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WORKPLAN FOR IMPROVEMENT OF GROUNDWATER CONTAINMENT SYSTEM EFFECTIVENESS

FOR THE NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT FRIDLEY, MINNESOTA

JANUARY 1995

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Section 1
INTRODUCTION

1.1 Background

The Record of Decision (ROD) (USEPA, 1990) for groundwater remediation at the Naval Industrial Reserve Ordnance Plant (NIROP) in Fridley, Minnesota, was signed in September 1990 by representatives of the U.S. Navy, the United States Environmental Protection Agency (USEPA) - Region V, and the Minnesota Pollution Control Agency (MPCA). The remedial action specified in the ROD called for the hydraulic containment and recovery of all future migration of contaminated groundwater from the NIROP and the recovery, to the extent feasible, of contamination downgradient of the NIROP. The selected remedy included the installation and operation of groundwater containment and extraction wells, with a two-phased plan for disposal of groundwater from the well system.

Under Phase I, the groundwater from the containment and extraction system is to be discharged to an existing sanitary sewer, which provides treatment at a local wastewater treatment facility. Under Phase II, a groundwater treatment facility will be constructed at the NIROP and operated to provide longer-term groundwater treatment. Treated groundwater from the on-site groundwater treatment facility will be discharged to the Mississippi River via a National Pollutant Discharge Elimination System (NPDES) storm sewer discharge.

A groundwater extraction (and containment) system has been constructed, based on design documents approved by the USEPA - Region V and the MPCA. The work performed during the construction of the groundwater extraction system included a pump capacity test at each of four extraction wells. The results of these tests, which included groundwater sampling and analysis, indicated that groundwater pretreatment was required prior to discharge of the groundwater to the sanitary sewer owned by the Metropolitan Council Wastewater Services (MCWS), formerly known as the Metropolitan Waste Control Commission (MWCC), to meet discharge limits set by the MCWS. Therefore, pretreatment facilities have also been constructed at the NIROP for use during the interim Phase I discharge to the sanitary sewer.

The groundwater extraction system and pretreatment facilities began operating in September 1992. Monitoring of these facilities and the monitoring wells has been performed since startup according to the procedures defined in the Remedial Action Workplan for Groundwater Remediation - Revision 2 (RMT, 1992a), which was approved by the MPCA and the USEPA.

As required by the ROD, a document presenting an evaluation of the effectiveness of the groundwater extraction system in achieving hydraulic containment of contaminated groundwater from the site during the initial 90-day operating period was submitted to the USEPA and the MPCA in December 1992 (RMT, 1992b). In that document, it was concluded that one or more additional groundwater extraction wells are likely to be needed to achieve hydraulic containment of contaminated groundwater from the site. The ROD stated that if the performance objective for groundwater containment (i.e., hydraulic containment of contaminated groundwater migration from the site) was not met by the existing groundwater extraction system, the Navy is to submit a written plan to the USEPA and the MPCA for upgrading the system to achieve hydraulic containment.

1.2 Purpose and Scope

The purpose of this workplan is to fulfill the requirement specified in the ROD for submission of a written plan for upgrading the existing groundwater extraction system and the effectiveness of hydraulic containment of contaminated groundwater. This workplan includes the following information:

- A description of the existing groundwater extraction and pretreatment system.
- A description of the proposed approaches for upgrading the groundwater extraction and pretreatment system, including:
  - The results of groundwater flow modeling to further evaluate the ability of the existing system to achieve hydraulic containment.
  - The results of groundwater flow modeling to identify the location and design of new groundwater extraction wells and the pumping capacity needed at each well to achieve hydraulic containment.
  - A description of the criteria which will be used to evaluate whether the existing groundwater extraction facilities will need to be upgraded (i.e., modified or replaced) when the additional groundwater extraction wells are installed.

- A description of the criteria which will be used to evaluate whether the existing pretreatment system needs to be upgraded to achieve pretreatment objectives.

- A plan for design and construction of the following:
  - The new groundwater extraction facilities.
  - Modifications to the existing groundwater extraction facilities and the existing pretreatment system (if required).
- A start-up and operational plan for the upgraded groundwater extraction system.
- A monitoring plan to evaluate the effectiveness of hydraulic containment for contaminated groundwater at the site.
- A schedule for implementing the design, construction, and start-up of the upgraded groundwater extraction system.

Section 2

EXISTING GROUNDWATER EXTRACTION AND PRETREATMENT SYSTEM

The existing facilities consist of groundwater extraction wells (for containment and recovery of contaminated groundwater) and a pretreatment system for removal of volatile organic compounds (VOCs) from the extracted groundwater, prior to discharge of the groundwater to the sanitary sewer.

2.1 Groundwater Extraction

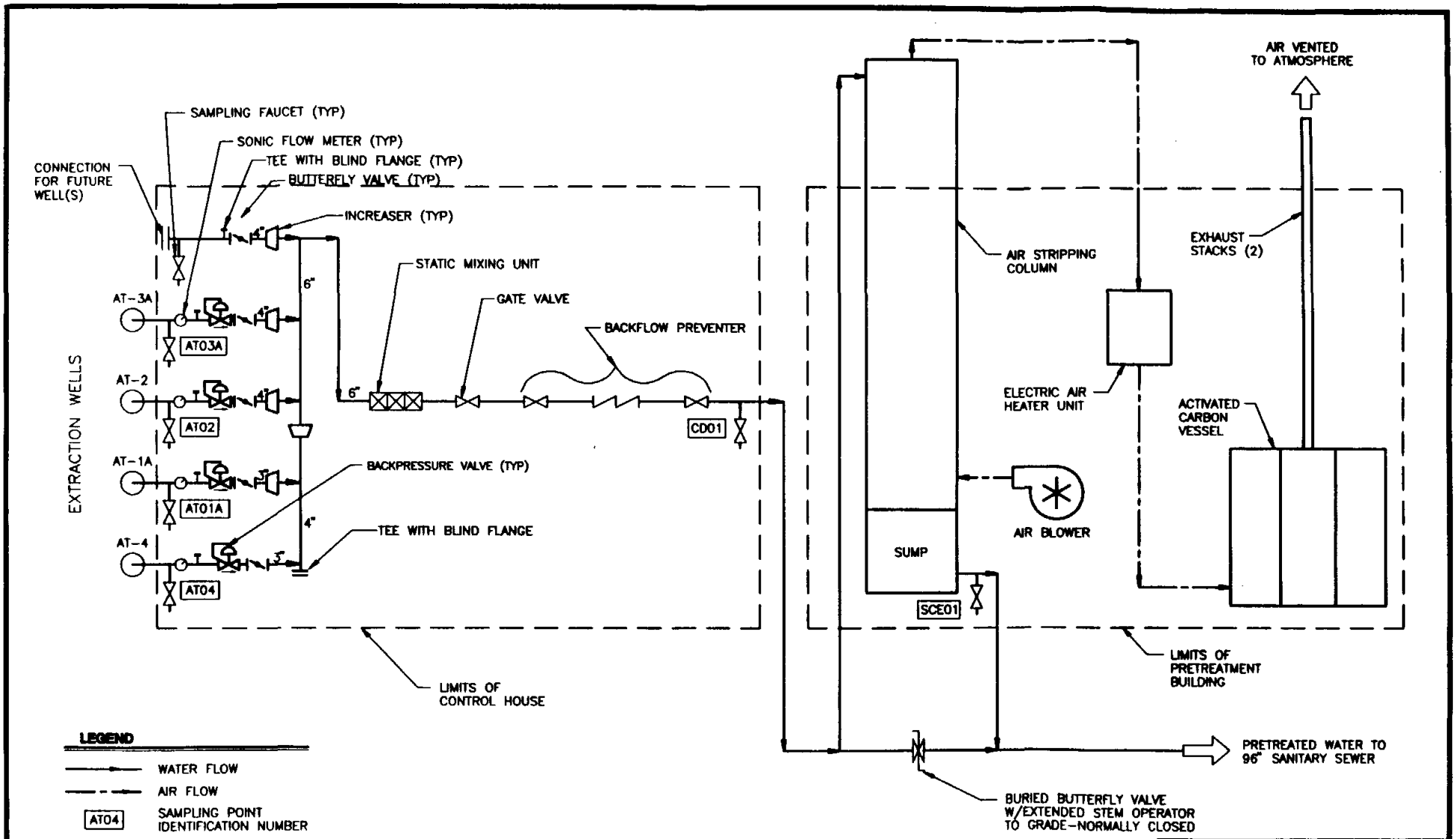
The existing groundwater extraction facilities consist of four extraction wells and related piping and appurtenances. A site map showing locations of the extraction wells and associated facilities is shown on Figure 2-1.

The extraction wells are identified as well numbers AT-1A, AT-2, AT-3A, and AT-4. Wells AT-2 and AT-3A were constructed and located to contain contaminated groundwater along the southwestern portion (downgradient) of the NIROP Fridley. The remaining two wells (AT-1A and AT-4) were constructed and located to control continuing sources of groundwater contamination on the eastern and northern sides of the plant, respectively.

A schematic diagram showing the components of the groundwater extraction and pretreatment facilities is shown on Figure 2-2. The discharge from each of the four extraction wells is routed via separate pipelines to a Control House, which is located near the security fence on the western side of the plant. Instrumentation provided at the Control House includes a flow rate indicator and a flow volume totalizer for each extraction well discharge. The combined discharge from the four extraction wells flows via a single pipe to a Pretreatment Building located near the Control House. Sampling ports are located on the piping for each extraction well and on the combined discharge to the Pretreatment Building.

2.2 Groundwater Pretreatment

Existing facilities provided in the Pretreatment Building include a single air stripping column with a loose-fill packing, an air blower, and air heating unit, and a removable activated carbon vessel. Volatile organic compounds (VOCs) in the groundwater entering the stripping column



SCHEMATIC OF EXISTING GROUNDWATER EXTRACTION AND PRETREATMENT SYSTEM

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APPROVED BY:	
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FILE #	33150401

FIGURE 2-2

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are transferred from the water to air by counter-current, forced-air stripping across the column packing. The air exiting the stripping column passes through the in-line electric air heating unit, and then into the activated carbon vessel where the VOCs are adsorbed onto the carbon. The air discharged from the carbon vessel is vented to the atmosphere.

The treated groundwater flows by gravity from the base of the stripping column to buried piping that has been installed beneath East River Road, and discharges to an existing 96-inch sanitary interceptor sewer owned by the MCWS that is located on the river side of East River Road. After entering the sanitary sewer, the pretreated groundwater flows to the MCWS's Pig's Eye Wastewater Treatment Facility.

When the activated carbon in the carbon vessel approaches its VOC-removal capacity, the extraction wells and pretreatment facilities are temporarily shut down and a vessel containing fresh activated carbon is exchanged for the vessel with the spent carbon. The spent carbon vessel is taken to a licensed carbon regeneration facility, where the VOCs are destroyed in the thermal carbon regeneration process.

2.3 Hydraulic Containment Effectiveness - December 1993 Operating Conditions

The existing extraction well system began sustained operation on September 14, 1992. Water level measurements taken in December 1993 after more than a year of continuous pumping were used to construct the post-startup maps of hydraulic heads shown on Figures 2-3, 2-4, 2-5, and 2-6. Since initial startup, the extraction wells have operated at levels below design specifications, which are 75, 125, 250, and 125 gpm for AT-1A, AT-2, AT-3A, and AT-4, respectively. Average pumping rates from September 14, 1992 to December 31, 1993 were 20, 40, 193, and 42 gpm, respectively, for the four wells. As discussed in the Annual Monitoring Report for 1993 (RMT, 1994), apparent fouling and other operational problems have occurred since startup which have resulted in periodic shutdown of extraction wells, and decreasing capacity of some wells, notably AT-2 and AT-1A. The long-term effectiveness of the groundwater extraction system will depend on overcoming well performance problems and maintaining adequate flow rates in the extraction wells.

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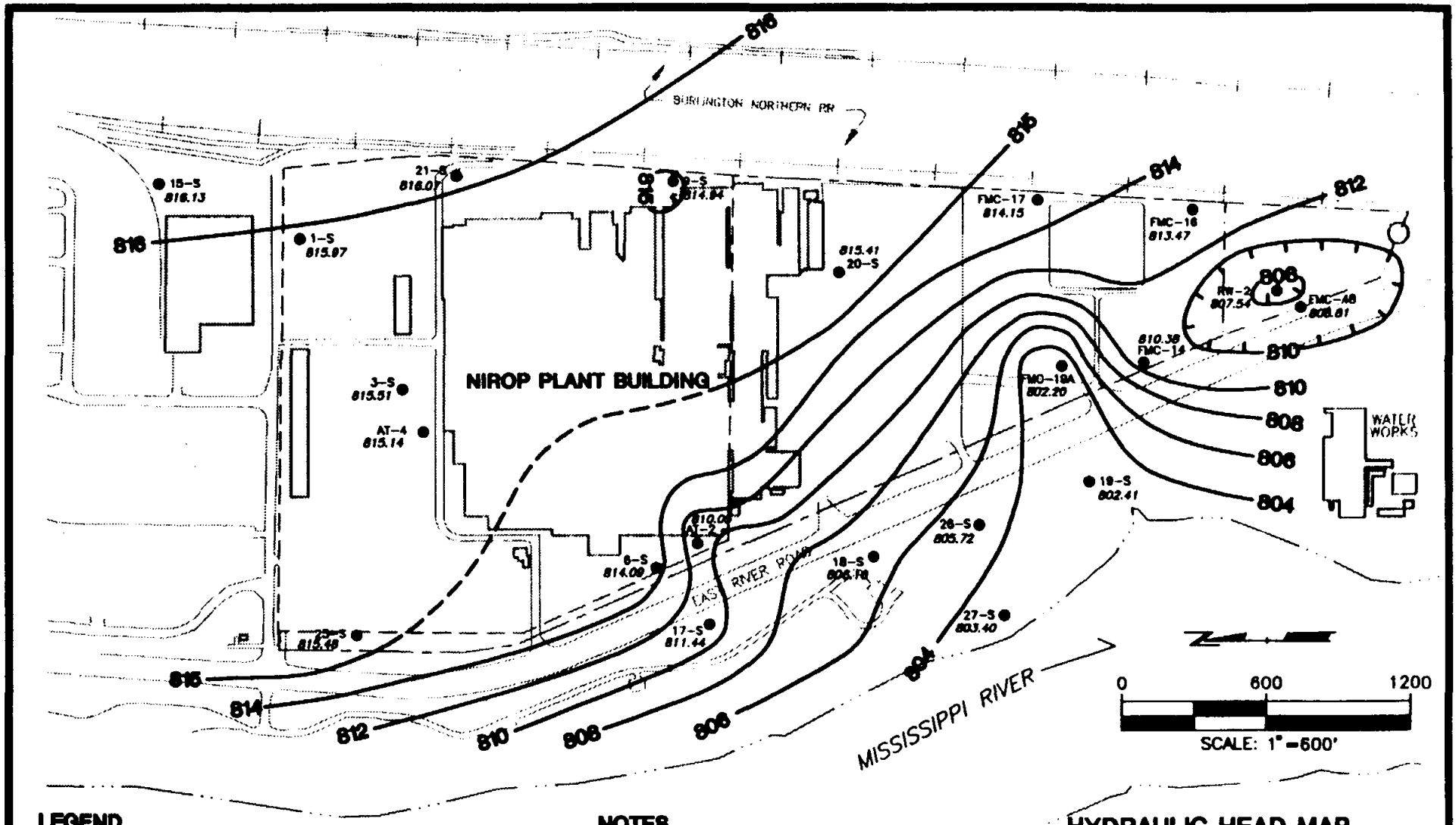

LEGEND

- BURLINGTON NORTHERN PROPERTY LINE, APPROX.
- FMC PROPERTY LINE, APPROX.
- NIROP PROPERTY LINE, APPROX.
- ● 3-S EXISTING WELL
- 815.51 WATER ELEVATION (FT, MSL)
- 814 WATER TABLE CONTOUR (2' CONTOUR INTERVAL) (DASHED WHERE INFERRED)

NOTES

1. WATER LEVELS IN FMC WELLS MEASURED NOVEMBER 30, 1993.
2. WELLS AND WATER LEVELS SHOWN ARE A SUBSET OF THE LARGER DATA BASE USED TO CREATE THIS MAP.
3. THIS MAP REPRESENTS THE HEAD DISTRIBUTION 15 MONTHS AFTER PUMP STARTUP.

HYDRAULIC HEAD MAP SHALLOW DRIFT (DECEMBER 4, 1993)

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FIGURE 2-3

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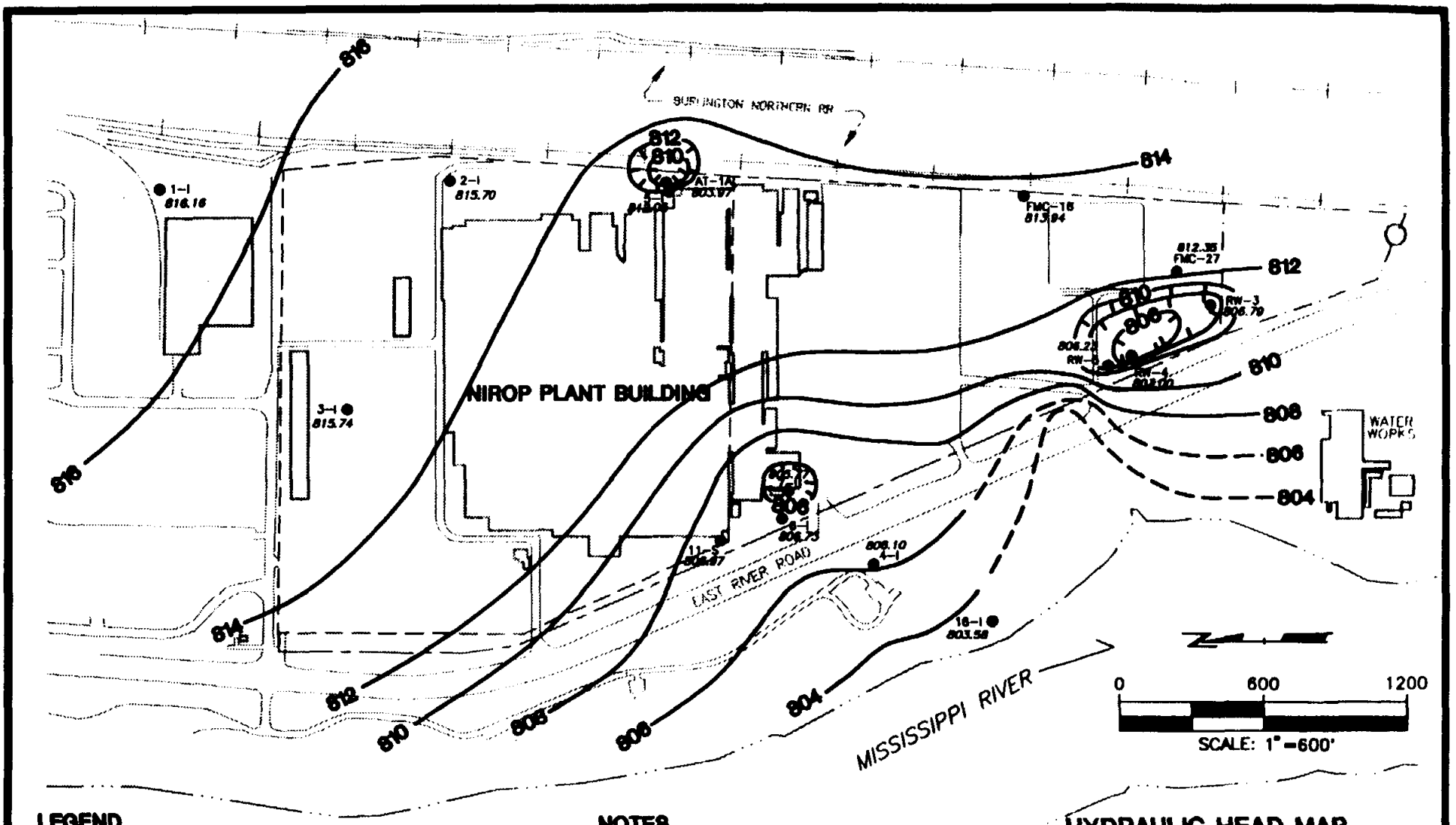

LEGEND

- BURLINGTON NORTHERN PROPERTY LINE, APPROX.
- FMC PROPERTY LINE, APPROX.
- NIROP PROPERTY LINE, APPROX.
- ● 3-I EXISTING WELL
- 815.74 WATER ELEVATION (FT, MSL)
- 814 WATER TABLE CONTOUR (2' CONTOUR INTERVAL) (DASHED WHERE INFERRED)

NOTES

1. WATER LEVELS IN FMC WELLS MEASURED NOVEMBER 30, 1993.
2. WELLS AND WATER LEVELS SHOWN ARE A SUBSET OF THE LARGER DATA BASE USED TO CREATE THIS MAP.
3. THIS MAP REPRESENTS THE HEAD DISTRIBUTION 15 MONTHS AFTER PUMP STARTUP.

HYDRAULIC HEAD MAP INTERMEDIATE DRIFT (DECEMBER 4, 1993)

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FIGURE 2-4

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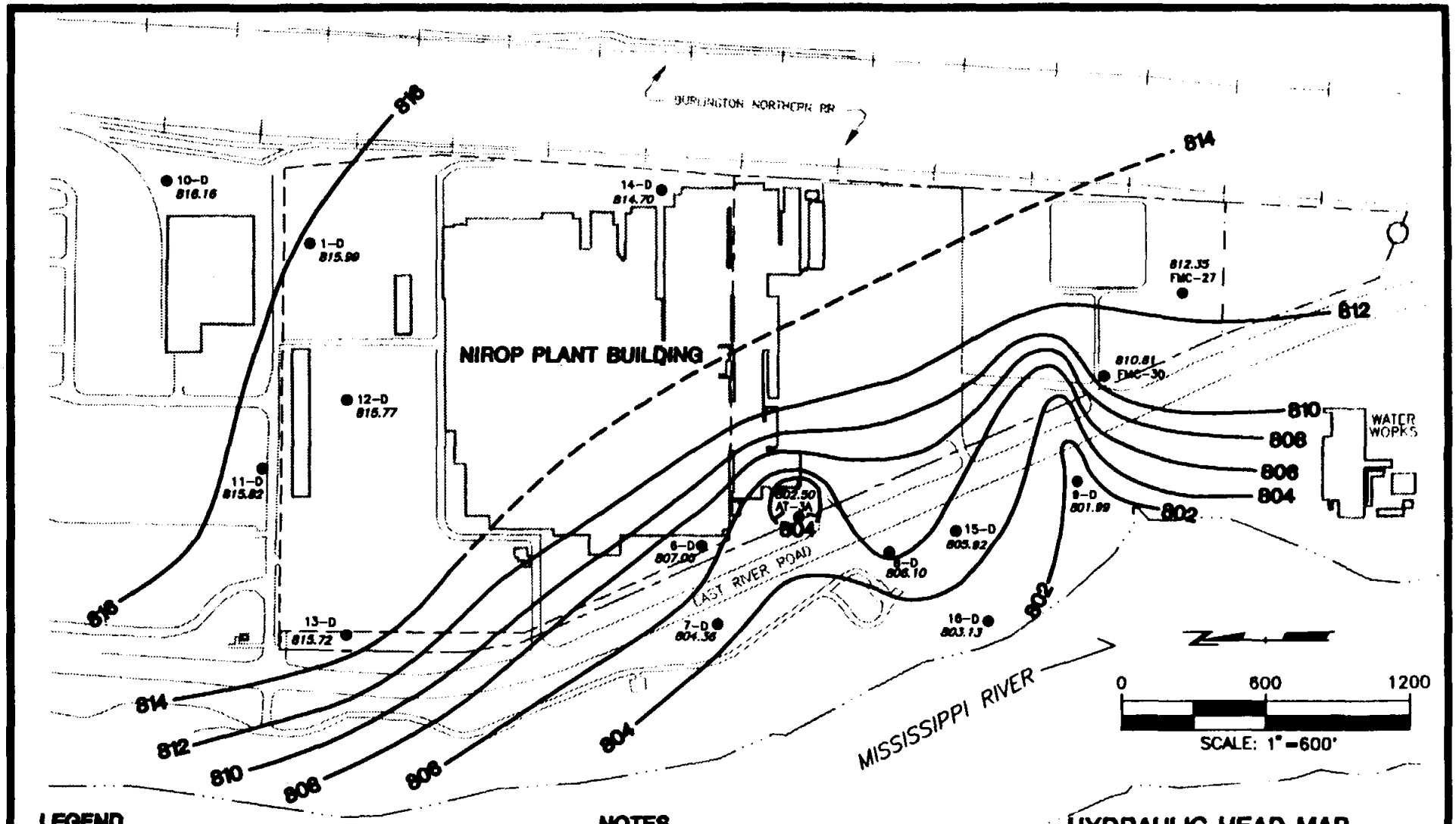

LEGEND

- BURLINGTON NORTHERN PROPERTY LINE, APPROX.
- FMC PROPERTY LINE, APPROX.
- NIROP PROPERTY LINE, APPROX.
- ● 12-D EXISTING WELL
- *815.77* WATER ELEVATION (FT, MSL)
- 814 WATER TABLE CONTOUR (2' CONTOUR INTERVAL) (DASHED WHERE INFERRED)

NOTES

1. WATER LEVELS IN FMC WELLS MEASURED NOVEMBER 30, 1993.
2. WELLS AND WATER LEVELS SHOWN ARE A SUBSET OF THE LARGER DATA BASE USED TO CREATE THIS MAP.
3. THIS MAP REPRESENTS THE HEAD DISTRIBUTION 15 MONTHS AFTER PUMP STARTUP.

HYDRAULIC HEAD MAP DEEP DRIFT (DECEMBER 4, 1993)

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FIGURE 2-6

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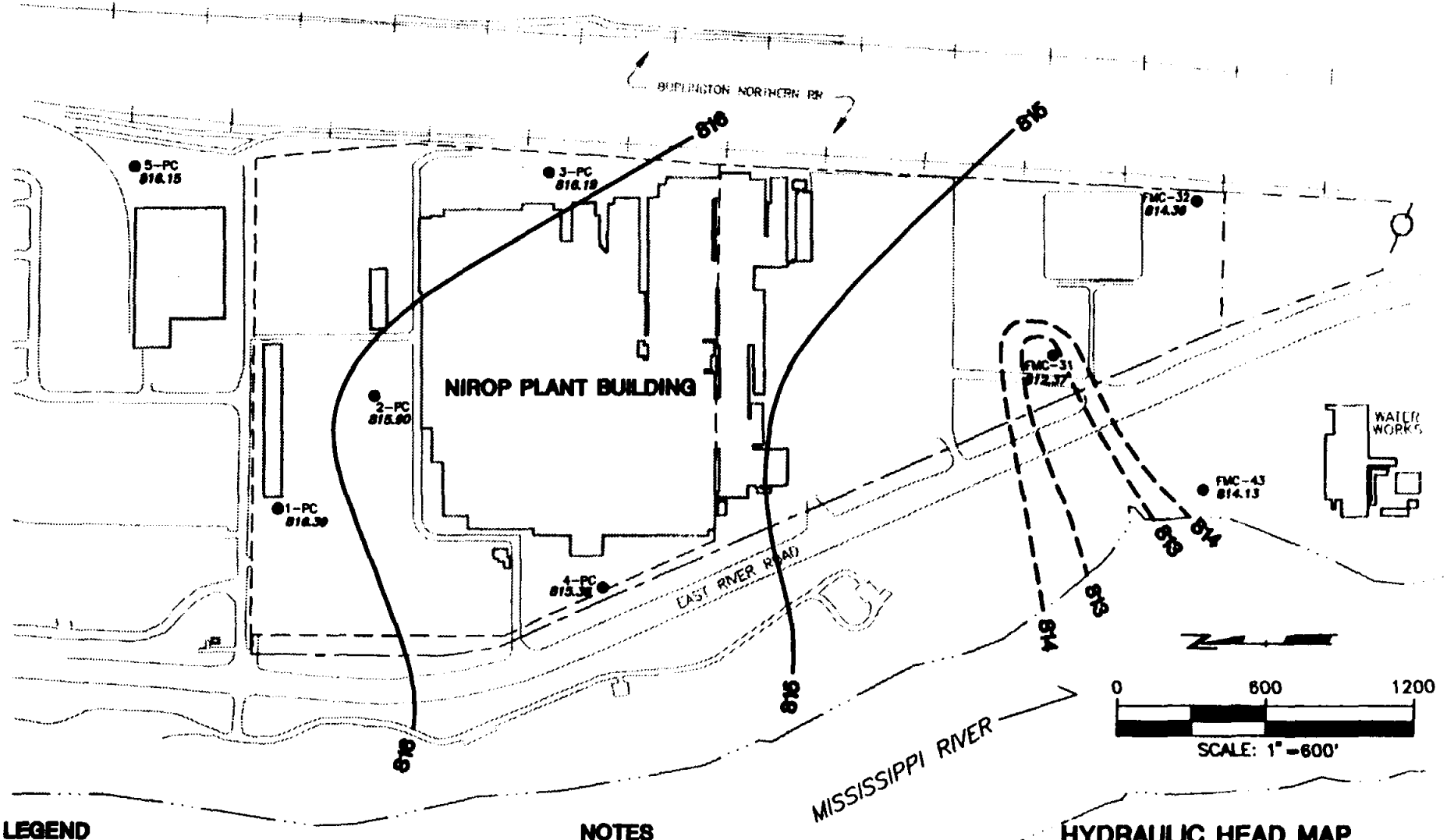

LEGEND

- BURLINGTON NORTHERN PROPERTY LINE, APPROX.
- FMC PROPERTY LINE, APPROX.
- NIROP PROPERTY LINE, APPROX.
- ● 2-PC EXISTING WELL
- *815.90* WATER ELEVATION (FT, MSL)
- 815 WATER TABLE CONTOUR (1' CONTOUR INTERVAL) (DASHED WHERE INFERRED)

NOTES

1. WATER LEVELS IN FMC WELLS MEASURED NOVEMBER 30, 1993.
2. THIS MAP REPRESENTS THE HEAD DISTRIBUTION 15 MONTHS AFTER PUMP STARTUP.

HYDRAULIC HEAD MAP BEDROCK AQUIFER (DECEMBER 4, 1993)

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FIGURE 2-6

An evaluation of the effectiveness of the extraction well system in controlling migration of dissolved contaminants in the groundwater has been conducted by modeling, under various pumping scenarios. A three-dimensional model (computer code MODFLOW[386] Version 2.0, Geraghty and Miller) (McDonald, 1988) has been developed for the NIROP facility and surrounding area that simulates the existing aquifer conditions and pumping rates, and calculates the extent of hydraulic capture. The modeling results and summary figures showing groundwater capture zones are presented and discussed in Appendix A of this report. The model includes four hydrogeologic layers: the upper sand, a discontinuous confining layer of clay, the lower sand, and a dolomite and sandstone aquifer. The model has been calibrated to actual site conditions, and model parameters have been adjusted to simulate the flow system's response to long-term pumping, based on water level measurements collected over the period of system operation.

Under December 1993 pumping rates, model results indicate that the extraction well system will capture approximately 70 percent of the area of the contaminated groundwater plume upgradient of East River Road (see Figures 2-7, 2-8, and 2-9). In the upper sand layer, the areas of highest on-site groundwater contamination are within the capture zone (see Figure 2-7). A portion of the plume near well AT-1A and along the northern site boundary are not being captured. In the lower sand unit, approximately 70 to 80 percent of the contaminant plume is captured, upgradient of East River Road. South of the NIROP building, on United Defense property, the results indicate that groundwater is captured to a point approximately 300 feet south of AT-3A. Based on groundwater sampling performed during the initial startup period, concentrations of VOCs over 100 ppb are still present in the groundwater at distances approximately 1,000 feet south of AT-3A. It appears that this southern portion of the contaminated groundwater plume would not be captured under the December 1993 pumping rates and well configurations.

Downgradient of extraction wells AT-2 and AT-3A (toward the river), recovery is limited, and it appears that the capture zone under December 1993 pumping rates does not extend significantly beyond East River Road. The capture zone also does not encompass the northwestern corner of the site. However, contaminant concentrations in that area are generally low. Therefore, the deficiency in hydraulic containment in the northwestern area of the site is less critical than in the southwestern area of the site, where elevated contaminant concentrations are present.

