from the raw data (p. 119). The result was obtained from the raw data printout at the end of the ICP run.

Blanks:

All blanks (initial calibration, continuing calibration and preparation) contain less than the CRDL of all analytes.

CRDL Standard for AA and ICP:

Initial and final CRDL standards were analyzed with the frequency prescribed by NYSDEC CLP criteria. The CRDL Standard for lead on its first run was incorrectly transcribed. This was manually corrected.

ICP Interference Check Sample Analysis:

All initial and final ICS results are within the $\pm 20\%$ control limit.

Spiked Sample Analysis:

Matrix spike sample (DUST 3) recoveries for arsenic (-125.3%) and barium (63.7%) were both outside the NYSDEC CLP QC limits of 75% to 125% recovery. Per CLP criteria all sample results for these analytes have been properly flagged with an "N" indicating these variances. Both results are considered estimated and possibly biased low. Sample results for chromium (-1705.5%), lead (2090.2%) and manganese (44.1%) were all outside the NYSDEC CLP QC limits of 75-125% recovery. However, since the initial sample results were greater than four times the spiking level, these matrix spike sample results were not used to qualify data. Matrix Spike Sample analysis was performed but not recorded on Form 5 for arsenic and lead. This was manually corrected. Arsenic results were all then flagged with an "N" as a result of this error.

Laboratory Duplicate Sample Analysis:

Laboratory duplicate analysis of DUST 3 complied with the 20% NYSDEC CLP QC limit for all analytes.

Laboratory Control Sample Analysis:

All LCS recoveries were within the established control limits.

ICP Serial Dilution Results:

All ICP serial dilution RPDs were within the NYSDEC QC limits.

Furnace AA Analysis:

All required furnace AA QC was performed. Method of Standard Addition (MSA) analyses were performed on DUST 1, DUST 3, DUST 3D, DUST 8, DUST 10, DUST 11, DUST 12 and DUST 13 for arsenic and DUST 1, DUST 2, DUST 3D, DUST 4, DUST 5, DUST 9 and DUST 15 for lead. MSA correlation coefficients for DUST 8 and DUST 12 were less than 0.995 and flagged with a "+" per NYSDEC CLP QC requirements. All other MSA analyses had correlation coefficients greater than or equal to 0.995 per NYSDEC CLP QC requirements. The following MSA results were incorrectly transcribed onto Form 8:

DUST 8, DUST 11, DUST 12 and DUST 13 for arsenic and DUST 15 for lead. The correct results were recalculated and manually corrected on Form 8. The corrected MSA results were transcribed onto Form 1.

I certify that the results detailed in this validation report are true and correct to the best of my knowledge and professional ability.

Signed: Douglas A. Wolf

Douglas A. Wolf

Dated: 1-27-92

1/20326.1

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1809

SDG Number: W-21

Contract Number: Q89-188R

Sample Identifications:

W-21 (9/26/91)
W-22 (9/26/91)
Field Blank-10 (9/26/91)
Field Duplicate-14 (9/26/91)
W-21 (10/4/91)
W-22 (10/4/91)
Field Blank-10 (10/4/91)
Field Duplicate-14 (10/4/91)

METHODOLOGY

All analyses were performed in accordance with New York State 1989 Analytical Services Protocol.

GENERAL COMMENTS

Comments pertain to data on one or all pages of this report.

Results have been reported utilizing standard qualifiers (Q) as defined on the Inorganic Data Comment Page.

Due to software limitations, the samples identifications have been abbreviated.

DATA VALIDATION REVIEW FOR VAN DER HORST PLANT 2 - PHASE IV
ERM-NORTHEAST PROJECT NUMBER 164.005
RECRA ENVIRONMENTAL, INC. CASE NO. 1809, SDG NO.W-21

Deliverables:

The Sample Data Summary Package and the Sample Data Package contain all required deliverables as stipulated under the 1989 ASP Superfund category for all metal analyses, except as noted in this review.

INORGANIC ANALYSES

Holding Times:

All samples were prepared and analyzed within required holding times.

Initial and Continuing Calibration Verification:

All percent recovery results for all analytes were within proper QC limits for both the initial and continuing calibration verification standards.

Blanks:

All blanks (initial calibration, continuing calibration and preparation) contain less than the CRDL of all analytes.

CRDL Standard for AA and ICP:

Initial and final CRDL standards were analyzed with the frequency prescribed by NYSDEC CLP criteria.

Spiked Sample Analysis:

No spiked sample analysis was performed on wipe samples due to amended analytical protocols.

Laboratory Duplicate Sample Analysis:

No duplicate sample analysis was performed on wipe samples due to amended analytical protocols.

Laboratory Control Sample Analysis:

All LCS recoveries were within the established control limits.

Furnace AA Analysis:

All required furnace AA QC was performed. Method of Standard Addition (MSA) analysis was performed on Field Blank 10 for lead. The MSA correlation coefficient was greater than or equal to 0.995, per NYSDEC CLP QC requirements.

Other QC Issues:

Due to the lack of any QC sample data (spikes, duplicates) all sample results should be considered estimated and flagged "J".

I certify that the results detailed in this validation report are true and correct to the best of my knowledge and professional ability.

Signed: Douglas A. Wolf
Douglas A Wolf

Dated: 1-27-92

A20223.1

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1809

SDG Number: SS-52(0-3")

Contract Number: G89-188R

Sample Identifications:

SS-60 (0-3")
SS-61 (0-3")
SS-62 (0-3")
SS-63 (0-3")
SS-52 (0-3")
Field Duplicate-9
SS-53 (0-3")
SS-54 (0-3")
SS-54 (0-3") Matrix Spike
SS-54 (0-3") Matrix Duplicate
SS-55 (0-3")
SS-56 (0-3")
SS-57 (0-3")
SS-58 (0-3")
SS-59 (0-3")
Field Blank #6

METHODOLOGY

Analyses were performed in accordance with New York State 1989, Analytical Services Protocol.

GENERAL COMMENTS

Comments pertain to data on one or all pages of this report.

Results have been reported utilizing standard qualifiers (Q) as defined on the Inorganic Data Comment Page.

The Sample identifications have been abbreviated due to computer software limitations.

DATA VALIDATION REVIEW FOR VAN DER HORST PLANT 2 - PHASE IV
ERM-NORTHEAST PROJECT NUMBER 164.005
RECRA ENVIRONMENTAL, INC. CASE NO. 1809, SDG NO.SS-52 (0-3)

Deliverables:

The Sample Data Summary Package and the Sample Data Package contain all required deliverables as stipulated under the 1989 ASP Superfund category for all metal analyses, except as noted in the review.

INORGANIC ANALYSES

Holding Times:

All samples were prepared and analyzed within required holding times.

Initial and Continuing Calibration Verification:

All percent recovery results for all analytes were within proper QC limits for both the initial and continuing calibration verification standards. The initial calibration verification for arsenic and lead was performed but was not listed on Form II. This was manually corrected.

Blanks:

All blanks (initial calibration, continuing calibration and preparation) contain less than the CRDL of all analytes.

CRDL Standard for AA:

All CRDL standards were analyzed with the frequency prescribed by NYSDEC CLP criteria.

Spiked Sample Analysis:

Matrix spike sample (SS5403) recoveries for arsenic (52.0%), chromium (47.2%) and lead (59.1%) were all outside the NYSDEC CLP QC limits of 75% to 125% recovery. Per CLP criteria all sample results for these analytes have been properly flagged with an "N" indicating these variances. All results are considered estimated and possibly biased low.

Laboratory Duplicate Sample Analysis:

Laboratory duplicate analysis of SS5403 complied with the 20% NYSDEC CLP QC limit for all analytes.

Laboratory Control Sample Analysis:

All LCS recoveries were within the established control limits.

Flame AA Analysis:

All required flame AA QC was performed.

Furnace AA Analysis:

All required furnace AA QC was performed. Method of Standard Addition (MSA) analyses were performed on SS5603 and SS5703 for arsenic and on SS5203, SS5603 and SS6103 for lead. All MSA correlation coefficients were greater than or equal to 0.995, per NYSDEC CLP QC requirements.

Other QC Notes:

Raw data (p. 117) was missing for the part 1 run for arsenic by furnace AA. From the run log (Form 14), it was determined that the missing data on this page was for the LCSS and PBS.

I certify that the results detailed in this validation report are true and correct to the best of my knowledge and professional ability.

Signed: Douglas A. Wolf

Douglas A. Wolf

Dated: 1-27-92

20437.1

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1809

SDG Number: W-33

Contract Number: Q89-188R

Sample Identifications: WIPE SAMPLE-33
WIPE SAMPLE-34
WIPE SAMPLE-35
WIPE SAMPLE-36
WIPE SAMPLE-37
WIPE SAMPLE-38
FIELD DUPLICATE-17

METHODOLOGY

Analyses were performed in accordance with New York State 1989 Analytical Services Protocol.

GENERAL COMMENTS

Comments pertain to data on one or all pages of this report.

The enclosed data has been reported utilizing data qualifiers (Q) as defined on the Inorganic Data Comment Page.

Due to software limitations the sample identifications have been abbreviated.

INORGANIC DATA

Samples were a wipe matrix.

The extra ZZZZZ's found on the form 14's of the Flame Inorganic Data represent the rezeroing of the instrument after each sample.

DATA VALIDATION REVIEW FOR VAN DER HORST PLANT 2 - PHASE IV
ERM-NORTHEAST PROJECT NUMBER 164.005
RECRA ENVIRONMENTAL, INC. CASE NO. 1809, SDG NO.W-33

Deliverables:

The Sample Data Summary Package and the Sample Data Package contain all required deliverables as stipulated under the 1989 ASP Superfund category for all metal analyses, except as noted in this review.

INORGANIC ANALYSES

Holding Times:

All samples were prepared and analyzed within required holding times.

Initial and Continuing Calibration Verification:

All percent recovery results for all analytes were within proper QC limits for both the initial and continuing calibration verification standards.

Blanks:

All blanks (initial calibration, continuing calibration and preparation) contain less than the CRDL of all analytes.

CRDL Standard for AA and ICP:

Initial and final CRDL standards were analyzed with the frequency prescribed by NYSDEC CLP criteria.

Spiked Sample Analysis:

No spiked sample analysis was performed on wipe samples due to amended analytical protocols.

Laboratory Duplicate Sample Analysis:

No duplicate sample analysis was performed on wipe samples due to amended analytical protocols.

Laboratory Control Sample Analysis:

All LCS recoveries were within the established control limits.

Furnace AA Analysis:

All required furnace AA QC was performed. Method of Standard Addition (MSA) analyses were performed on samples W33 and W35 for arsenic, and W35 and W36 for lead. All MSA correlation coefficients were greater than or equal to 0.995 for lead, but less than 0.995 for arsenic. Flag arsenic results in W33 and W35 "J".

Other QC Issues:

Due to the lack of any QC sample data (spikes, duplicates) all sample results should be considered estimated and flagged "J".

I certify that the results detailed in this validation report are true and correct to the best of my knowledge and professional ability.

Signed: _____
Douglas A. Wolf

Dated: 1-27-92

1/203286.1

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1809

SDG Number: W-1

Contract Number: Q89-188R

Sample Identifications:

Wipe Sample-1 (9/26/91)
Wipe Sample-2 (9/26/91)
Wipe Sample-3 (9/26/91)
Wipe Sample-4 (9/26/91)
Wipe Sample-5 (9/26/91)
Wipe Sample-6 (9/26/91)
Wipe Sample-7 (9/26/91)
Wipe Sample-8 (9/26/91)
Wipe Sample-9 (9/26/91)
Wipe Sample-10 (9/26/91)
Wipe Sample-11 (9/26/91)
Wipe Sample-12 (9/26/91)
Wipe Sample-13 (9/26/91)
Wipe Sample-14 (9/26/91)
Wipe Sample-15 ((/26/91)
Wipe Sample-16 (9/26/91)
Wipe Sample-17 (9/26/91)
Wipe Sample-18 (9/26/91)
Wipe Sample-19 (9/26/91)
Wipe Sample-20 (9/26/91)
Wipe Sample-1 (10/4/91)
Wipe Sample-2 (10/4/91)
Wipe Sample-3 (10/4/91)
Wipe Sample-4 (10/4/91)
Wipe Sample-5 (10/4/91)
Wipe Sample-6 (10/4/91)
Wipe Sample-7 (10/4/91)
Wipe Sample-8 (10/4/91)
Wipe Sample-9 (10/4/91)

Sample Identications (cont.)

Wipe Sample-10 (10/4/91)
Wipe Sample-11 (10/4/91)
Wipe Sample-12 (10/4/91)
Wipe Sample-13 (10/4/91)
Wipe Sample-14 (10/4/91)
Wipe Sample-15 (10/4/91)
Wipe Sample-16 (10/4/91)
Wipe Sample-17 (10/4/91)
Wipe Sample-18 (10/4/91)
Wipe Sample-19 (10/4/91)
Wipe Sample-20 (10/4/91)

METHODOLOGY

All analyses were performed in accordance with New York State 1989 Analytical Services Protocol.

GENERAL COMMENTS

Comments pertain to data on one or all pages of this report.

Results have been reported utilizing standard qualifiers (Q) as defined on the Inorganic Data Comment Page.

Due to software limitations, the samples identifications have been abbreviated.

DATA VALIDATION REVIEW FOR VAN DER HORST PLANT 2 - PHASE IV
ERM-NORTHEAST PROJECT NUMBER 164.005
RECRA ENVIRONMENTAL, INC. CASE NO. 1809, SDG NO. W-1

Deliverables:

The Sample Data Summary Package and the Sample Data Package contain all required deliverables as stipulated under the 1989 ASP Superfund category for all metal analyses, except as noted in this review.

INORGANIC ANALYSES

Holding Times:

All samples were prepared and analyzed within required holding times.

Initial and Continuing Calibration Verification:

All percent recovery results for all analytes were within proper QC limits for both the initial and continuing calibration verification standards.