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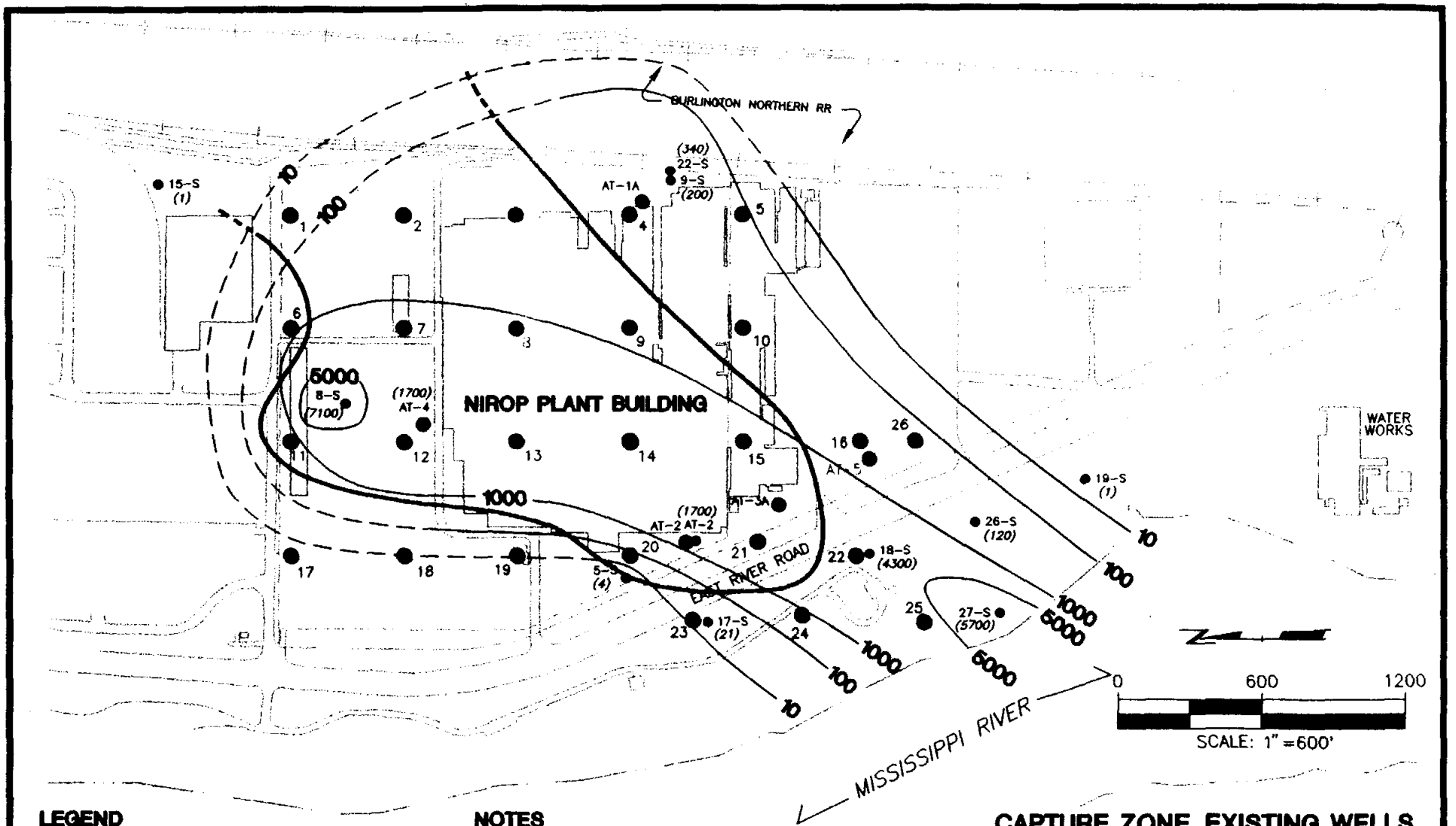

LEGEND

(1700)	TCE CONCENTRATION, ug/L
1000 —	TCE ISOCONCENTRATION LINE, ug/L (DASHED WHERE INFERRED)
● 1	CAPTURED BY WELL
● 5	NOT CAPTURED BY WELL
	CAPTURE ZONE

NOTES

1. PARTICLE TRACKS ARE TRACED FROM THE INITIAL POSITIONS SHOWN, AT A DEPTH OF 10 FT. BELOW WATER TABLE.
2. RESULTS ARE FROM MODEL RUN NR 103.
3. FLOW RATES ARE 32, 24, 200, AND 38 GPM FOR AT-1A, AT-2, AT-3A, AND AT-4.

CAPTURE ZONE, EXISTING WELLS SHALLOW DRIFT (DECEMBER 1993)

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FIGURE 2-7

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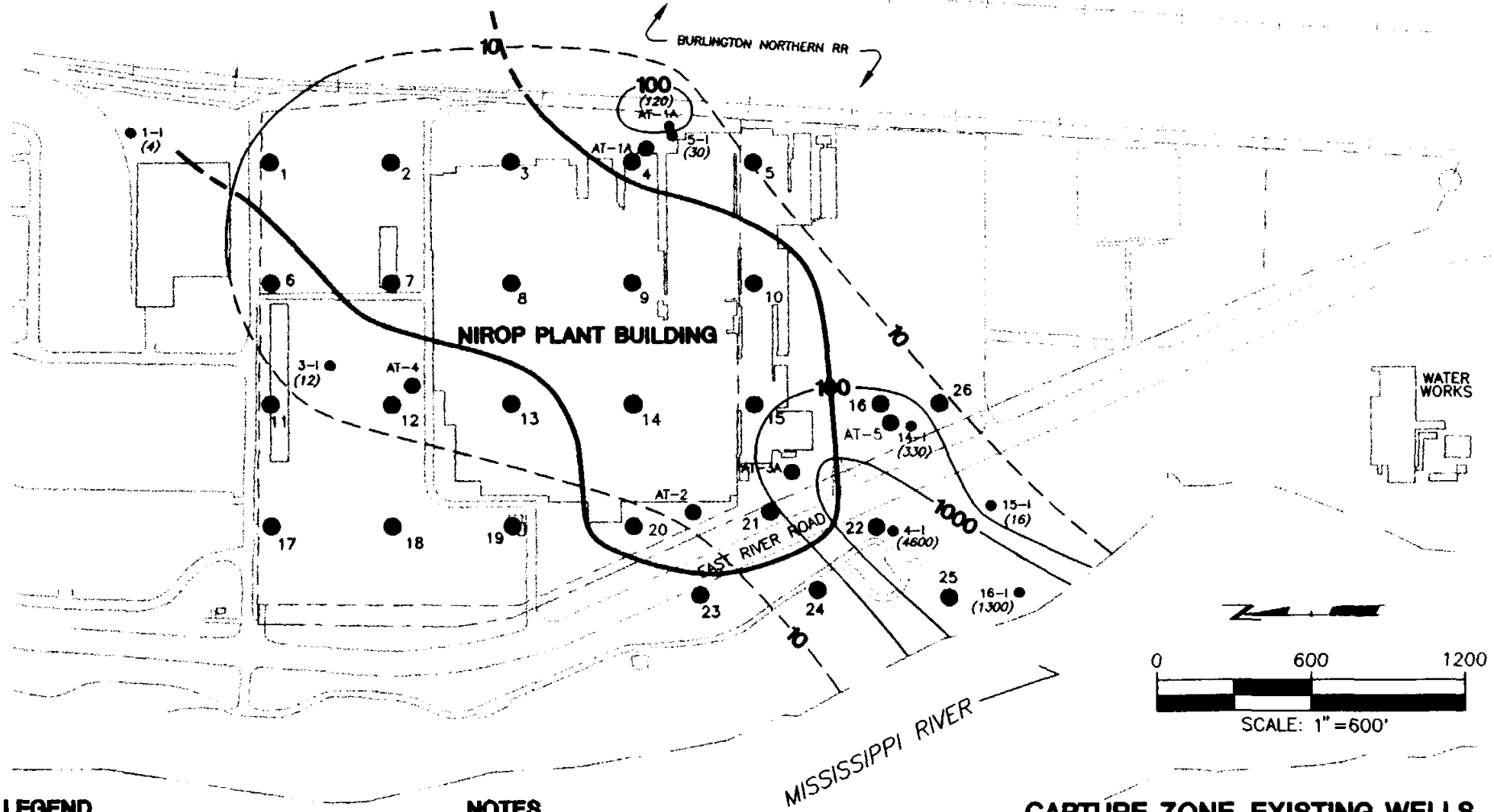

LEGEND

(1700)	TCE CONCENTRATION, ug/L
1000 ——	TCE ISOCONCENTRATION LINE, ug/L (DASHED WHERE INFERRED)
● 1	CAPTURED BY WELL
● 5	NOT CAPTURED BY WELL
⌒	CAPTURE ZONE

NOTES

1. PARTICLE TRACKS ARE TRACED FROM THE INITIAL POSITIONS SHOWN AT A DEPTH OF 45 FT BELOW WATER TABLE.
2. RESULTS ARE FROM MODEL RUN NR 103.
3. FLOW RATES ARE 32, 24, 200, AND 38 GPM FOR AT-1A, AT-2, AT-3A, AT-4.

CAPTURE ZONE, EXISTING WELLS INTERMEDIATE DRIFT (DECEMBER 1993)

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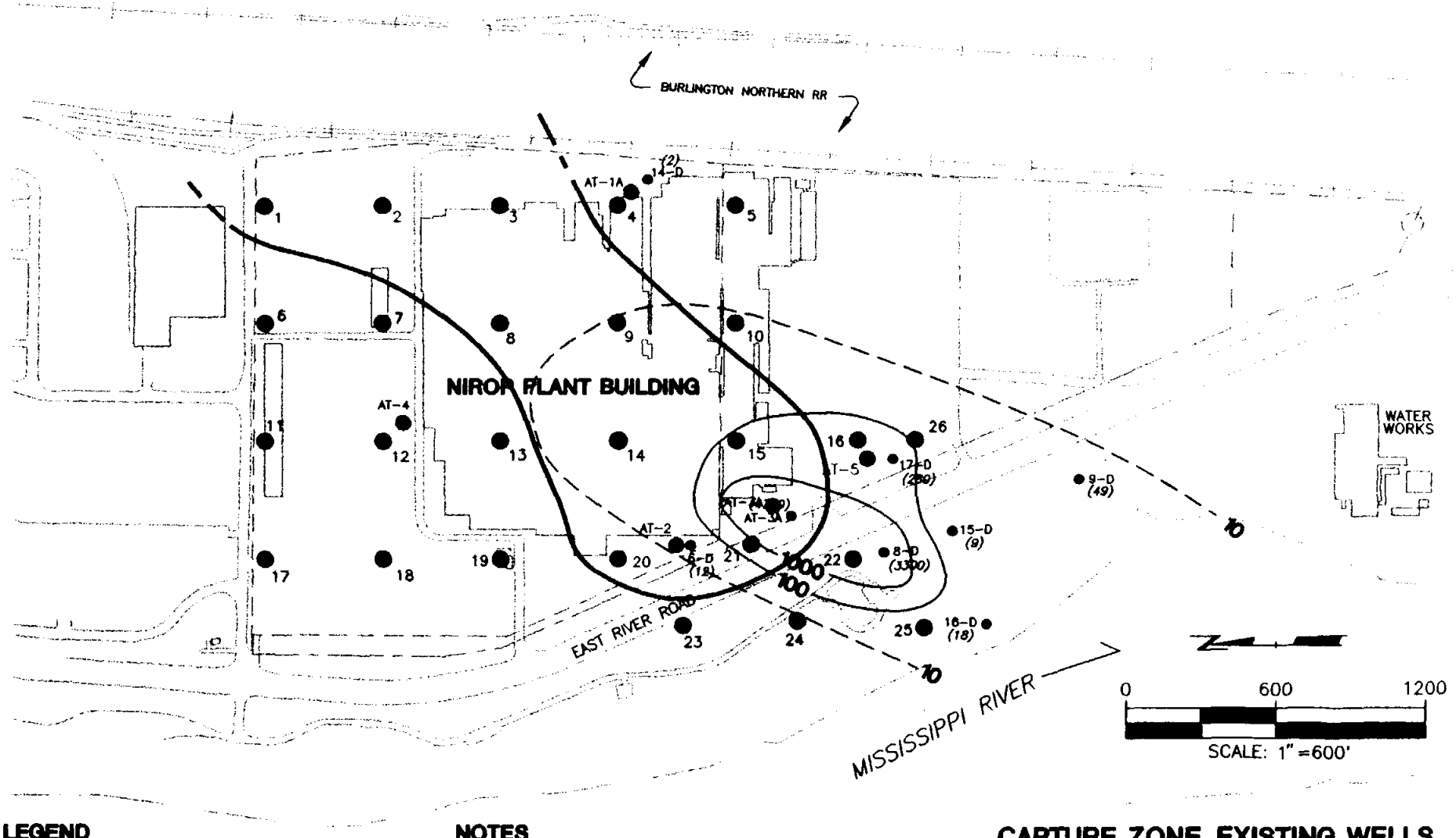
PROJ. #	3315.04
FILE #	33150407

FIGURE 2-8

$$DWC
$$PRF.
$$SCALE$$



LEGEND

(1700)	TCE CONCENTRATION, ug/L
1000 ——	TCE ISOCONCENTRATION LINE, ug/L (DASHED WHERE INFERRED)
● 1	CAPTURED BY WELL
● 5	NOT CAPTURED BY WELL
⌒	CAPTURE ZONE

NOTES

1. PARTICLE TRACKS ARE TRACED FROM THE INITIAL POSITIONS SHOWN, AT A DEPTH OF 85 FT. BELOW WATER TABLE.
2. RESULTS ARE FROM MODEL RUN NR 103.
3. FLOW RATES ARE 32, 24, 200, AND 38 GPM FOR AT-1A, AT-2, AT-3A, AND AT-4.

CAPTURE ZONE, EXISTING WELLS DEEP DRIFT (DECEMBER 1993)

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APPROVED BY:	TBS
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PROJ. #	3315.04
FILE #	33150408

FIGURE 2-9

Conclusions from the capture zone simulations of conditions as of December 1993 are supported by chemical data collected since startup of the extraction well system, which indicate that trichloroethene (TCE) concentrations in most of the wells located west (downgradient) of AT-3A decreased during 1993 (RMT, 1994). This favorable trend suggests that much of the dissolved TCE in the groundwater is now being intercepted by the extraction well system, although the model results indicate that this capture could be improved since a significant portion of the plume is not currently captured.

Section 3
PROPOSED UPGRADING OF GROUNDWATER EXTRACTION SYSTEM

3.1 Summary of Groundwater Flow Simulations

3.1.1 Optimized Operating Conditions - Existing Phase I System

The actual flow capacity of the existing extraction well system under optimized conditions is uncertain at this time. Flow rates at the wells are significantly below the original design conditions due to system interferences, possibly including design problems, scaling, or backpressure buildup caused by precipitates accumulating at constrictions in the system. System tests have been conducted by United Defense to evaluate independent operation of individual extraction wells. One test condition increased the pumping rate at AT-2 from 24 to 160 gpm when the well was operated independently. These data imply that elevated backpressures may be reducing pump design capacity and substantially reducing flow rates of the overall pumping system. However, until the operating conditions have been fully evaluated, it is not possible to predict the optimum system flow rate. Nonetheless, it is valuable to understand how the effectiveness of the system would be enhanced if flow rates produced by the existing well system were increased.

A simulation of increased pumping rates from the four existing extraction wells was conducted to evaluate whether the existing system could achieve sufficient capture even under higher flow conditions. An increase in pumping rates to 80 percent of the design capacities (i.e., 60, 100, 200, and 100 gpm for AT-1A, AT-2, AT-3A, and AT-4 respectively) was simulated. The model results indicate that a substantially larger capture zone would be achieved; however, some area to the south is still not captured (see Figures A-25, A-26, and A-27 in Appendix A).

Simulations to evaluate the effects of possible continued declining pumping rates, to 60 percent of the December 1993 rates, indicated that the capture zone would be substantially reduced, even if one additional well were added at a rate of 120 gpm at the planned location of wells AT-5A/AT-5B. Thus, it is clear that maintaining or improving the current performance of the extraction well system is imperative to meet the objectives of the ROD.

3.1.2 Modified Phase I System

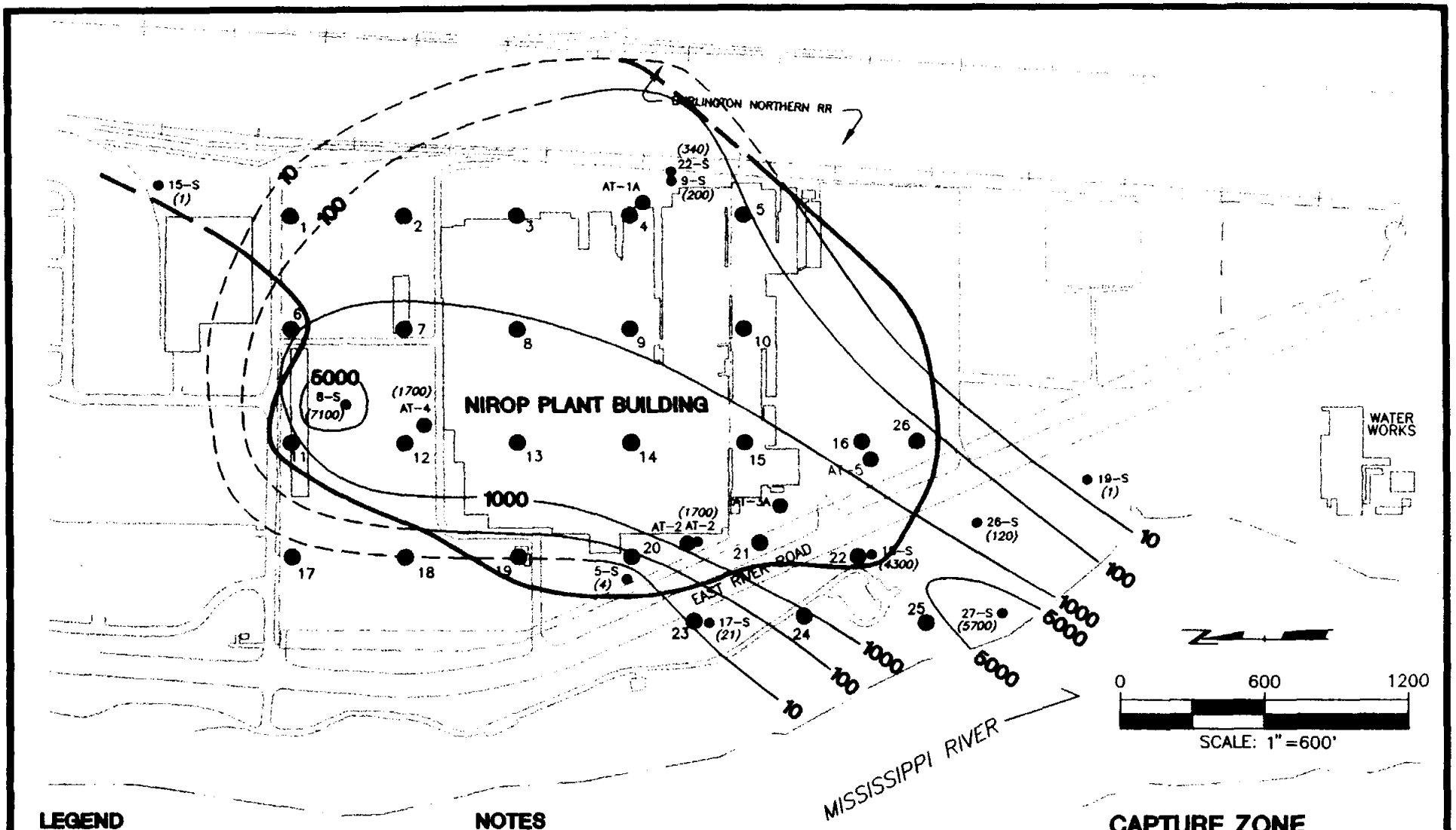
3.1.2.1 Simulated Well Addition

Enhancement of the Phase I system was simulated, and the effectiveness of the modified system has been evaluated through the use of same model simulations. Two additional extraction wells were simulated, at a location near well 17-D, approximately 300 feet southeast of well AT-3A. The wells were simulated to be screened within the upper and lower sand units.

Several pumping scenarios were evaluated with a combined pumping rate for the two wells (AT-5A and AT-5B) of 200 gpm, which is slightly higher than the average rate for AT-3A from startup through December 1993. In the first simulation, with the remaining four wells pumping at December 1993 rates, the model results indicate that the width of the capture zone for the modified extraction well system would increase by about 200 feet in the upper sand and by about 600 feet in the lower sand unit. This configuration would provide significantly better coverage in the southern portion of the contaminant plume (see Figures 3-1, 3-2, and 3-3). Capture of the contaminant plume in the lower sand encompasses most if not all of the plume upgradient of East River Road. Capture of the plume in the upper sand would also be improved, although it appears that the southeastern portion of the plume might not be completely contained.

In a second simulation, the flow rates of the existing extraction wells were increased to 80 percent of the design rates to 60, 100, 200, and 100 gpm, respectively, for AT-1A, AT-2, AT-3A, and AT-4. The addition of new wells AT-5A and AT-5B pumping at 50 gpm and 150 gpm, respectively, was also included in the simulation. As shown on Figures 3-4, 3-5, and 3-6, the zone of capture at all three depths is substantially increased, providing essentially 100 percent capture of groundwater east of East River Road, and also capturing some of the groundwater west (downgradient) of the road. It is clear that this represents a highly effective recovery system.

$$DWG$
$$PRF$
$$SCALE$$



LEGEND

(1700)	TCE CONCENTRATION, ug/L
1000	TCE ISOCONCENTRATION LINE, ug/L (DASHED WHERE INFERRED)
● 1	CAPTURED BY WELL
● 5	NOT CAPTURED BY WELL
	CAPTURE ZONE

NOTES

1. PARTICLES ARE TRACKED FROM THE INITIAL POSITIONS SHOWN, AT A DEPTH OF 10 FT. BELOW WATER TABLE.
2. RESULTS ARE FROM MODEL RUN NR 106.
3. FLOW RATES ARE 32, 24, 200, 38, 52 AND 148 GPM FOR AT-1A, AT-2, AT-3A, AT-4, AT-5A, AND 5B.

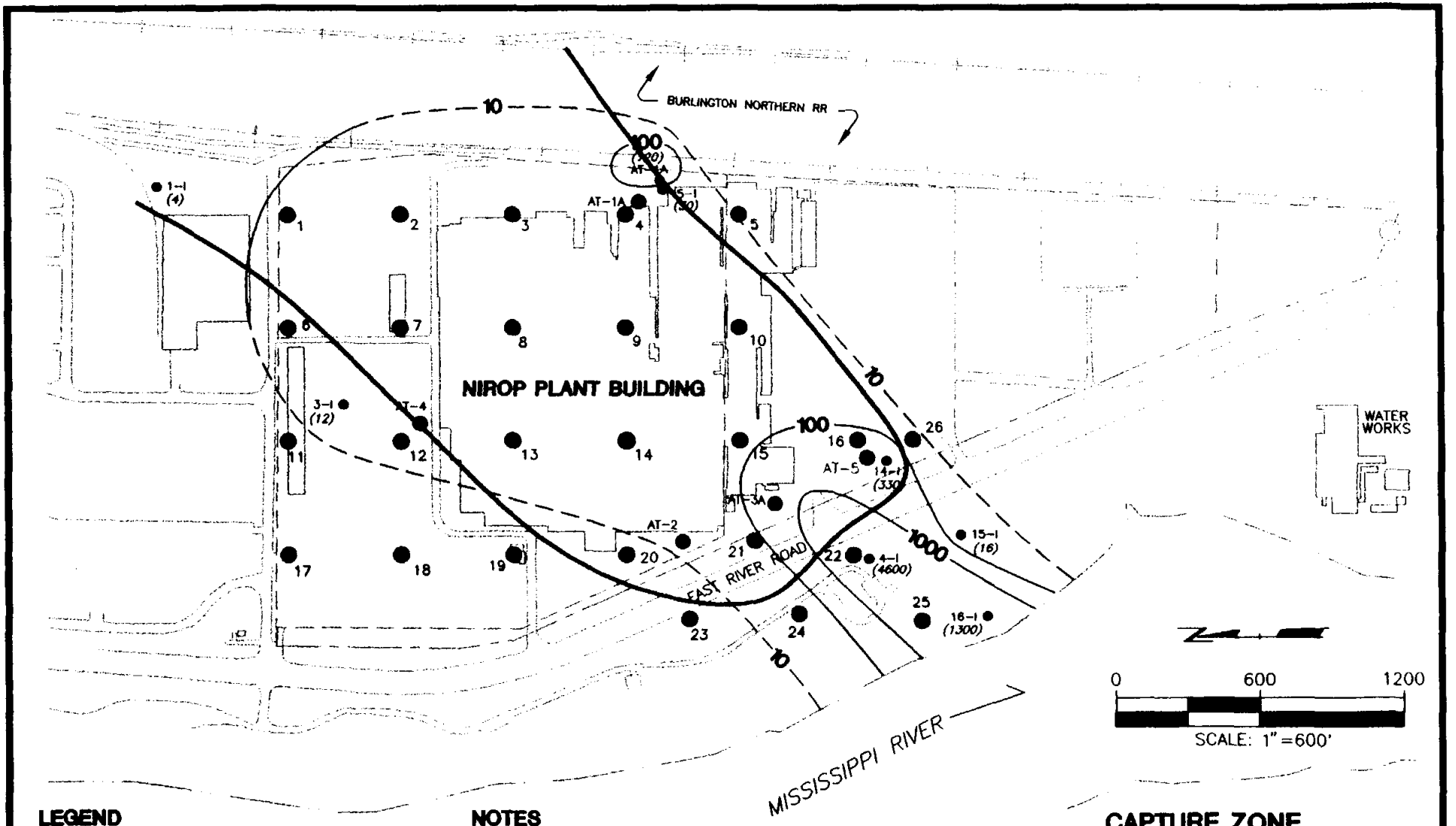
CAPTURE ZONE UPGRADED RECOVERY SYSTEM SHALLOW DRIFT

RMT INC.

DWN. BY:	RBN
APPROVED BY:	TEG
DATE:	JANUARY 1995
PROJ. #	3315.04
FILE #	33150409

FIGURE 3-1

$$DWG$
$$PRF$\
$$SCALE$$



LEGEND

(1700)	TCE CONCENTRATION, ug/L
1000 ——	TCE ISOCONCENTRATION LINE, ug/L (DASHED WHERE INFERRED)
● 1	CAPTURED BY WELL
● 5	NOT CAPTURED BY WELL
⌒	CAPTURE ZONE

NOTES

1. PARTICLE TRACKS ARE TRACED FROM THE INITIAL POSITIONS SHOWN, AT A DEPTH OF 45 FT. BELOW WATER TABLE.
2. RESULTS ARE FROM MODEL RUN NR 106.
3. FLOW RATES ARE 32, 24, 200, 38 52, AND 148 GPM FOR AT-1A, AT-2, AT-3A, AT-4, AT-5A, AND AT-5B.

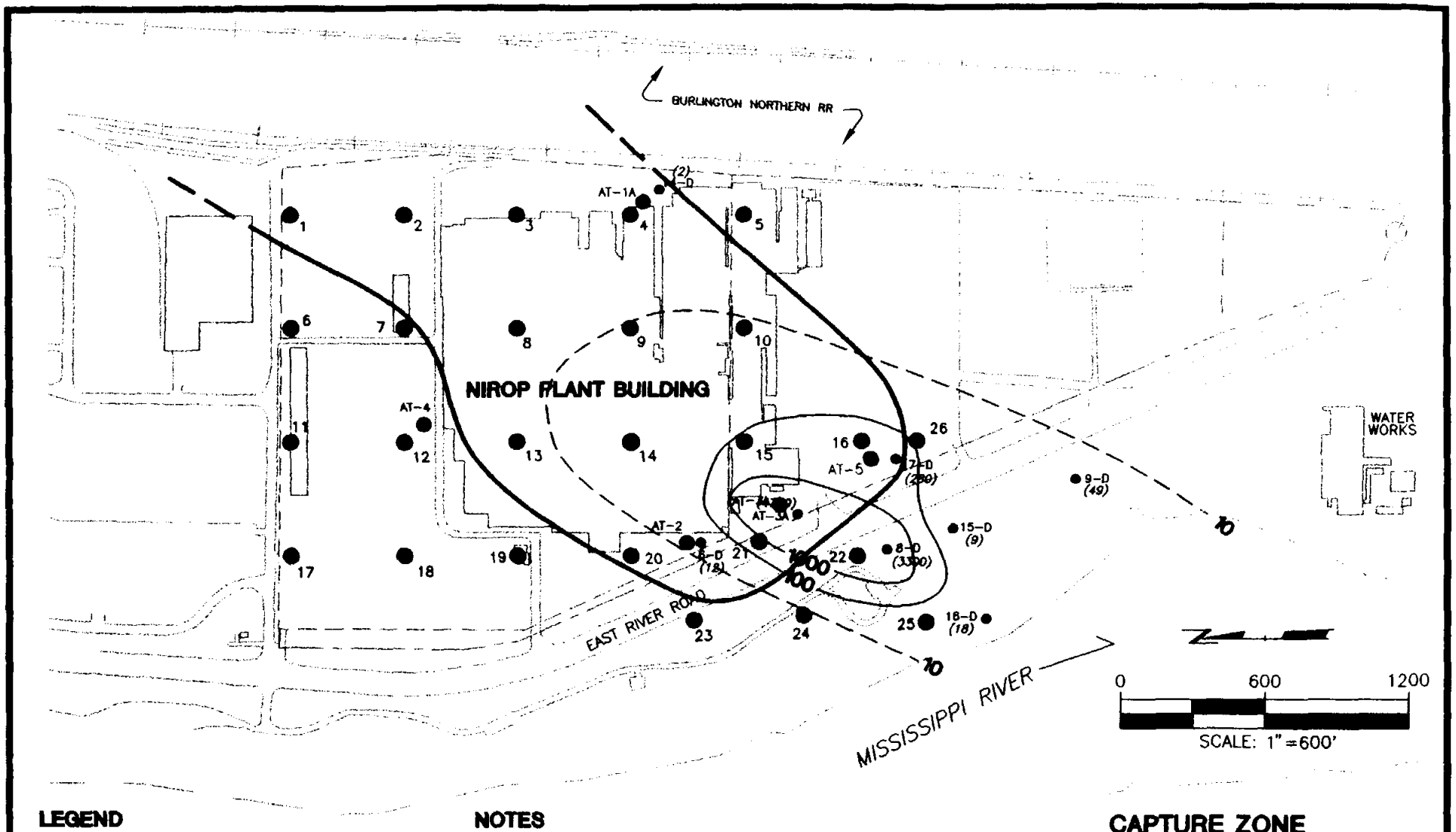
CAPTURE ZONE
UPGRADED RECOVERY SYSTEM
INTERMEDIATE DRIFT

RMT, INC.

DWN. BY:	RBN
APPROVED BY:	TEG
DATE:	JANUARY 1995
PROJ. #	3315.04
FILE #	33150410

FIGURE 3-2

$$DWG$
$$PRF$
$$SCALE$$



LEGEND

(1700)	TCE CONCENTRATION, ug/L
1000 —	TCE ISOCONCENTRATION LINE, ug/L (DASHED WHERE INFERRED)
● 1	CAPTURED BY WELL
● 5	NOT CAPTURED BY WELL
	CAPTURE ZONE

NOTES

1. PARTICLE TRACKS ARE TRACED FROM THE INITIAL POSITIONS SHOWN, AT A DEPTH OF 85 FT. BELOW WATER TABLE.
2. RESULTS ARE FROM MODEL RUN NR 106.
3. FLOW RATES ARE 32, 24, 200, 38, 52, AND 148 GPM FOR AT-1A, AT-2, AT-3A, AT-4, AT-5A, AND AT-5B.

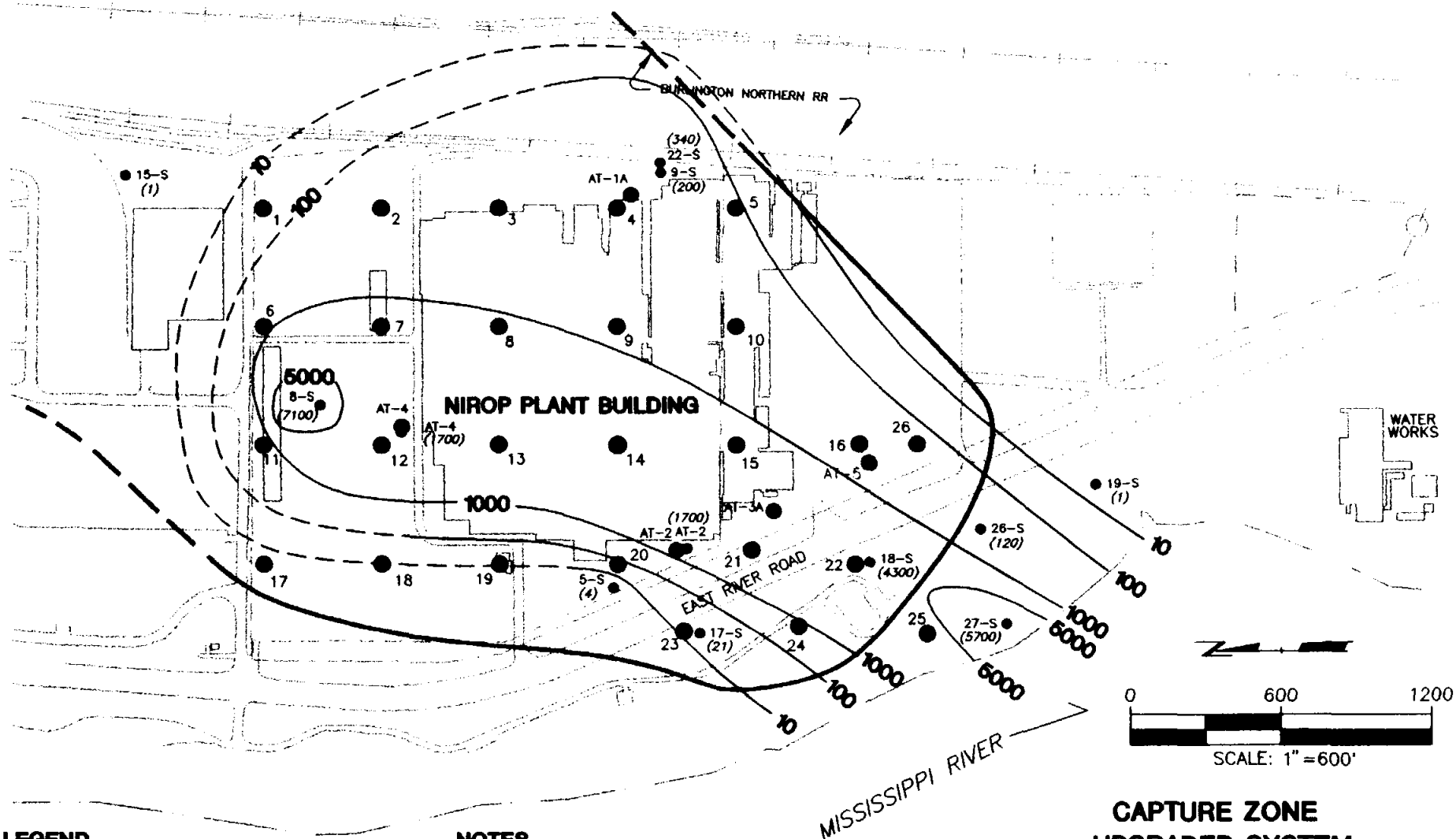
CAPTURE ZONE UPGRADED RECOVERY SYSTEM DEEP DRIFT

RMT INC.

DWN. BY:	RBN
APPROVED BY:	TBC
DATE:	JANUARY 1995
PROJ. #	3315.04
FILE #	33150411

FIGURE 3-3

$$DWG$
$$PRF$
$$SCALE$$



LEGEND

(1700)	TCE CONCENTRATION, ug/L
1000 ——	TCE ISOCONCENTRATION LINE, ug/L (DASHED WHERE INFERRED)
● 1	CAPTURED BY WELL
● 5	NOT CAPTURED BY WELL
	CAPTURE ZONE

NOTES

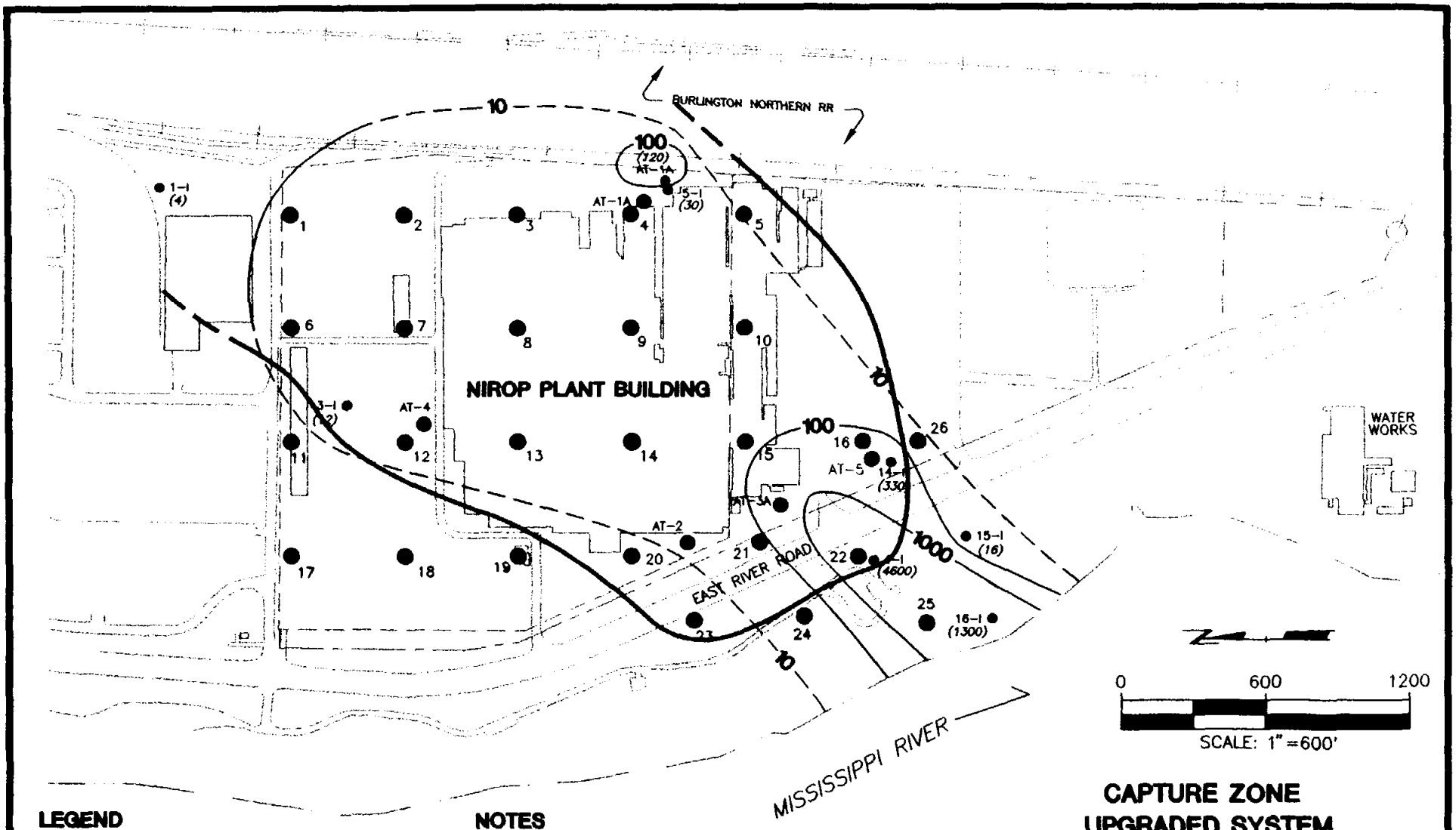
1. PARTICLE TRACKS ARE TRACED FROM THE INITIAL POSITIONS SHOWN, AT A DEPTH OF 10 FT. BELOW WATER TABLE.
2. RESULTS ARE FROM MODEL RUN NR 105.
3. FLOW RATES ARE 60, 100, 200, 100, 52, AND 148 GPM FROM AT-1A, AT-2, AT-3A, AT-4, AT-5A, AND AT-5B.

CAPTURE ZONE
UPGRADED SYSTEM
OPTIMIZED RATES #1
SHALLOW DRIFT

RMT INC.

DWN. BY:	RBN
APPROVED BY:	TEB
DATE:	JANUARY 1995
PROJ. #	3315.04
FILE #	33150412

FIGURE 3-4



LEGEND

(1700)	TCE CONCENTRATION, ug/L
1000	TCE ISOCONCENTRATION LINE, ug/L (DASHED WHERE INFERRED)
● 1	CAPTURED BY WELL
● 5	NOT CAPTURED BY WELL
	CAPTURE ZONE

NOTES

1. PARTICLE TRACKS ARE TRACED FROM THE INITIAL POSITIONS SHOWN, AT A DEPTH OF 45 FT. BELOW WATER TABLE.
2. RESULTS ARE FROM MODEL RUN NR 105.
3. FLOW RATES ARE 60, 100, 200, 100, 52, AND 148 GPM FROM AT-1A, AT-2, AT-3A, AT-4, AT-5A, AND AT-5B.

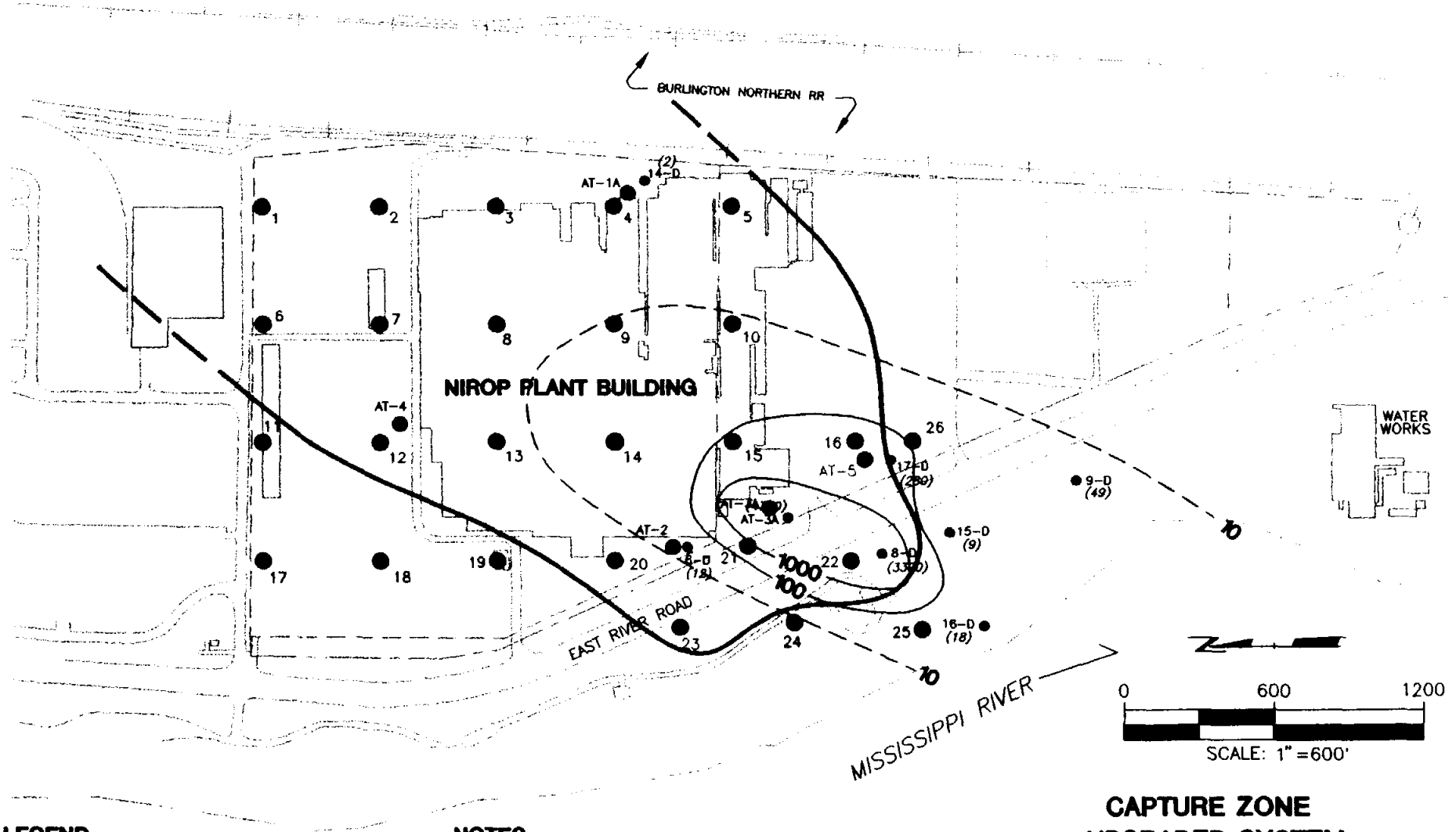
CAPTURE ZONE
UPGRADED SYSTEM
OPTIMIZED RATES #1
INTERMEDIATE DRIFT

RMT INC.

DWN. BY:	RBN
APPROVED BY:	TGB
DATE:	JANUARY 1995
PROJ. #	3315.04
FILE #	33150413

FIGURE 3-5

$$DWG
$$PRF$$
$$SCALE$$



LEGEND

(1700)	TCE CONCENTRATION, ug/L
1000 ——	TCE ISOCONCENTRATION LINE, ug/L (DASHED WHERE INFERRED)
● 1	CAPTURED BY WELL
● 5	NOT CAPTURED BY WELL
⌒	CAPTURE ZONE

NOTES

1. PARTICLE TRACKS ARE TRACED FROM THE INITIAL POSITIONS SHOWN, AT A DEPTH OF 85 FT. BELOW WATER TABLE.
2. RESULTS ARE FROM MODEL RUN NR 105.
3. FLOW RATES ARE 60, 100, 200, 100, 52, AND 148 GPM FROM AT-1A, AT-2, AT-3A, AT-4, AT-5A, AND AT-5B.

CAPTURE ZONE
UPGRADED SYSTEM
OPTIMIZED RATES #1
DEEP DRIFT

RMT, INC.

DWN. BY:	RBN
APPROVED BY:	TEG
DATE:	JANUARY 1995
PROJ. #	3315.04
FILE #	33150414

FIGURE 3-6

3.1.2.2 Effects of Discontinuing Pumping at AT-1A

In the Annual Monitoring Report for 1993 (RMT, 1994), a recommendation was made to discontinue pumping at well AT-1A, based on low contaminant recovery rates. However, simulations of the extraction well system without AT-1A show that, unless the flow rates of the other wells can be increased, the cessation of pumping at AT-1A would cause more of the contaminant plume to move deeper in the aquifer and not be captured. Therefore, unless the pumping rate of AT-2, AT-3A, AT-4, and the two new extraction wells can be increased above 100, 200, 100, 50, and 150 gpm respectively, to compensate for the loss of 60 gpm from AT-1A, there will be a small reduction in the total system flow rate, but a significant reduction in the effectiveness of the overall extraction well system.

3.2 Groundwater Extraction System Upgrading

Based on observed concentrations of TCE and other VOCs in the groundwater, and on the evaluation of the effectiveness of the existing groundwater extraction system, it is recommended that one shallow well and one deep extraction well be installed approximately 300 feet southeast of AT-3A, as shown on Figure 2-1. The wells should be installed in the upper sand and lower sand units, respectively, which will enhance the ability of the system to capture the contaminant plume at both depths, especially at the plume's southern edge.

Based on pumping capacity tests of the existing extraction wells and pumps, and on results from previous aquifer pumping tests at the site, it is believed that the proposed wells can yield flow rates of 50 gpm and 150 gpm for the shallow well (AT-5A) and deep well (AT-5B), respectively. Pumps to be installed in the proposed wells will be sized to provide these flow rates as the design rated capacities. The total head required for each pump at its design rated conditions will be specified to achieve the design flow rates with the wells operating together with the four existing wells. The design capacity and total head for each pump will also account for an anticipated decrease in pump efficiency and increased piping system headloss over time due to general pump wear and accumulation of scale and deposits in the piping system between cleaning events. The pumps will also be sized to allow the design capacities to be met with the pumps discharging to the existing pretreatment system, although the flow from the two proposed and four existing wells will normally be discharged directly to the sanitary sewer without pretreatment (refer to Subsection 3.3). In addition, the total head

ratings for the pumps will be selected, if practical, to meet the estimated requirements for pumping from the proposed wells to the future Phase II treatment facility.

In addition to installation of the new extraction wells, an evaluation of potential methods to increase the pumping rates for the four existing wells will be conducted. The groundwater flow model simulations have demonstrated that a substantial increase in the effectiveness of the system can be achieved if the pumping rates are increased. Conversely, declining pumping rates over 1993 point to the serious impact of diminished well productivity on system objectives unless the problems are identified and managed.

Upgrading of the groundwater extraction system to include the new groundwater extraction wells will affect the operation of the existing groundwater extraction system components, including the existing groundwater extraction pumps and piping. After approval of the conceptual approach for upgrading the groundwater extraction system, an evaluation will be performed to determine the ability of the existing groundwater extraction system to meet its groundwater extraction objectives with the new wells in operation. The evaluation will consider the groundwater extraction system components and evaluation criteria listed in Table 3-1.

Based on the evaluation, a list of constraints which may be found to limit the ability of the existing system to met the groundwater extraction objectives will be developed. Based on this list, modifications to the existing groundwater extraction system will be designed to improve the efficiency of the existing system. These modifications will be constructed at the time the new groundwater extraction wells are installed.

3.3 Groundwater Pretreatment System

At the beginning of design for upgrading the groundwater extraction system, an evaluation will be performed to determine the ability of the existing pretreatment system to meet the pretreatment objectives when treating the increased groundwater flow rate and increased untreated VOC mass flow rate. The evaluation will consider the pretreatment system components and evaluation criteria listed in Table 3-2. An evaluation of methods that will enable carbon change-out before breakthrough occurs will also be performed. Based on the evaluation, a list of constraints which may limit the ability of the existing pretreatment system to meet its effluent requirements will be developed.

TABLE 3-1

EVALUATION OF EXISTING GROUNDWATER EXTRACTION SYSTEM COMPONENTS

Groundwater Extraction System Component	Evaluation Criteria
• Groundwater extraction piping	• Effect of piping on groundwater extraction pumps discharge pressure
• Groundwater extraction pumps	• Ability to provide the needed capacity at an increased pump discharge pressure
• Groundwater extraction pump motors	• Ability of motors to meet horsepower requirements for pumps
• Power wiring to groundwater extraction pump motors	• Ability to handle power load to motors
• Groundwater extraction wells	• Effect of possible scaling or fouling of well components

TABLE 3-2

EVALUATION OF EXISTING PRETREATMENT SYSTEM COMPONENTS

Pretreatment System Component	Evaluation Criteria
• Combined pipe header to pretreatment system	• Capacity to handle increased flow rate
• Spray nozzle in air stripping column	• Capacity to handle increased flow rate • Ability to properly distribute water at increased groundwater flow rate
• Air stripping column diameter	• Ability to handle increased flow rate
• Height of column packing	• Ability to remove VOCs at increased flow rate and changed VOC concentration
• Air stripping column	• Ability to provide needed increase in air flow rate to remove VOCs • Effect of increased water flow rate on fan discharge pressure • Effect of possible scaling or fouling of stripping column packing and other internal components • Ability to meet the Allowable Emission Rates defined by the MPCA
• Air stripping fan motor	• Ability of motor to meet fan horsepower requirements
• Combined discharge piping to sanitary sewer	• Capacity to handle increased flow rate
• Air ductwork	• Capacity to handle increased air flow rate
• Air heater	• Capacity to provide increased heating due to increased air flow rate
• Power wiring to air heater	• Ability to handle increased power load to air heater
• GAC vessel	• Capacity to handle increased air flow rate • Capacity to handle increased untreated VOC mass in inlet air

The concentrations of TCE and other VOCs in the combined discharge from the four existing extraction wells to the air stripping column have decreased significantly since startup of the system in 1992. For the last several months, the concentrations have remained below the limits specified in the permit issued by the MCWS for discharge to the sanitary sewer. Pretreatment of the groundwater is no longer necessary to comply with the discharge permit limits. The Navy has submitted a written request to the MCWS to discontinue operation of the pretreatment system, and has received verbal approval from the MCWS to shut down the pretreatment system and discharge the combined groundwater flow directly to the sanitary sewer. It is currently planned to shut down the pretreatment system and discharge the groundwater directly from the extraction wells to the sanitary sewer in February 1995. It is anticipated that the concentrations of TCE and other VOCs in the groundwater from the two proposed extraction wells will also be below the limits required for discharge to the sanitary sewer, based on results of sampling and analysis of groundwater from monitoring wells in the vicinity of the proposed location of the new extraction wells.

Implementation of modifications to the pretreatment system that may be identified from the evaluation described above to allow it to meet the pretreatment objectives after addition of the two proposed extraction wells is not expected to be necessary, because the groundwater is expected to be discharged directly to the sanitary sewer without the need for pretreatment. If the actual concentrations of TCE and other VOCs in the groundwater after startup of the two proposed wells cause the concentrations in the total groundwater flow to exceed the MCWS permit limits, the modifications to the pretreatment system that may be needed will be designed and constructed, and the pretreatment system will be returned to service.

3.4 Maintenance of Groundwater Extraction System Capacity

As described in the Annual Monitoring Report for 1993 for the groundwater extraction and pretreatment system (RMT, 1994), the flow rates from the existing individual extraction wells, and therefore the combined flow rate from all four existing wells, are significantly less than the original design flow rates, which were based on the results of pumping tests at each well. Based on experience gained by United Defense from operation and maintenance of the system since 1992, and on hydraulic evaluations of the existing piping system, the primary causes of the reduced flow capacity are believed to include the following:

- Buildup of inorganic scale and biological deposits in the piping and components, causing additional pipeline headloss.
- Additional backpressure on the well pumps due to undersized piping and piping system components at the Control House and Pretreatment Building.

- Possible errors in selection of the original design ratings for the well pumps.

It is believed that the well yields are being reduced primarily by the piping constrictions and backpressure problems noted above rather than by limited groundwater flow into the wells due to plugging of the well screens or packing.

United Defense has established service contracts with the air stripping system manufacturer and a drilling company to provide assistance with maintenance for the pretreatment system and the extraction wells. The groundwater piping has been periodically cleaned and flushed out to remove scale and biological deposits. The extraction wells and pumps have also been cleaned. Although the cleaning procedures are believed to be relatively effective, these measures have provided limited improvements in the flow rates from individual wells.

The current flow produced by each well and the combined system appears to represent the maximum achievable flows with the current system configuration, equipment, condition, and operation and maintenance procedures. However, the planned shutdown of the pretreatment system will increase the flowrate from each of the four existing wells by eliminating the static head and excessive piping headloss associated with operation of the pretreatment system.

The optimum operating flow rates for the four existing and two proposed extraction wells to achieve the desired containment effectiveness for contaminated groundwater are shown in Table 3-3, as determined by use of the groundwater flow model for the site (refer to Appendix A). Based on the results of a hydraulic evaluation of the extraction well pumps and piping system, it is estimated that the four existing and two proposed wells will be able to produce the optimum operating flow rates shown in Table 3-3 after shutdown of the pretreatment system.

Operation and maintenance practices will be continued and improved where practical to attempt to maintain or increase these optimum flow rates. The inability to achieve the optimum operating flow rates from existing wells, or the inability to maintain the design flow rates from the two new wells, may result in ineffective hydraulic capture of contaminated groundwater at the site. Conversely, any increase in flow rate above the operating flow rates shown in Table 3-3 would enhance the system effectiveness in capturing the contaminant plume.

TABLE 3-3

OPTIMUM[1] OPERATING FLOW RATES FOR GROUNDWATER EXTRACTION WELLS

Extraction Well No.	Current Status	Recorded Average Flow Rate[3], gpm	Optimum Operating Flow Rate, gpm[2]
AT-1A	Existing	20	60
AT-2	Existing	40	100
AT-3A	Existing	193	200
AT-4	Existing	42	100
AT-5A	Proposed	--	50
AT-5B	Proposed	--	150
	Total	**295**	**660**

NOTES:

1. Optimum flow rates to achieve the planned containment effectiveness for contaminated groundwater.
2. The flow rate at any individual well may be adjusted lower than indicated, by up to 40 percent, if the total flow rate from all extraction wells does not decrease. Well AT-1A could be removed from service entirely without a decrease in system effectiveness, if the total flow rate does not decrease from 660 gpm.
3. From September 14, 1992 through December 31, 1993.

Section 4
DESIGN AND CONSTRUCTION PLAN

4.1 Extraction Well Design and Construction

The proposed extractions wells (AT-5A and AT-5B) will be located near existing monitoring well MW-17D (see Figure 2-1). This location was chosen based on results of the groundwater flow modeling (see Section 3.2). The two extraction wells will be located approximately 20 feet apart, one screened in the upper consolidated sand and one screened in the lower unconsolidated sand.

Well AT-5A will be drilled to the top of a clay layer (approximately 770 feet MSL) that exists in this area, and will be screened across the unconsolidated sands above the clay (see cross-section B-B', Figure A-5 in Appendix A). The screened interval will extend from the water table surface down to the top of the clay layer (approximately 810 to 770 feet MSL). Well AT-5B will be drilled to bedrock (approximately 700 feet MSL) and will capture water from the lower sand deposits below the clay. Well AT-5B will be screened across the bottom 40 feet of the lower sand (approximately 740 to 700 feet MSL).

The well elevations listed above are approximate and may be adjusted in the field based on the soil conditions encountered during drilling. The soil conditions in the area where AT-5A and AT-5B will be installed are highly variable, based on four test borings installed at this location in December 1990. In general, the geology at this location consists of two layers of fine to coarse sand, separated by a clay layer. However, the clay layer varies significantly in thickness and elevation at the four test boring locations. The top of the clay was encountered at elevations ranging from 763 feet MSL in TH-5 to 789 feet MSL in TH-4, and the thickness varied from 28 feet in TH-3A to 37 feet in TH-4. Due to the variability in thickness and elevation of the clay layer, split-spoon samples will be collected at 2.5-foot intervals during installation of the extraction well borings to confirm the soil conditions at each sample location and verify the proposed well design for AT-5A and AT-5B. The screened interval and elevation will be adjusted according to these field observations.

Preliminary specifications for both wells are as follows: an outer (borehole) diameter of 14 inches; an 8-inch inside-diameter (ID) black steel well casing; and 8-inch ID stainless

steel well screen (estimated 0.040-inch slot size); and an estimated #30 filter pack material. These estimated values for slot size and filter pack will be reviewed following drilling of the boreholes for the new wells, and adjusted if necessary. The proposed well design specifications are shown on Figures C-1 and C-2 (Appendix C). The pumps for the two wells will be selected as part of the design of the extraction system improvements. A brief discussion of the preliminary design specifications for the wells is given below:

- The wells are expected to be drilled using the cable-tool drilling method, due to the potential for heaving sands which may be encountered during drilling. However, other drilling methods, such as dual-tube reverse-rotary, mud-rotary, water-rotary, or air-rotary, may be used at the discretion of the field crew chief.

- The extraction wells will be 8-inch inside-diameter.

- The well screen will be constructed of stainless steel to minimize chemical corrosion and increase the life of the well.

- A filter pack of #30 sand will be used for the extraction wells. Sieve analysis performed on the four test borings installed in December 1990 indicated that a #30 filter pack sand is the appropriate filter pack material. This filter pack material will retain most of the formation material and will minimize the movement of fine material through the filter pack into the well. This filter pack material is consistent with the filter pack used for the four existing extraction wells. It will be reviewed during drilling of the boreholes for the new wells and adjusted if the geology is other than expected.

- The well screens for the two wells will be continuous-slot screens, with a slot size of 0.040 inch. A slot size of 0.040 inch was chosen because it will retain 90 percent or more of the filter pack material. According to Driscoll (1986), the average entrance velocity of water moving into the screen should not exceed 0.1 ft/sec, to minimize headloss and maximize well efficiency. If an 8-inch diameter, 40-slot well screen is used, a flow rate of approximately 30 gallons/minute/foot of well screen can be maintained without exceeding the recommended entrance velocity. This flow rate is much higher than expected in the sands at the NIROP site. Therefore, a slot size of 0.040 inch is expected to be adequate for the required well yields.

4.2 Groundwater Collection System Design and Construction

The design for the upgraded system will include new pumps and collection piping for conveying the groundwater from the new extraction wells to the existing piping in the Control House, with associated electrical power supply, controls, and instrumentation. The design output will consist of detailed engineering drawings (plans) and specifications for use by the

Navy's construction contractor in constructing the system upgrades. The plans and specifications issued for construction will be sent to the USEPA and the MPCA.

During construction of the existing groundwater extraction system, a 4-inch-diameter buried pipeline and electrical conduits were installed by the USACE's contractor from the Control House to the general location of a fifth extraction well that was planned at that time (see location of AT-5A and AT-5B on Figure 2-1). The pipeline was capped prior to trench backfilling, and a marker was installed at grade to identify the end-of-pipe location. This pipeline has remained unused since the original system was installed. The existing buried pipeline will be used to convey the groundwater from well AT-5B to the Control House.

A new 2 1/2-inch-diameter buried pipeline (with electrical conduit) will be installed along the same location as the existing 4-inch pipeline to convey the discharge from well AT-5A to the Control House.

As described in Subsection 3.3, the pretreatment system is expected to be shut down before the new extraction wells are placed into operation. Therefore, improvements to the pretreatment facilities that would be required to accommodate the increased flow and VOC loading from the upgraded extraction well system will not be included in the construction plans.

After the drilling method for installation of the new wells has been selected, a plan for management of construction-derived waste materials (drilling fluids, well development water, etc.) will be submitted by the Navy to the USEPA and the MPCA for approval prior to starting construction.

Construction of all groundwater extraction system improvements will be managed by the Navy's Remedial Action Contractor (RAC) for the NIROP Fridley. In this role, the RAC will be responsible for management of health and safety during construction and startup, including preparation of a Health and Safety Plan. An updated hazard assessment for the site is included in Appendix D, to provide information for preparation of the Health and Safety Plan.

Construction of the new extraction wells and the tie-in to the existing piping and electrical system is expected to require minimal interruption in the operation of the existing system. Temporary (1 to 2 days) shut-down of the system may be required to accommodate modifications to some system components. The possible need for longer shut-down of the extraction wells to complete more extensive modifications will be evaluated during design for addition of the new wells. If an extended shut-down (greater than 1 week) is found to be necessary, the USEPA and the MPCA will be notified in advance of the shut-down.

4.3 Coordination with Phase II Groundwater Treatment Facility Design

The planning and implementation of the groundwater extraction system improvements will provide information that will affect the design approach and schedule for the groundwater treatment facility (REICH) required under Phase II of the groundwater remedial action specified in the ROD. This section includes a summary of the primary areas where coordination of the groundwater extraction system improvements and design of the REICH is required, and identifies additional criteria that will affect the REICH design.

The key information needed to allow design of the REICH to proceed includes the following:

- Groundwater flow rates from the final groundwater extraction system, as approved by the USEPA and the MPCA after effective capture of contaminated groundwater has been demonstrated.
- Concentration of total VOCs and the predominant individual VOCs in the flow from the final and approved groundwater extraction system.
- Required effluent quality from the treatment facility.
- Allowable Emission Rates for VOCs under the state and federal air program regulations.

The ROD specifies that within 360 days after the USEPA and the MPCA approve the determination that the groundwater containment and extraction system is effective, design documents for the REICH will be completed by the Navy and approved by the USEPA and the MPCA. This time constraint may require the design of the REICH to proceed based on certain design assumptions.

4.3.1 Pumping Rates

The rate of pumping from the final extraction system will not be known with certainty until the new extraction wells are in full operation and the effectiveness of the combined extraction well system in containing contaminated groundwater has been evaluated and approved by the USEPA and the MPCA. If it is necessary to begin final design of the Phase II REICH before the containment effectiveness of the upgraded extraction well system has been approved by the USEPA and the MPCA, it will be necessary to base the design on assumed final flow rates.