Blanks:

All blanks (initial calibration, continuing calibration and preparation) contain less than the CRDL of all analytes.

CRDL Standard for AA:

All CRDL standards were analyzed with the frequency prescribed by NYSDEC CLP criteria. All exhibited acceptable recoveries except for chromium by flame AA which yielded a negative result. This may indicate a problem in evaluating data at this concentration. The CRDL for lead by furnace AA was performed and incorrectly stated on Form II. This was manually corrected. The CRDL for arsenic by furnace AA was performed but not listed on Form II. This was manually corrected.

Spiked Sample Analysis:

No spike sample analysis was performed on wipe samples due to amended analytical protocols.

Laboratory Duplicate Sample Analysis:

No duplicate sample analysis was performed on wipe samples due to amended analytical protocols.

Laboratory Control Sample Analysis:

All LCS recoveries were within the established control limits.

Flame and Furnace AA Analysis:

All required flame and furnace AA QC was performed. Method of Standard Addition (MSA) analyses were performed on W-9, W-14, W-17, and W-20 for arsenic and on W-5, W-7, W-10, and W-19 for lead. The MSA correlation coefficients were less than 0.995 and were appropriately flagged with a "+". However, the "+" flag was not listed on Form I for W-14. This was manually corrected.

Other QC Issues:

Due to lack of any QC sample data (spikes, duplicates) all sample results should be considered estimated and flagged "J".

I certify that the results detailed in this validation report are true and correct to the best of my knowledge and professional ability.

Signed: Douglas A. Wolf
Douglas A. Wolf

Dated: 1-27-92

20212.1

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1809

SDG Number: B23(0-2')

Contract Number: Q89-188R

Sample Identifications:
B-23(0-2')
B-23(0-2') MATRIX SPIKE
B-23(0-2') MATRIX DUPLICATE
B-23(2-4')
B-24(0-2')
B-24(2-4')
B-25(0-2')
B-25(2-4')
B-26(0-2')
B-26(2-4')
B-27(0-2')
B-27(2-4')
FIELD DUPLICATE-8
B-28(0-2')
B-28(2-4')
B-29(0-2')
B-29(2-4')
B-30(0-2')
B-30(2-4')
B-31(0-2')
B-32(0-2')
B-32(2-4')
Field Blank #5

METHODOLOGY

Analyses were performed in accordance with New York State 1989 Analytical Services Protocol.

GENERAL COMMENTS

Comments pertain to data on one or all pages of this report.

Results have been reported utilizing standard qualifiers as defined on the Inorganic Data Comment Page.

DATA VALIDATION REVIEW FOR VAN DER HORST PLANT 2 - PHASE IV
ERM-NORTHEAST PROJECT NUMBER 164.005
RECRA ENVIRONMENTAL, INC. CASE NO. 1809, SDG NO.B23 (0-2)

Deliverables:

The Sample Data Summary Package and the Sample Data Package contain all required deliverables as stipulated under the 1989 ASP Superfund category for all metal analyses, except as noted in this review.

INORGANIC ANALYSES

Holding Times:

All samples were prepared and analyzed within required holding times.

Initial and Continuing Calibration Verification:

All percent recovery results for all analytes were within proper QC limits for both the initial and continuing calibration verification standards.

Blanks:

All blanks (initial calibration, continuing calibration and preparation) contain less than the CRDL of all analytes.

CRDL Standard for AA:

Initial and final CRDL standards were analyzed with the frequency prescribed by NYSDEC CLP criteria.

Spiked Sample Analysis:

Matrix spike sample (B23(0-2)) recoveries for arsenic (65.0%), cadmium (49.7%), chromium (386.9%) and lead (33.1%) were all outside the NYSDEC CLP QC limits of 75% to 125% recovery. Per CLP criteria sample results for arsenic, cadmium and lead have been properly flagged with an "N" indicating these variances. These results are considered estimated and possibly biased low. The sample result for chromium falls outside the 75-125% CLP limit, but the sample result is greater than four times the spike added and therefore chromium results cannot be

qualified. Post digestion spike recovery was performed for chromium but was not listed on Form V. This was manually corrected.

Laboratory Duplicate Sample Analysis:

Laboratory duplicate analysis of B23(0-2) exhibited out of compliance RPDs for lead (54.6%) with respect to the 20% NYSDEC CLP QC limit. Per NYSDEC CLP criteria sample result for this out of compliance analyte has been flagged with the asterisk indicating this variance. Positive lead results should be flagged "J" and negative results "UJ".

Laboratory Control Sample Analysis:

All LCS recoveries were within the established control limits.

Flame and Furnace AA Analysis:

All required flame and furnace AA QC was performed. Method of Standard Addition (MSA) analyses were performed on the following samples for arsenic: B23(2-4), B24(2-4), B25(0-2), B25(2-4), B27(0-2), B28(2-4), B29(0-2), B29(2-4), B31(0-2), B32(0-2), B32(2-4) and FLDDUP8 and the following samples for lead: B23(2-4), B25(2-4), B27(2-4), and B30(0-2). All MSA correlation coefficients were greater than or equal to 0.995, per NYSDEC CLP QC requirements, except: B24(2-4), B25(0-2), B24(2-4), B29(0-2), B32(2-4), and B25(2-4). These results were appropriately flagged with a "+" per NYSDEC CLP QC requirements and should also be flagged "J". MSA for B29(0-2) was performed but was not listed on Form VIII. This was manually corrected.

I certify that the results detailed in this validation report are true and correct to the best of my knowledge and professional ability.

Signed: Douglas A. Wolf
Douglas A. Wolf

Dated: 1-27-92

20287.1

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1809

SDG Number: SS-45(0-3")

Contract Number: Q89-188R

Sample Identifications:
MW-12D(4-6')
MW-12D(9-11')
SS-45(0-3")
SS-46(0-3")
SS-46(0-3")Matrix Spike
SS-46(0-3")Matrix Spike Duplicate
SS-46(0-3")Matrix Duplicate
SS-47(0-3")
SS-48(0-3")
SS-49(0-3")
SS-50(0-3")
SS-51(0-3")
FIELD DUPLICATE-10
FIELD BLANK-7

METHODOLOGY

Analyses were performed in accordance with New York State 1989 Analytical Services Protocol.

GENERAL COMMENTS

Comments pertain to data on one or all pages of this report.

Results are reported utilizing standard qualifiers (Q) as defined on the Organic and Inorganic Data Comment Pages.

Results of the analysis of soils are corrected for moisture content and reported on a dry weight basis.

DATA VALIDATION REVIEW FOR VAN DER HORST PLANT 2 - PHASE IV
ERM-NORTHEAST PROJECT NUMBER 164.005
RECRA ENVIRONMENTAL, INC. CASE NO. 1809, SDG NO.SS-45(0-3)

Deliverables:

The Sample Data Summary Package and the Sample Data Package contain all required deliverables as stipulated under the 1989 ASP Superfund category for all volatile, and metal analyses, except as noted in the review.

VOLATILE ANALYSES:

Holding Times:

All samples were analyzed within seven days of VTSR.

Surrogate Recovery:

All sample and blank surrogate spike recoveries were within the proper QC limits, with the exception of the initial and re-analyses of samples SS4503, SS4703, SS4903, SS5003 and the field duplicate. Use the initial analysis results for all samples except SS4503 and flag all positive results "J" and all negative results "UJ".

Matrix Spike /Matrix Spike Duplicate (MS/MSD):

All MS/MSD spike recovery and relative percent difference (RPD) results were within proper QC limits.

Matrix Spike Blank (MSB):

All matrix spike blank spike recoveries were within proper QC limits.

Blanks:

The following table lists blanks, blank contaminants and concentrations and associated samples.

Method Blank	Contaminant (Concentration in ug/kg)	Associated Samples
VBLK09	Methylene Chloride (0.4J)	Field Blank 7, VHB2716A, VHB2718A
VBLK04	Toluene (0.8J) Chlorobenzene (1J)	Field DUP, Field DUP Re, MW12D46, MW12D911, SS4503, SS4703, SS4903, SS5003, SS5103
VBLK05	Toluene (0.4J) Chlorobenzene (0.8J)	MSB,SS4503Re,SS4603, SS4703Re,SS4803,SS4903Re, SS5003Re,SS4603MS, SS4603MSD
Field Blank 7	Chloroform (4J) Methylene Chloride (0.5J) Unknown Alkane-R.T.=5.9 (9J)	All samples except SS4703 and SS5103

Sample results for toluene or methylene chloride which are less than ten times the associated blank result are considered laboratory derived contamination and are therefore rejected. The same rule applies for chlorobenzene and chloroform but an action level of five times the associated blank value should be used. If the unknown alkane TIC that was found in the field blank is found in any associated samples, it should be rejected. Toluene, chlorobenzene, chloroform and methylene chloride sample results are reported as undetected ("U") at the contract required detection limit (CRQL).

GS/MS Tuning and Performance:

All BFB mass spectra were acceptable. All tuning and mass calibration criteria were within QC limits. All samples, blanks and calibration standards were analyzed within 12 hours of their associated tune.

Internal Standard Areas and Retention Times:

All sample and blank internal standard areas were within the +100%/-50% control limits of the associated continuing calibration, with the exception of the initial and re-analyses of samples SS4503, SS4703, SS4903, and SS5003 and the field duplicate, each of which had one or more internal standard areas outside QC limits. Use the first analysis results for all samples except SS4503 and flag all positive results "J" and all negative results "UJ". All internal standard

retention times were within 30 seconds of the retention time of that compound in the associated continuing calibration.

Calibrations:

All initial and continuing calibrations associated with this data packages exhibited acceptable precision with respect to the NYSDEC ASP QC limits for %RSD between the initial calibration RRFs and the continuing calibration RRFs. All RRFs met the minimum requirements for instrument response as well.

Compound Identification:

Review of sample raw data, chromatograms, and mass spectra indicate that, all positive sample results (with the exception of toluene, chlorobenzene, chloroform and methylene chloride) have been adequately identified and quantitated within the constraints of NYSDEC CLP criteria.

INORGANIC ANALYSES

Holding Times:

All samples were prepared and analyzed within required holding times.

Initial and Continuing Calibration Verification:

All percent recovery results for all analytes were within proper QC limits for both the initial and continuing calibration verification standards.

Blanks:

All blanks (initial calibration, continuing calibration and preparation) contain less than the CRDL of all analytes.

CRDL Standard for AA and ICP:

Initial and final CRDL standards were analyzed with the frequency prescribed by NYSDEC CLP criteria.

ICP Interference Check Sample Analysis:

All initial and final ICS results are within the $\pm 20\%$ control limit.

Spiked Sample Analysis:

Matrix spike sample recoveries for arsenic (135%), chromium (52%), and lead (34%), were all outside the NYSDEC CLP QC limits of 75% to 125% recovery. Per CLP criteria all sample results for these analytes have been properly flagged with an "N" indicating these variances. Sample results are considered estimated and possibly biased low. Negative arsenic results should be rejected due to 0% recovery. Chromium post-digestion spiked sample recovery was acceptable.

Laboratory Duplicate Sample Analysis:

Laboratory duplicate analysis exhibited out of compliance RPDs for arsenic with respect to the 20% NYSDEC CLP QC limit. All positive arsenic data is considered estimated and should be flagged "J".

Laboratory Control Sample Analysis:

LCS samples were analyzed, but the summary Form VII was not included in the package.

ICP Serial Dilution Results:

All ICP serial dilution RPDs were within the NYSDEC QC limits, except for manganese. Flag all manganese results "J".

Furnace AA Analysis:

All required furnace AA QC was performed. Method of Standard Addition (MSA) analyses were performed on samples MW12D911, SS4503, SS4603, SS4703, SS4803, SS5103 and the field duplicate for arsenic, and SS4803 for lead. All MSA correlation coefficients were greater than or equal to 0.995, per NYSDEC CLP QC requirements, except for the arsenic results in SS4603, and SS5103. These arsenic results should be flagged "J".

I certify that the results detailed in this validation report are true and correct to the best of my knowledge and professional ability.

Signed: Douglas A. Wolf

Douglas A. Wolf

Dated: 1-27-92

20331.1

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1809

SDG Number: MW-14S(9-11')

Contract Number: Q89-188R

Sample Identifications: MW-14S(9-11')†
MW-14S(9-11') Matrix Spike
MS-14S(9-11') Matrix Spike Duplicate
MS-14S(9-11') Matrix Duplicate
MS-14S(14-16')†

METHODOLOGY

Analyses were performed in accordance with New York State 1989 Analytical Services Protocol.

GENERAL COMMENTS

Comments pertain to data on one or all pages of this report.

Results have been reported utilizing standard qualifiers (Q) as defined on the Organic and Inorganic Data Comment Pages.

Due to software limitations the sample identifications have been abbreviated.

Results of the analysis of soils are corrected for moisture content and are reported on a dry weight basis.

VOLATILE DATA

Volatile sample and standard areas are listed on the corresponding data system printouts.

Volatile data are processed utilizing Finnigan Autoquantitation and QA Formaster software. All compounds determined to be present by the computer-generated autoquantitation were subjected to a manual ion search for secondary and tertiary ions. Unedited quantitation reports have been submitted with this data package.

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RECRA ENVIRONMENTAL, INC. CASE NO. 1809, SDG NO.MW-14S(9-11)

Deliverables:

The Sample Data Summary Package and the Sample Data Package contain all required deliverables as stipulated under the 1989 ASP Superfund category for all volatile and metal analyses, except as noted in this review.

VOLATILE ANALYSES:

Holding Times:

All samples were analyzed within seven days of VTSR.

Surrogate Recovery:

All sample and blank surrogate spike recoveries were within the proper QC limits.

Matrix Spike /Matrix Spike Duplicate (MS/MSD):

All MS/MSD spike recovery and relative percent difference (RPD) results were within proper QC limits.

Matrix Spike Blank (MSB):

All matrix spike blank spike recoveries were within proper QC limits.