4.3.2 VOC Concentrations

Actual VOC concentrations for the REICH design will not be confirmed until a sufficient number of sampling rounds have been completed after startup of the upgraded extraction well system. Depending on the sufficiency of the water quality data available at the time, it may be necessary to base the REICH design on some assumptions regarding VOC concentrations in the combined flow from the final extraction system and in the flow from individual extraction wells.

4.3.3 Required Effluent Quality

The required effluent quality for the REICH will be defined in the final NPDES permit for the discharge to be issued by the MPCA. The MPCA's schedule for issuing the final NPDES permit is uncertain. To begin design of the REICH before the final permit is issued, it is necessary to estimate the groundwater treatment efficiency that must be achieved by the new treatment facilities. If the effluent limitations in the final permit are different from the estimated effluent limits used to begin design of the REICH, some redesign of the treatment facilities may be required.

4.3.4 Air Emissions Requirements

As indicated in the ROD, it is anticipated that the primary treatment process to be used for removal of VOCs from the groundwater is counter-current air stripping. This treatment process transfers the VOCs from the water to an air stream. The Allowable Emission Rates established by the MPCA Division of Air Quality for the individual VOCs in the air stream will be the primary criteria in determining whether treatment of the air

discharge from the REICH will be required, and in determining the design criteria for air treatment equipment if treatment is determined to be needed.

4.4 Permits and Approvals

Permits and approvals needed to implement the groundwater extraction system improvements that have been identified include the following:

Well Construction Permit

A permit to construct the new wells is required from the Minnesota Department of Health.

MCWS Permit

As specified in the current Industrial Discharge Permit issued by the MCWS for the discharge of pretreated groundwater to the MCWS's sanitary sewer, the Navy is to "report any change in the proposed discharge plan, including changes in pretreatment system design of rate of discharge" to the MCWS.

Well Construction Approval

The new wells and buried piping to tie into the existing piping at the Control House will be constructed on property owned by United Defense. Approval for access to complete the work is needed from United Defense. In addition, coordination with United Defense is required during design and construction of the improvements to minimize disruptions to the United Defense employee parking area, where the work will be done.

Water Appropriation Permit

A Water Appropriation Permit (No. 92-6127) was issued by the Minnesota Department of Natural Resources, Division of Waters, Permits Unit, for the four existing extraction wells in April 1992. An amended permit is needed to address the two additional extraction wells.

Section 5

STARTUP AND OPERATION PLAN

Startup of the new extraction wells will occur when construction of all improvements has been completed, and the new extraction well pumps have been installed. The two new wells will be brought on-line with the existing wells immediately upon startup of the new wells. During the initial week following startup, performance and check-out tests for the pumps, controls, instruments, and other components will be performed, in accordance with the construction specifications.

After completion of the equipment shakedown period and after the Navy's acceptance of the work, operation of the system will be turned over to the operating contractor, United Defense. Operation of the system will follow procedures established by United Defense since original startup in September 1992, and procedures specified in the Operation and Maintenance Plan and Manual that are in effect at the time of startup of the additional wells.

After some experience has been gained with operation and maintenance of the overall system following startup of the improved facilities, the Operation and Maintenance Plan and Manual will be revised, if necessary, to address the modified system and the operation and maintenance practices that are found to be most effective.

Section 6
MONITORING PLAN

6.1 Startup and Initial Operation Period

Monitoring of the performance of the groundwater extraction system during the startup and initial operating period of the upgraded system will be performed in addition to the monitoring requirements specified in the approved Remedial Action Monitoring Plan (RAMP). The RAMP is included in the approved Remedial Action Workplan (RMT, 1992a). The additional data to be collected during this period are described below.

6.1.1 Groundwater Flow Rates

Readings from the flow rate indicators and flow volume totalizers for each extraction well discharge will be taken and recorded daily for several days following initial startup. Recording of flow rates and volumes and water levels in the extraction wells will continue throughout the startup period, including during various performance tests of equipment to be completed by the construction contractor, or until the total system has operated continuously for at least two weeks. After the entire system has reached approximately stable operating conditions and the system has been turned over to United Defense for regular operation and maintenance, the flow rate and volume readings will be recorded according to the regular schedules developed previously.

6.1.2 Groundwater Level Measurements

To establish hydraulic conditions within the aquifer prior to startup of the new extraction wells, a round of water level readings will be taken from all monitoring wells in the approved well network, the 4 existing extraction wells, and at the river within 2 days prior to startup. Within approximately 4 weeks after initial startup, an additional complete round of water level readings will be taken. It is anticipated that approximate hydraulic equilibrium will be established in the aquifer within this time period after reaching stable operation. Subsequent groundwater and river level measurement readings will then be performed according to the regular monitoring schedule defined in the approved Remedial Action Workplan.

6.1.3 Discharge to Sanitary Sewer

Grab samples of the groundwater flow from each extraction well and from the combined groundwater discharge to the sanitary sewer will be collected 1 day after startup of the upgraded system. The samples will be analyzed for VOCs according to the current Remedial Action Workplan, with 7-day turn-around-time provided by the laboratory. If the sample analysis results indicate that the discharge to the sewer complies with the MCWS permit requirements, subsequent sampling of the extraction wells and the combined discharge to the sewer will follow the regular sampling schedule according to the Remedial Action Workplan.

If the results indicate that MCWS permit limits have been exceeded, notifications will be made according to the permit and the Remedial Action Workplan, and the Navy will initiate steps to upgrade the pretreatment system and return the system to operation. In addition, adjustments will immediately be made to the operating conditions to attempt to reduce the VOC concentrations to levels within the permit limits. This would be accomplished by reducing the flow contribution from one or more extraction well with the higher VOC concentrations, or if necessary, temporarily shutting down one or more well until the upgraded pretreatment system is returned to service.

6.1.4 Air Emissions

If operation of the pretreatment system is determined to be necessary after startup of the upgraded extraction well system, the groundwater flow rate data and the results of VOC analyses of groundwater samples collected after startup will be used to calculate the additional VOC mass loading that would enter the vapor phase activated carbon vessel in the pretreatment system. Based on information gained from operation of the air stripping column and the carbon vessel since 1992, estimates of the effect of the additional VOC loading from the upgraded extraction system on the carbon consumption rate and the projected carbon bed life will be prepared. This data will be used to develop conservative estimates of the required date for change-out of the carbon vessel. Air emissions monitoring of the carbon vessel exhaust would also be continued according to the monitoring procedures approved by the MPCA in effect at that time.

6.2 Evaluation of Hydraulic Containment Effectiveness

The groundwater and river level measurement data and flow rate records collected immediately prior to and within 4 weeks after startup will be used with the calibrated groundwater flow model to evaluate the effectiveness of the upgraded extraction well system. The results of this evaluation with supporting information will be sent in a memorandum to the USEPA and MPCA for review and approval within 90 days after the Navy accepts the construction and turns over operating responsibility to United Defense.

6.3 Long-Term Monitoring

Monitoring of the groundwater extraction system will continue throughout construction and startup of the system improvements, following the procedures and schedule in the Remedial Action Workplan. Additional monitoring data will be collected during the startup period, as described in Section 6.1. After the upgraded system has been turned over to United Defense for operation, monitoring will continue according to the procedures and schedule in the Remedial Action Workplan.

Section 7
SCHEDULE

The proposed schedule for implementing the improvements to the groundwater extraction system is shown below.

Activity	Proposed Date
• Final upgrade design to USEPA and MPCA	February 24, 1995
• Start of construction	March 27, 1995
• Startup of upgraded system	May 8, 1995
• Acceptance of construction by Navy	May 22, 1995 (anticipated date)
• Memorandum on containment evaluation to USEPA and MPCA	August 22, 1995 (anticipated date)

Section 8

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APPENDIX A

GROUNDWATER FLOW MODELING AND CAPTURE ZONE ANALYSIS

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Attachment 1	Model Summary Input

Section 1
INTRODUCTION

Hydrogeologic modeling has been conducted to provide an estimate of whether the extraction well system currently in operation at the NIROP will effectively capture contaminated groundwater from the site. The feasibility of alternative pumping scenarios, with adjusted pumping rates or additional wells, was also evaluated using the model to determine if more effective designs could be implemented.

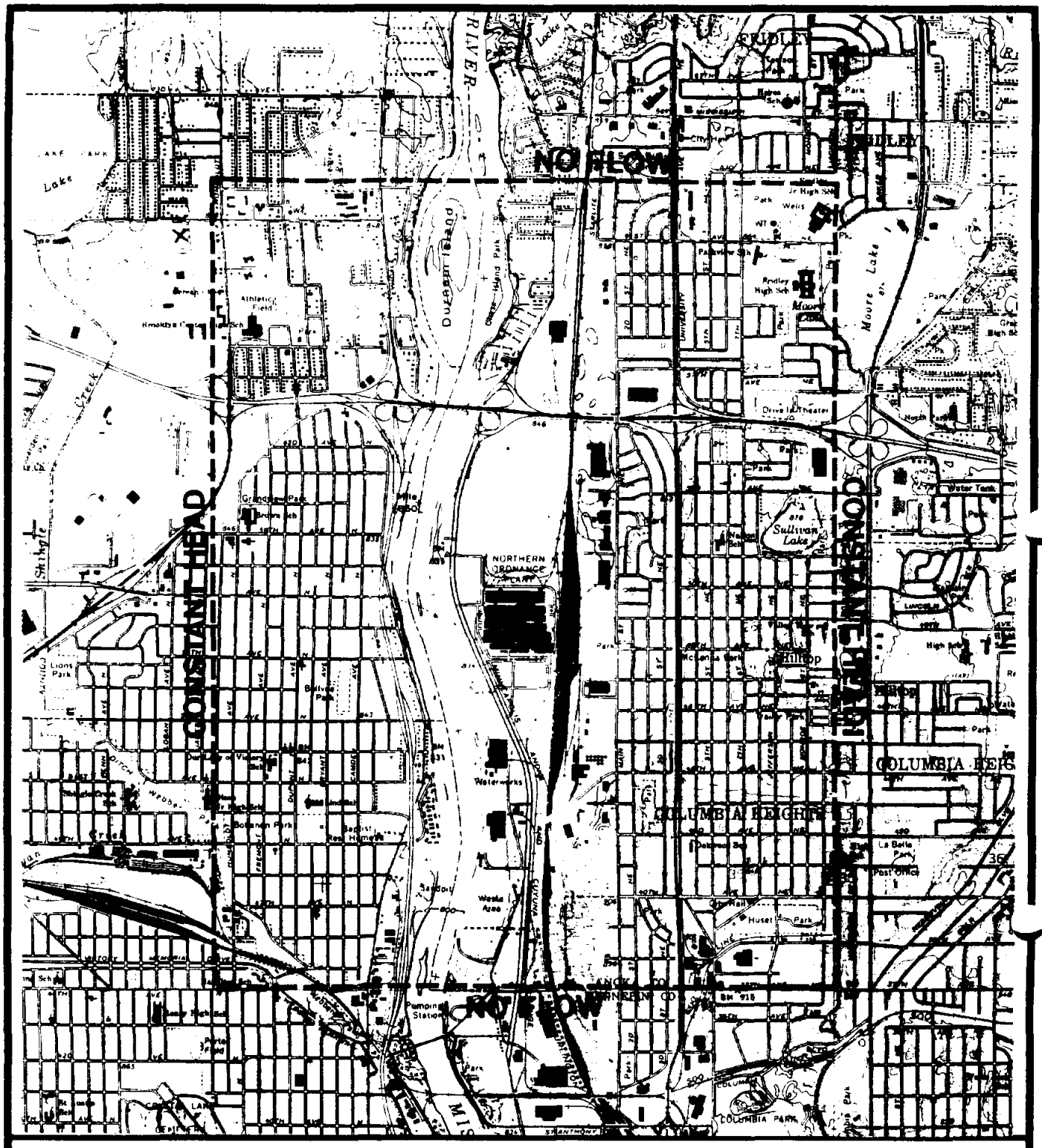
Results of flow modeling and capture zone analysis are presented in this Appendix. These results are based on the response of the groundwater flow system to sustained pumping of the extraction wells that began on September 14, 1992. The model documentation, including discussion of model setup, boundary conditions, and parameters, is presented here and in Attachment 1. The results and implications are discussed in this appendix and in Sections 2 and 3 of the Workplan.

Section 2
CONCEPTUAL MODEL

The topographic setting of the NIROP is shown on Figure A-1. The site lies in a relatively flat alluvial plain of the Mississippi River approximately 800 feet east of and 35 feet above the river. Moraine uplands to the east rise more than 100 feet above the site. To the west of the river, a broad, flat alluvial plain flanks the river. The Mississippi River flows from north to south across the study area, losing about 2 feet in elevation over a span of approximately 3 miles.

A conceptual model of the groundwater flow system at the NIROP is illustrated on Figure A-2. Two or more layers of fine to coarse sand underlie the site. A discontinuous clay layer of variable thickness separates the upper and lower sand layers over most of the site and region; in some areas an additional clay layer is present, and in other areas no clay is present. The water table occurs at a depth of about 20 to 30 feet near the site, and is located within the upper sand over most of the area. The presence of the clay causes up to 6 feet of head difference between the upper and lower sand in the southwestern corner of the NIROP. Bedrock underlies the area at a depth of approximately 120 feet, and includes the Prairie du Chien Dolomite and the Jordan Sandstone, which have similar heads and are commonly lumped together as a single aquifer unit in this area (Lindgren, 1990). The St. Peter Sandstone overlies the Prairie du Chien Dolomite in most of the study area, and appears to be in close hydraulic connection with the overlying sand aquifer (Lindgren, 1990). The thickness of the various units is variable, as shown on detailed cross sections of the site (see Figures A-3, A-4, and A-5). The range of aquifer parameter values for the various strata are shown in Table A-1.

The Mississippi River has a controlling influence on the groundwater flow system, acting as a discharge zone for both the unconsolidated sediments and the bedrock. Groundwater flows downward from the uplands to the east of the NIROP, moves laterally toward the river through the more permeable zones (e.g., sand, dolomite), and finally moves upward as it approaches the river. The gradient in the Prairie du Chien/Jordan (PDC/J) aquifer is toward the river and to the south, in the direction of the surface water gradient. The depth of the bedrock aquifer (below approximately 120 feet) and the high transmissivity of the aquifer result in a low gradient that is much more regular and subdued than at the water table.



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MODEL DOMAIN LOCATOR AND BOUNDARY CONDITIONS MAP

NOTES:

1. BOUNDARY CONDITIONS SHOWN APPLY TO THE TOP 3 MODEL LAYERS. MODEL LAYER 4 IS BOUNDED BY CONSTANT HEAD BOUNDARIES ON ALL SIDES.
2. BASE MAP FROM MINNEAPOLIS AND NEW BRIGHTON, MINN., 7.5 MINTE USGS QUADRANGLE.

RMT, INC.

DWN. BY:	RBN
APPROVED BY:	
DATE:	JANUARY 1995
PROJ. #	3315.04
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FIGURE A-1

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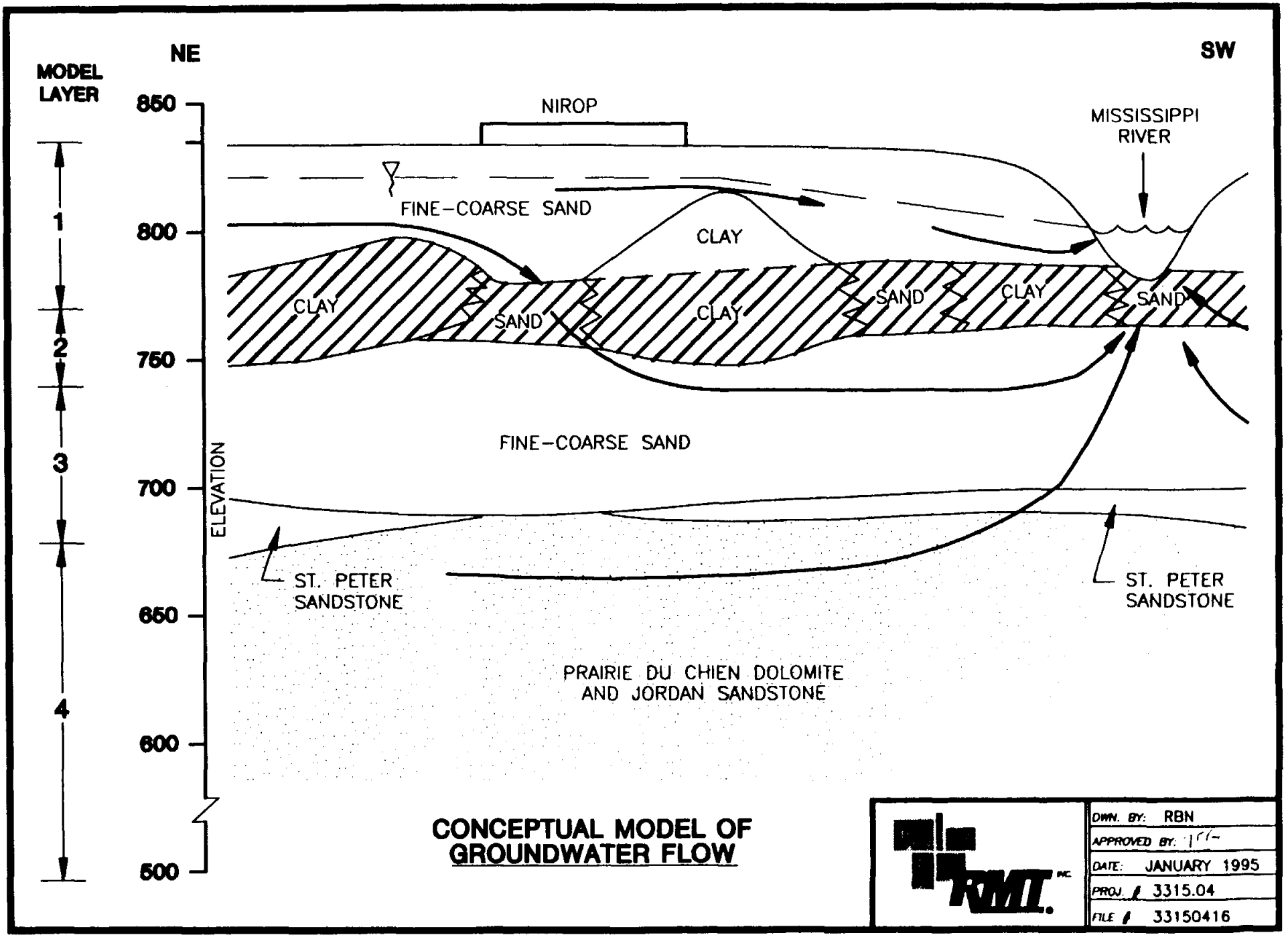


CONCEPTUAL MODEL OF GROUNDWATER FLOW

RMT, INC.

DWN. BY:	RBN
APPROVED BY:	
DATE:	JANUARY 1995
PROJ. #	3315.04
FILE #	33150416

FIGURE A-2

TABLE A-1

AQUIFER PARAMETER VALUES

	Saturated Thickness (feet)	Horizontal Hydraulic Conductivity (ft/d)	Transmissivity (ft^2/d)	Vertical Hydraulic Conductivity (ft/d)
Upper Sand	0-60 (a,e)	16-1,100 (h,k)	0-11,800 (j)	
Clay Confining Bed	0-45 (e,k)			$9x10^{-5}$-$7x10^{-2}$ (c,f)
Lower Sand	25-100 (e,k)	0.8-500 (e,f)	2,700-6,600 (b)	
Basal St. Peter Confining Unit				$4x10^{-6}$ (d)
PDC/J Bedrock	120-275 (d,g) 200 (a)	29-600 (e,i)	5,000-26,000 (d) 11,000 (a)	

REFERENCES:

a. Helgesen and Lindholm (1973)
b. Ranney Co. (1978)
c. Norris (1962)
d. Norvitch et al. (1974)
e. RMT (1987)
f. RMT (1988a)
g. Schoenberg (1990)
h. Larsen-Higdem et al. (1975)
i. U.S. Army Corps of Engineers (1990)
j. RMT (1988b)
k. RMT, unpublished data

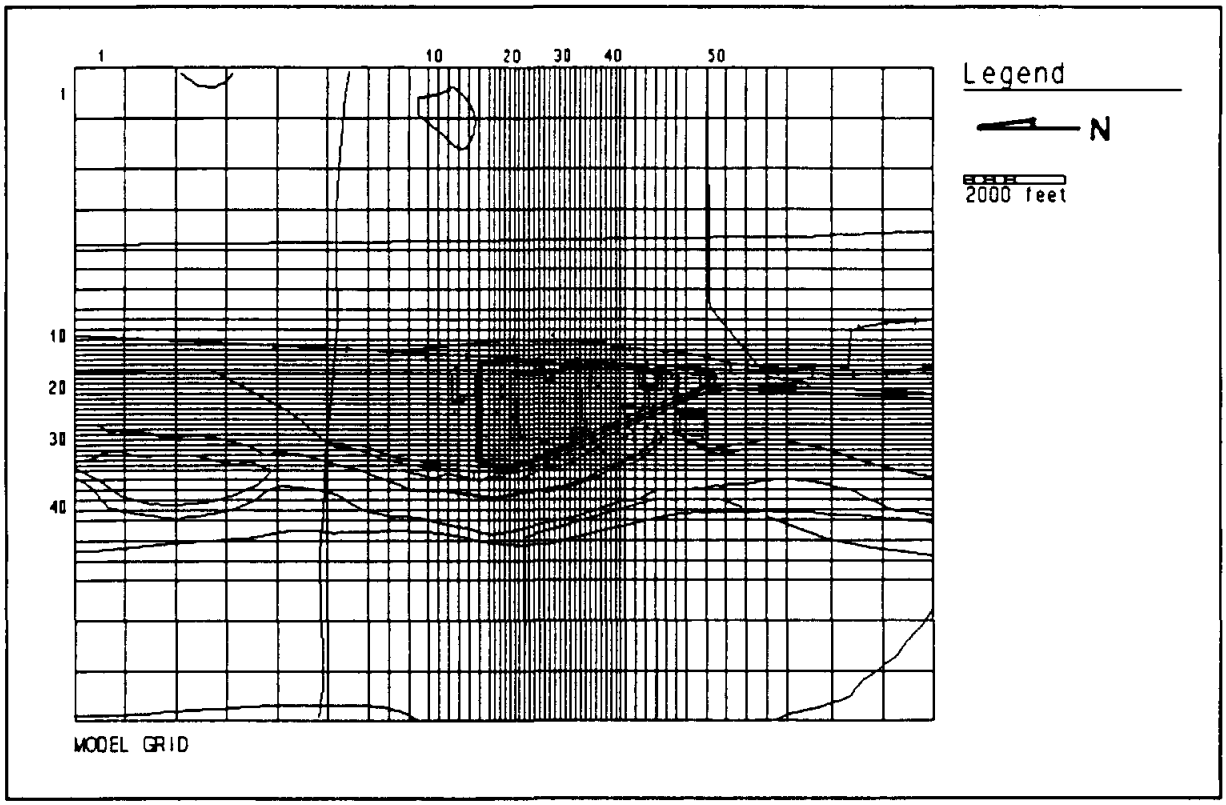
Locally, clay layers between the upper and lower sand aquifers form a hydraulic barrier that impedes downward and lateral flow, and causes the slope on the water table at the north end of the NIROP to be flat where the clay rises to intersect the water table. The hydraulic heads in the upper sand fall off sharply on the downgradient side of the clay near the southwestern corner of the NIROP, and as the river is approached. The low permeability of the clay layer(s) also profoundly affects the movement of dissolved contaminants in the groundwater, resulting in complex contaminant concentration patterns.

On the basis of the observed stratigraphy and head distribution in the area, the groundwater flow system can be divided into four hydrostratigraphic units: Unit 1, the upper sand (and glacial drift in the uplands); Unit 2, the clay(s) separating the upper and lower sand units; Unit 3, the lower sand, and the St. Peter Sandstone where present; and Unit 4, the PDC/J bedrock aquifer.

Section 3
MODEL SETUP AND GRID

A four-layer model was used to simulate the four hydrostratigraphic units described above (see Figure A-2). Generally, the model layers correspond to the hydrostratigraphic units described above. However, local variations are common. Layer 1 is the upper sand, except where the clay layer intersects the water table. In this zone, the clay is assigned as model Layer 1, with corresponding low permeability. In the uplands, model Layer 1 consists of glacial till. The bottom elevation of model Layer 1 is allowed to change over the model domain; it decreases from 840 feet in the uplands to 770 feet near the river. Where the clay layer is absent, model Layer 2 consists of sand rather than clay. Model Layer 3 is the lower sand, and model Layer 4 is the PDC/J bedrock aquifer.

The model domain is 17,000 feet north to south, and 13,000 feet east to west. A 56 x 47 x 4 grid, representing 10,528 nodes, was used (see Figure A-6). Cell size varies from 100 x 100 feet at the NIROP, to 1,000 x 1,000 feet at the model boundaries.



See Attachment 1 for definition of all zones values

FIGURE A-6

Section 4
BOUNDARY CONDITIONS

The model domain and boundary conditions are illustrated on Figure A-1. In model Layers 1, 2, and 3, which corresponds generally to the upper sand, clay, and lower sand units, respectively, no-flow boundaries were set along the northern and southern ends of the domain, based on the assumption that groundwater flow is predominantly toward the river and that the component of flow to the north or south is insignificant. Constant-head boundary conditions were set for the eastern and western boundaries of these three layers, to allow for flow across these boundaries to occur. The constant-head and no-flow boundaries are set far enough (at least 5,000 feet) from the area of interest to minimize any constraint on the model solution. For model Layer 4, which corresponds to the PDC/J bedrock aquifer, gradients to the north and south are significant; therefore, constant-head boundaries were assigned along all four sides to allow for flow across the boundaries.

The Mississippi River forms a discharge boundary for the groundwater. However, the model domain was extended approximately 4,000 feet beyond the river to the west to evaluate the possibility that groundwater could flow beneath the river after startup of the extraction well system at the NIROP, although that possibility appeared unlikely.

Section 5
INPUT PARAMETERS

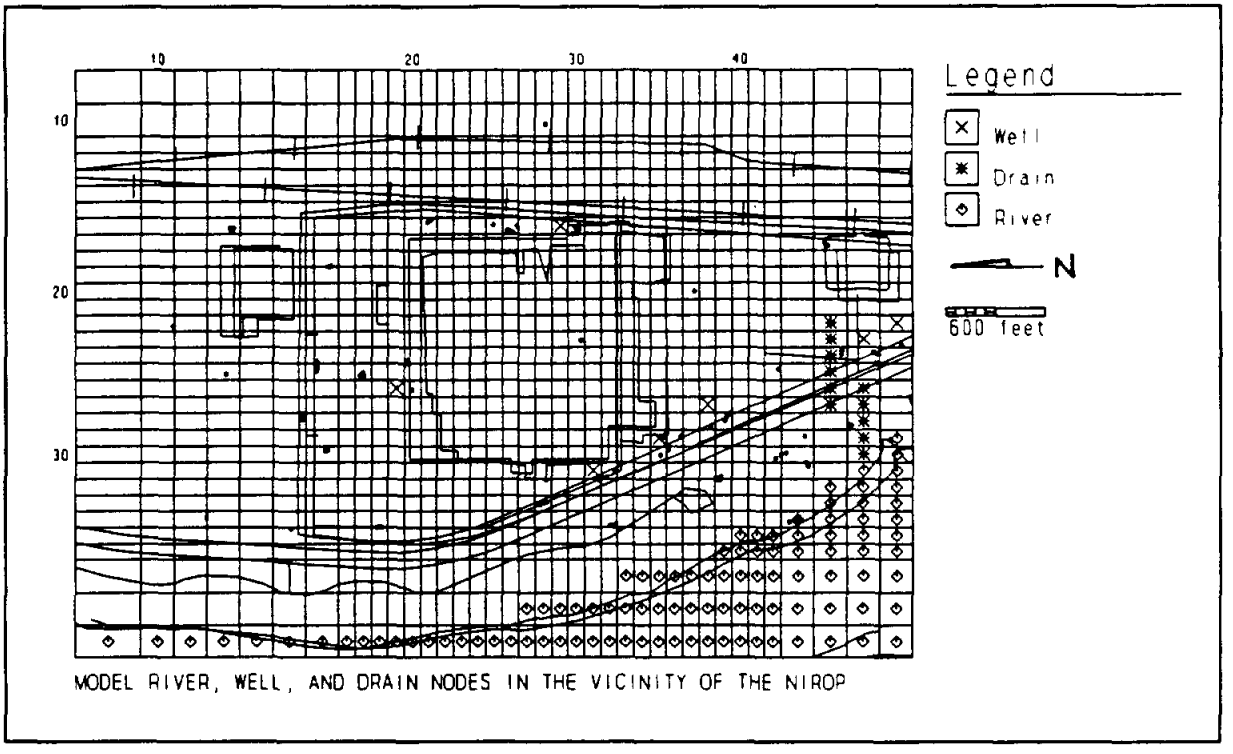
Aquifer parameters for the four geologic units vary significantly in the region, as described in Table A-1. Input parameters for the model were adjusted based on measured values, where available, and were adjusted within reasonable limits during the calibration process, to achieve a good match between modeled heads and measured head values. The model input parameters vary spatially because clay layers were absent from some areas, and each model layer did not necessarily correspond to a single geologic layer over the model domain. Factors such as hydraulic conductivity, leakance between layers, and bottom elevation of Layer 1 exhibit a wide range of values across the model domain.

The model parameter values are summarized in Table A-2. The spatial zonation of aquifer parameter values is presented on Figures A-7 through A-14; parameter values associated with the zone numbers are explained in Attachment 1. Low hydraulic conductivity and leakance values are associated with the clay layer(s), where present. In general, areas of steep hydraulic gradient, such as near the southwest corner of the NIROP building, were simulated with nodes of low hydraulic conductivity and leakance.

TABLE A-2

HYDRAULIC PARAMETER VALUES USED IN CALIBRATED MODEL

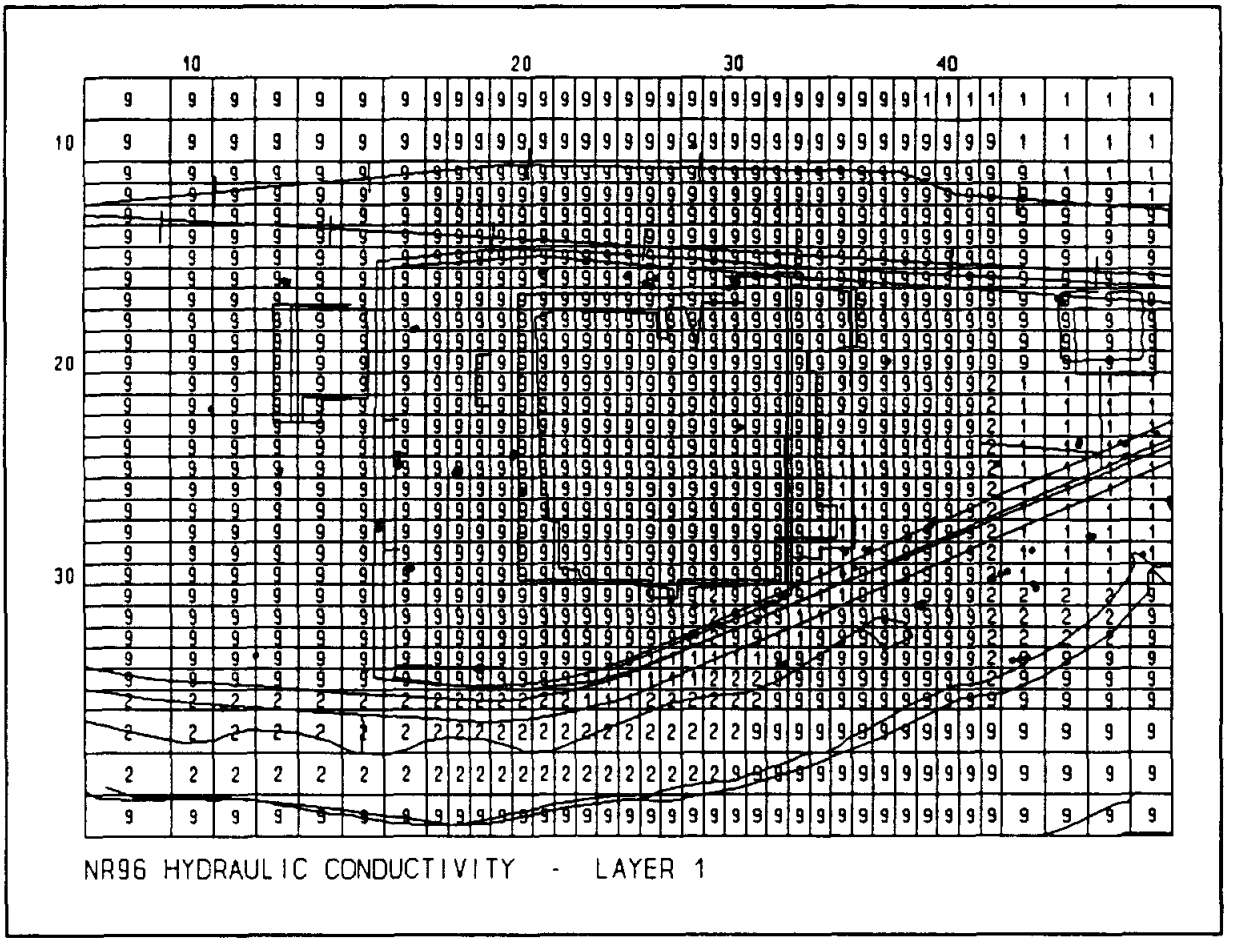
Model Layer	Thickness	Hydraulic Conductivity (Layer 1) and Transmissivity (Layers 2-4)	Leakance	Recharge
Layer 1 (mostly sand, some clay)	20-50 feet	0.5-60 ft/d	$5x10^{-5}$-5.0	0-8.8 in/yr
Layer 2 (mostly clay, some sand)	--	5-2,000 ft^2/d	$5x10^{-5}$-5.0	--
Layer 3 (fine to coarse sand)	--	100-8,000 ft^2/d	10^{-2}-10^{-4}	--
Layer 4 (dolomite, sandstone)	--	11,000-20,000 ft^2/d	--	--



MODEL RIVER, WELL, AND DRAIN NODES IN THE VICINITY OF THE NIROP

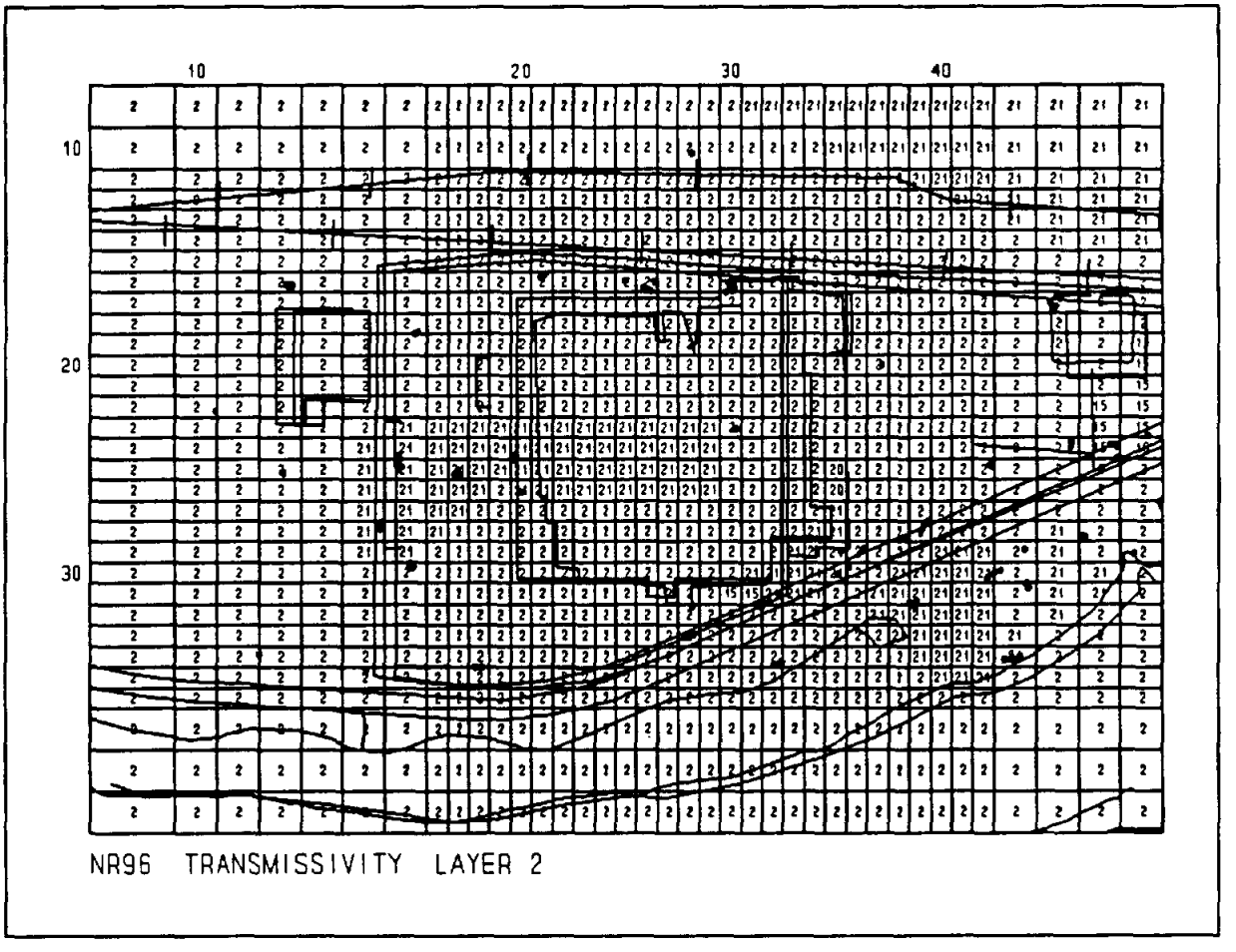
See Attachment 1 for definition of all zones values

FIGURE A-7



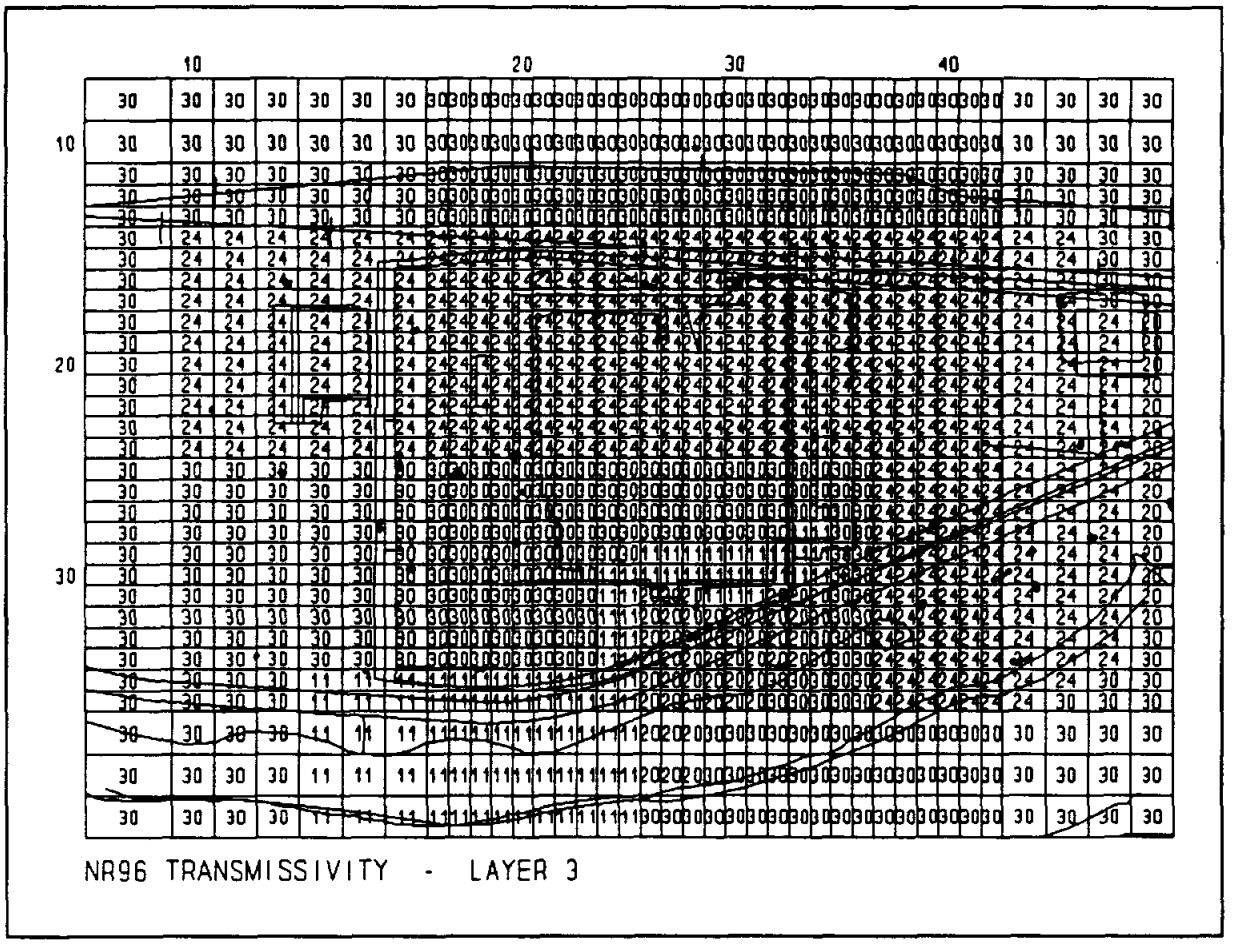
See Attachment 1 for definitions of all zones values

FIGURE A-8



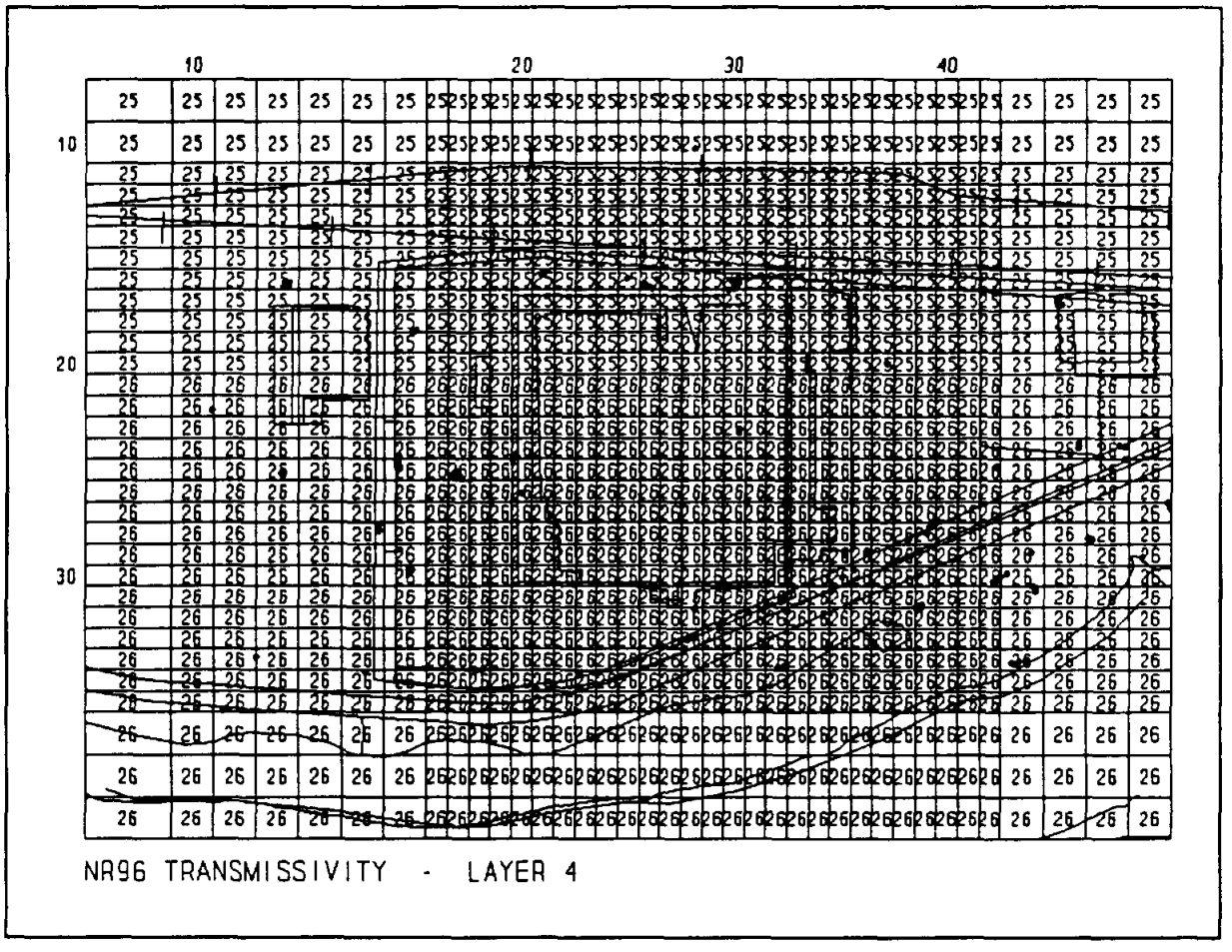
See Attachment 1 for definition of all zones values

FIGURE A-9



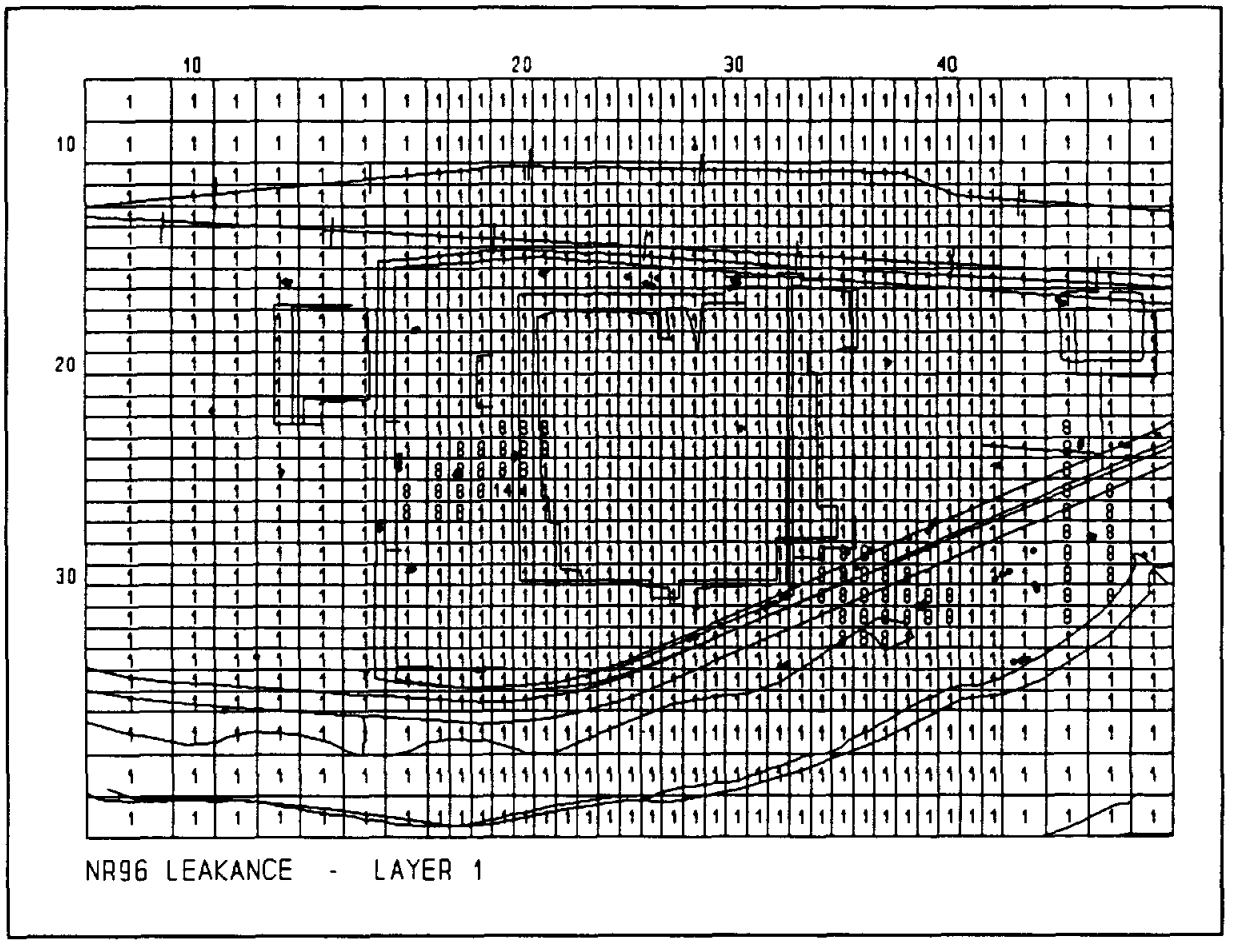
See Attachment 1 for definitions of all zones values

FIGURE A-10



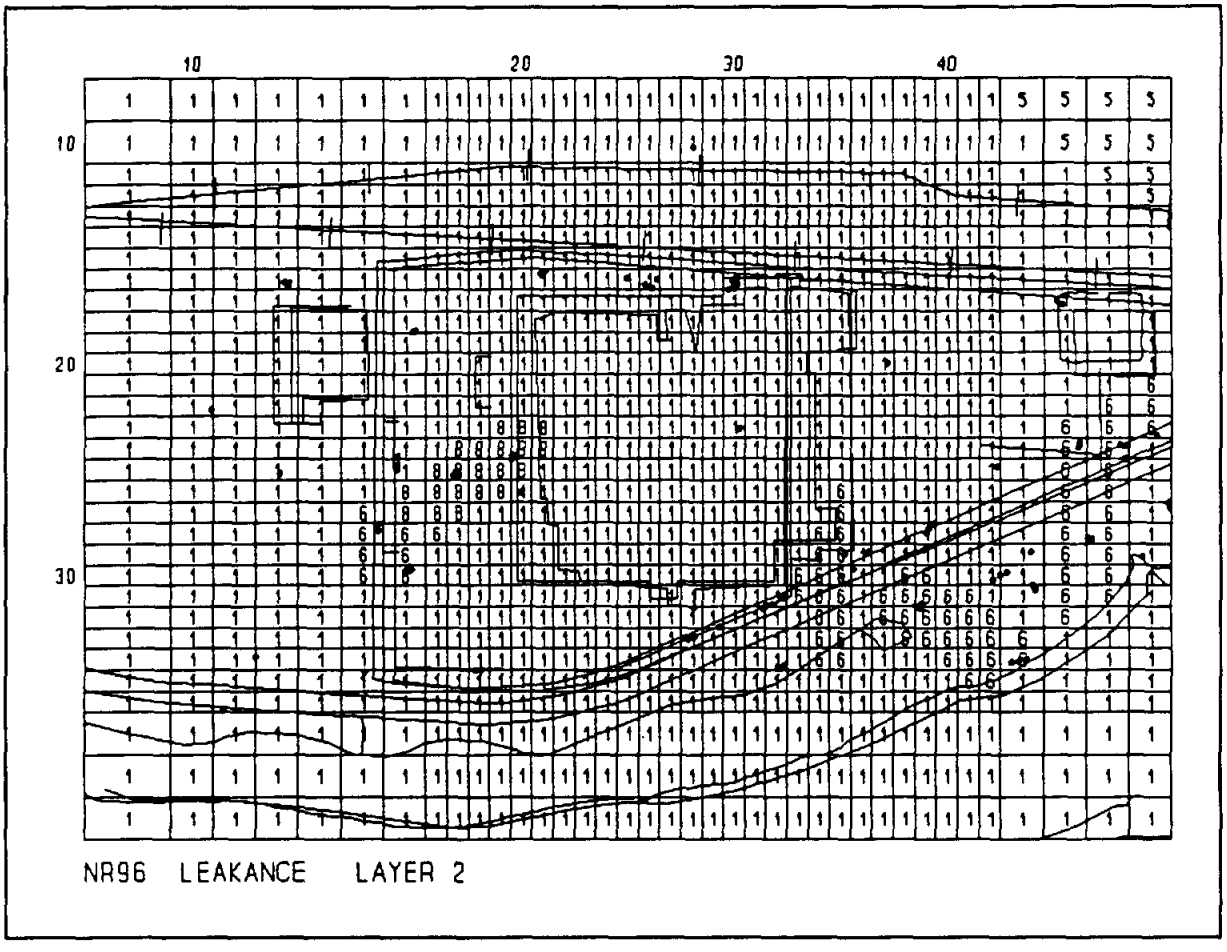
See Attachment 1 for definition of all zones values

FIGURE A-11



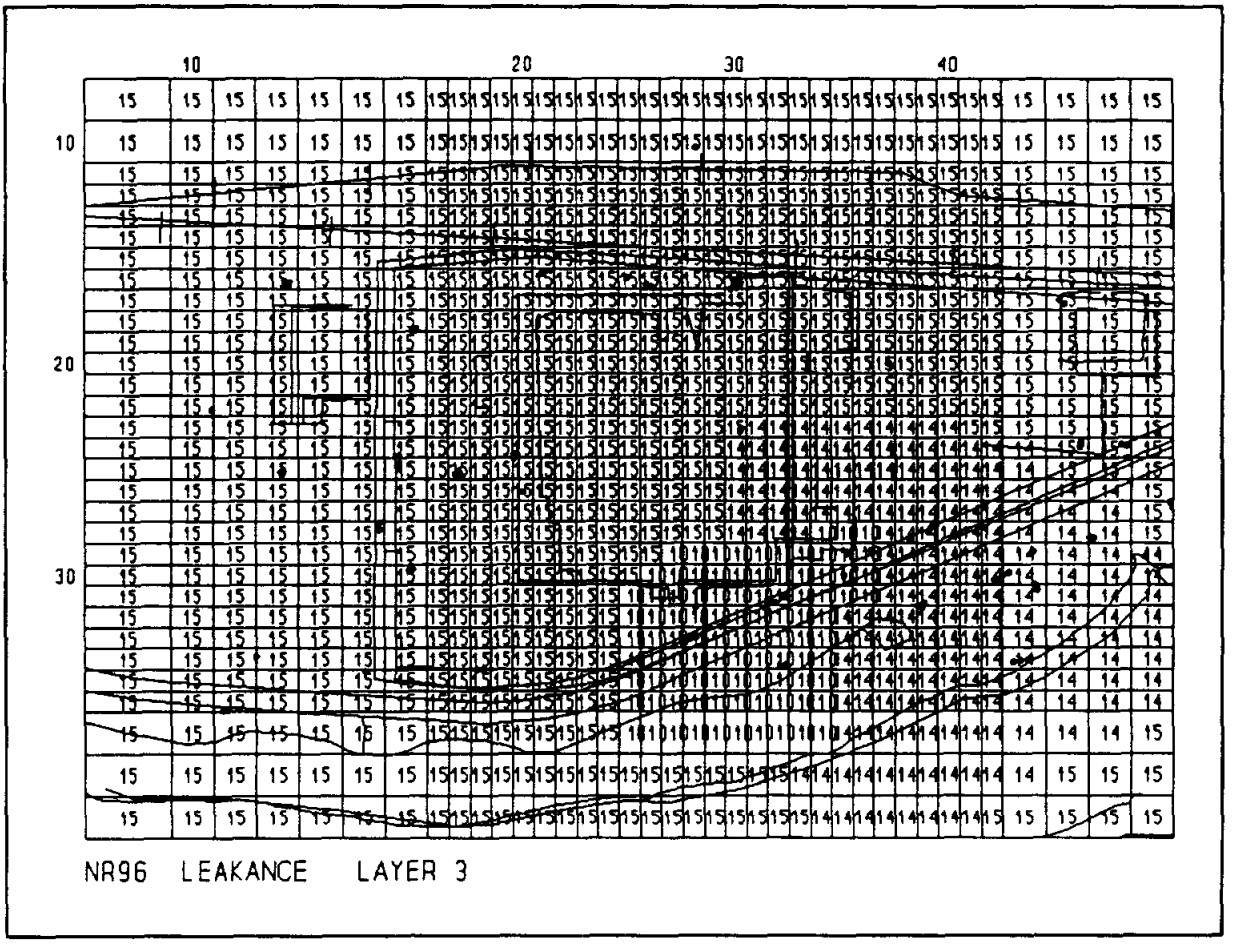
See Attachment 1 for definition of all zones values

FIGURE A- 12



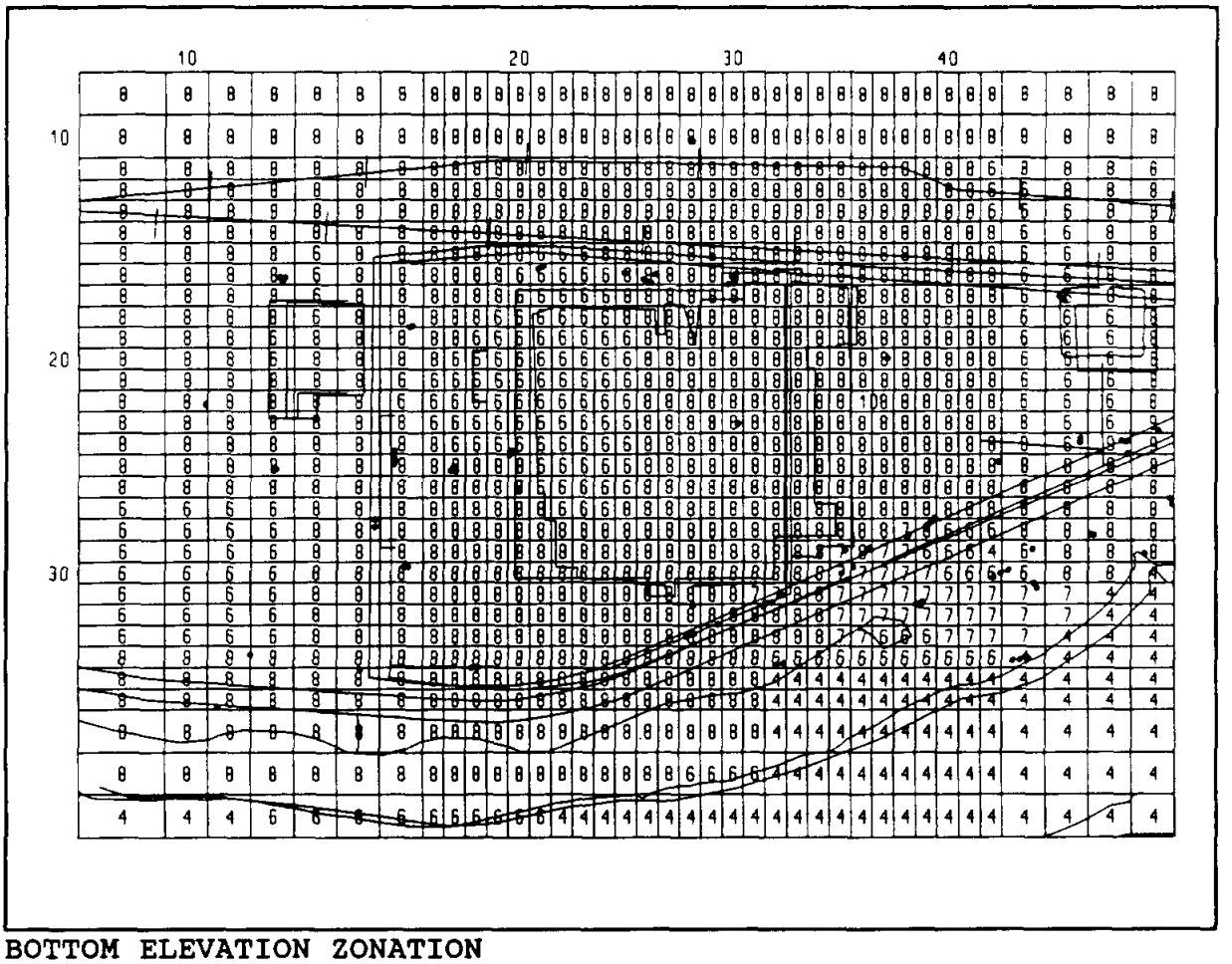
See Attachment 1 for definition of all zones values

FIGURE A-13



See Attachment 1 for definition of all zones values

FIGURE A-14



BOTTOM ELEVATION ZONATION

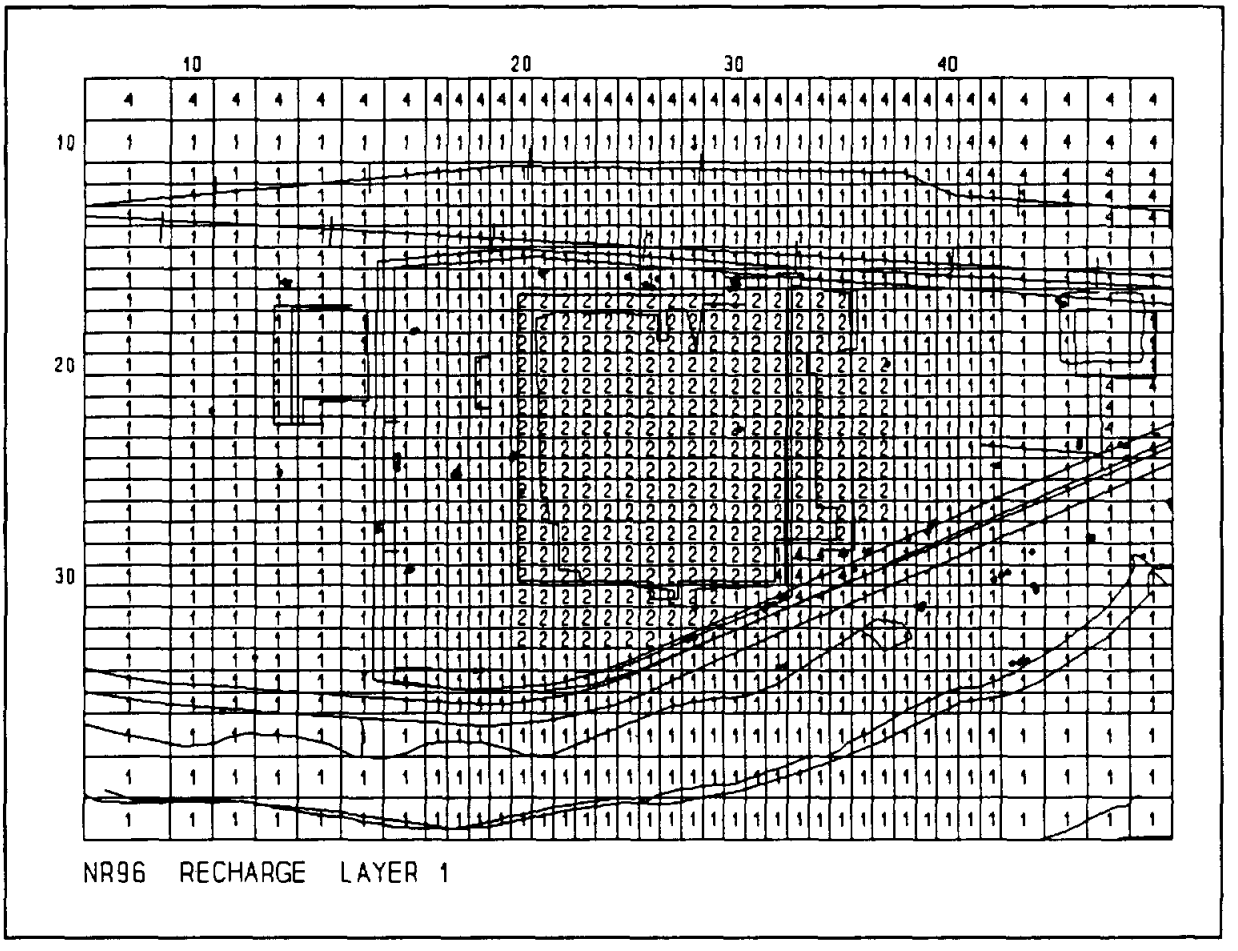
See Attachment 1 for definition af all zones values

FIGURE A-15

Section 6
SOURCES AND SINKS

Sources and sinks of water to the flow model include groundwater recharge through precipitation, wells, storm sewers, and the Mississippi River. Precipitation recharge is difficult to measure, and can be highly variable across an area depending on surface slope, vegetation, soil permeability, and density of development. Recharge values were estimated for the site based on literature values for similar settings and climatic regimes, and were adjusted within reasonable limits during the calibration to achieve a good fit to the head data. Walton (1970) reported recharge values for a large number of basins in Minnesota, where average values for basins ranged from about 1 to 3 inches per year. Norvitch et al. (1974) estimated the groundwater discharge to the major rivers in the Minneapolis region at about 5 inches per year. Recharge values used in the calibrated model generally ranged from 1.8 inches per year in the uplands to 8.8 inches per year in the higher permeability areas of the valley of the Mississippi (see Figure A-16, and Attachment 1). Zero recharge was assigned to the areas covered by the NIROP building and paved parking lots, because rainfall runoff is directed to storm sewers in these areas.