Blanks:

All blanks were contaminant-free with the exception of the volatile holding blank which contained 0.4J ug/kg of methylene chloride. No methylene chloride was detected in any sample.

GS/MS Tuning and Performance:

All BFB mass spectra were acceptable. All tuning and mass calibration criteria were within QC limits. All samples, blanks and calibration standards were analyzed within 12 hours of their associated tune.

Internal Standard Areas and Retention Times:

All sample and blank internal standard areas were within the +100%/-50% control limits of the associated continuing calibration. All internal standard retention times were within 30 seconds of the retention time of that compound in the associated continuing calibration.

Calibrations:

All initial and continuing calibrations associated with this data packages exhibited acceptable precision with respect to the NYSDEC ASP QC limits for %RSD between the initial calibration RRFs and the continuing calibration RRFs. All RRFs met the minimum requirements for instrument response as well.

Compound Identification:

Review of sample raw data, chromatograms, and mass spectra indicate that all positive sample results have been adequately identified and quantitated within the constraints of NYSDEC CLP criteria.

INORGANIC ANALYSES

Holding Times:

All samples were prepared and analyzed within required holding times.

Initial and Continuing Calibration Verification:

All percent recovery results for all analytes were within proper QC limits for both the initial and continuing calibration verification standards.

Blanks:

All blanks (initial calibration, continuing calibration and preparation) contain less than the CRDL of all analytes.

CRDL Standard for AA and ICP:

Initial and final CRDL standards were analyzed with the frequency prescribed by NYSDEC CLP criteria.

ICP Interference Check Sample Analysis:

All initial and final ICS results are within the ±20% control limit.

Spiked Sample Analysis:

No associated spiked sample data is included in the package.

Laboratory Duplicate Sample Analysis:

No associated duplicate sample data is included in the package.

Laboratory Control Sample Analysis:

All LCS recoveries were within the established control limits.

ICP Serial Dilution Results:

No ICP serial dilution analysis data is included in the package.

Furnace AA Analysis:

All required furnace AA QC was performed. Method of Standard Addition (MSA) analyses were performed and all MSA correlation coefficients were greater than or equal to 0.995, per NYSDEC CLP QC requirements.

Other QC Issues:

The package is missing the raw data for the third lead Continuing Calibration Verification standard (CCV3). The package is also missing the raw data for the final ICP CRDL standard for chromium and manganese. As stated above, the package does not contain any QC sample data (spike, duplicate, serial dilution). Flag all sample results "J" due to these deficiencies.

I certify that the results detailed in this validation report are true and correct to the best of my knowledge and professional ability.

Signed: Douglas A. Wolf
Douglas A. Wolf

Dated: 1-27-92

20147.1

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1809

SDG Number: MW-20 (6-8')

Contract Number: Q89-188R

Sample Identifications:

MW-20 (6-8')
MW-20 (6-8') Matrix Spike
MW-20 (6-8') Matrix Duplicate
MW-20 (16-18')
MW-20 (18-20')
MW-20 (25-27')
MW-20 (30-32')
B-37 (4-2')
B-37 (2-4')
B-37 (4-6')
B-37 (6-8')
B-37 (8-10')
B-37 (12-14')
B-37 (14-16')
B-37 (16-18')
B-37 (18-20')
B-38 (8-2')
B-38 (2-4')
B-38 (4-6')
B-38 (6-8')
B-38 (8-10')
Field Duplicate-2
Lab Control Sample

GENERAL COMMENTS

Analyses were performed in accordance with the New York State Analytical Service Protocol 1989.

The enclosed data has been reported utilizing data qualifiers as defined on the Inorganic Data Comment Page.

Results of the analysis of soils are corrected for moisture content and reported on a dry weight basis.

DATA VALIDATION REVIEW FOR VAN DER HORST PLANT 2 - PHASE IV
ERM-NORTHEAST PROJECT NUMBER 164.005
RECRA ENVIRONMENTAL, INC. CASE NO. 1809, SDG NO.MW-20(6-8)

Deliverables:

The Sample Data Summary Package and the Sample Data Package contain all required deliverables as stipulated under the 1989 ASP Superfund category for all metal analyses, except as noted in this review.

INORGANIC ANALYSES

Holding Times:

All samples were prepared and analyzed within required holding times.

Initial and Continuing Calibration Verification:

All percent recovery results for all analytes were within proper QC limits for both the initial and continuing calibration verification standards. ICVs and CCVs for barium by flame AA were performed but not listed on Form 2A. This was manually corrected. CCV3 for arsenic by furnace AA was listed on form 2A but no data sheet was in the data package. On another arsenic run by furnace CCV3 was performed but not listed. This was manually corrected.

Blanks:

All blanks (initial calibration, continuing calibration and preparation) contain less than the CRDL of all analytes. CCB3 for arsenic by furnace AA was listed but the raw data was not present in the data package.

CRDL Standard for AA and ICP:

All CRDL standards were analyzed with the frequency prescribed by NYSDEC CLP criteria.

ICP Interference Check Sample Analysis:

All initial and final ICS results are within the $\pm 20\%$ control limit.

Spiked Sample Analysis:

Matrix spike sample MW-20(6-8) recoveries for arsenic (60.6%), barium (48.2%), chromium (46.3%) and lead (56.3%) were all outside the NYSDEC CLP QC limits of 75% to 125% recovery. Per CLP criteria all sample results for these analytes have been properly flagged with an "N" indicating these variances. These results are considered estimated and possibly biased low. Flag all positive results "J" and negative results "UJ".

Laboratory Duplicate Sample Analysis:

Laboratory duplicate analysis of MW-20(6-8) exhibited acceptable RPDs with respect to the 20% NYSDEC CLP QC limit.

Laboratory Control Sample Analysis:

All LCS recoveries were within the established control limits.

ICP Serial Dilution Results:

All ICP serial dilution RPDs were within the NYSDEC QC limits.

Flame and Furnace AA Analysis:

All required furnace AA QC was performed. Method of Standard Addition (MSA) analyses were performed on field duplicate-2, MW20(30-32), B37(12-14), B37(16-18), B37(2-4) and B38(6-8) for arsenic and MW20(18-20), B37(14-16), B37(16-18), B37(18-20) and B38(8-10) for lead. All MSA correlation coefficients, except MW20(30-32), B37(2-4) and B38(6-8) for arsenic and B38(8-10) for lead were greater than or equal to 0.995, per NYSDEC CLP QC requirements. The remaining MSAs with correlation coefficients less than 0.995 were flagged with a "+" per NYSDEC CLP QC criteria and should be flagged "J". In a few instances the wrong MSA result was used on Form 1. This was manually corrected.

I certify that the results detailed in this validation report are true and correct to the best of my knowledge and professional ability.

Signed: Douglas A. Wolf

Douglas A. Wolf

Dated: 7-4-92

1/20270.1

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1809

SDG Number: B-22 (0-2')

Contract Number: Q89-188R

Sample Identifications:

B-22 (0-2')
B-22 (2-4')
B-22 (14-16')
B-28 (0-3')
SS-33R

METHODOLOGY

Analyses were performed in accordance with New York State 1989 Analytical Service Protocol.

GENERAL COMMENTS

Comments pertain to data on one or all pages of this report.

Results are reported utilizing standard qualifiers (Q) as defined on the Inorganic Data Comment Page.

Results of the analysis of soils are corrected for moisture content and reported on a dry weight basis.

DATA VALIDATION REVIEW FOR VAN DER HORST PLANT 2 - PHASE IV
ERM-NORTHEAST PROJECT NUMBER 164.005
RECRA ENVIRONMENTAL, INC. CASE NO. 1809, SDG NO. B-22(0-2)

Deliverables:

The Sample Data Summary Package and the Sample Data Package contain all required deliverables as stipulated under the 1989 ASP Superfund category for all metal analyses, except as noted in this review.

INORGANIC ANALYSES

Holding Times:

All samples were prepared and analyzed within required holding times.

Initial and Continuing Calibration Verification:

All percent recovery results for all analytes were within proper QC limits for both the initial and continuing calibration verification standards.

Blanks:

All blanks (initial calibration, continuing calibration and preparation) contain less than the CRDL of all analytes. CCB-1 and CCB-3 for mercury and the preparation blank-soil for manganese were incorrectly transcribed onto Form 3. These were manually corrected. The ICB for arsenic by furnace was performed but not listed on Form 3. This was manually corrected.

CRDL Standard for AA and ICP:

Initial and final CRDL standards were analyzed with the frequency prescribed by NYSDEC CLP criteria. The CRDL final standard for silver by ICP was incorrectly transcribed onto Form 2B. This was manually corrected. The CRDL standard for manganese by flame was not detected.

ICP Interference Check Sample Analysis:

All initial and final ICS results are within the $\pm 20\%$ control limit. The final ICSA and final ICSAB for silver and zinc were incorrectly transcribed onto Form 4. This was manually corrected.

Spiked Sample Analysis:

No spike samples associated with the soil samples in this package were analyzed. Therefore all results are considered estimated and should be flagged "J".

Laboratory Duplicate Sample Analysis:

No duplicate samples associated with the soil samples in this package were analyzed. Therefore all results are considered estimated and should be flagged "J".

Laboratory Control Sample Analysis:

All LCS recoveries were within the established control limits.

ICP Serial Dilution Results:

All ICP serial dilution RPDs were within the NYSDEC QC limits.

Flame and Furnace AA Analysis:

All required furnace AA QC was performed, except as noted above. Method of Standard Addition (MSA) analyses was performed on B2202 for arsenic. The MSA correlation coefficient was greater than or equal to 0.995, per NYSDEC CLP QC requirements.

I certify that the results detailed in this validation report are true and correct to the best of my knowledge and professional ability.

Signed: Douglas A. Wolf
Douglas A. Wolf

Dated: 2-4-92

CASE NARRATIVE

Laboratory Name: Recra Environmental Inc.

Laboratory Code: RECNY

SDG Number: MW-16S(0-2')

Case Number: 1809

Contract Number: Q89-188R

Sample Identifications:

RSS-44	RSS-51	BB-2R(0-3")
RSS-45	RSS-52	MW-16S(0-2')
RSS-46	RSS-53	MW-16S(0-2')MS
RSS-47	RSS-54	MW-16S(0-2')MSD
RSS-48	RSS-54 MS	MW-16S(0-2')MD
RSS-49	RSS-54 MD	MW-16S(19-21')
RSS-50	RSS-55	
	Field Duplicate-16A	
	Field Blank-11A	

METHODOLOGY

Analyses were performed in accordance with New York State 1989 Analytical Services Protocol.

Sample identifications were abbreviated due to computer software limitations.

COMMENTS

Comments pertain to data on one or all pages of this report.

Results are reported utilizing standard qualifiers (Q) as defined on the Organic and Inorganic Data Comment Pages.

Soil samples have been corrected for moisture content and are reported on a dry weight basis.

VOLATILE DATA

Volatile sample and standard areas are listed on the

DATA VALIDATION REVIEW FOR VAN DER HORST PLANT 2 - PHASE IV
ERM-NORTHEAST PROJECT NUMBER 164.005
RECRA ENVIRONMENTAL, INC. CASE NO. 1809, SDG NO. MW16S02

Deliverables:

The Sample Data Summary Package and the Sample Data Package contain all required deliverables as stipulated under the 1989 ASP Superfund category for all volatile and metal analyses, except as noted in this review.

VOLATILE ANALYSES:

Holding Times:

All samples were analyzed within seven days of VTSR.

Surrogate Recovery:

All sample and blank surrogate spike recoveries were within the proper QC limits, except for the initial analysis of BB2R03 which had slightly high recovery of toluene-d8 and MW16S1921, MW16S1921MS and MW16S1921MSD which had high recovery of 1,2-dichloroethane-d4. Use the re-analysis of BB2R03. Flag all positive results in MW1631921 "J" and all negative results "UJ".

Matrix Spike /Matrix Spike Duplicate (MS/MSD):

All MS/MSD spike recovery and relative percent difference (RPD) results were within proper QC limits.

Matrix Spike Blank (MSB):

All matrix spike blank spike recoveries were within proper QC limits.

Blanks:

VBLK61, associated with the volatile holding blanks, contained 0.4J ug/l methylene chloride. All other blanks were contaminant free.

GS/MS Tuning and Performance:

All BFB mass spectra were acceptable. All tuning and mass calibration criteria were within QC limits. All samples, blanks and calibration standards were analyzed within 12 hours of their associated tune.

Internal Standard Areas and Retention Times:

All sample and blank internal standard areas were within the +100%/-50% control limits of the associated continuing calibration, except for the initial and re-analysis of sample BB2R03 which had low area counts for the chlorobenzene-d5 internal standard. Use the re-analysis results and flag all compounds quantitated against this intend standard "J" for positive results and "UJ" for negative results. All internal standard retention times were within 30 seconds of the retention time of that compound in the associated continuing calibration.

Calibrations:

All initial and continuing calibrations associated with this data packages exhibited acceptable precision with respect to the NYSDEC ASP QC limits for %RSD between the initial calibration RRFs and the continuing calibration RRFs. All RRFs met the minimum requirements for instrument response as well.

Compound Identification:

Review of sample raw data, chromatograms, and mass spectra, all positive sample results have been adequately identified and quantitated within the constraints of NYSDEC CLP criteria.

INORGANIC ANALYSES

Holding Times:

All samples were prepared and analyzed within required holding times.

Initial and Continuing Calibration Verification:

All percent recovery results for all analytes were within proper QC limits for both the initial and continuing calibration verification standards.

Blanks:

All blanks (initial calibration, continuing calibration and preparation) contain less than the CRDL of all analytes.

CRDL Standard for AA and ICP:

All CRDL standards were analyzed with the frequency prescribed by NYSDEC CLP criteria.

ICP Interference Check Sample Analysis:

All initial and final ICS results are within the $\pm 20\%$ control limit.

Spiked Sample Analysis:

Matrix spike sample recoveries for arsenic and chromium were outside the NYSDEC CLP QC limits of 75% to 125% recovery. Per CLP criteria all sample results for these analytes have been properly flagged with an "N" indicating these variances. Positive sample results for these metals should be flagged "J" and negative results "UJ".

Laboratory Duplicate Sample Analysis:

Laboratory duplicate analysis RSS54 exhibited out of compliance RPDs for arsenic with respect to the 20% NYSDEC CLP QC limit. Duplicate analysis of MW16S02 exhibited out of compliance RPDs for lead. The duplicate summary form for this sample was not included in the data package. Positive lead and chromium results should be flagged "J" and negative results "UJ".

Laboratory Control Sample Analysis:

All LCS recoveries were within the established control limits.

ICP Serial Dilution Results:

All ICP serial dilution RPDs were within the NYSDEC QC limits, except for manganese. Flag all positive ICP manganese results "J" and all negative results "UJ".

Furnace AA Analysis:

All required furnace AA QC was performed. Method of Standard Addition (MSA) analyses were performed on RSS50, RSS53 and the field duplicate for arsenic, and RSS45, RSS47, and MW16S1921 for lead. All MSA correlation coefficients were greater than or equal to 0.995, per NYSDEC CLP QC requirements, except for arsenic in the field duplicate and RSS50. Arsenic results in these samples should be flagged "J".

I certify that the results detailed in this validation report are true and correct to the best of my knowledge and professional ability.

Signed: Douglas A. Wolf

Douglas A. Wolf

Dated: 2-4-92

20299.1

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1809

SDG Number: B-21(0-2')

Contract Number: Q89-188R

Sample Identifications:
FIELD BLANK-9
FIELD BLANK-11
FIELD DUPLICATE-12
FIELD DUPLICATE-15
FIELD DUPLICATE-16
MW-13D(0-2')
MW-13D(14-16')
MW-13D(14-16') MATRIX SPIKE
MW-13D(14-16') MATRIX SPIKE DUPLICATE
MW-13D(14-16') MATRIX DUPLICATE
TMC-5
TMC-5 MATRIX SPIKE
TMC-5 MATRIX SPIKE DUPLICATE
TMC-5 MATRIX DUPLICATE
TMC-6
TMC-7
TMC-8
TMC-9
TMC-5W
TMC-5W MATRIX SPIKE
TMC-5W MATRIX SPIKE DUPLICATE
TMC-5W MATRIX DUPLICATE
TMC-6W
TMC-7W
TMC-8W
TMC-9W

METHODOLOGY

Analyses were performed in accordance with New York State Analytical Services Protocol, 1989.

20299.1

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1809

SDG Number: B-21(0-2')

Contract Number: Q89-188R

Sample Identifications:
B-21(0-2')
B-21(2-4')
B-21(2-4') MATRIX SPIKE
B-21(2-4') MATRIX SPIKE DUPLICATE
B-21(2-4') MATRIX DUPLICATE
FIELD BLANK-8
FIELD BLANK-9
FIELD BLANK-11
FIELD DUPLICATE-11
FIELD DUPLICATE-12
FIELD DUPLICATE-13
FIELD DUPLICATE-15
FIELD DUPLICATE-16
MW-13D(0-2')
MW-13D(9-11')
MW-13D(9-11') MATRIX SPIKE
MW-13D(9-11') MATRIX SPIKE DUPLICATE
MW-13D(14-16')
MW-13D(14-16') MATRIX SPIKE
MW-13D(14-16') MATRIX SPIKE DUPLICATE
TMC-5
TMC-5 MATRIX SPIKE
TMC-5 MATRIX SPIKE DUPLICATE
TMC-5 MATRIX DUPLICATE
TMC-6
TMC-7
TMC-8
TMC-9
TMC-5W
TMC-5W MATRIX SPIKE
TMC-5W MATRIX DUPLICATE
TMC-6W
TMC-7W
TMC-8W
TMC-9W
TRIP BLANK-1

DATA VALIDATION REVIEW FOR VAN DER HORST PLANT 2 - PHASE IV
ERM-NORTHEAST PROJECT NUMBER 164.005
RECRA ENVIRONMENTAL, INC. CASE NO. 1809, SDG NO. B2102

Deliverables:

The Sample Data Summary Package and the Sample Data Package contain all required deliverables as stipulated under the 1989 ASP Superfund category for all volatile and metal analyses, except as noted in this review.

VOLATILE ANALYSES:

Holding Times:

All samples were analyzed within seven days of VTSR.

Surrogate Recovery:

All sample and blank surrogate spike recoveries were within the proper QC limits.

Matrix Spike /Matrix Spike Duplicate (MS/MSD):

All MS/MSD spike recovery and relative percent difference (RPD) results were within proper QC limits, except chlorobenzene in the medium level MS which had a percent recovery 3% over the upper QC limit. No action taken to qualify medium level sample data based on this result.

Matrix Spike Blank (MSB):

All matrix spike blank spike recoveries were within proper QC limits.

Blanks:

VBLK06H, associated with all low level soil samples, contained 0.8J ug/l of benzene, 0.9J ug/l of toluene and 1.0J ug/l of chlorobenzene. VBLK14, trip blank 1, and the field blanks contained between 0.1J ug/l and 0.5J ug/l of methylene chloride. The field blanks also contained between 3J ug/l and 4J ug/l of chloroform. Sample results less than ten times the associated blank result for methylene chloride or toluene or less than five times the associated blank result for benzene, chlorobenzene or chloroform are considered laboratory derived

contamination and are therefore rejected. Sample results are reported as undetected ("U") at the contract required detection limit (CRQL).

GS/MS Tuning and Performance:

All BFB mass spectra were acceptable. All tuning and mass calibration criteria were within QC limits. All samples, blanks and calibration standards were analyzed within 12 hours of their associated tune.

Internal Standard Areas and Retention Times:

All sample and blank internal standard areas were within the +100%/-50% control limits of the associated continuing calibration. All internal standard retention times were within 30 seconds of the retention time of that compound in the associated continuing calibration.

Calibrations:

All initial and continuing calibrations associated with this data packages exhibited acceptable precision with respect to the NYSDEC ASP QC limits for %RSD between the initial calibration RRFs and the continuing calibration RRFs. All RRFs met the minimum requirements for instrument response as well.

Compound Identification:

Review of sample raw data, chromatograms, and mass spectra, all positive sample results (with the exception of toluene, benzene, chlorobenzene, chloroform and methylene chloride) have been adequately identified and quantitated within the constraints of NYSDEC CLP criteria.

INORGANIC ANALYSES

Holding Times:

All samples were prepared and analyzed within required holding times.

Initial and Continuing Calibration Verification:

All percent recovery results for all analytes were within proper QC limits for both the initial and continuing calibration verification standards.

Blanks:

All blanks (initial calibration, continuing calibration and preparation) contain less than the CRDL of all analytes.

CRDL Standard for AA and ICP:

All CRDL standards were analyzed with the frequency prescribed by NYSDEC CLP criteria.

ICP Interference Check Sample Analysis:

All initial and final ICS results are within the $\pm 20\%$ control limit.

Spiked Sample Analysis:

Water spiked sample recoveries were acceptable. Soil matrix spike sample recoveries for arsenic, barium, cadmium, chromium, beryllium, manganese, zinc, and lead by GFAA were all outside the NYSDEC CLP QC limits of 75% to 125% recovery. Per CLP criteria all sample results for these analytes have been properly flagged with an "N" indicating these variances. All positive results for these metals in the affected samples should be flagged "J" and all negative results should be flagged "UJ". Post-digestion spike sample recoveries were acceptable.

Laboratory Duplicate Sample Analysis:

Water laboratory duplicate analysis RPDs were within acceptable limits. Soil laboratory duplicate analysis exhibited out of compliance RPDs for chromium manganese, cadmium and barium with respect to the 20% NYSDEC CLP QC limit. Flag positive results for these metals in affected samples "J" and negative results "UJ".

Laboratory Control Sample Analysis:

All LCS recoveries were within the established control limits.

ICP Serial Dilution Results:

All ICP serial dilution RPDs were within the NYSDEC QC limits, except for manganese. Flag positive manganese results "J" and negative results "UJ".

Furnace AA Analysis:

All required furnace AA QC was performed. Method of Standard Addition (MSA) analyses were performed on Field Duplicate 13 and Field Duplicate 15 for arsenic, and B2124, D1416, Field Duplicate 11, Field Duplicate 16 and TMC7 for lead. All MSA correlation coefficients were greater than or equal to 0.995, per NYSDEC CLP QC requirements.

I certify that the results detailed in this validation report are true and correct to the best of my knowledge and professional ability.

Signed: Douglas A. Wolf

Douglas A. Wolf

Dated: 2-4-97

a20186.1

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1809

Contract Number: Q89-188R

Sample Identifications:

B-38 (10-12')
B-38 (10-12') Matrix Duplicate
B-38 (10-12') Matrix Spike
B-38 (14-16')
B-38 (16-18')
B-38 (18-20')
B-39 (5"-2')
B-39 (2-4')
B-39 (4-6')
B-39 (6-8')
B-39 (8-10')
B-39 (8-10') Matrix Spike
B-39 (10-12')
B-39 (12-14')
B-39 (14-16')
B-39 (18-20')
B-40 (5"-2')
B-40 (2-4')
B-40 (4-6')
B-40 (8-10')
B-40 (10-12')
B-40 (12-14')
B-40 (14-16')

METHODOLOGY

Analyses were performed in accordance with New York State Analytical Services Protocol, 1989.

GENERAL COMMENTS

Comments pertain to data on one or all pages of this report.

The enclosed data has been reported utilizing standard USEPA qualifiers (Q) as defined on the Inorganic Data Comment Page.

DATA VALIDATION REVIEW FOR VAN DER HORST PLANT 2 - PHASE IV
ERM-NORTHEAST PROJECT NUMBER 164.005
RECRA ENVIRONMENTAL, INC. CASE NO. 1809, SDG NO. B-38(10-12)

Deliverables:

The Sample Data Summary Package and the Sample Data Package contain all required deliverables as stipulated under the 1989 ASP Superfund category for all metal analyses, except as noted in this review.

INORGANIC ANALYSES

Holding Times:

All samples were prepared and analyzed within required holding times.

Initial and Continuing Calibration Verification:

All percent recovery results for all analytes were within proper QC limits for both the initial and continuing calibration verification standards. The ICVs for arsenic by furnace AA were performed but were either incorrectly transcribed or not listed on Form 2A. This was manually corrected.

Blanks:

All blanks (initial calibration, continuing calibration and preparation) contain less than the CRDL of all analytes.

CRDL Standard for AA and ICP:

All CRDL standards were analyzed with the frequency prescribed by NYSDEC CLP criteria.

ICP Interference Check Sample Analysis:

All initial and final ICS results are within the $\pm 20\%$ control limit.

Spiked Sample Analysis:

Matrix spike sample B38(10-12) recoveries for arsenic (40.9%), barium (47.1%), Chromium (45.4%) and lead (55.6%) were all outside the NYSDEC CLP QC limits of 75% to 125% recovery. Per CLP criteria all sample results for these

analytes have been properly flagged with an "N" indicating these variances. These results are considered estimated and possibly biased low. Flag positive results for these metals "J" and negative results "UJ". Another matrix spike sample was prepared using sample B39810 for TCLP metals. All results complied with the 75-125% recovery limits per NYSDEC CLP QC criteria.

Laboratory Duplicate Sample Analysis:

Laboratory duplicate analysis of B38(10-12) exhibited out of compliance RPDs for arsenic (35.4%) and lead (49.1%) with respect to the 20% NYSDEC CLP QC limit. Per NYSDEC CLP criteria sample results for these two out of compliance analytes have been flagged with an asterisk indicating these variances. Flag positive arsenic and lead results "J" and negative results "UJ".

Laboratory Control Sample Analysis:

All LCS recoveries were within the established control limits.

ICP Serial Dilution Results:

All ICP serial dilution RPDs were within the NYSDEC QC limits.

Flame and Furnace AA Analysis:

All required flame and furnace AA QC was performed, except that per NYSDEC CLP QC criteria method of standard addition should have been performed on B39(8-10) for TCLP metals analysis of arsenic. Therefore, this result should be considered estimated and flagged "J". Method of Standard Addition (MSA) analyses were performed on B38(10-12)D, B38(18-20), B39(14-16), B39(4-6), B39(5-2), B39(6-8), B40(10-12), B40(12-14), and B40(2-4) for arsenic; B38(10-12), B38(14-16), B38(18-20), B39(10-12), B39(14-16), B39(2-4), B39(5-2), B39(6-8), B40(12-14), B40(4-6), B40(5-2) and B40(2-4) for lead; and B39(8-10)S for selenium. All MSA correlation coefficients except B39(4-6), B39(6-8), B40(10-12) and B40(2-4) for arsenic and B39(2-4) for lead, were greater than or equal to 0.995, per NYSDEC CLP QC requirements. All others were less than 0.995 and flagged with a "+" per NYSDEC CLP QC criteria. These results should be flagged "J". MSA's for B39(4-6) and B40(2-4) for arsenic, B40(2-4) for lead and B39(8-10)S for selenium were performed but not listed on Form 8. This was manually corrected.

Other QC Issues:

The Chain of Custody documents indicate that sample B39(2-4) required total metal analysis and TCLP metal analysis and should have been included within this data package. However, TCLP metal analysis of this sample does not appear to have been performed or reported in this data package or any other data package for this project.

I certify that the results detailed in this validation report are true and correct to the best of my knowledge and professional ability.

Signed: Douglas A. Wolf
Douglas A. Wolf

Dated: 2-3-92

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1809

Contract Number: Q89-188R

Sample Identifications:
MW-19(6"-2')
MW-19(2'-4')
MW-19(4'-6')
MW-19(4'-6') Matrix spike
MW-19(6'-8')
MW-19(8'-10')
MW-19(10'-12')
MW-19(12'-14')
MW-19(14'-16')
MW-19(16'-18')
MW-19(16'-18') Matrix duplicate
MW-19(16'-18') Matrix spike
MW-19(16'-18') Matrix spike duplicate
MW-20(14'-16')
B-37(10'-12')
B-38(12'-14')
B-39(16'-18')
B-40(16'-18')
MW-20(6"-2')
MW-20(4'-6')
MW-20(8'-10')
MW-20(12'-14')
Field Duplicate - 1

MW-19. (16.20) ?