Regionally, three off-site areas with large-capacity water supply wells are located in the model domain and were included in the model. The model-based coordinate locations for these and other wells are presented in the model input summary (Attachment 1). In the northeastern corner of the model domain, the City of Fridley wells pump from the PDC/J aquifer at a combined rate of 704 gpm, and wells in the lower sand pump at a total of 348 gpm, based on 1991 data from the Minnesota Geological Survey. Sensitivity testing showed that the pumping of the wells had little if any effect on simulated groundwater flow patterns above the bedrock at the NIROP, but they were included for completeness. Fridley Well #13, located near the northwestern corner of the NIROP property, pumps for short periods at high rates, but averaged only 41 gpm over 1991; it was included in the model due to its proximity to the site. FMC recovery wells RW2, RW3, RW4, and RW5, located south of the NIROP on FMC property, were simulated at pumping rates of 15, 28, 33, and 33 gpm, respectively, based on 1992 data from Doug Hildre of United Defense.



See Attachment 1 for definition of all zones values

FIGURE A-16

No other off-site wells that pumped at rates above 40 gpm were located in the model domain; any off-site pumping at less than this rate is considered insignificant, based on a sensitivity analysis, and is not included in the model.

The Mississippi River serves as a major groundwater discharge zone. The river is simulated with designated RIVER nodes in the MODFLOW model. The assigned river stage values range from 802 feet at the north end of the domain to 800 feet at the south end, based on data reported in Final Report Phase I and II Investigation Programs prepared by S.S. Papadopulos (1984). The model assumes that the river level is constant over time, although changes in stage actually range over 5 feet or more during a year. It is assumed that the predictions regarding the long-term effectiveness of the extraction well system will not be affected significantly by short-term fluctuations of the river level. River conductance values were adjusted during model calibration to achieve the best fit to recorded head values in the aquifer, especially those closest to the river.

The effect of storm sewers on groundwater is accounted for through the recharge term, whereby the amount of groundwater recharge is reduced to zero in areas where the precipitation runoff is directed into storm sewers, in paved areas or from the NIROP building. A notable exception is the area approximately 1,600 feet south of the NIROP southern property line, near a large embankment in the Mississippi River. A substantial depression in hydraulic heads extends eastward from the river for approximately 600 feet, with head values approximately equal to or slightly lower than the river level, and substantially lower than adjacent areas (see Figures 2-3 to 2-6). The depression in heads at this location persists from season to season, as seen by monitoring results from two shallow drift wells, one deep drift well, and one bedrock well in the area. The cause of this depression in heads is uncertain, and it is unknown whether it is caused by a natural or a manmade conduit in the subsurface. The measured depression in heads in the area could not be reproduced in the model by assigning higher transmissivity to the area of the depression. It was necessary to use the DRAIN option in MODFLOW to simulate the depression. The modeling results indicate that the effect is substantial, draining approximately 700 gpm from the drift aquifer. It is possible that

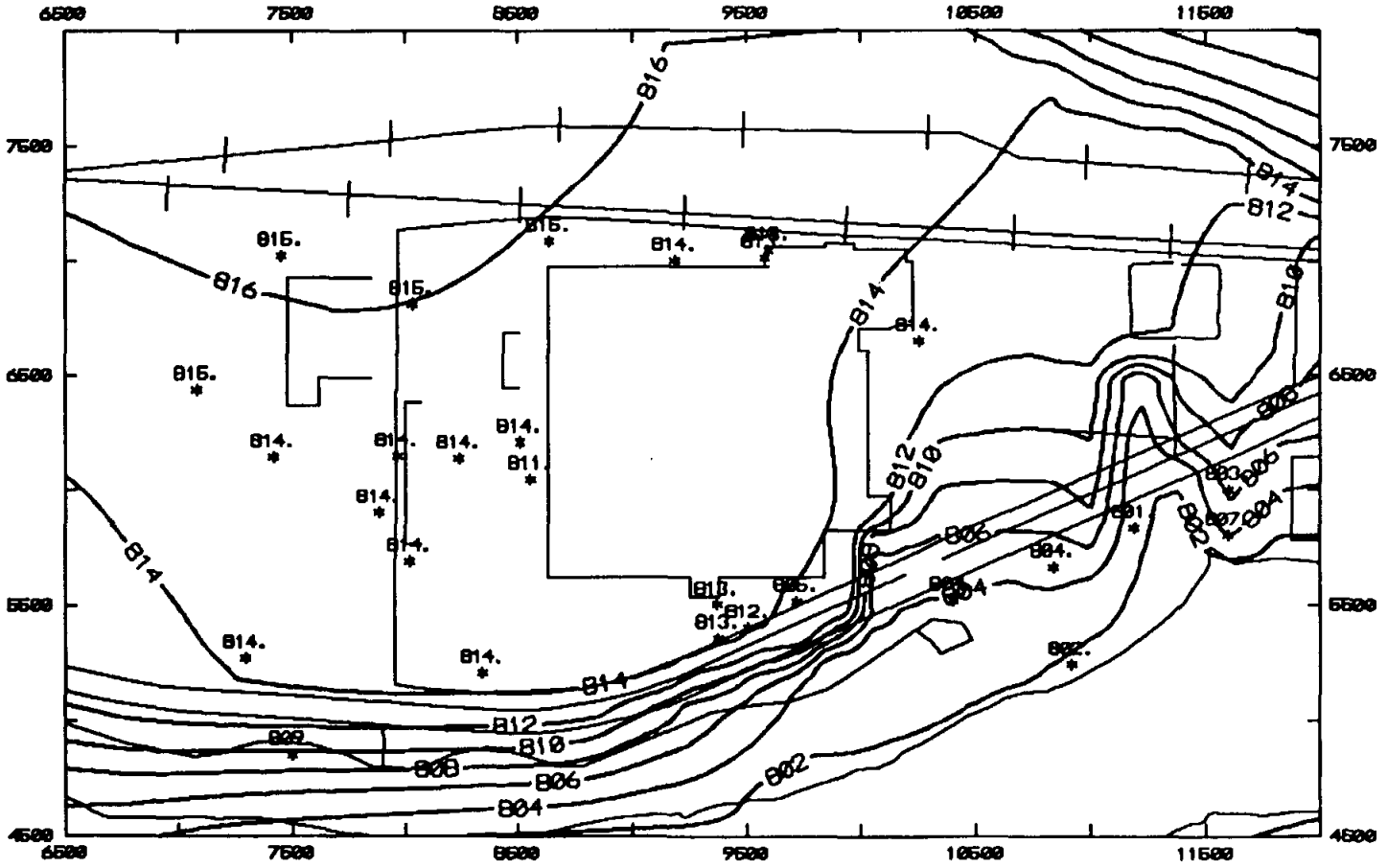
the depression is a result of an old conduit that was installed at a time when the river elevation at this location was lower, prior to the emplacement of a dam downstream of the site. Regardless of the cause of the depression, the effect appears to be reasonably well-simulated with DRAIN nodes in the model.

Section 7
MODEL CALIBRATION

Calibration is an essential step in the modeling process before predictive modeling can proceed. Calibration of a model involves adjusting hydraulic parameters in the model within reasonable ranges until a good match to measured hydraulic head values is achieved. A set of pre-startup measured head values from August 13, 1992, was used for calibration purposes. This data set was collected from monitoring wells at the site immediately prior to the initial extraction well system startup, during the shakedown period, and approximately 1 month prior to the start of sustained operation on September 14, 1992. Neither drought nor heavy rainfall events occurred during the time period leading up to the August 13, 1992, measurement. This data set was used to generate the water table map and piezometric surface maps for the site shown on Figures 2-3 through 2-6 presented earlier in this report. Regional head values used for calibration are taken mainly from residential water supply well logs obtained from the Minnesota Geological Survey. These values are much less reliable than those from wells at the NIROP site for the following reasons: the wells are mostly residential wells; the wells have not been surveyed for elevation; and the heads were measured over a time span of several decades. Therefore, off-site hydraulic heads are judged to be accurate only to within 5 to 10 feet. The surface elevations of surface water bodies (Sullivan Lake, Moore Lake, and Shingle Creek) were used to help define the water table in model Layer 1, based on the assumption that there is good hydraulic connection to the groundwater system.

The resulting pre-startup calibrated head distributions for Layers 1, 2, 3, and 4 are shown on Figures A-17, A-18, A-19, and A-20. The contoured calibrated head values compare favorably (within 1 to 2 feet) to measured values (shown on the figures), given the natural variability in this complex hydrogeologic system. In general, the differences are least within and adjacent to the NIROP. While the model provides a reasonably good fit to the data in model Layers one, two, and three, the model was unable to closely reproduce the few measured head values that are available for the bedrock (Layer 4). However, the model does reproduce the general gradient toward the river, and the upward gradient from the bedrock to the overlying drift, and is judged to be adequate for the purposes of this model, particularly because nearly all of the groundwater contamination is in the overlying glacial drift.

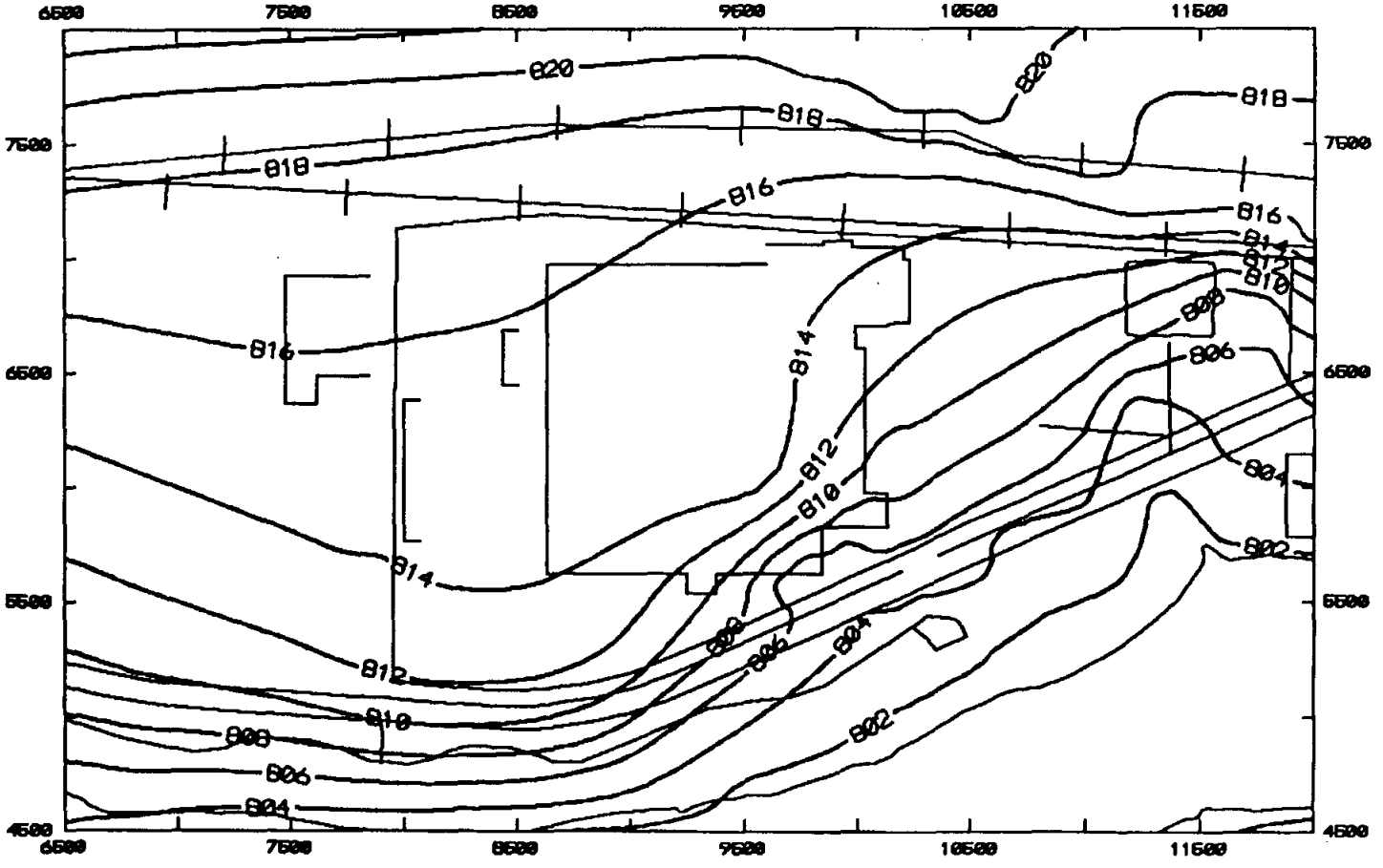
NR107 LAYER 1 CALIBRATION - PRE-STARTUP CONDITIONS



See Attachment 1 for definition of all zones values

FIGURE A-17

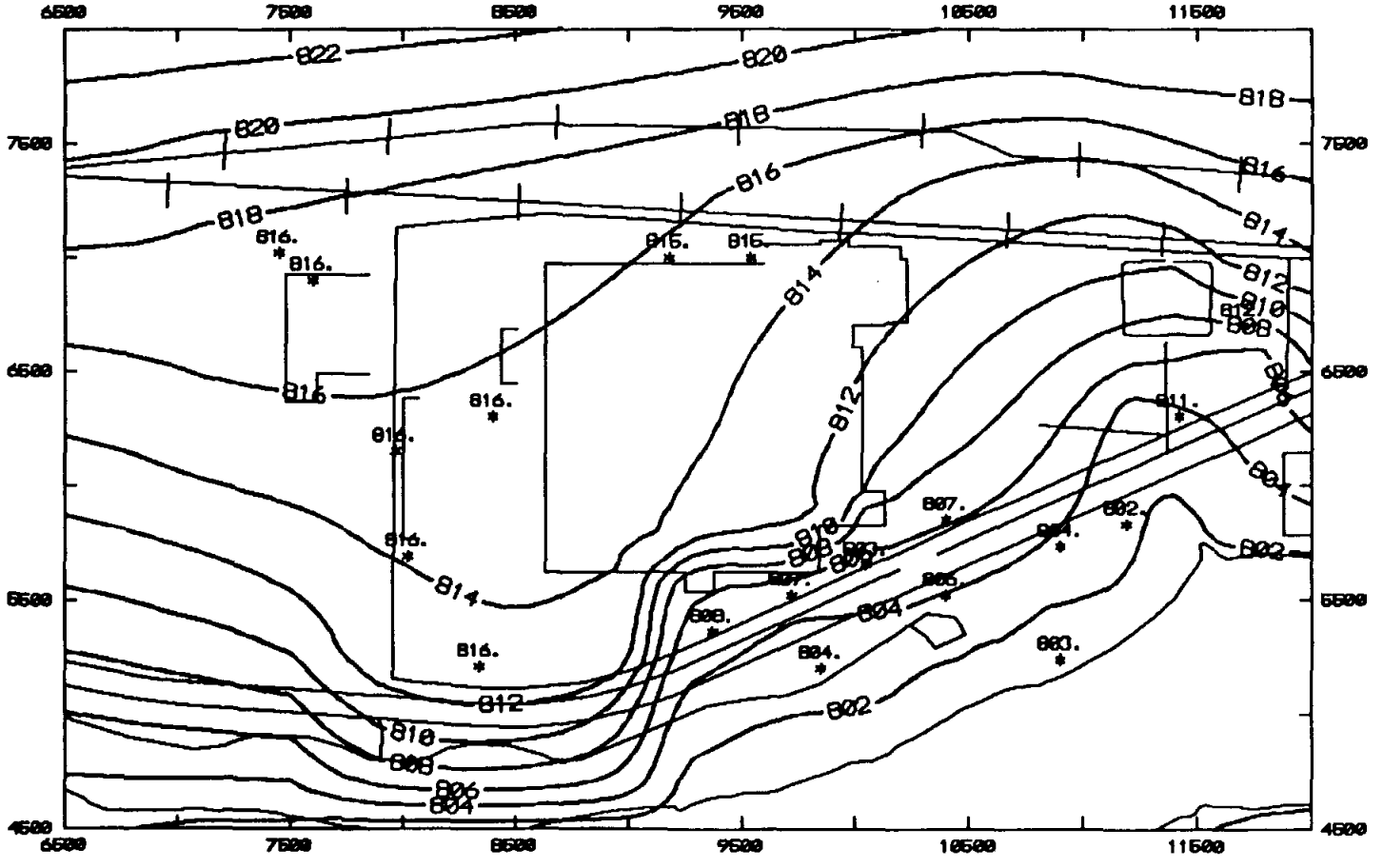
NR107 LAYER 2 CALIBRATION - PRE-STARTUP CONDITIONS



See Attachment 1 for definition of all zones values

FIGURE A-18

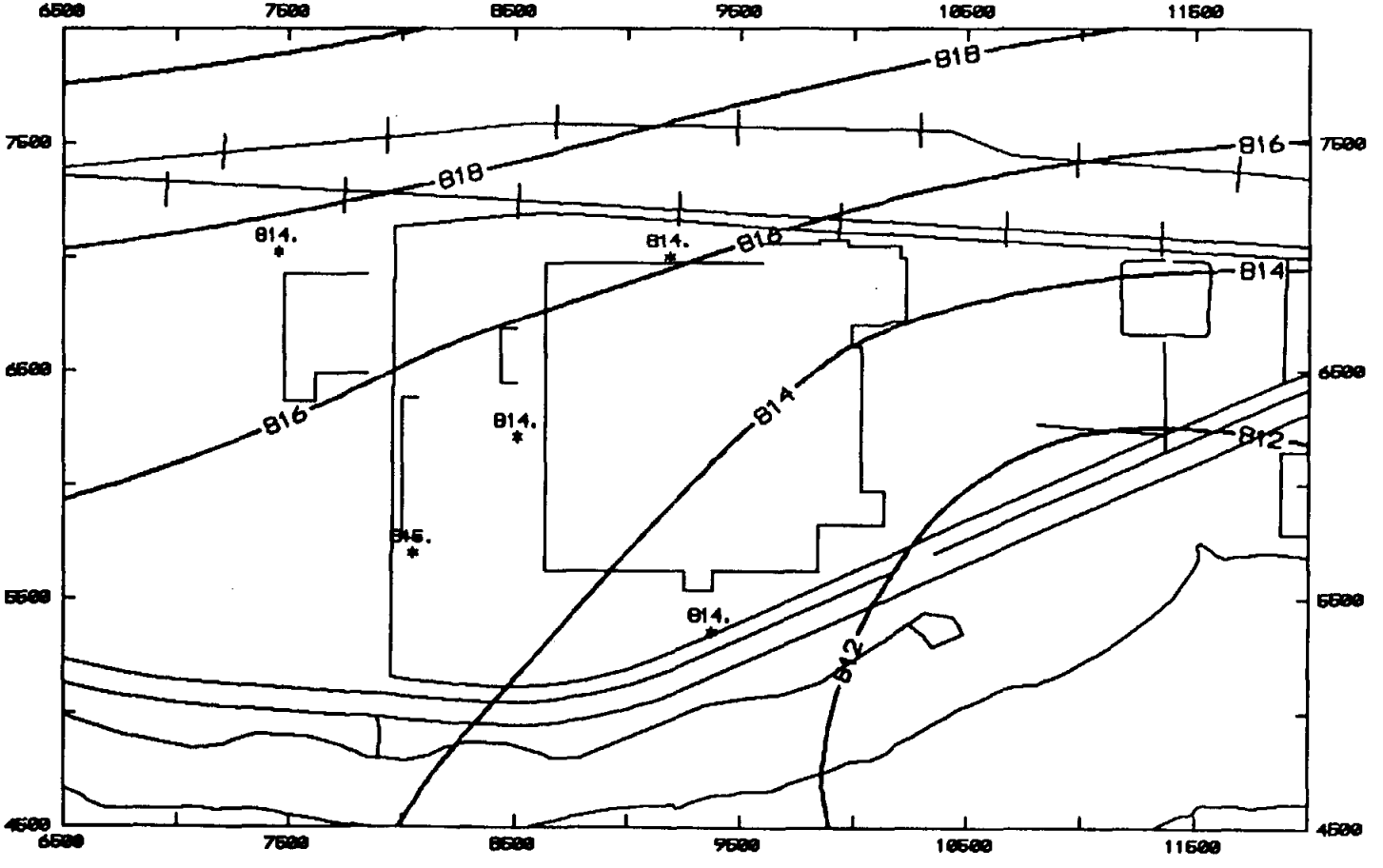
NR107 LAYER 3 CALIBRATION - PRE-STARTUP CONDITIONS



See Attachment 1 for definition of all zones values

FIGURE A-19

NR107 LAYER 4 CALIBRATION - PRE-STARTUP CONDITIONS



See Attachment 1 for definition of all zones values

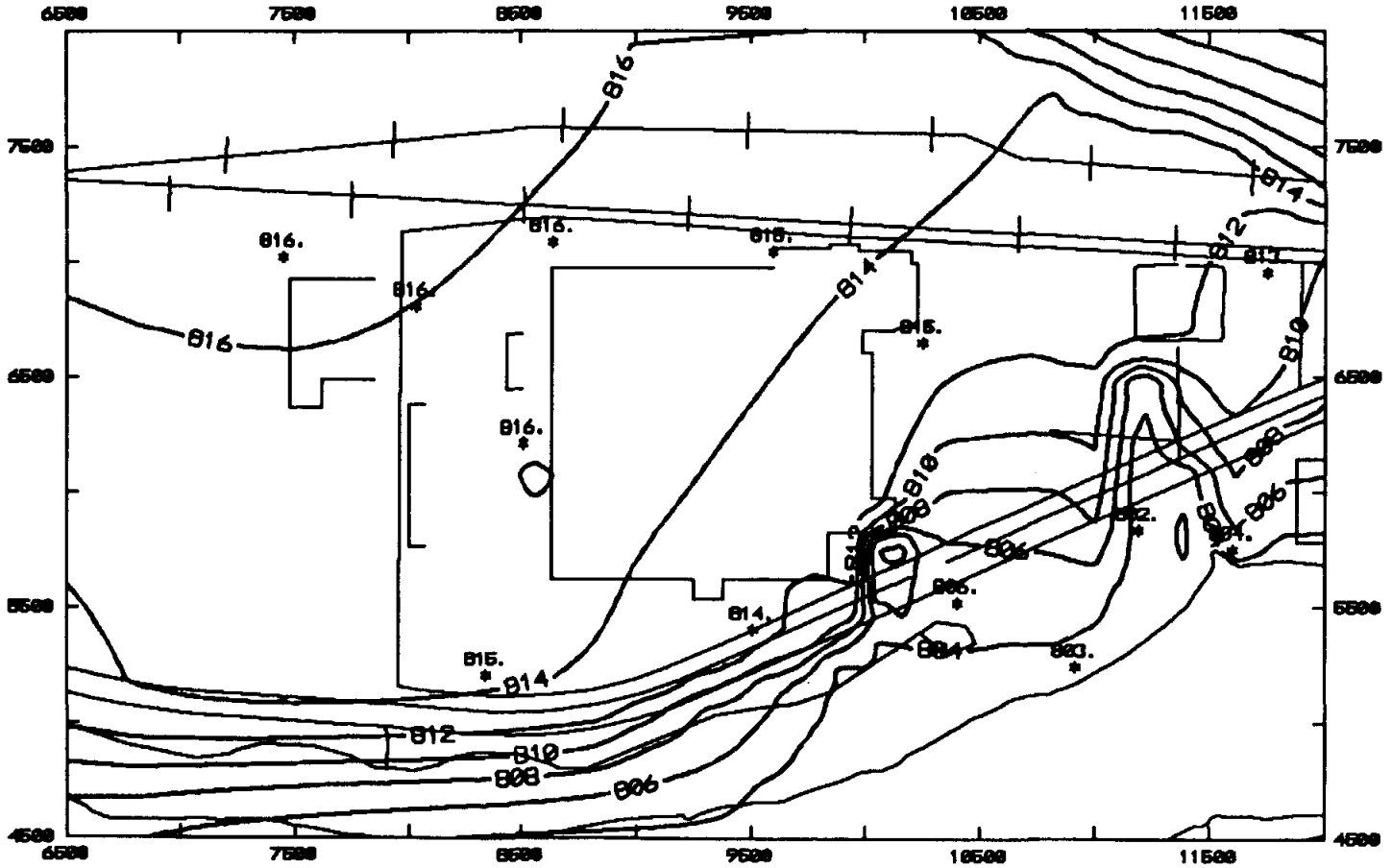
FIGURE A-20

A calibration to a second set of hydraulic conditions has been conducted, for post-startup pumping conditions at the NIROP. The steady-state hydraulic heads measured at the site after 16 months of pumping were simulated with the model, using the same aquifer parameters as with the pre-startup calibration, but with pumping rates from December 1993. This time was chosen because it was during a period of relatively constant pumping rates from the four NIROP extraction wells, and there was a relatively complete data set on measured head values for this time. Review of the head data collected since the system startup indicated that the heads could be considered to be at steady-state, because they stabilize in less than a month after changing pumping rates.

The model-predicted hydraulic heads under December 1993 pumping conditions are illustrated on Figures A-21 through A-24, for model Layers 1, 2, 3, and 4, respectively. The model used average pumping rates from December 1993 of 32, 24, 200, and 38 gpm, respectively, for wells AT-1A, AT-2, AT-3A, and AT-4. The contoured values of head can be compared to the measured heads, shown on the same figures. For clarity, only a small portion of the well data are included on the figures. In general, there is reasonably close agreement (within 1 to 2 feet) between model-predicted values and measured values, although it is clear that local heterogeneities cause small deviations from the predicted response.

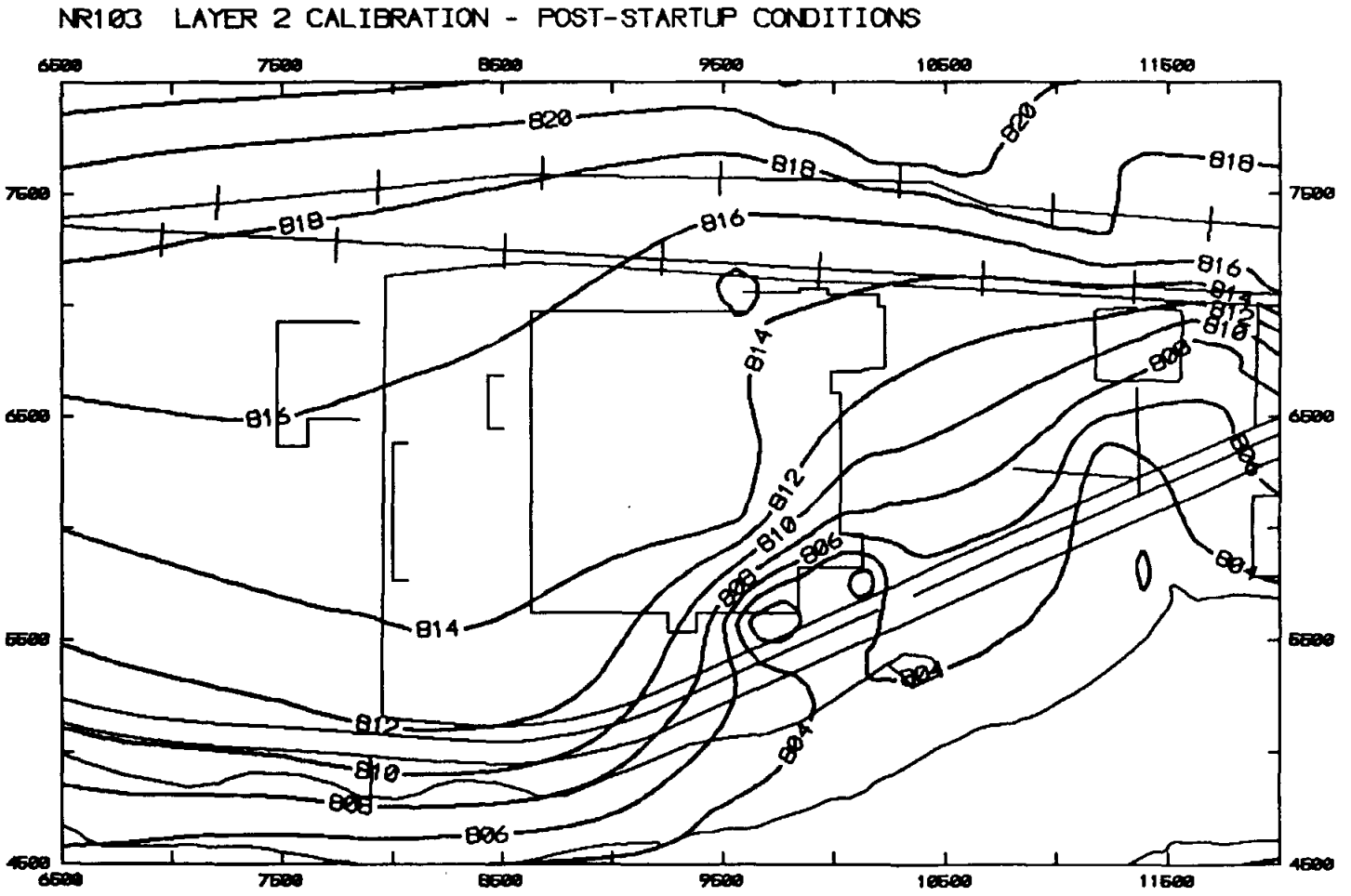
The steady-state response of the groundwater system to two sets of hydraulic head data and pumping rates has been simulated reasonably well. Because the model is able to reproduce the measured head gradients under non-pumping conditions, and the drawdowns around the pumping wells under pumping conditions, this indicates that the model accurately represents aquifer conditions and therefore can be used to predict the effectiveness of the existing extraction well system under various pumping rates. In addition, the effectiveness of an upgraded extraction well system with additional wells can be predicted. In the following sections, the effectiveness of the extraction well system for capturing contaminated groundwater under various pumping scenarios is tested.