METHODOLOGY

Analyses were performed in accordance with New York State 1989 Analytical Services Protocol.

The Toxicity Characteristic Leaching procedure was performed as per Method 1311, 40 CFR Appendix II to part 261, June, 1990.

GENERAL COMMENTS

Comments pertain to data on one or all pages of this report.

Results have been reported utilizing standard qualifiers (Q) as defined on the Organic & Inorganic Data Comment Pages.

DATA VALIDATION REVIEW FOR VAN DER HORST PLANT 2 - PHASE IV
ERM-NORTHEAST PROJECT NUMBER 164.005
RECRA ENVIRONMENTAL, INC. CASE NO. 1809, SDG NO. MW1924

Deliverables:

The Sample Data Summary Package and the Sample Data Package contain all required deliverables as stipulated under the 1989 ASP Superfund category for all volatile and metal analyses, except as noted in this review.

VOLATILE ANALYSES:

Holding Times:

All samples were analyzed within seven days of VTSR.

Surrogate Recovery:

All sample and blank surrogate spike recoveries were within the proper QC limits.

Matrix Spike /Matrix Spike Duplicate (MS/MSD):

All MS/MSD spike recovery and relative percent difference (RPD) results were within proper QC limits.

Matrix Spike Blank (MSB):

All matrix spike blank spike recoveries were within proper QC limits.

Blanks:

VBLK37, associated with sample MW201416, contained 0.6J ug/l of TCE. This blank was analyzed low level, but the sample was analyzed medium level. The 0.6 ug/l of TCE in a low level blank is equivalent to 75 ug/l in a medium lead blank. Based on this conversion, the 40 ug/l of TCE detected in MW201416 may be negated and attributed to laboratory contamination.

GS/MS Tuning and Performance:

All BFB mass spectra were acceptable. All tuning and mass calibration criteria were within QC limits. All samples, blanks and calibration standards were analyzed within 12 hours of their associated tune.

Internal Standard Areas and Retention Times:

All sample and blank internal standard areas were within the +100%/-50% control limits of the associated continuing calibration. All internal standard retention times were within 30 seconds of the retention time of that compound in the associated continuing calibration.

Calibrations:

All initial and continuing calibrations associated with this data packages exhibited acceptable precision with respect to the NYSDEC ASP QC limits for %RSD between the initial calibration RRFs and the continuing calibration RRFs. All RRFs met the minimum requirements for instrument response as well.

Compound Identification:

Review of sample raw data, chromatograms, and mass spectra, all positive sample results (with the exception of TCE in MW201416) have been adequately identified and quantitated within the constraints of NYSDEC CLP criteria. It is the reviewer's professional judgement that the lab falsely identified chlorobenzene in sample B401618. This result has been negated.

INORGANIC ANALYSES

Holding Times:

All samples were prepared and analyzed within required holding times.

Initial and Continuing Calibration Verification:

All percent recovery results for all analytes were within proper QC limits for both the initial and continuing calibration verification standards.

Blanks:

All blanks (initial calibration, continuing calibration and preparation) contain less than the CRDL of all analytes.

CRDL Standard for AA and ICP:

All CRDL standards were analyzed with the frequency prescribed by NYSDEC CLP criteria.

ICP Interference Check Sample Analysis:

All initial and final ICS results are within the ±20% control limit.

Spiked Sample Analysis:

Matrix spike sample recoveries for arsenic, barium and chromium were all outside the NYSDEC CLP QC limits of 75% to 125% recovery. Per CLP criteria all sample results for these analytes have been properly flagged with an "N" indicating these variances. Flag positive results for these metals "J" and negative results "UJ". Post digestion spike recoveries for barium and chromium were acceptable.

Laboratory Duplicate Sample Analysis:

Laboratory duplicate analysis exhibited out of compliance RPDs for chromium, lead and manganese with respect to the 20% NYSDEC CLP QC limit. Flag all positive results for these metals "J", negative results "UJ".

Laboratory Control Sample Analysis:

All LCS recoveries were within the established control limits.

ICP Serial Dilution Results:

All ICP serial dilution RPDs were within the NYSDEC QC limits.

Furnace AA Analysis:

All required furnace AA QC was performed. Method of Standard Addition (MSA) analyses were performed on B37, B38, B40, 1910, 1912, 1914, 1924, 1946, 1962, 2012, 2014, 20810 and the field duplicate for arsenic, and B38, B39, 1910, 1912, 1914, 1918, 1968, 19810, 2046, 2062, 20810 and the field duplicate for lead.

All MSA correlation coefficients were greater than or equal to 0.995, per NYSDEC CLP QC requirements, except for 1924 and 1946 for arsenic and B38, 1912, 19810 and 20810 for lead. Flag these results "J".

I certify that the results detailed in this validation report are true and correct to the best of my knowledge and professional ability.

Signed: _____
Douglas A. Wolf

Dated: 2-3-92

20372.1

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1809

SDG Number: CB-1

Contract Number: Q89-188R

Sample Identifications: CB-1
DD-2
DD-2 Matrix Spike

METHODOLOGIES

Analyses were performed in accordance with 1989 New York State Analytical Services Protocol.

The Toxicity Characteristic Leaching Procedure was performed in accordance with Method 1311, 40 CFR, Appendix II to Part 261, June 1990.

GENERAL COMMENTS

Comments pertain to data on one or all pages of this report.

The enclosed results are reported utilizing standard data qualifiers (Q) as defined on the attached Organic and Inorganic Data Comment Pages.

Results of the analysis of soils are corrected for moisture content and reported on a dry weight basis.

Elevated detection limits are the result of a dilution necessitated by sample matrix.

TCLP Matrix Spike Quality Control Analysis was performed on sample DD-2 MS. The measured values for sample DD-2 on the enclosed TCLP data have been corrected for analytical bias based upon the matrix spike results from sample DD-2 MS as required by the referenced TCLP protocol.

Quantitation limits are not corrected for analytical bias.

The Toxicity Characteristic Leaching Procedure was performed on October 2, 1991.

DATA VALIDATION REVIEW FOR VAN DER HORST PLANT 2 - PHASE IV
ERM-NORTHEAST PROJECT NUMBER 164.005
RECRA ENVIRONMENTAL, INC. CASE NO. 1809, SDG NO. CB-1

Deliverables:

The Sample Data Summary Package and the Sample Data Package contain all required deliverables as stipulated under the 1989 ASP Superfund category for all volatile, semi-volatile, pesticide/PCB, and metal analyses, except as noted in this review.

VOLATILE ANALYSES:

Holding Times:

All samples were analyzed within seven days of VTSR.

Surrogate Recovery:

Blank surrogate spike recoveries were within the proper QC limits. CB-1 surrogate recoveries for toluene-d8 and BFB were out in both the initial and re-analyses. Use the re-analysis results due to better compound recovery. Flag all positive results "J" and all negative results "UJ".

Matrix Spike /Matrix Spike Duplicate (MS/MSD):

No MS/MSD analyzed. This breach of protocol will not affect the technical usability of the sample data.

Matrix Spike Blank (MSB):

No MSB analyzed. This breach of protocol will not affect the technical usability of the sample data.

Blanks:

VBLK14, associated with the volatile holding blank, contains 0.1J ug/l of methylene chloride. VBLK06 and VBLK08 both contain benzene, toluene and chlorobenzene at about 0.8J ug/l, 0.8J ug/l and 1.0 ug/l, respectively. Although the re-analysis of CB-1 contains these compounds, they are present at concentrations above those that would allow them to be negated. Therefore, these compounds are flagged with a "B" qualifier.

GS/MS Tuning and Performance:

All BFB mass spectra were acceptable. All tuning and mass calibration criteria were within QC limits. All samples, blanks and calibration standards were analyzed within 12 hours of their associated tune.

Internal Standard Areas and Retention Times:

All blank internal standard areas were within the +100%/-50% control limits of the associated continuing calibration. CB-1 initial and re-analysis both had poor internal standard response for two (CB-1) or three (CB1RE) internal standards. Use CB1RE and flag all positive results "J" and all negative results "UJ". All internal standard retention times were within 30 seconds of the retention time of that compound in the associated continuing calibration.

Calibrations:

All initial and continuing calibrations associated with this data packages exhibited acceptable precision with respect to the NYSDEC ASP QC limits for %RSD between the initial calibration RRFs and the continuing calibration RRFs. All RRFs met the minimum requirements for instrument response as well.

Compound Identification:

Review of sample raw data, chromatograms, and mass spectra, all positive sample results have been adequately identified and quantitated within the constraints of NYSDEC CLP criteria.

SEMI-VOLATILE ANALYSES

Holding Times:

The sample was extracted and analyzed within acceptable holding times.

Method Blanks:

The method blank, SBLK40, associated with the one sample in this package, exhibited two tentatively identified compounds (TICs) with mass spectra which did not match the TICs reported for the sample.

GC/MS Tuning and Performance:

All DFTPP mass spectra were acceptable. All tuning and mass calibration criteria were within QC limits. All samples, blanks and calibration standards were analyzed within 12 hours of their associated tune.

Internal Standard Areas and Retention Times:

All internal standard retention times were within 30 seconds of the retention time of that compound in the associated continuing calibration. All internal standard areas were within the +100%/-50% control limits of the associated continuing calibration internal standard area.

Calibrations:

All initial calibration relative response factor and percent relative standard deviation results are within QC limits for all compounds. All continuing calibration relative response factor results are greater than 0.05. All percent difference results between the initial calibration average relative response factor and the continuing calibration relative response factor are within the applicable QC limits. All compounds in the continuing calibrations had relative retention times within 0.06 retention time units of the same compounds in the associated initial calibration.

Surrogate Recoveries:

All surrogate recoveries were within the NYSDEC CLP QC limits.

MS/MSD/MSB:

No MS/MSD or MSB was analyzed. This breach of contract protocol will not affect the technical usability of the sample data.

Compound Identification:

The laboratory analyzed CB-1 twice. Use the analysis labeled CB1RE. Bis(2-ethylhexyl) phthalate was detected above the instrument's linear calibration range in the initial analysis. The extract was diluted and re-analyzed. Use CB1DL for bis(2-ethyhexyl) phthalate only. CB1DL also contained low concentrations of benzoic acid and phenanthrene. These compounds were not detected in either of the two undiluted analyses and are considered to be laboratory artifacts. They should be negated.

PESTICIDE/PCB ANALYSES

Holding Times:

The sample was extracted and analyzed within the required 1989 ASP holding times.

Surrogate Recovery:

All surrogate recoveries were within advisory QC limits.

MS/MSD/MSB:

No MS/MSD or MSB was analyzed. This breach of contract protocol will not affect the technical usability of the sample data.

Pesticide Evaluation Standards Summary:

Evaluation Check For Linearity:

All percent relative standard deviation results are less than 10.0%.

Evaluation Check for 4,4-DDT/Endrin Breakdown:

Combined breakdown on the DB5 column is less than 20%.

Evaluation of Retention Time Shift for DBC:

DBC retention time shift was less than the 1.5% limit for megabore columns. DBC was not spiked into arochlor standards.

72 Hour Analytical Sequence:

The proper analytical sequence was adhered to.

Continuing Calibration:

Percent difference results were less than 15% for all standards. Retention time windows were properly developed.

Blanks:

The method blank was contaminant-free.

Compound Identification:

Chromatograms were well-developed for all standards, blanks and samples. Baselines were stable.

INORGANIC ANALYSES

Holding Times:

All samples were prepared and analyzed within required holding times.

Initial and Continuing Calibration Verification:

All percent recovery results for all analytes were within proper QC limits for both the initial and continuing calibration verification standards.

Blanks:

All blanks (initial calibration, continuing calibration and preparation) contain less than the CRDL of all analytes.

CRDL Standard for AA and ICP:

All CRDL standards were analyzed with the frequency prescribed by NYSDEC CLP criteria.

ICP Interference Check Sample Analysis:

All initial and final ICS results are within the $\pm 20\%$ control limit.

Spiked Sample Analysis:

No spiked sample analysis was performed for total metals analysis of CB-1. TCLP spiked sample analysis was performed for DD-2. Arsenic, mercury, selenium, and silver spike recoveries were outside of QC limits of 75%-125%. These metal results will be flagged with a "J".

Laboratory Duplicate Sample Analysis:

No duplicate sample analysis was performed for total metals analysis of CB-1.

Laboratory Control Sample Analysis:

All LCS recoveries were within the established control limits.

ICP Serial Dilution Results:

All ICP serial dilution RPDs were within the NYSDEC QC limits, except for aluminum, barium, calcium, chromium, iron, lead, manganese, nickel and zinc. Flag these metal results "J".

Furnace AA Analysis:

All required furnace AA QC was performed. Method of Standard Addition (MSA) analyses were performed on DD-2 for arsenic. MSA correlation coefficient was greater than 0.995, per NYSDEC CLP QC requirements.

Other QC Issues:

Because no QC samples (spike or duplicate) were analyzed associated with sample CB-1, all sample results are considered estimated and flagged "J" for positive results and "UJ" for negative results.

I certify that the results detailed in this validation report are true and correct to the best of my knowledge and professional ability.

Signed: _____
Douglas A. Wolf

Dated: 2-3-92

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1809

SDG Number: B-19 (8-10')

Contract Number: Q89-188R

Sample Identifications:

B-19 (8-10')	B-35 (14-16') Matrix Spike
B-22 (2-4')	B-35 (14-16') Matrix Spike Duplicate
B-35 (10-12')	Field Duplicate - 7
B-35 (14-16')	SS - 68 (0-6')
Field Duplicate - 5	SS - 68 (0-6') Matrix Spike
B-36 (2-4')	SS - 68 (0-6') Matrix Spike Duplicate
B-36 (2-4') Matrix Spike	SS - 69 (0-6')
B-36 (2-4') Matrix Spike Duplicate	SS - 66
B-36 (12-14')	SS - 67
B-36 (18-20')	Field Blank - 3
Field Duplicate - 4	Field Blank - 4

METHODOLOGY

Analyses were performed in accordance with New York State 1989 Analytical Service Protocol

GENERAL COMMENTS

Comments pertain to data on one or all pages of this report.