NR103 LAYER 1 CALIBRATION - POST-STARTUP CONDITIONS



See Attachment 1 for definition of all zones values

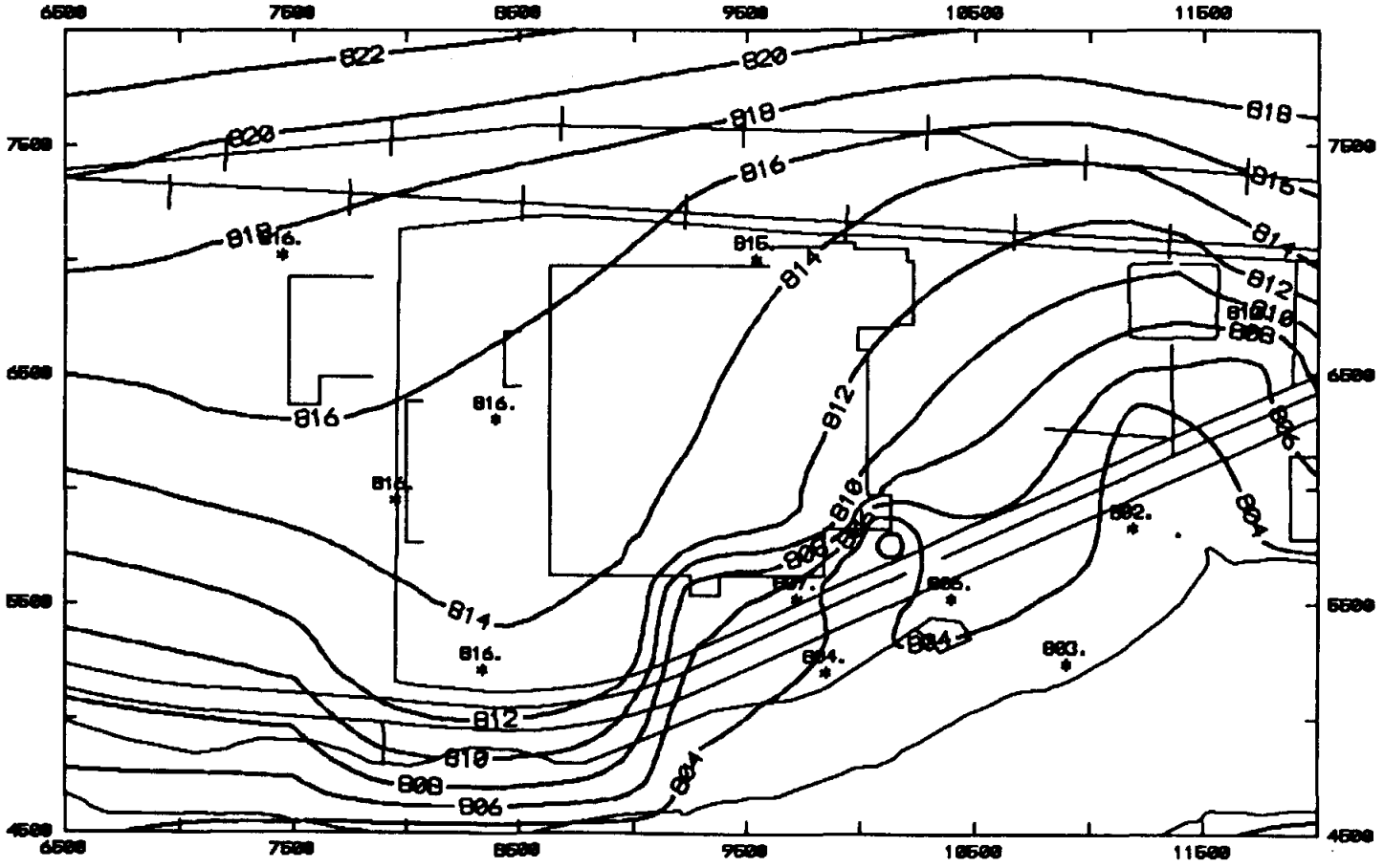
FIGURE A-21



See Attachment 1 for definition of all zones values

FIGURE A-22

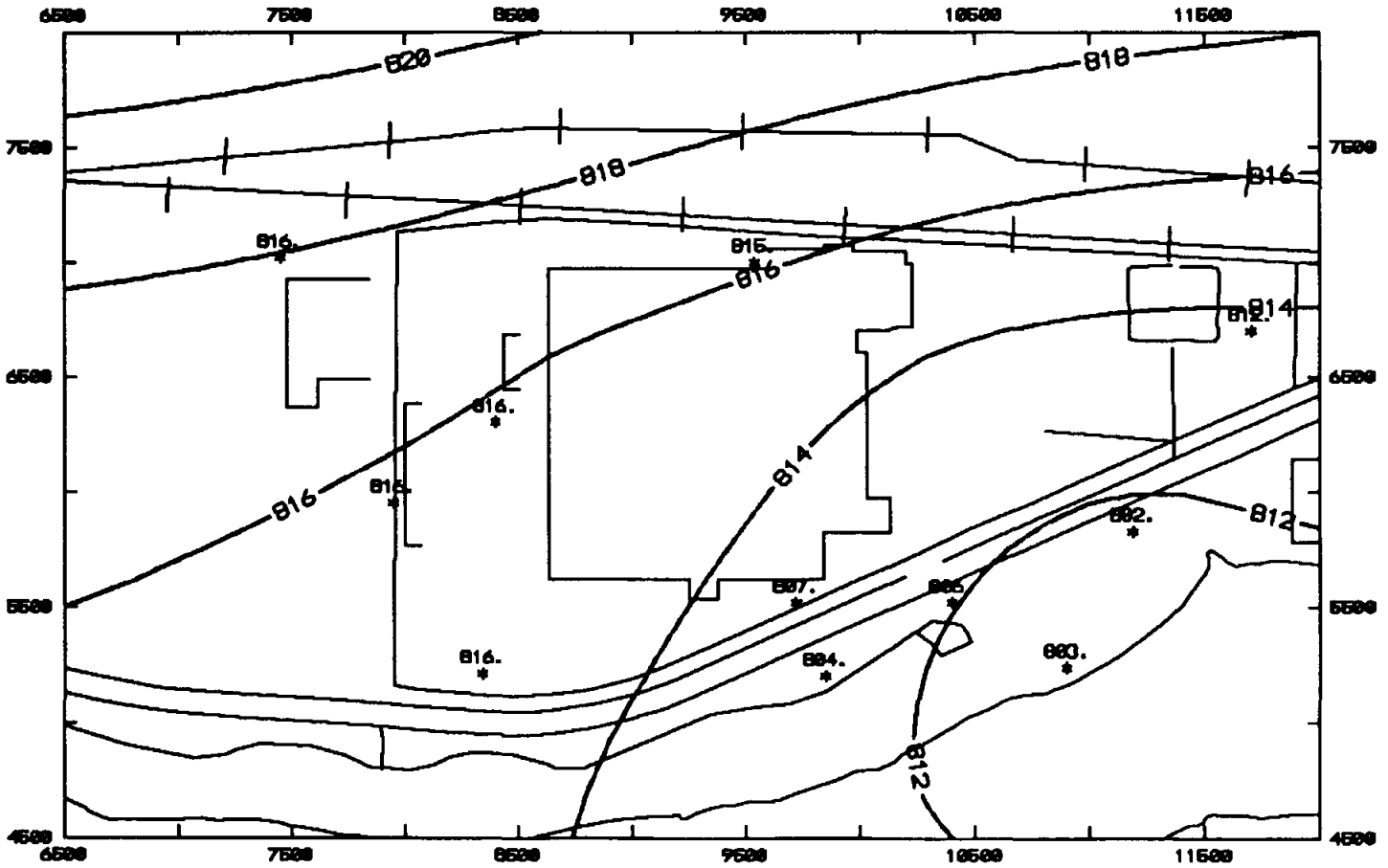
NR103 LAYER 3 CALIBRATION - POST-STARTUP CONDITIONS



See Attachment 1 for definition of all zones values

FIGURE A-23

NR103 LAYER 4 CALIBRATION - POST-STARTUP CONDITIONS



See Attachment 1 for definition of all zones values

FIGURE A-24

Section 8

EXTRACTION SYSTEM EFFECTIVENESS AT DECEMBER 1993 PUMPING RATES

The effectiveness of the extraction well system in containing off-site migration of contaminated groundwater at the NIROP was tested by simulating the long-term (steady-state) head distribution under December 1993 pumping rates, and conducting particle-tracking to simulate the movement of contaminants in the groundwater. It was assumed that the on-site extraction wells would continue to pump at the approximate average rate that they achieved during December 1993: 32, 24, 200, and 38 gallons per minute (gpm) for wells AT-1A, AT-2, AT-3A, and AT-4, respectively (see Table A-3 for a summary of the pumping rates for capture zone simulations).

Particle-tracking was conducted using the PATH3D computer code (Zheng, 1991), linked with the MODFLOW code. The aquifer parameters that were used for the calibrated model were used in the predictive runs. "Particles" that simulated discrete packets of groundwater were tracked forward (i.e., toward the river) from 26 initial locations that were distributed evenly across the NIROP site (see Figures 2-7, 2-8, and 2-9). At each location, particles were tracked from three vertical positions: 10 feet below the water table; 45 feet below the water table; and 85 feet below the water table. These depths correspond approximately to the middle of model Layer 1, and the upper and lower portions of model Layer 3, providing good vertical coverage of the permeable (sand) portions of the drift aquifer. The distribution of particles provides good coverage of known groundwater contaminant locations and adjacent areas within glacial drift that underlie the site.

The results of the particle-tracking are illustrated on Figures 2-7, 2-8, and 2-9, for the existing extraction well system and December 1993 pumping rates. With initial positions at the shallow and intermediate depths, only approximately 60% of the width of the contaminant plume is captured. For locations in the deep drift, approximately 90% of the width of the contaminant plume is captured. The capture zone does not extend a significant distance west of East River Road; thus, the wells apparently cannot pull back contaminated groundwater that lies downgradient (southwest) of the wells to a significant degree. This is consistent with the observed drawdowns associated with each extraction well, which are relatively small when

TABLE A-3

SUMMARY OF PUMPING RATES FOR CAPTURE ZONE SIMULATIONS
Pumping Rate (GPM)

	AT-1A	AT-2	AT-3A	AT-4	AT-5A	AT-5B
Existing Extraction Well System						
• December 1993 rates	32	24	200	38	0	0
• Optimized pumping rates	60	100	200	100	0	0
Upgraded Extraction Well System						
• December 1993 rates for AT-1A *through* AT-4	32	24	200	38	52	148
• Optimized rates #1	60	100	200	100	52	148
• Optimized rates #2	0	24	200	38	123	128

compared to the steepness of the hydraulic gradient southwest of the NIROP. Those particles that were not captured would eventually discharge into the Mississippi River.

It is apparent that groundwater over the most concentrated central portion of the contaminant plume is being captured. This is consistent with the observed high concentration of groundwater that is recovered from most of the extraction wells over 1993. However, approximately 40% of the plume width is not being captured under the pumping rates that were achieved in December 1993. Declining pumping rates over 1993 have resulted in an extraction system that is not performing adequately to contain the contaminant plume.

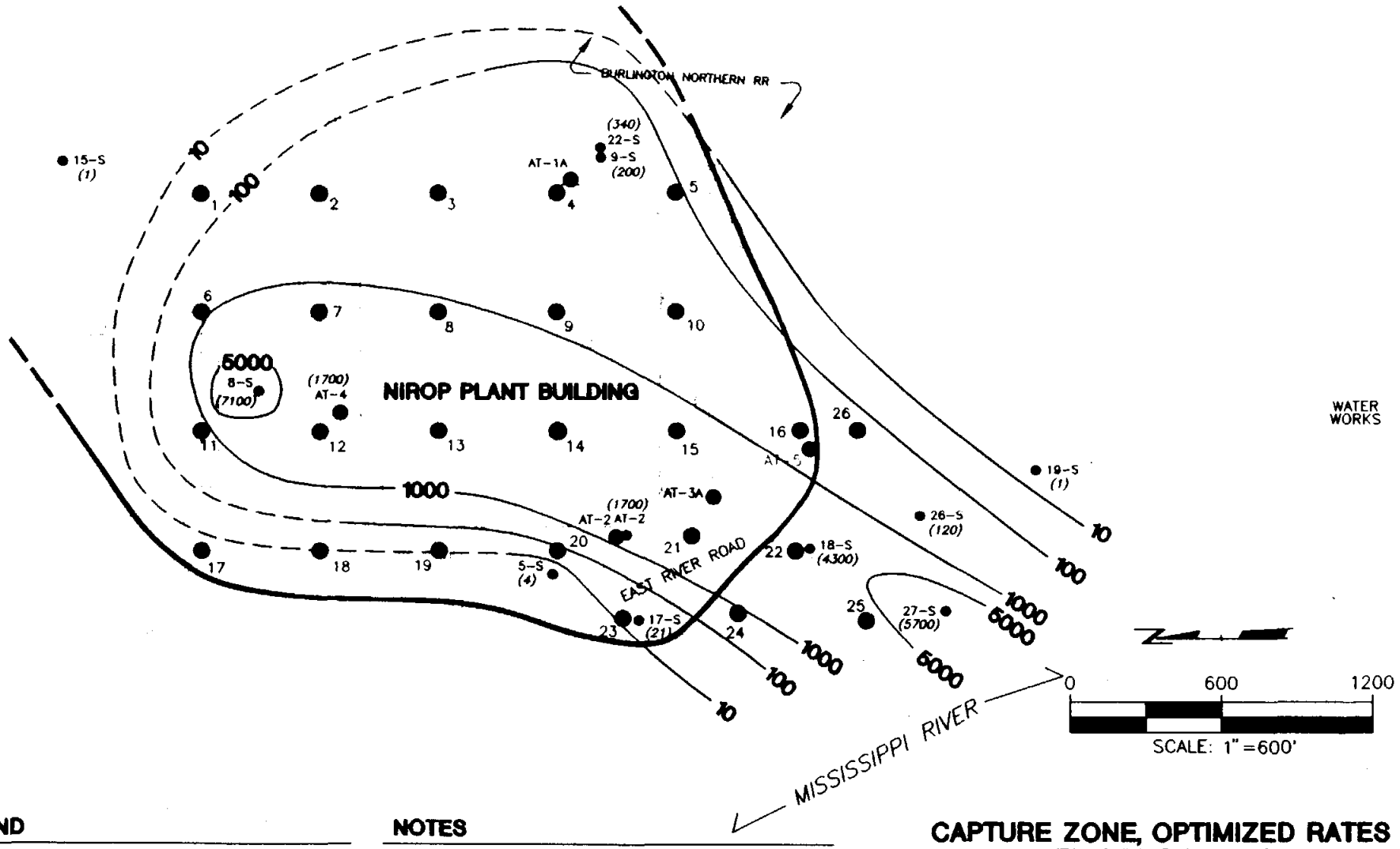
Section 9

EXISTING EXTRACTION SYSTEM EFFECTIVENESS AT OPTIMIZED PUMPING RATES

The feasibility of obtaining adequate capture from the existing extraction well system by increasing the pumping rates was evaluated with the model. Although it is uncertain at this time whether the system can be modified so that the well design rates (75, 125, 250, and 125 gpm, respectively) can be achieved, recent tests and hydraulic evaluations indicate that there is a strong potential to increase the pumping rates, particularly for wells AT-1A, AT-2, and AT-4. A simulation was conducted where the four existing wells were pumped at 80% of the design rates; this equates to rates of 60, 100, 200, and 100 gpm, respectively, for AT-1A, AT-2, AT-3A, and AT-4.

The resulting capture zones are illustrated on Figures A-25, A-26, and A-27. The zone of capture is substantially improved over that shown on Figures 2-7, 2-8, and 2-9 for December 1993 pumping rates, and encompasses nearly all of the NIROP site east of East River Road, in the shallow drift. For the intermediate drift and deep drift, the width of the capture zone is 90 to 100% of the width of the contaminant plume, and is sufficient to cut off the flow of contaminants from upgradient areas; however, there is a significant portion of the plume to the south that would not be captured. It is clear that a substantial improvement in the effectiveness of the extraction system would result from increased pumping rates that more closely approached the design rates.

$$DWG$$
$$PRF$$
$$SCALE$$



LEGEND

(1700)	TCE CONCENTRATION, ug/L
1000 ——	TCE ISOCONCENTRATION LINE, ug/L (DASHED WHERE INFERRED)
● 1	CAPTURED BY WELL
● 5	NOT CAPTURED BY WELL
⌒	CAPTURE ZONE

NOTES

1. PARTICLE TRACKS ARE TRACED FROM THE INITIAL POSITIONS SHOWN, AT A DEPTH OF 10 FT. BELOW WATER TABLE.
2. RESULTS ARE FROM MODEL RUN NR 108.
3. FLOW RATES ARE 60, 100, 200, AND 100 GPM FOR AT-1A, AT-2, AT-3A, AND AT-4.

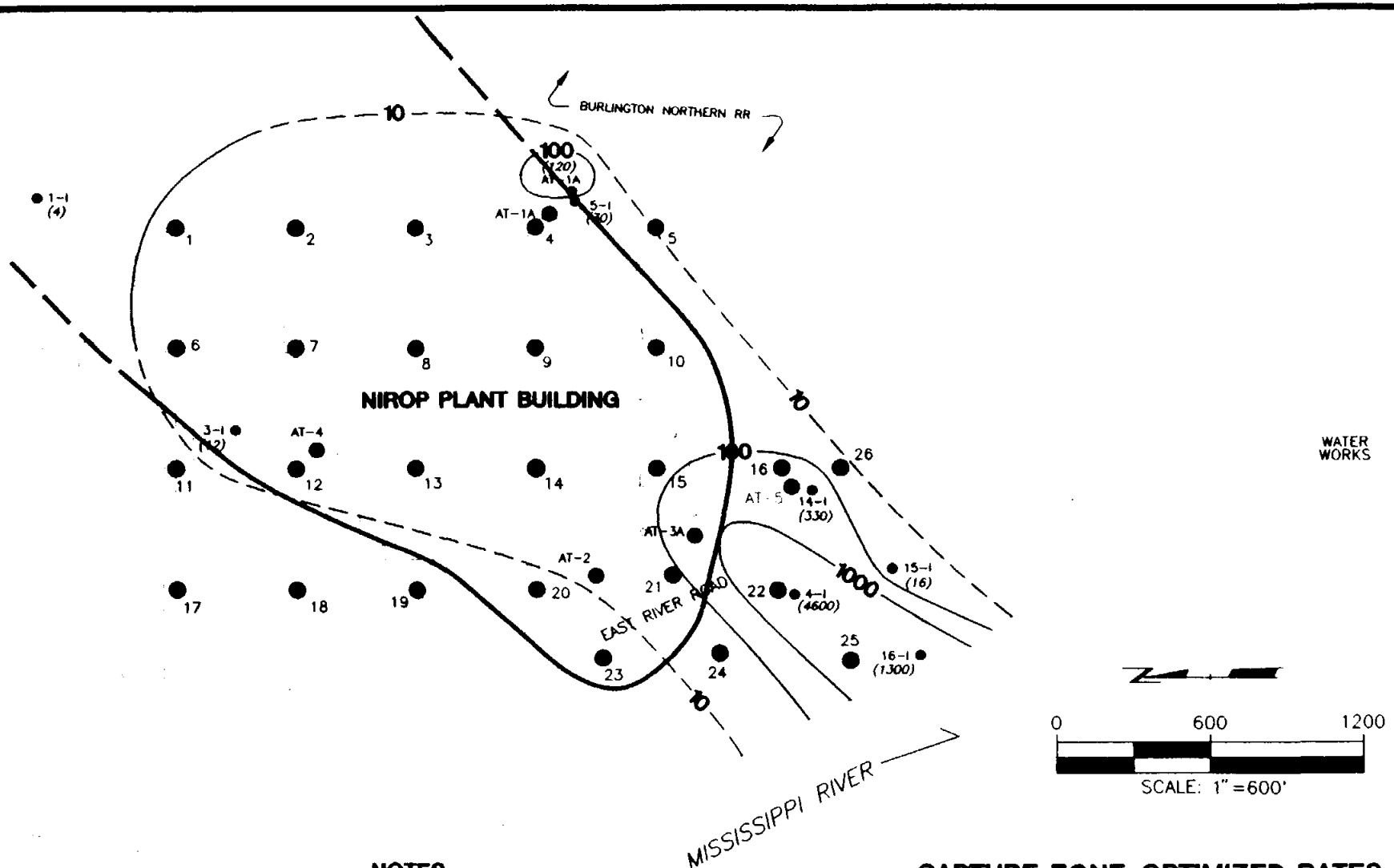
CAPTURE ZONE, OPTIMIZED RATES EXISTING WELLS SHALLOW DRIFT

RMT INC.

DWN. BY:	RBN
APPROVED BY:	TEB
DATE:	JANUARY 1995
PROJ. #	3315.04
FILE #	33150417

FIGURE A-25

$$DWG$$
$$PRF$$
$$SCALE$$



LEGEND

(1700)	TCE CONCENTRATION, ug/L
1000 ——	TCE ISOCONCENTRATION LINE, ug/L (DASHED WHERE INFERRED)
● 1	CAPTURED BY WELL
● 5	NOT CAPTURED BY WELL
⌒	CAPTURE ZONE

NOTES

1. PARTICLE TRACKS ARE TRACED FROM THE INITIAL POSITIONS SHOWN AT A DEPTH OF 45 FT BELOW WATER TABLE.
2. RESULTS ARE FROM MODEL RUN NR 108.
3. FLOW RATES ARE 60, 100, 200, AND 100 GPM FOR AT-1A, AT-2, AT-3A, AT-4.

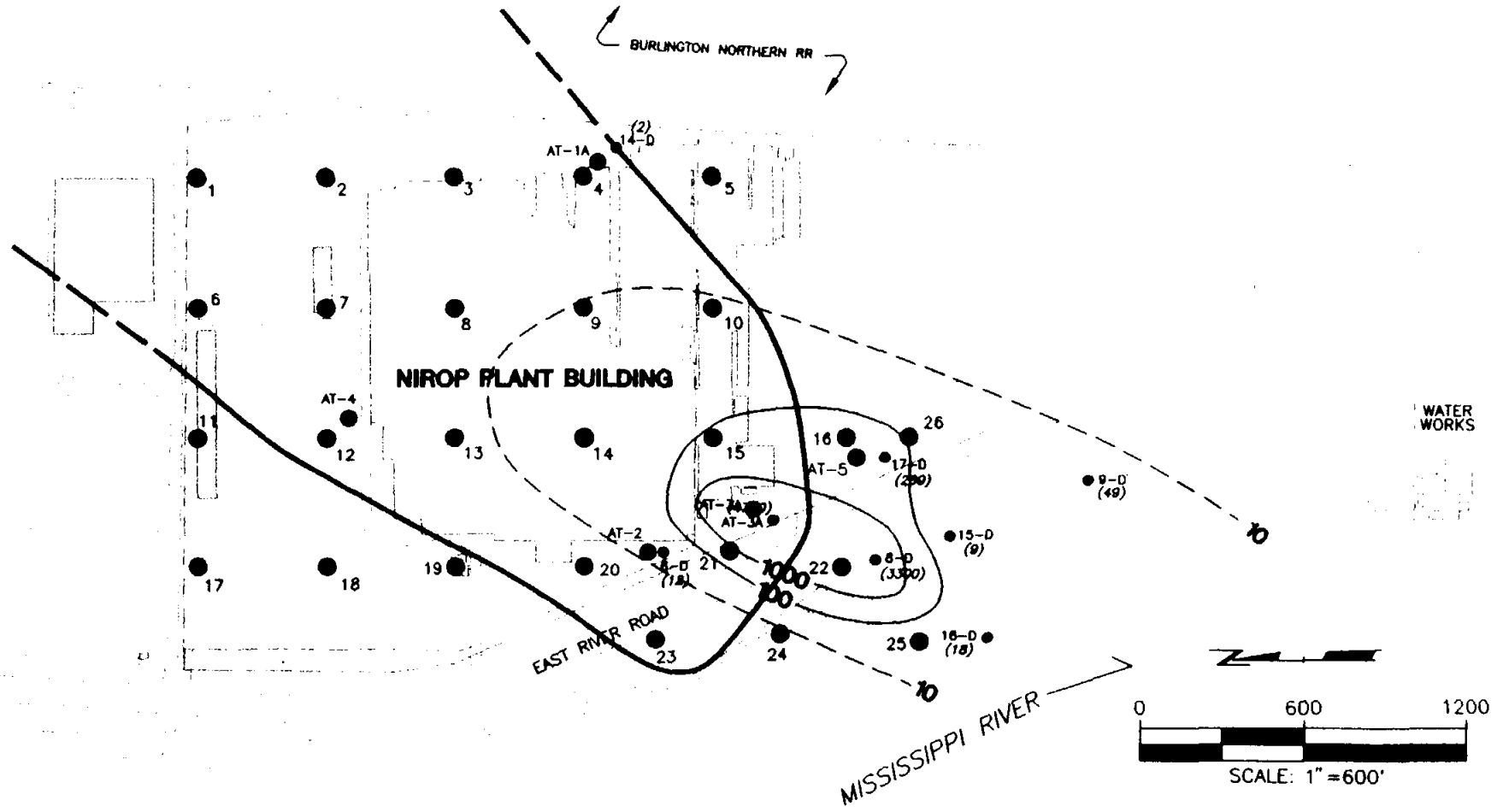
CAPTURE ZONE, OPTIMIZED RATES EXISTING WELLS INTERMEDIATE DRIFT

RMT INC.

DWN. BY:	RBN
APPROVED BY:	TBG
DATE:	JANUARY 1995
PROJ. #	3315.04
FILE #	33150418

FIGURE A-26

$$DWG$$
$$PRF$$
$$SCALE



LEGEND

(1700)	TCE CONCENTRATION, ug/L
1000 ——	TCE ISOCONCENTRATION LINE, ug/L (DASHED WHERE INFERRED)
● 1	CAPTURED BY WELL
● 5	NOT CAPTURED BY WELL
⌒	CAPTURE ZONE

NOTES

1. PARTICLE TRACKS ARE TRACED FROM THE INITIAL POSITIONS SHOWN, AT A DEPTH OF 85 FT. BELOW WATER TABLE.
2. RESULTS ARE FROM MODEL RUN NR 108.
3. FLOW RATES ARE 60, 100, 200, AND 100 GPM FOR AT-1A, AT-2, AT-3A, AND AT-4.

CAPTURE ZONE, OPTIMIZED RATES EXISTING WELLS DEEP DRIFT

RMT INC.

DWN. BY:	RBN
APPROVED BY:	TGS
DATE:	JANUARY 1995
PROJ. #	3315.04
FILE #	33150419

FIGURE A-27

Section 10

EXTRACTION SYSTEM EFFECTIVENESS WITH ADDITIONAL EXTRACTION WELLS

An evaluation of the effectiveness of adding additional extraction wells has been conducted. Two additional wells (AT-5A and AT-5B) were simulated, located approximately 300 feet southeast of existing well AT-3A, near monitoring wells 14-I and 17-D (see Figure 2-2). This location was chosen because there are relatively high (greater than 100 ppb) concentrations of TCE in groundwater that lies south of the capture zone that is indicated on Figures A-25, A-26, and A-27 even under increased pumping rates with the existing wells. The two new wells were simulated to be screened in model Layer 1 (the upper sand) and model Layer 3 (the lower sand), because there is a 25-foot-thick clay layer separating the upper and lower sand units at this location (see Figure A-5). The wells were simulated as pumping at a combined rate of 200 gpm (52 gpm and 148 gpm, respectively). Although the actual pumping rate capacity at the two wells cannot be accurately predicted until they are installed and tested, the selected rates appear reasonable based on the available boring logs and the performance of nearby well AT-3A (approximately 200 gpm).

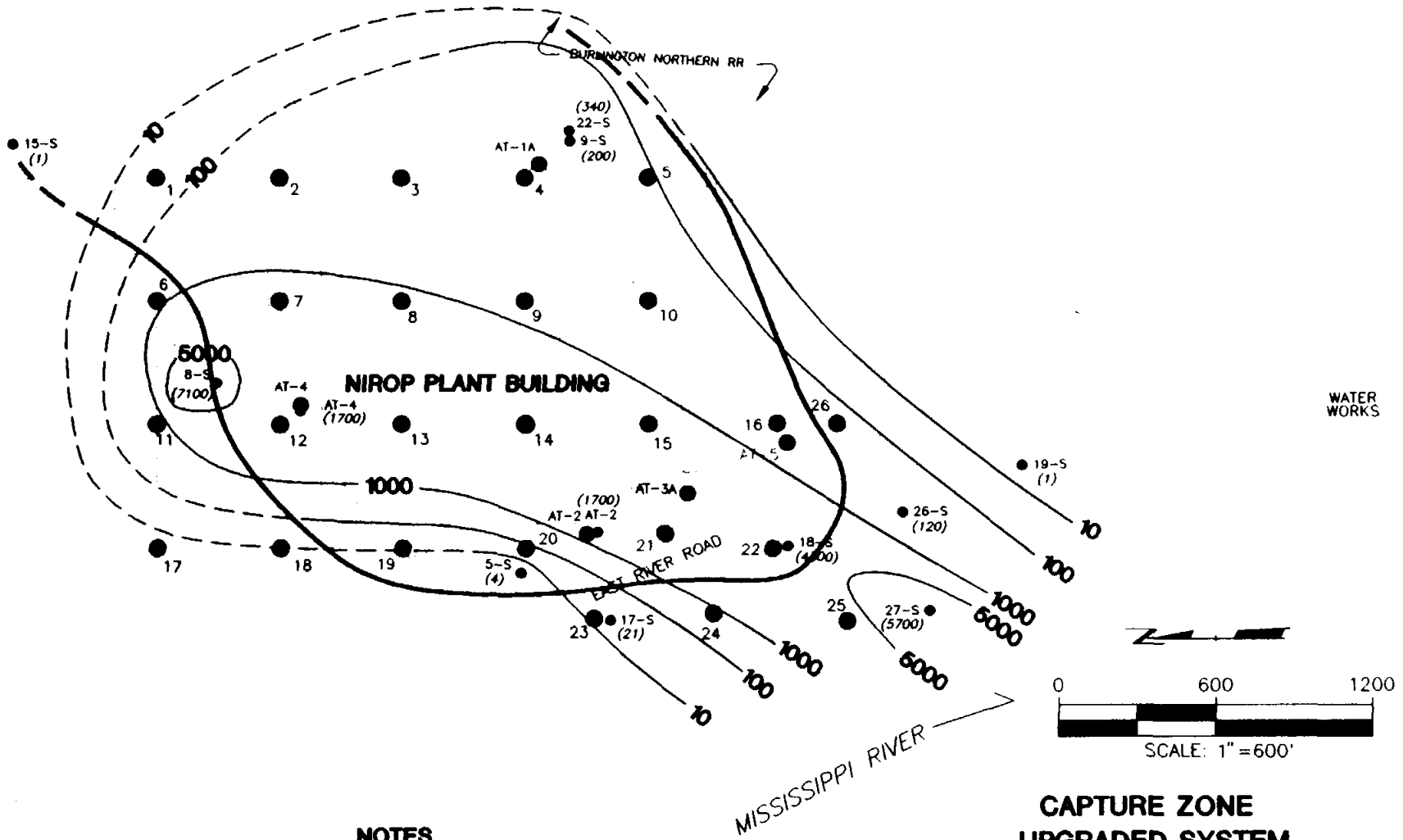
In the first simulation, the pumping rates of the existing wells were kept at their December 1993 rates, with an additional 52 and 148 gpm from the two new wells. The effect of these additional wells, shown on Figures 3-1, 3-2, and 3-3, would be to extend the width of the capture zone to approximately 90% of the plume width in the shallow and intermediate depths, and 100% of the plume width in the deep drift. This evaluation indicates that substantially better coverage of the site is accomplished, especially to the south, over that of the existing system.

In a second simulation, the flow rates of the existing wells were increased to 80% of the design rates, as described in Section 9. As shown on Figures 3-4, 3-5, and 3-6, the zone of capture at all three depths is substantially increased, providing essentially 100% capture of groundwater east of East River Road, and also capturing some of the groundwater west (downgradient) of the road. It is clear that this represents a highly effective containment system.

A third simulation was conducted, in which well AT-1A is removed from service, wells AT-2, AT-3A, and AT-4 pump at their December 1993 rates, and the two new wells pump at a combined rate of 250 gpm (123 and 128 gpm, respectively). This simulation tested the effect of removing an existing well from an upgradient location, and compensating for it with increased rates from the two new wells. The results of this simulation, shown on Figures A-28, A-29, and A-30, indicate that while the capture zone is substantially improved over that with the existing system and flow rates, there are still some significant areas to the north and south in the shallow drift and intermediate drift that would not be captured.

The simulations presented here cover a range of possible configurations of pumping rates that could be achieved at the NIROP site; there are many other possibilities that could be tested, but those that are presented here bracket most of the likely scenarios. These results can be used to qualitatively estimate the effectiveness of other scenarios that were not tested but which lie within the range of scenarios that were tested. At this time, the largest uncertainty lies in estimating the pumping rates that the extraction well system can achieve when it is upgraded and optimized.

$$DWG$
$$PRF$
$$SCALE$$



LEGEND

(1700)	TCE CONCENTRATION, ug/L
1000 ——	TCE ISOCONCENTRATION LINE, ug/L (DASHED WHERE INFERRED)
● 1	CAPTURED BY WELL
● 5	NOT CAPTURED BY WELL
⌒	CAPTURE ZONE

NOTES

1. PARTICLE TRACKS ARE TRACED FROM THE INITIAL POSITIONS SHOWN, AT A DEPTH OF 10 FT. BELOW WATER TABLE.
2. RESULTS ARE FROM MODEL RUN NR 100.
3. FLOW RATES ARE 0, 24, 200, 38 123, AND 128 GPM FROM AT-1A, AT-2, AT-3A, AT-4, AT-5A, AND AT-5B.