Results have been reported utilizing standard qualifiers (Q) as defined on the Organic and Inorganic Data Comment Pages.

Sample identifications were abbreviated due to computer software limitations.

Results of the analyses of soils are corrected for moisture content and reported on a dry weight basis.

The SDG numbers, SB19810 or B19810 appear on various forms. The numbers refer to the same SDG.

DATA VALIDATION REVIEW FOR VAN DER HORST PLANT 2 - PHASE IV
ERM-NORTHEAST PROJECT NUMBER 164.005
RECRA ENVIRONMENTAL, INC. CASE NO. 1809, SDG NO. SB19810

Deliverables:

The Sample Data Summary Package and the Sample Data Package contain all required deliverables as stipulated under the 1989 ASP Superfund category for all volatile, semi-volatile, PCB, and metal analyses, except as noted in this review.

VOLATILE ANALYSES:

Holding Times:

All samples were analyzed within seven days of VTSR.

Surrogate Recovery:

All sample and blank surrogate spike recoveries were within the proper QC limits.

Matrix Spike /Matrix Spike Duplicate (MS/MSD):

All MS/MSD spike recovery and relative percent difference (RPD) results were within proper QC limits.

Matrix Spike Blank (MSB):

All matrix spike blank spike recoveries were within proper QC limits.

Blanks:

VBLK40 contained 0.2J ug/l of TCE. Field blanks contained 3 J ug/l of chloroform. No TCE or chloroform was detected in any sample.

GS/MS Tuning and Performance:

All BFB mass spectra were acceptable. All tuning and mass calibration criteria were within QC limits. All samples, blanks and calibration standards were analyzed within 12 hours of their associated tune.

Internal Standard Areas and Retention Times:

All sample and blank internal standard areas were within the +100%/-50% control limits of the associated continuing calibration. All internal standard retention times were within 30 seconds of the retention time of that compound in the associated continuing calibration.

Calibrations:

All initial and continuing calibrations associated with this data packages exhibited acceptable precision with respect to the NYSDEC ASP QC limits for %RSD between the initial calibration RRFs and the continuing calibration RRFs. All RRFs met the minimum requirements for instrument response as well.

Compound Identification:

Review of sample raw data, chromatograms, and mass spectra, all positive sample results have been adequately identified and quantitated within the constraints of NYSDEC CLP criteria, however it is the reviewer's opinion that the samples should have been run at a low level rather than medium level analysis due to the absence of target compounds in the samples.

SEMI-VOLATILE ANALYSES

Holding Times:

All samples were extracted and analyzed within required NYSDEC ASP holding times.

Blanks:

SBLK71 contains 2000 J ug/kg of an unknown acid TIC at a retention time of 20.15 minutes. Although associated samples have a TIC flagged "BJ" that elutes at about this retention time, in all cases, this TIC is not the same compound as found in the blank and therefore the "B" flag should be negated. All remaining blanks are contaminant-free.

GC/MS Tuning and Performance:

All DFTPP mass spectra were acceptable. All tuning and mass calibration criteria were within QC limits. All samples, blanks and calibration standards were analyzed within 12 hours of their associated tune.

Internal Standard Areas and Retention Times:

All internal standard retention times were within 30 seconds of the retention time of that compound in the associated continuing calibration. All internal standard areas were within the +100%/-50% control limits of the associated continuing calibration internal standard area.

Calibrations:

All initial calibration relative response factor and percent relative standard deviation results are within QC limits for all compounds. All continuing calibration relative response factor results are greater than 0.05. All percent difference results between the initial calibration average relative response factor and the continuing calibration relative response factor are within the applicable QC limits. All compounds in the continuing calibrations had relative retention times within 0.06 retention time units of the same compounds in the associated initial calibration.

Surrogate Recoveries:

All surrogate recoveries were within the NYSDEC CLP QC limits.

MS/MSD:

Seven out of 22 MS/MSD spike recoveries were outside of QC limits, while two RPD results were outside of QC limits. This appears to be due to matrix interferences in the MS. No action will be taken to qualify sample data based on these results.

MSB:

No MSB was analyzed. It is the reviewer's professional judgement that this will not affect the technical usability of the data although it is a contract deficiency.

PCB ANALYSES

Holding Times:

All samples were extracted and analyzed within the required 1989 ASP holding times.

Surrogate Recovery:

All surrogate recoveries were within advisory QC limits.

MS/MSD/MSB:

No CLP QC criteria for spike recovery exists for PCBs, however, ERM finds these aroclor 1242 recoveries to be acceptable and the sample data are therefore not qualified based on them.

Pesticide Evaluation Standards Summary:

Evaluation Check For Linearity:

All percent relative standard deviation results are less than 10.0%.

Evaluation Check for 4,4-DDT/Endrin Breakdown:

Combined breakdown is less than 20%.

Evaluation of Retention Time Shift for DBC:

DBC retention time shift was less than the 1.5% limit for megabore columns. DBC was not spiked into arochlor standards.

72 Hour Analytical Sequence:

The proper analytical sequence was adhered to.

Continuing Calibration:

Percent difference results were less than 15% for all standards. Retention time windows were properly developed.

Blanks:

The method and field blanks were contaminant-free.

Compound Identification:

Chromatograms were well-developed for all standards, blanks and samples. Baselines were stable.

INORGANIC ANALYSES

Holding Times:

The sample was prepared and analyzed within required holding times.

Initial and Continuing Calibration Verification:

All percent recovery results for all analytes were within proper QC limits for both the initial and continuing calibration verification standards.

Blanks:

All blanks (initial calibration, continuing calibration and preparation) contain less than the CRDL of all analytes.

CRDL Standard for AA and ICP:

All CRDL standards were analyzed with the frequency prescribed by NYSDEC CLP criteria.

ICP Interference Check Sample Analysis:

All initial and final ICS results are within the $\pm 20\%$ control limit.

Spiked Sample Analysis:

No spiked sample analysis; sample is a field blank.

Laboratory Duplicate Sample Analysis:

No duplicate sample analysis; sample is a field blank.

Laboratory Control Sample Analysis:

All LCS recoveries were within the established control limits.

ICP Serial Dilution Results:

No ICP serial dilution; sample is a field blank.

Furnace AA Analysis:

All required furnace AA QC was performed. Method of Standard Addition (MSA) analyses were not required.

I certify that the results detailed in this validation report are true and correct to the best of my knowledge and professional ability.

Signed: (Douglas A. Wolf)
Douglas A. Wolf

Dated: 2-3-92

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1809

SDG Number: B-19 (8-10')

Contract Number: Q89-188R

Sample Identifications:

B-19 (8-10')
B-22 (2-4')
B-35 (10-12')
B-35 (14-16')
Field Duplicate - 5
B-36 (2-4')
B-36 (2-4') Matrix Spike
B-36 (2-4') Matrix Spike Duplicate
B-36 (12-14')
B-36 (18-20')
Field Duplicate - 4
B-35 (14-16') Matrix Spike
B-35 (14-16') Matrix Spike Duplicate
Field Duplicate - 7
SS - 68 (0-6')
SS - 68 (0-6') Matrix Spike
SS - 68 (0-6') Matrix Spike Duplicate
SS - 69 (0-6')
SS - 66
SS - 67
Field Blank - 3
Field Blank - 4

METHODOLOGY

Analyses were performed in accordance with New York State 1989 Analytical Service Protocol

GENERAL COMMENTS

Comments pertain to data on one or all pages of this report.

Results have been reported utilizing standard qualifiers (Q) as defined on the Organic and Inorganic Data Comment Pages.

Sample identifications were abbreviated due to computer software limitations.

Results of the analyses of soils are corrected for moisture content and reported on a dry weight basis.

The SDG numbers, SB19810 or B19810 appear on various forms. The numbers refer to the same SDG.

DATA VALIDATION REVIEW FOR VAN DER HORST PLANT 2 - PHASE IV
ERM-NORTHEAST PROJECT NUMBER 164.005
RECRA ENVIRONMENTAL, INC. CASE NO. 1809, SDG NO. SB19810

Deliverables:

The Sample Data Summary Package and the Sample Data Package contain all required deliverables as stipulated under the 1989 ASP Superfund category for all volatile, semi-volatile, PCB, and metal analyses, except as noted in this review.

VOLATILE ANALYSES:

Holding Times:

All samples were analyzed within seven days of VTSR.

Surrogate Recovery:

All sample and blank surrogate spike recoveries were within the proper QC limits.

Matrix Spike /Matrix Spike Duplicate (MS/MSD):

All MS/MSD spike recovery and relative percent difference (RPD) results were within proper QC limits.

Matrix Spike Blank (MSB):

All matrix spike blank spike recoveries were within proper QC limits.

Blanks:

VBLK40 contained 0.2J ug/l of TCE. Field blanks contained 3 J ug/l of chloroform. No TCE or chloroform was detected in any sample.

GS/MS Tuning and Performance:

All BFB mass spectra were acceptable. All tuning and mass calibration criteria were within QC limits. All samples, blanks and calibration standards were analyzed within 12 hours of their associated tune.

Internal Standard Areas and Retention Times:

All sample and blank internal standard areas were within the +100%/-50% control limits of the associated continuing calibration. All internal standard retention times were within 30 seconds of the retention time of that compound in the associated continuing calibration.

Calibrations:

All initial and continuing calibrations associated with this data packages exhibited acceptable precision with respect to the NYSDEC ASP QC limits for %RSD between the initial calibration RRFs and the continuing calibration RRFs. All RRFs met the minimum requirements for instrument response as well.

Compound Identification:

Review of sample raw data, chromatograms, and mass spectra, all positive sample results have been adequately identified and quantitated within the constraints of NYSDEC CLP criteria, however it is the reviewer's opinion that the samples should have been run at a low level rather than medium level analysis due to the absence of target compounds in the samples.

SEMI-VOLATILE ANALYSES

Holding Times:

All samples were extracted and analyzed within required NYSDEC ASP holding times.

Blanks:

SBLK71 contains 2000 J ug/kg of an unknown acid TIC at a retention time of 20.15 minutes. Although associated samples have a TIC flagged "BJ" that elutes at about this retention time, in all cases, this TIC is not the same compound as found in the blank and therefore the "B" flag should be negated. All remaining blanks are contaminant-free.

GC/MS Tuning and Performance:

All DFTPP mass spectra were acceptable. All tuning and mass calibration criteria were within QC limits. All samples, blanks and calibration standards were analyzed within 12 hours of their associated tune.

Internal Standard Areas and Retention Times:

All internal standard retention times were within 30 seconds of the retention time of that compound in the associated continuing calibration. All internal standard areas were within the +100%/-50% control limits of the associated continuing calibration internal standard area.

Calibrations:

All initial calibration relative response factor and percent relative standard deviation results are within QC limits for all compounds. All continuing calibration relative response factor results are greater than 0.05. All percent difference results between the initial calibration average relative response factor and the continuing calibration relative response factor are within the applicable QC limits. All compounds in the continuing calibrations had relative retention times within 0.06 retention time units of the same compounds in the associated initial calibration.

Surrogate Recoveries:

All surrogate recoveries were within the NYSDEC CLP QC limits.

MS/MSD:

Seven out of 22 MS/MSD spike recoveries were outside of QC limits, while two RPD results were outside of QC limits. This appears to be due to matrix interferences in the MS. No action will be taken to qualify sample data based on these results.

MSB:

No MSB was analyzed. It is the reviewer's professional judgement that this will not affect the technical usability of the data although it is a contract deficiency.

PCB ANALYSES

Holding Times:

All samples were extracted and analyzed within the required 1989 ASP holding times.

Surrogate Recovery:

All surrogate recoveries were within advisory QC limits.

MS/MSD/MSB:

No CLP QC criteria for spike recovery exists for PCBs, however, ERM finds these aroclor 1242 recoveries to be acceptable and the sample data are therefore not qualified based on them.

Pesticide Evaluation Standards Summary:

Evaluation Check For Linearity:

All percent relative standard deviation results are less than 10.0%.

Evaluation Check for 4,4-DDT/Endrin Breakdown:

Combined breakdown is less than 20%.

Evaluation of Retention Time Shift for DBC:

DBC retention time shift was less than the 1.5% limit for megabore columns. DBC was not spiked into arochlor standards.

72 Hour Analytical Sequence:

The proper analytical sequence was adhered to.

Continuing Calibration:

Percent difference results were less than 15% for all standards. Retention time windows were properly developed.

Blanks:

The method and field blanks were contaminant-free.

Compound Identification:

Chromatograms were well-developed for all standards, blanks and samples. Baselines were stable.

INORGANIC ANALYSES

Holding Times:

The sample was prepared and analyzed within required holding times.

Initial and Continuing Calibration Verification:

All percent recovery results for all analytes were within proper QC limits for both the initial and continuing calibration verification standards.

Blanks:

All blanks (initial calibration, continuing calibration and preparation) contain less than the CRDL of all analytes.

CRDL Standard for AA and ICP:

All CRDL standards were analyzed with the frequency prescribed by NYSDEC CLP criteria.

ICP Interference Check Sample Analysis:

All initial and final ICS results are within the $\pm 20\%$ control limit.

Spiked Sample Analysis:

No spiked sample analysis; sample is a field blank.

Laboratory Duplicate Sample Analysis:

No duplicate sample analysis; sample is a field blank.

Laboratory Control Sample Analysis:

All LCS recoveries were within the established control limits.

ICP Serial Dilution Results:

No ICP serial dilution; sample is a field blank.

Furnace AA Analysis:

All required furnace AA QC was performed. Method of Standard Addition (MSA) analyses were not required.

I certify that the results detailed in this validation report are true and correct to the best of my knowledge and professional ability.

Signed: (Douglas A. Wolf)
Douglas A. Wolf

Dated: 2-3-92

1/20272.1

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1809

SDG Number: B-40 (6-8')

Contract Number: Q89-188R

Sample Identifications:

B-35 (0-2')
B-35 (2-4')
B-35 (4-6')
B-35 (6-8')
B-35 (8-10')
B-35 (12-14')
B-35 (16-18')
B-35 (18-20')
B-36 (0-2')
B-36 (4-6')
B-36 (6-8')
B-36 (8-10')
B-36 (10-12')
B-36 (14-16')
B-36 (16-18')
B-40 (6-8')
B-40 (6-8')MS
B-40 (6-8')MSD
B-40 (18-20')
Field Duplicate-3
Field Blank I
Field Blank II

METHODOLOGY

Analyses were performed in accordance with New York State 1989 Analytical Service Protocol.

DATA VALIDATION REVIEW FOR VAN DER HORST PLANT 2 - PHASE IV
ERM-NORTHEAST PROJECT NUMBER 164.005
RECRA ENVIRONMENTAL, INC. CASE NO. 1809, SDG NO. B-40(6-8)

Deliverables:

The Sample Data Summary Package and the Sample Data Package contain all required deliverables as stipulated under the 1989 ASP Superfund category for all metal analyses, except as noted in this review.

INORGANIC ANALYSES

Holding Times:

All samples were prepared and analyzed within required holding times.

Initial and Continuing Calibration Verification:

All percent recovery results for all analytes were within proper QC limits for both the initial and continuing calibration verification standards. CCV-6 for arsenic by furnace and CCV-4 for lead by furnace were performed but not listed on Form 2A.

Blanks:

All blanks (initial calibration, continuing calibration and preparation) contain less than the CRDL of all analytes.

CRDL Standard for AA and ICP:

All CRDL standards were analyzed with the frequency prescribed by NYSDEC CLP criteria.

ICP Interference Check Sample Analysis:

All initial and final ICS results are within the $\pm 20\%$ control limit.

Spiked Sample Analysis:

Matrix spike sample (B40) recoveries for barium (44.7%), chromium (49.1%), lead (53.0%) and manganese (35.7%) were all outside the NYSDEC CLP QC limits of 75% to 125% recovery. Per CLP criteria all

sample results for these analytes have been properly flagged with an "N" indicating these variances. Sample results for the four analytes are considered estimated and possibly biased low. All positive results should be flagged "J" and all negative results "UJ".

Laboratory Duplicate Sample Analysis:

Laboratory duplicate analysis of B40 exhibited out of compliance RPDs for chromium (20.3%) with respect to the 20% NYSDEC CLP QC limit. Per NYSDEC CLP criteria the sample result for this out of compliance analyte has been flagged with an asterisk indicating this variance. Flag all positive chromium results "J" and all negative results "UJ".

Laboratory Control Sample Analysis:

All LCS recoveries were within the established control limits. The LCSW for ICP analysis was incorrectly transcribed onto Form 7. This was manually corrected.

ICP Serial Dilution Results:

All ICP serial dilution RPDs were within the NYSDEC QC limits.

Flame and Furnace AA Analysis:

All required furnace AA QC was performed. Method of Standard Addition (MSA) analyses were performed on B350, B352, B354, B356, B358, B360 and B40 for arsenic and on B350, B3518, B358, B364, B366, B368, B40, B40D and B4018 for lead. All MSA correlation coefficients except B360 for arsenic and B3518, B358, B364 and B40 for lead were greater than or equal to 0.995, per NYSDEC CLP QC requirements. The MSA correlation coefficients which were less than 0.995 were flagged with a "+" per NYSDEC CLP QC requirements and should be flagged "J".

I certify that the results detailed in this validation report are true and correct to the best of my knowledge and professional ability.

Signed: _____
Douglas A. Wolf

Dated: 2-3-97

A20416.1

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1809

SDG Number: MW-15S (4-6')

Project Name: Van Der Horst Plant #2

Contract Number: Q89-1882

Sample Identifications:

MW-8D (0-2')
MW-8D (9-11')
MW-11S (0-2')
MW-11S (19-21')
MW-15S (4-6')
MW-15S (4-6') Matrix Spike
MW-15S (4-6') Matrix Spike Duplicate
MW-15S (4-6') Matrix Duplicate
MW-15S (14-16')
Matrix Spike Blank
Lab Control Sample

GENERAL COMMENTS

All analysis were performed in accordance with the New York State Analytical Service Protocol 1989.

The enclosed data has been reported utilizing data qualifiers (Q) as defined on the Organic and Inorganic Data Comment Pages.

VOLATILE DATA

Volatile sample and standard areas are listed on the corresponding data system printouts.

Volatile data are processed utilizing Finnigan Autoquantitation and QA Formaster software. All compounds determined to be present by the computer-generated autoquantitation were subjected to a manual ion search for secondary and tertiary ions. If contract laboratory protocol spectral identification criteria were not met, those compounds were deleted from the quantitation report.

DATA VALIDATION REVIEW FOR VAN DER HORST PLANT 2 - PHASE IV
ERM-NORTHEAST PROJECT NUMBER 164.005
RECRA ENVIRONMENTAL, INC. CASE NO. 1809, SDG NO.MW-15S(4-6)

Deliverables:

The Sample Data Summary Package and the Sample Data Package contain all required deliverables as stipulated under the 1989 ASP Superfund category for all volatile and metal analyses, except as noted in this review.

VOLATILE ANALYSES:

Holding Times:

All samples were analyzed within seven days of VTSR.

Surrogate Recovery:

All sample and blank surrogate spike recoveries were within the proper QC limits.

Matrix Spike /Matrix Spike Duplicate (MS/MSD):

All low and medium level MS/MSD spike recovery and relative percent difference (RPD) results were within proper QC limits, except for high chlorobenzene recovery in both the medium level MS and MSD. No action will be taken to qualify sample data based on this result.

Matrix Spike Blank (MSB):

All matrix spike blank spike recoveries were within proper QC limits.

Blanks:

The following table lists method blanks, method blank contaminants and concentrations and associated samples.

Method Blank	Compound (Concentration in ug/kg)	Associated Samples
VBLK22	Acetone (6J) Hexane (5J)	MW15S1416, MW15S46
VBLK23	Acetone (8J)	MSB2, MW15S46MS, MW15S46MSD
VBLK28	Acetone (10)	MW11S02, MW8D911

Sample results for acetone which are less than ten times the associated laboratory method blank result are considered laboratory derived contamination and are therefore rejected. Acetone sample results are reported as undetected ("U") at the contract required detection limit (CRQL). Hexane results in samples associated with VBLK22 should be rejected.

GS/MS Tuning and Performance:

All BFB mass spectra were acceptable. All tuning and mass calibration criteria were within QC limits. All samples, blanks and calibration standards were analyzed within 12 hours of their associated tune.

Internal Standard Areas and Retention Times:

All sample and blank internal standard areas were within the +100%/-50% control limits of the associated continuing calibration. All internal standard retention times were within 30 seconds of the retention time of that compound in the associated continuing calibration.

Calibrations:

All initial and continuing calibrations associated with this data packages exhibited acceptable precision with respect to the NYSDEC ASP QC limits for %RSD between the initial calibration RRFs and the continuing calibration RRFs. All RRFs met the minimum requirements for instrument response as well. Styrene was not detected in the continuing calibration from 10-14-91 on instrument 51A. No samples were analyzed associated with this calibration.

Compound Identification:

Review of sample raw data, chromatograms, and mass spectra indicate that all positive sample results (with the exception of acetone) have been adequately identified and quantitated within the constraints of NYSDEC CLP criteria.

INORGANIC ANALYSES

Holding Times:

All samples were prepared and analyzed within required holding times.

Initial and Continuing Calibration Verification:

All percent recovery results for all analytes were within proper QC limits for both the initial and continuing calibration verification standards.

Blanks:

All blanks (initial calibration, continuing calibration and preparation) contain less than the CRDL of all analytes.

CRDL Standard for AA and ICP:

Initial and final CRDL standards were analyzed with the frequency prescribed by NYSDEC CLP criteria.

Spiked Sample Analysis:

Matrix spike sample recoveries for arsenic (319%), chromium (189%), and lead (165%) were all outside the NYSDEC CLP QC limits of 75% to 125% recovery. Per CLP criteria all sample results for these analytes have been properly flagged with an "N" indicating these variances. Results are considered estimated and possibly biased high. Positive sample results should be flagged "J" and negative results "UJ". Chromium post-digestion spike recovery was acceptable.

Laboratory Duplicate Sample Analysis:

Laboratory duplicate analysis exhibited out of compliance RPDs for arsenic with respect to the 20% NYSDEC CLP QC limit. All positive sample results should be flagged "J".

Laboratory Control Sample Analysis:

All LCS recoveries were within the established control limits.

Furnace AA Analysis:

All required furnace AA QC was performed. Method of Standard Addition (MSA) analyses were performed on samples MW11S02, MW11S1921, MW15S1416, MW8D02 and MW8D911 for arsenic, and MW11S02, MW15S46, MW15S1416 and MW8D911 for lead. All MSA correlation coefficients were greater than or equal to 0.995, per NYSDEC CLP QC requirements, except for arsenic in samples MW11S1921 and MW8D02 and lead in MW8D911. Flag these results "J".

I certify that the results detailed in this validation report are true and correct to the best of my knowledge and professional ability.

Signed: Douglas A. Wolf
Douglas A. Wolf

Dated: 1-31-92

20524.1

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1809

SDG Number: MW-11S-W

Project Name: Van Der Horst Plant #2

Contract Number: Q89-188R

Sample Identifications:

MW-1D-W	MW-3S-W
MW-3D-W	MW-4S-W
MW-4D-W	MW-6S-W
MW-6D-W	MW-8S-W
MW-6D-W Matrix Spike	MW-11S-W
MW-6D-W Matrix Spike Duplicate	MW-13S-W
MW-6D-W Matrix Duplicate	MW-14S-W
MW-8D-W	MW-15S-W
MW-13D-W	MW-16S-W
MW-14D-W	Field Blank-12
MW-14D-W Matrix Spike	Trip Blank-2
MW-14D-W Matrix Spike Duplicate	VHB
MW-14D-W Matrix Duplicate	Matrix Spike Blank
MW-1S-W	Lab Control Sample

GENERAL COMMENTS

Analyses were performed in accordance with the New York State Analytical Service Protocol 1989.

The enclosed data has been reported utilizing data qualifiers as defined on the Organic and Inorganic Data Comment Pages.

VOLATILE DATA

Volatile sample and standard areas are listed on the corresponding data system printouts.

Volatile data are processed utilizing Finnigan Autoquantitation and QA Formaster software. All compounds determined to be present by the computer-generated autoquantitation were subjected to a manual ion search for secondary and tertiary ions. If contract laboratory protocol spectral identification criteria were not met, those compounds were deleted from the quantitation report.

DATA VALIDATION REVIEW FOR VAN DER HORST PLANT 2 - PHASE IV
ERM-NORTHEAST PROJECT NUMBER 164.005
RECRA ENVIRONMENTAL, INC. CASE NO. 1809, SDG NO.MW11SW

Deliverables:

The Sample Data Summary Package and the Sample Data Package contain all required deliverables as stipulated under the 1989 ASP Superfund category for all volatile and metal analyses except as noted in this review.

VOLATILE ANALYSES:

Holding Times:

All samples were analyzed within seven days of VTSR.

Surrogate Recovery:

All sample and blank surrogate spike recoveries were within the proper QC limits, except for the initial and re-analysis of MW4SW which had low recovery of toluene-d8 and bromofluorobenzene. Use the re-analysis due to better TIC recovery. Flag all negative TCL compound results "UJ".

Matrix Spike /Matrix Spike Duplicate (MS/MSD):

All MS/MSD spike recovery and relative percent difference (RPD) results were within proper QC limits.

Matrix Spike Blank (MSB):

All matrix spike blank spike recoveries were within proper QC limits.

Blanks:

The method blanks and the trip blank were contaminant-free. The field blank contained 2J ug/l of chloroform. One sample contained chloroform. It will be negated due to field blank contamination.

GS/MS Tuning and Performance:

All BFB mass spectra were acceptable. All tuning and mass calibration criteria were within QC limits, except for the mass 95/96 ratio in the tune for 11-07-91 at 0003 which was above the 9.0% upper QC limit. The laboratory was required by protocol to re-tune before analyzing any samples, however a re-tune was not performed. Therefore all samples and blanks analyzed associated with this tune should have all positive results flagged "J" and all negative results flagged "UJ". All samples, blanks and calibration standards were analyzed within 12 hours of their associated tune.

Internal Standard Areas and Retention Times:

All sample and blank internal standard areas were within the +100%/-50% control limits of the associated continuing calibration. All internal standard retention times were within 30 seconds of the retention time of that compound in the associated continuing calibration.

Calibrations:

All initial and continuing calibrations associated with this data packages exhibited acceptable precision with respect to the NYSDEC ASP QC limits for %RSD between the initial calibration RRFs and the continuing calibration RRFs. All RRFs met the minimum requirements for instrument response as well.

Compound Identification:

Review of sample raw data, chromatograms, and mass spectra, all positive sample results (with the exception of chloroform) have been adequately identified and quantitated within the constraints of NYSDEC CLP criteria. Sample MW14SW was run undiluted and at a 2:1 dilution due to levels of TCL compounds above the instrument's linear calibration range. TIC compounds are comparable between the two analyses however the TIC results of the undiluted analysis should be used. Use the diluted sample results for those compounds flagged "E" in the undiluted analysis only.

INORGANIC ANALYSES

Holding Times:

All samples were prepared and analyzed within required holding times.

Initial and Continuing Calibration Verification:

All percent recovery results for all analytes were within proper QC limits for both the initial and continuing calibration verification standards.

Blanks:

All blanks (initial calibration, continuing calibration and preparation) contain less than the CRDL of all analytes.

CRDL Standard for AA and ICP:

Initial and final CRDL standards were analyzed with the frequency prescribed by NYSDEC CLP criteria.

ICP Interference Check Sample Analysis:

All initial and final ICS results are within the $\pm 20\%$ control limit.

Spiked Sample Analysis:

Matrix spike sample recoveries for chromium, hexavalent chromium, cadmium, beryllium and manganese were all outside the NYSDEC CLP QC limits of 75% to 125% recovery. Per CLP criteria all sample results for these analytes have been properly flagged with an "N" indicating these variances. Sample results for these analytes are considered estimated and possibly biased low. Flag positive results "J" and negative results "UJ". Hexavalent chromium post-digestion spike recovery was low.

Laboratory Duplicate Sample Analysis:

Laboratory duplicate analysis exhibited out of compliance RPDs for lead with respect to the 20% NYSDEC CLP QC limit. Flag positive lead results "J" and negative results "UJ".

Laboratory Control Sample Analysis:

All LCS recoveries were within the established control limits. No hexavalent chromium LCS was analyzed.

ICP Serial Dilution Results:

All ICP serial dilution RPDs were within the NYSDEC QC limits.

Furnace AA Analysis:

All required furnace AA QC was performed. Method of Standard Addition (MSA) analyses were performed on MW3DW for arsenic, and MW1SW, MW11SW, MW13DW, MW13SW, MW14DW, MW14SW, MW15SW, MW16SW, MW3SW, MW4SW, MW6DW, MW6SW, MW8DW and MW8SW for lead. All MSA correlation coefficients were greater than or equal to 0.995, per NYSDEC CLP QC requirements, except for MW13SW, MW16SW, MW6DW and MW6SW. Flag the lead results in these samples "J".

I certify that the results detailed in this validation report are true and correct to the best of my knowledge and professional ability.

Signed: Douglas A. Wolf

Douglas A.Wolf

Dated: 1-31-92

SDG# MW-19-W, [illegible]

MATRIX	SAMPLE NUMBER	ANALYTICAL PROCEDURE VOA GC/MS	BNA GC/MS	VOA GC	PEST PCB	METALS	OTHER	DATE SAMPLED	DATE [illegible] AT LAB
WATE.	MW-19	✓	✓			✓		9/20/91	
WATER	MW-20	✓	✓			✓		9/20/91	

NOTE: Non ASP Methodology
VOA 2 SW-846 3rd Ed. METHOD

DATA VALIDATION REVIEW FOR VAN DER HORST PLANT 2 - PHASE IV
ERM-NORTHEAST PROJECT NUMBER 164.005
RECRA ENVIRONMENTAL, INC. CASE NO. 1809, SDG NO. MW-19-W

Deliverables:

The Sample Data Package contains deliverables for all volatile, semi-volatile, and metal analyses. Analyses were performed by EPA SW-846 methodologies.

Holding Times:

All samples were extracted and/or analyzed within acceptable SW-846 holding times.

Surrogate Recovery:

Volatile and semi-volatile surrogate recoveries appear to be acceptable. QC limits are not reported.

Internal Standard Areas:

Volatile and semi-volatile internal standard recoveries appear to be acceptable. QC limits are not reported.

Laboratory Control Sample:

Inorganic LCS recoveries are acceptable.

Blanks:

All blanks are contaminant-free.

I certify that the results detailed in this validation report are true and correct to the best of my knowledge and professional ability.

Signed: Douglas A. Wolf
Douglas A. Wolf

Dated: 1-27-92

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE IDENTIFICATION
AND
ANALYTICAL REQUEST SUMMARY

506 MW2SW

NYSDEC.1

CUSTOMER SAMPLE CODE	LABORATORY SAMPLE CODE	ANALYTICAL REQUIREMENTS*						Date Rec'd at Lab
		VOA* GC/MS	BNA* GC/MS	VOA* GC	PEST* PCB	METALS **	OTHER*	
MW-2D-W	91-3260	ASP89	-	-	-	X	-	11/6/91
MW-5D-W	91-3260	ASP89	-	-	-	X	-	11/7/91
MD-7D-W	91-3260	ASP89	-	-	-	X	-	11/6/91
MW-10D-W	91-3260	ASP89	-	-	-	X	-	11/7/91
MW-12D-W	91-3260	ASP89	-	-	-	X	-	11/6/91
MW-2S-W	91-3260	ASP89	-	-	-	X	-	11/6/91
MW-5S-W	91-3260	ASP89	-	-	-	X	-	11/7/91
MW7S-W	91-3260	ASP89	-	-	-	X	-	11/6/91
MW-10S-W	91-3260	ASP89	-	-	-	X	-	11/7/91
MW-12S-W	91-3260	ASP89	-	-	-	X	-	11/6/91
MW-9-W	91-3260	ASP89	-	-	-	X	-	11/6/91
MW-19-W	91-3260	ASP89	ASP89	-	-	X	-	11/7/91
MW-20-W	91-3260	ASP89	ASP89	-	-	X	-	11/7/91
FIELD DUP-18	91-3260	ASP89	-	-	-	X	-	1
FIELD DUP-19	91-3260	ASP89	-	-	-	X	-	
FIELD DUP-20	91-3260	ASP89	ASP89	-	-	X	-	11/7/91
FIELD BLANK-13	91-3260	ASP89	-	-	-	X	-	11/6/91
FIELD BLANK-14	91-3260	APP89	ASP89	-	-	X	-	11/7/91
TRIP BLANK-3	91-3260	ASP89	-	-	-	-	-	11/6/91

** Cr, As, Pb, Be, Mn

RECRA ENVIRONMENTAL INC.

SLS-11= MW 25W

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE IDENTIFICATION
AND
ANALYTICAL REQUEST SUMMARY

Date Sampled 11/6/91

CUSTOMER SAMPLE CODE	LABORATORY SAMPLE CODE	ANALYTICAL REQUIREMENTS*						DATE rec'd AT LAB
		VOA* GC/MS	BNA* GC/MS	VOA* GC	PEST* PCB	METALS	OTHER*	
TRIP BLANK-4	91-3260	ASP89	-	-	-	-	-	11/7/91
MATRIX SPIKE BLANK	91-3260	ASP89	ASP89	-	-	-	-	
VHB	91-3260	ASP89	-	-	-	-	-	

I.D. #91-3260.1

NYSDEC-1

Note: Samples sampled on 11/7/91 were assumed to be so b/c of missing dates on COC form

RECRA ENVIRONMENTAL INC.

DATA VALIDATION REVIEW FOR VAN DER HORST PLANT 2 - PHASE IV
ERM-NORTHEAST PROJECT NUMBER 164.005
RECRA ENVIRONMENTAL, INC. CASE NO. 1809, SDG NO.MW-25W

Deliverables:

The Sample Data Summary Package and the Sample Data Package contain all required deliverables as stipulated under the 1989 ASP Superfund category for all volatile, semi-volatile, pesticide/PCB, and metal analyses, except as noted in this review.

VOLATILE ANALYSES:

Holding Times:

All samples were analyzed within seven days of VTSR.

Surrogate Recovery:

All sample and blank surrogate spike recoveries were within the proper QC limits.

Matrix Spike /Matrix Spike Duplicate (MS/MSD):

All MS/MSD spike recovery and relative percent difference (RPD) results were within proper QC limits, except for TCE which had low recovery in both. No action taken to qualify sample data based on these results.

Matrix Spike Blank (MSB):

All matrix spike blank spike recoveries were within proper QC limits.

Blanks:

Method blanks were contaminant-free. Field blank 13 contained 2J ug/l of chloroform. Trip blank 4 contained 8J ug/l of trichlorofluoromethane Volatile holding blank 2 contained 0.8J ug/l of methylene chloride. None of these compounds were detected in any sample, therefore no action will be taken to qualify sample data.

GS/MS Tuning and Performance:

All BFB mass spectra were acceptable. All tuning and mass calibration criteria were within QC limits. All samples, blanks and calibration standards were analyzed within 12 hours of their associated tune.

Internal Standard Areas and Retention Times:

All sample and blank internal standard areas were within the +100%/-50% control limits of the associated continuing calibration. All internal standard retention times were within 30 seconds of the retention time of that compound in the associated continuing calibration.

Calibrations:

All initial and continuing calibrations associated with this data packages exhibited acceptable precision with respect to the NYSDEC ASP QC limits for %RSD between the initial calibration RRFs and the continuing calibration RRFs. All RRFs met the minimum requirements for instrument response as well.

Compound Identification:

Review of sample raw data, chromatograms, and mass spectra, all positive sample results have been adequately identified and quantitated within the constraints of NYSDEC CLP criteria, except for a false identification of TCE in Field Duplicate 20, which should be negated.

SEMI-VOLATILE ANALYSES

Holding Times:

All samples were extracted and analyzed within acceptable holding times.

Blank:

The blanks were contaminant-free.

GC/MS Tuning and Performance:

All DFTPP mass spectra were acceptable. All tuning and mass calibration criteria were within QC limits. All samples, blanks and calibration standards were analyzed within 12 hours of their associated tune.

Internal Standard Areas and Retention Times:

All internal standard retention times were within 30 seconds of the retention time of that compound in the associated continuing calibration. All internal standard areas were within the +100%/-50% control limits of the associated continuing calibration internal standard area.

Calibrations:

All initial calibration relative response factor and percent relative standard deviation results are within QC limits for all compounds. All continuing calibration relative response factor results are greater than 0.05. All percent difference results between the initial calibration average relative response factor and the continuing calibration relative response factor are within the applicable QC limits, except for 2,4-dinitrophenol. Flag positive results for this compound "J" and negative results "UJ". All compounds in the continuing calibrations had relative retention times within 0.06 retention time units of the same compounds in the associated initial calibration.

Surrogate Recoveries:

Field duplicate 14 had 5 out of 6 surrogate recoveries above the upper QC limits. No reanalysis was performed due to lack of sample. Flag all positive sample results "J" and negative results "UJ".

MS/MSD:

All MS and MSD spike recoveries were within QC limits, except for 2,4-dinitrotoluene which had high recovery and pentachlorophenol which had low recovery. Pentachlorophenol RPD was outside of QC limits. All other relative percent difference results were acceptable. No action will be taken to qualify sample data based on these results.

MSB:

The matrix spike blank (MSB) exhibited poor percent recovery for all compounds. It is the professional judgement of this reviewer that this will not negatively affected the sample data.

PESTICIDE/PCB ANALYSES

Holding Times:

All samples were extracted and analyzed within the required 1989 ASP holding times.

Surrogate Recovery:

All surrogate recoveries were within advisory QC limits.

MS/MSD/MSB:

The MS/MSD and MSB had acceptable recovery and RPD results.

Pesticide Evaluation Standards Summary:

Evaluation Check For Linearity:

All percent relative standard deviation results are less than 10.0%.

Evaluation Check for 4,4-DDT/Endrin Breakdown:

No Endrin or DDT breakdown was detected.

Evaluation of Retention Time Shift for DBC:

DBC retention time shift was less than the 1.5% limit for megabore columns.

72 Hour Analytical Sequence:

The proper analytical sequence was adhered to.

Continuing Calibration:

Percent difference results were less than 15% for all standards. Retention time windows were properly developed.

Blanks:

The method blank was contaminant-free.

Compound Identification:

Chromatograms were well-developed for all standards, blanks and samples. Baselines were stable.

INORGANIC ANALYSES

Holding Times:

All samples were prepared and analyzed within required holding times.

Initial and Continuing Calibration Verification:

All percent recovery results for all analytes were within proper QC limits for both the initial and continuing calibration verification standards. The cadmium calibration curve had a correlation coefficient less than 0.995. Flag all positive cadmium results "J" and all negative results "UJ".

Blanks:

All blanks (initial calibration, continuing calibration and preparation) contain less than the CRDL of all analytes.

CRDL Standard for AA and ICP:

Initial and final CRDL standards were analyzed with the frequency prescribed by NYSDEC CLP criteria.

ICP Interference Check Sample Analysis:

All initial and final ICS results are within the $\pm 20\%$ control limit.

Spiked Sample Analysis:

Matrix spike sample recoveries for arsenic (0%), nickel (434%) lead (0%), selenium (0%) and silver (28%) were all outside the NYSDEC CLP QC limits of 75% to 125% recovery. Per CLP criteria all sample results for these analytes have been properly flagged with an "N" indicating these variances. Nickel results are considered estimated and possibly biased high. Sample results for the other analytes are considered estimated and possibly biased low. Negative arsenic, lead and selenium results should be rejected due to 0% recovery. Nickel and silver post-digestion spike recovery was acceptable.

Laboratory Duplicate Sample Analysis:

Laboratory duplicate analysis exhibited out of compliance RPDs for calcium with respect to the 20% NYSDEC CLP QC limit. Flag calcium results "J".

Laboratory Control Sample Analysis:

All LCS recoveries were within the established control limits. No LCS Summary Form was included for hexavalent chromium, although an LCS was analyzed.

ICP Serial Dilution Results:

All ICP serial dilution RPDs were within the NYSDEC QC limits, except for iron, aluminum, chromium and manganese. Flag positive results for these metals "J" and negative results "UJ".

Furnace AA Analysis:

All required furnace AA QC was performed. Method of Standard Addition (MSA) analyses were performed on Field Duplicate 19, MW10DW, MW10SW, MW12SW, MW2SW and MW19W for arsenic, and MW9W, MW10DW, MW10SW and MW12SW for lead. All MSA

correlation coefficients were greater than or equal to 0.995, per NYSDEC CLP QC requirements, except for arsenic in MW2SW and MW12SW and lead in MW9W. Flag results for these metals in these samples "J".

I certify that the results detailed in this validation report are true and correct to the best of my knowledge and professional ability.

Signed: Douglas A. Wolf
Douglas A. Wolf

Dated: 1-27-92