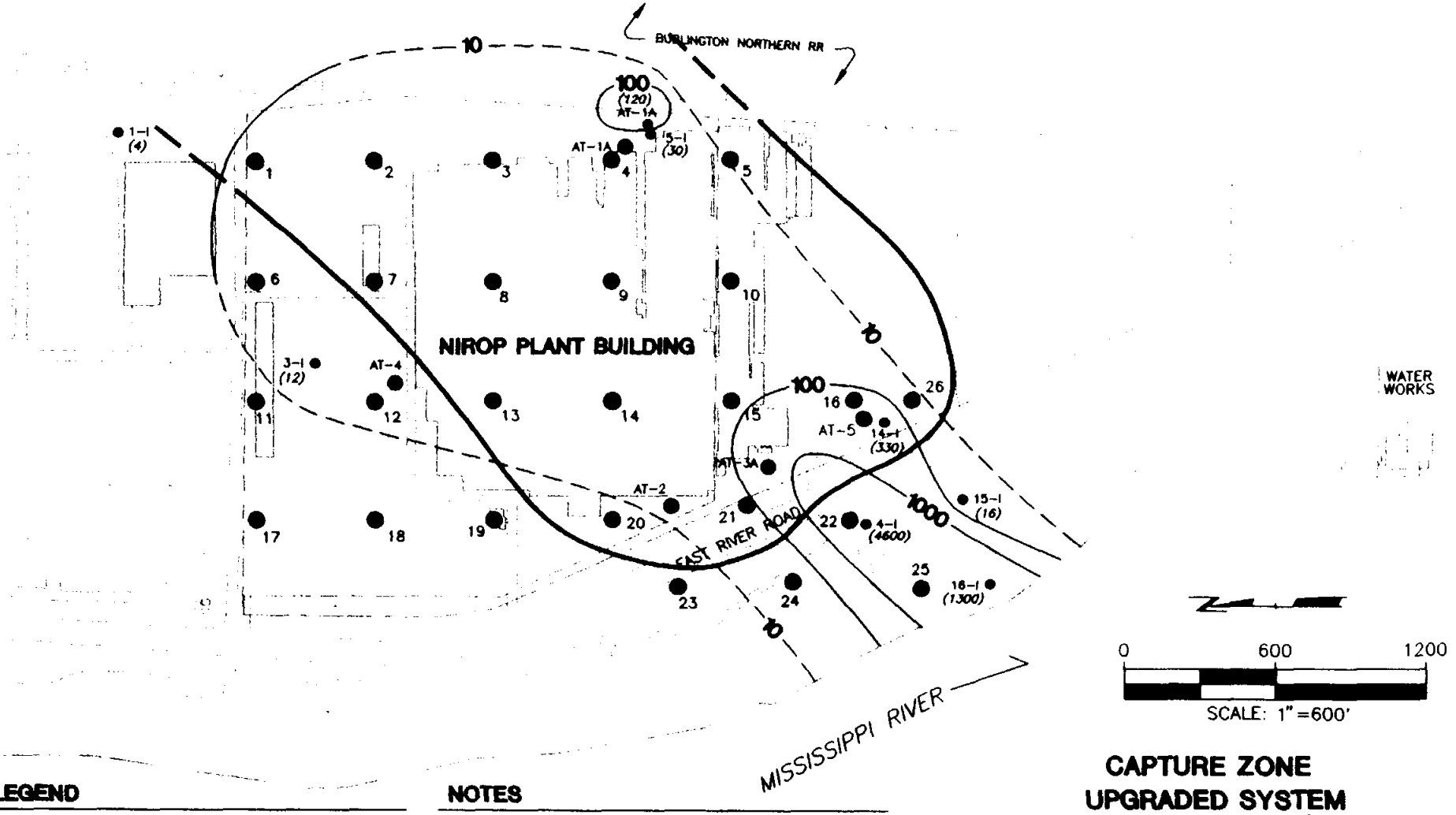
CAPTURE ZONE
UPGRADED SYSTEM
OPTIMIZED RATES #2
SHALLOW DRIFT

RMT INC.

DWN. BY:	RBN
APPROVED BY:	TB
DATE:	JANUARY 1995
PROJ. #	3315.04
FILE #	33150420

FIGURE A-28

$$DWG$$
$$PRF$$
$$SCAL



LEGEND

(1700)	TCE CONCENTRATION, ug/L
1000 ——	TCE ISOCONCENTRATION LINE, ug/L (DASHED WHERE INFERRED)
● 1	CAPTURED BY WELL
● 5	NOT CAPTURED BY WELL
⌒	CAPTURE ZONE

NOTES

1. PARTICLE TRACKS ARE TRACED FROM THE INITIAL POSITIONS SHOWN, AT A DEPTH OF 45 FT. BELOW WATER TABLE.
2. RESULTS ARE FROM MODEL RUN NR 100.
3. FLOW RATES ARE 0, 24, 200, 38, 123, AND 128 GPM FROM AT-1A, AT-2, AT-3A, AT-4, AT-5A, AND AT-5B.

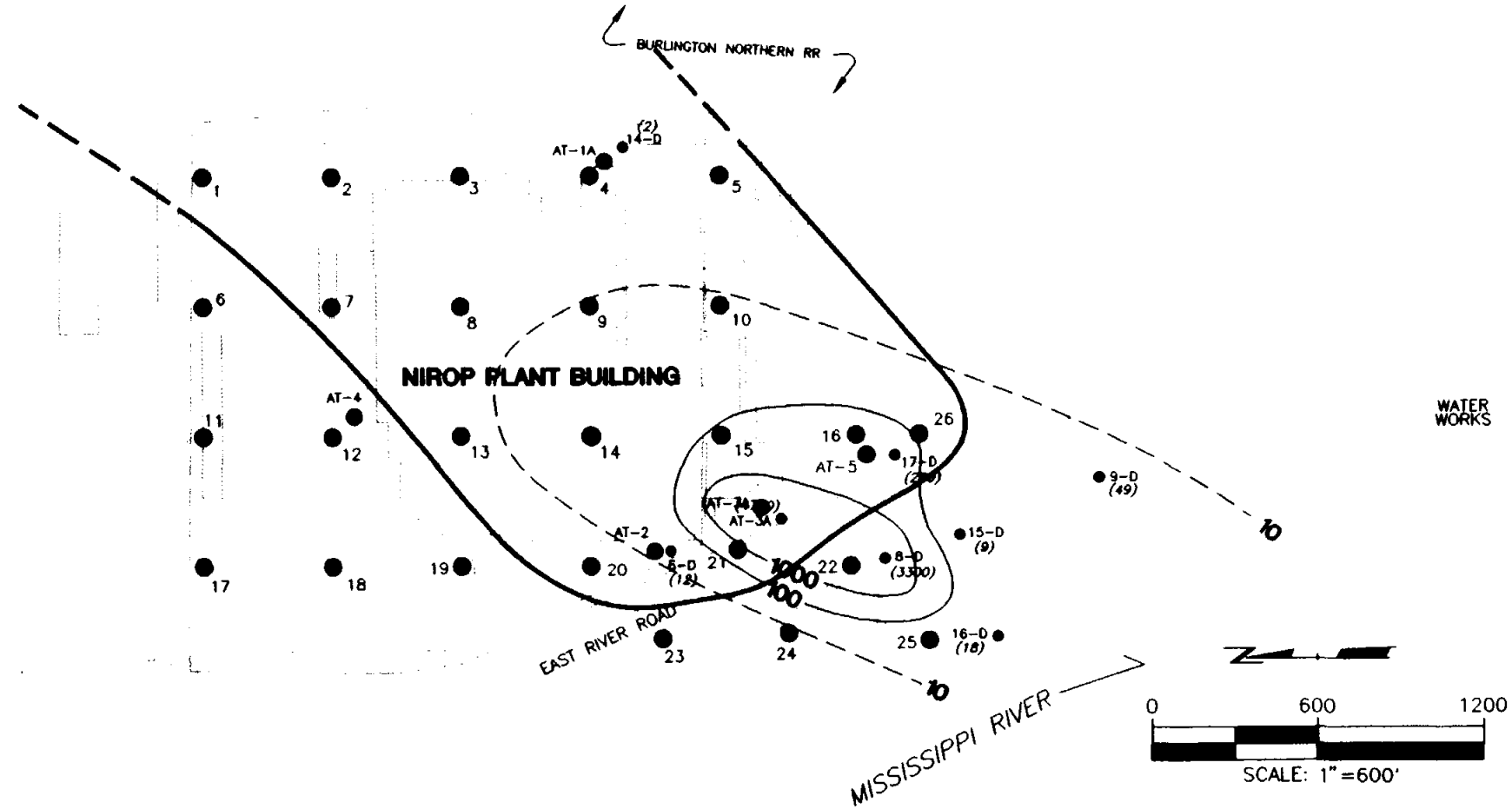
CAPTURE ZONE
UPGRADED SYSTEM
OPTIMIZED RATES #2
INTERMEDIATE DRIFT

RMT INC.

DWN. BY:	RBN
APPROVED BY:	TBB
DATE:	JANUARY 1995
PROJ. #	3315.04
FILE #	33150421

FIGURE A-29

$$DWG$$
$$PRF$$
$$SCALE$$



LEGEND

(1700)	TCE CONCENTRATION, ug/L
1000 ——	TCE ISOCONCENTRATION LINE, ug/L (DASHED WHERE INFERRED)
● 1	CAPTURED BY WELL
● 5	NOT CAPTURED BY WELL
⌒	CAPTURE ZONE

NOTES

1. PARTICLE TRACKS ARE TRACED FROM THE INITIAL POSITIONS SHOWN, AT A DEPTH OF 85 FT. BELOW WATER TABLE.
2. RESULTS ARE FROM MODEL RUN NR 100.
3. FLOW RATES ARE 0, 24, 200, 38, 123, AND 128 GPM FROM AT-1A, AT-2, AT-3A, AT-4, AT-5A, AND AT-5B.

CAPTURE ZONE
UPGRADED SYSTEM
OPTIMIZED RATES #2
DEEP DRIFT

RMT INC.

DWN. BY:	MDD
APPROVED BY:	
DATE:	JAN. 1995
PROJ. #	2826.01
FILE #	28260114

FIGURE A-30

Section 11

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ATTACHMENT 1

MODEL SUMMARY INPUT AND OUTPUT EXAMPLES

ModelCad-386
Model Design Software for Extended-DOS

Developed by

James O. Rumbaugh, III

(c) 1992 Geraghty & Miller, Inc.

Date: 6/20/1994
Time: 14:19:16.61

Input File: NR96.grd
Root Name : NR94

Map File 1 : NIROP3.MAP
Map File 2 : NR4.MAP

GRID INFORMATION:

Number of Rows : 47
Number of Columns : 56
Number of Layers : 4

Total Cells : 10528
Total Active Cells: 10528
Percent Inactive : 0

GRID DIMENSIONS

>>>>> ROW SPACINGS (DELTA-Y) <<<<<

Row 1: 1000.000000
Row 2: 1000.000000
Row 3: 800.000000
Row 4: 800.000000
Row 5: 400.000000
Row 6: 400.000000
Row 7: 400.000000
Row 8: 200.000000
Row 9: 200.000000
Row 10: 200.000000
Row 11: 100.000000
Row 12: 100.000000
Row 13: 100.000000
Row 14: 100.000000
Row 15: 100.000000
Row 16: 100.000000
Row 17: 100.000000
Row 18: 100.000000
Row 19: 100.000000
Row 20: 100.000000
Row 21: 100.000000
Row 22: 100.000000
Row 23: 100.000000
Row 24: 100.000000
Row 25: 100.000000
Row 26: 100.000000
Row 27: 100.000000

Row 28: 100.000000
Row 29: 100.000000
Row 30: 100.000000
Row 31: 100.000000
Row 32: 100.000000
Row 33: 100.000000
Row 34: 100.000000
Row 35: 100.000000
Row 36: 100.000000
Row 37: 200.000000
Row 38: 200.000000
Row 39: 200.000000
Row 40: 200.000000
Row 41: 200.000000
Row 42: 400.000000
Row 43: 400.000000
Row 44: 400.000000
Row 45: 800.000000
Row 46: 1000.000000
Row 47: 1000.000000

Minimum Delta-Y: 100.000000
Maximum Delta-Y: 1000.000000

>>>>> COLUMN SPACINGS (DELTA-X) <<<<<

Column 1: 1000.000000
Column 2: 1000.000000
Column 3: 1000.000000
Column 4: 1000.000000
Column 5: 1000.000000
Column 6: 800.000000
Column 7: 400.000000
Column 8: 400.000000
Column 9: 400.000000
Column 10: 200.000000
Column 11: 200.000000
Column 12: 200.000000
Column 13: 200.000000
Column 14: 200.000000
Column 15: 200.000000
Column 16: 100.000000
Column 17: 100.000000
Column 18: 100.000000
Column 19: 100.000000
Column 20: 100.000000
Column 21: 100.000000
Column 22: 100.000000
Column 23: 100.000000
Column 24: 100.000000
Column 25: 100.000000
Column 26: 100.000000
Column 27: 100.000000
Column 28: 100.000000
Column 29: 100.000000
Column 30: 100.000000
Column 31: 100.000000
Column 32: 100.000000
Column 33: 100.000000
Column 34: 100.000000
Column 35: 100.000000
Column 36: 100.000000
Column 37: 100.000000
Column 38: 100.000000
Column 39: 100.000000
Column 40: 100.000000
Column 41: 100.000000
Column 42: 100.000000
Column 43: 200.000000
Column 44: 200.000000
Column 45: 200.000000
Column 46: 200.000000
Column 47: 200.000000
Column 48: 200.000000
Column 49: 400.000000
Column 50: 400.000000
Column 51: 400.000000
Column 52: 400.000000
Column 53: 400.000000

Column 54: 900.000000
Column 55: 1000.000000
Column 56: 1000.000000

Minimum Delta-X: 100.000000
Maximum Delta-X: 1000.000000

MODEL PARAMETER INFORMATION:

>>>>>>>>>> PARAMETER ZONES IN LAYER 1 <<<<<<<<<<

Hydraulic Cond Zone.. 1: Kx = 5.000e-001
Ky = 5.000e-001
Kz = 5.000e-001
Hydraulic Cond Zone.. 2: Kx = 5.000e+000
Ky = 5.000e+000
Kz = 5.000e+000
Hydraulic Cond Zone.. 7: Kx = 2.000e+001
Ky = 2.000e+001
Kz = 2.000e+001
Hydraulic Cond Zone.. 9: Kx = 6.000e+001
Ky = 6.000e+001
Kz = 6.000e+001

Leakance Zone..... 1 Kv = 5.000e-005
Leakance Zone..... 8 Kv = 5.000e+000
Leakance Zone..... 14 Kv = 1.000e-002

Storage Zone..... 1: S = 1.000e-001
Sy = 0.000e+000
Porosity = 0.000e+000

Bottom Zone..... 4 Bottom = 7.700e+002
Bottom Zone..... 6 Bottom = 7.800e+002
Bottom Zone..... 7 Bottom = 7.850e+002
Bottom Zone..... 8 Bottom = 7.900e+002
Bottom Zone..... 9 Bottom = 7.950e+002
Bottom Zone..... 10 Bottom = 8.000e+002
Bottom Zone..... 12 Bottom = 8.100e+002
Bottom Zone..... 14 Bottom = 8.200e+002
Bottom Zone..... 15 Bottom = 8.300e+002
Bottom Zone..... 16 Bottom = 8.400e+002

Recharge Zone..... 1: R = 2.000e-003 Area = 6.130e+007
Concentration = 0.000e+000
Recharge Zone..... 2: R = 0.000e+000 Area = 2.590e+006
Concentration = 0.000e+000
Recharge Zone..... 3: R = 2.000e-004 Area = 5.300e+007
Concentration = 0.000e+000
Recharge Zone..... 4: R = 4.000e-004 Area = 1.041e+008
Concentration = 0.000e+000

>>>>>>>>>> PARAMETER ZONES IN LAYER 2 <<<<<<<<<<

Transmissivity Zone.. 2: Tx = 5.000e+000
Ty = 5.000e+000
Kz = 5.000e+000
Transmissivity Zone.. 15: Tx = 5.000e+002
Ty = 5.000e+002
Kz = 5.000e+002
Transmissivity Zone.. 20: Tx = 1.000e+003
Ty = 1.000e+003
Kz = 1.000e+003
Transmissivity Zone.. 21: Tx = 2.000e+003
Ty = 2.000e+003
Kz = 2.000e+003

Leakance Zone..... 1 Kv = 5.000e-005
Leakance Zone..... 5 Kv = 5.000e-001
Leakance Zone..... 8 Kv = 1.000e+000

Leakance Zone..... 8 Kv = 5.000e+000

Storage Zone..... 5: S = 1.000e-004
Sy = 0.000e+000
Porosity = 0.000e+000

>>>>>>>>>> PARAMETER ZONES IN LAYER 3 <<<<<<<<<<

Transmissivity Zone.. 3: Tx = 1.000e-003
Ty = 1.000e-003
Kz = 1.000e-003
Transmissivity Zone.. 11: Tx = 1.000e+002
Ty = 1.000e+002
Kz = 1.000e+002
Transmissivity Zone.. 20: Tx = 1.000e+003
Ty = 1.000e+003
Kz = 1.000e+003
Transmissivity Zone.. 24: Tx = 8.000e+003
Ty = 8.000e+003
Kz = 8.000e+003
Transmissivity Zone.. 30: Tx = 3.000e+003
Ty = 3.000e+003
Kz = 3.000e+003

Leakance Zone..... 9 Kv = 2.000e-005
Leakance Zone..... 10 Kv = 1.000e-004
Leakance Zone..... 14 Kv = 1.000e-002
Leakance Zone..... 15 Kv = 1.000e-003

Storage Zone..... 5: S = 1.000e-004
Sy = 0.000e+000
Porosity = 0.000e+000

>>>>>>>>>> PARAMETER ZONES IN LAYER 4 <<<<<<<<<<

Transmissivity Zone.. 25: Tx = 1.100e+004
Ty = 1.100e+004
Kz = 1.100e+004
Transmissivity Zone.. 26: Tx = 2.000e+004
Ty = 2.000e+004
Kz = 2.000e+004

Storage Zone..... 5: S = 1.000e-004
Sy = 0.000e+000
Porosity = 0.000e+000

MODEL BOUNDARY CONDITIONS:

Constant Heads.....: 536
Rivers.....: 316
Drains.....: 19
General Heads.....: 0
Wells.....: 46

CONSTANT HEAD CELLS:

Reach	Row	Column	Layer	Head	Concentration Time	Starting Time	Ending
0	1	4	1	870.000	0.000e+000	0.000	0.000
0	1	5	1	870.000	0.000e+000	0.000	0.000
0	1	1	1	868.000	0.000e+000	0.000	0.000
0	1	2	1	867.000	0.000e+000	0.000	0.000
0	1	6	1	872.000	0.000e+000	0.000	0.000
0	1	7	1	873.000	0.000e+000	0.000	0.000
0	1	8	1	874.000	0.000e+000	0.000	0.000
0	1	9	1	877.000	0.000e+000	0.000	0.000
0	1	3	1	872.000	0.000e+000	0.000	0.000
0	1	10	1	878.000	0.000e+000	0.000	0.000
0	1	11	1	878.000	0.000e+000	0.000	0.000
0	1	12	1	878.000	0.000e+000	0.000	0.000
0	1	13	1	878.000	0.000e+000	0.000	0.000
0	1	14	1	879.000	0.000e+000	0.000	0.000
0	1	15	1	880.000	0.000e+000	0.000	0.000

0	1	16	1	880.000	0.000e+000	0.000	0.000
0	1	29	1	890.000	0.000e+000	0.000	0.000
0	1	17	1	881.000	0.000e+000	0.000	0.000
0	1	18	1	882.000	0.000e+000	0.000	0.000
0	1	19	1	883.000	0.000e+000	0.000	0.000
0	1	20	1	884.000	0.000e+000	0.000	0.000
0	1	21	1	885.000	0.000e+000	0.000	0.000
0	1	22	1	886.000	0.000e+000	0.000	0.000
0	1	23	1	887.000	0.000e+000	0.000	0.000
0	1	24	1	887.000	0.000e+000	0.000	0.000
0	1	25	1	888.000	0.000e+000	0.000	0.000
0	1	26	1	888.000	0.000e+000	0.000	0.000
0	1	27	1	889.000	0.000e+000	0.000	0.000
0	1	28	1	889.000	0.000e+000	0.000	0.000
0	1	42	1	895.000	0.000e+000	0.000	0.000
0	1	31	1	890.000	0.000e+000	0.000	0.000
0	1	32	1	891.000	0.000e+000	0.000	0.000
0	1	33	1	891.000	0.000e+000	0.000	0.000
0	1	34	1	891.000	0.000e+000	0.000	0.000
0	1	35	1	892.000	0.000e+000	0.000	0.000
0	1	36	1	892.000	0.000e+000	0.000	0.000
0	1	37	1	893.000	0.000e+000	0.000	0.000
0	1	38	1	893.000	0.000e+000	0.000	0.000
0	1	39	1	894.000	0.000e+000	0.000	0.000
0	1	40	1	894.000	0.000e+000	0.000	0.000
0	1	41	1	895.000	0.000e+000	0.000	0.000
0	1	43	1	896.000	0.000e+000	0.000	0.000
0	1	44	1	897.000	0.000e+000	0.000	0.000
0	1	45	1	898.000	0.000e+000	0.000	0.000
0	1	46	1	899.000	0.000e+000	0.000	0.000
0	1	58	1	895.000	0.000e+000	0.000	0.000
0	47	1	1	840.000	0.000e+000	0.000	0.000
0	1	30	1	890.000	0.000e+000	0.000	0.000
0	47	12	1	835.000	0.000e+000	0.000	0.000
0	47	13	1	835.000	0.000e+000	0.000	0.000
0	47	14	1	835.000	0.000e+000	0.000	0.000
0	47	6	1	837.000	0.000e+000	0.000	0.000
0	47	7	1	837.000	0.000e+000	0.000	0.000
0	47	8	1	836.000	0.000e+000	0.000	0.000
0	47	9	1	836.000	0.000e+000	0.000	0.000
0	47	10	1	836.000	0.000e+000	0.000	0.000
0	47	11	1	836.000	0.000e+000	0.000	0.000
0	47	2	1	840.000	0.000e+000	0.000	0.000
0	47	3	1	839.000	0.000e+000	0.000	0.000
0	47	4	1	838.500	0.000e+000	0.000	0.000
0	47	5	1	838.000	0.000e+000	0.000	0.000
0	47	15	1	835.000	0.000e+000	0.000	0.000
0	47	16	1	835.000	0.000e+000	0.000	0.000
0	47	17	1	835.000	0.000e+000	0.000	0.000
0	47	18	1	835.000	0.000e+000	0.000	0.000
0	47	19	1	835.000	0.000e+000	0.000	0.000
0	47	20	1	835.000	0.000e+000	0.000	0.000
0	47	21	1	835.000	0.000e+000	0.000	0.000
0	47	22	1	835.000	0.000e+000	0.000	0.000
0	47	23	1	835.000	0.000e+000	0.000	0.000
0	47	24	1	835.000	0.000e+000	0.000	0.000
0	47	25	1	835.000	0.000e+000	0.000	0.000
0	47	26	1	835.000	0.000e+000	0.000	0.000
0	47	27	1	835.000	0.000e+000	0.000	0.000
0	47	28	1	835.000	0.000e+000	0.000	0.000
0	47	29	1	835.000	0.000e+000	0.000	0.000
0	47	30	1	835.000	0.000e+000	0.000	0.000
0	47	31	1	835.000	0.000e+000	0.000	0.000
0	47	32	1	835.000	0.000e+000	0.000	0.000
0	47	33	1	835.000	0.000e+000	0.000	0.000
0	47	34	1	835.000	0.000e+000	0.000	0.000
0	47	35	1	835.000	0.000e+000	0.000	0.000
0	47	36	1	835.000	0.000e+000	0.000	0.000
0	47	37	1	835.000	0.000e+000	0.000	0.000
0	47	38	1	835.000	0.000e+000	0.000	0.000
0	47	39	1	835.000	0.000e+000	0.000	0.000
0	47	40	1	835.000	0.000e+000	0.000	0.000
0	47	41	1	835.000	0.000e+000	0.000	0.000
0	47	42	1	835.000	0.000e+000	0.000	0.000
0	47	43	1	835.000	0.000e+000	0.000	0.000
0	47	44	1	835.000	0.000e+000	0.000	0.000
0	47	45	1	835.000	0.000e+000	0.000	0.000
0	47	46	1	835.000	0.000e+000	0.000	0.000
0	47	47	1	835.000	0.000e+000	0.000	0.000
0	47	48	1	835.000	0.000e+000	0.000	0.000
0	47	49	1	835.000	0.000e+000	0.000	0.000

0	47	50	1	835.000	0.000e+000	0.000	0.000
0	47	51	1	835.000	0.000e+000	0.000	0.000
0	47	52	1	835.000	0.000e+000	0.000	0.000
0	47	53	1	835.000	0.000e+000	0.000	0.000
0	47	54	1	835.000	0.000e+000	0.000	0.000
0	47	55	1	835.000	0.000e+000	0.000	0.000
0	47	56	1	835.000	0.000e+000	0.000	0.000
0	1	55	1	896.000	0.000e+000	0.000	0.000
0	1	54	1	897.000	0.000e+000	0.000	0.000
0	1	47	1	898.000	0.000e+000	0.000	0.000
0	1	48	1	898.000	0.000e+000	0.000	0.000
0	1	49	1	898.000	0.000e+000	0.000	0.000
0	1	50	1	898.000	0.000e+000	0.000	0.000
0	1	51	1	898.000	0.000e+000	0.000	0.000
0	1	52	1	898.000	0.000e+000	0.000	0.000
0	1	53	1	898.000	0.000e+000	0.000	0.000
0	47	1	2	840.000	0.000e+000	0.000	0.000
0	47	2	2	835.000	0.000e+000	0.000	0.000
0	47	3	2	830.000	0.000e+000	0.000	0.000
0	47	4	2	825.000	0.000e+000	0.000	0.000
0	47	5	2	823.000	0.000e+000	0.000	0.000
0	47	6	2	822.000	0.000e+000	0.000	0.000
0	47	7	2	821.000	0.000e+000	0.000	0.000
0	47	8	2	820.000	0.000e+000	0.000	0.000
0	47	9	2	820.000	0.000e+000	0.000	0.000
0	47	10	2	820.000	0.000e+000	0.000	0.000
0	47	11	2	819.000	0.000e+000	0.000	0.000
0	47	12	2	819.000	0.000e+000	0.000	0.000
0	47	13	2	819.000	0.000e+000	0.000	0.000
0	47	14	2	819.000	0.000e+000	0.000	0.000
0	47	15	2	818.000	0.000e+000	0.000	0.000
0	47	37	2	817.000	0.000e+000	0.000	0.000
0	47	38	2	817.000	0.000e+000	0.000	0.000
0	47	39	2	817.000	0.000e+000	0.000	0.000
0	47	40	2	817.000	0.000e+000	0.000	0.000
0	47	41	2	817.000	0.000e+000	0.000	0.000
0	47	42	2	817.000	0.000e+000	0.000	0.000
0	47	16	2	818.000	0.000e+000	0.000	0.000
0	47	17	2	818.000	0.000e+000	0.000	0.000
0	47	18	2	818.000	0.000e+000	0.000	0.000
0	47	19	2	818.000	0.000e+000	0.000	0.000
0	47	20	2	818.000	0.000e+000	0.000	0.000
0	47	21	2	818.000	0.000e+000	0.000	0.000
0	47	22	2	818.000	0.000e+000	0.000	0.000
0	47	23	2	818.000	0.000e+000	0.000	0.000
0	47	24	2	818.000	0.000e+000	0.000	0.000
0	47	25	2	818.000	0.000e+000	0.000	0.000
0	47	26	2	818.000	0.000e+000	0.000	0.000
0	47	27	2	818.000	0.000e+000	0.000	0.000
0	47	28	2	818.000	0.000e+000	0.000	0.000
0	47	29	2	818.000	0.000e+000	0.000	0.000
0	47	30	2	818.000	0.000e+000	0.000	0.000
0	47	31	2	818.000	0.000e+000	0.000	0.000
0	47	32	2	818.000	0.000e+000	0.000	0.000
0	47	33	2	818.000	0.000e+000	0.000	0.000
0	47	34	2	818.000	0.000e+000	0.000	0.000
0	47	35	2	818.000	0.000e+000	0.000	0.000
0	47	36	2	818.000	0.000e+000	0.000	0.000
0	47	43	2	817.000	0.000e+000	0.000	0.000
0	47	44	2	817.000	0.000e+000	0.000	0.000
0	47	45	2	817.000	0.000e+000	0.000	0.000
0	47	46	2	817.000	0.000e+000	0.000	0.000
0	47	47	2	817.000	0.000e+000	0.000	0.000
0	47	48	2	817.000	0.000e+000	0.000	0.000
0	47	49	2	817.000	0.000e+000	0.000	0.000
0	47	50	2	817.000	0.000e+000	0.000	0.000
0	47	51	2	817.000	0.000e+000	0.000	0.000
0	47	52	2	817.000	0.000e+000	0.000	0.000
0	47	53	2	817.000	0.000e+000	0.000	0.000
0	47	54	2	817.000	0.000e+000	0.000	0.000
0	47	55	2	817.000	0.000e+000	0.000	0.000
0	47	56	2	818.000	0.000e+000	0.000	0.000
0	1	1	2	863.000	0.000e+000	0.000	0.000
0	1	2	2	861.000	0.000e+000	0.000	0.000
0	1	3	2	864.000	0.000e+000	0.000	0.000
0	1	5	2	861.000	0.000e+000	0.000	0.000
0	1	6	2	862.000	0.000e+000	0.000	0.000
0	1	7	2	862.000	0.000e+000	0.000	0.000
0	1	8	2	862.000	0.000e+000	0.000	0.000
0	1	9	2	864.000	0.000e+000	0.000	0.000
0	1	11	2	865.000	0.000e+000	0.000	0.000

0	1	12	2	865.000	0.000e+000	0.000	0.000
0	1	13	2	865.000	0.000e+000	0.000	0.000
0	1	14	2	865.000	0.000e+000	0.000	0.000
0	1	15	2	866.000	0.000e+000	0.000	0.000
0	1	16	2	866.000	0.000e+000	0.000	0.000
0	1	17	2	866.000	0.000e+000	0.000	0.000
0	1	18	2	867.000	0.000e+000	0.000	0.000
0	1	19	2	868.000	0.000e+000	0.000	0.000
0	1	20	2	869.000	0.000e+000	0.000	0.000
0	1	21	2	870.000	0.000e+000	0.000	0.000
0	1	22	2	870.000	0.000e+000	0.000	0.000
0	1	23	2	871.000	0.000e+000	0.000	0.000
0	1	24	2	871.000	0.000e+000	0.000	0.000
0	1	25	2	872.000	0.000e+000	0.000	0.000
0	1	26	2	872.000	0.000e+000	0.000	0.000
0	1	27	2	873.000	0.000e+000	0.000	0.000
0	1	28	2	873.000	0.000e+000	0.000	0.000
0	1	29	2	873.000	0.000e+000	0.000	0.000
0	1	30	2	873.000	0.000e+000	0.000	0.000
0	1	31	2	873.000	0.000e+000	0.000	0.000
0	1	32	2	874.000	0.000e+000	0.000	0.000
0	1	33	2	874.000	0.000e+000	0.000	0.000
0	1	34	2	874.000	0.000e+000	0.000	0.000
0	1	36	2	876.000	0.000e+000	0.000	0.000
0	1	35	2	875.000	0.000e+000	0.000	0.000
0	1	38	2	875.000	0.000e+000	0.000	0.000
0	1	37	2	876.000	0.000e+000	0.000	0.000
0	1	42	2	877.000	0.000e+000	0.000	0.000
0	1	41	2	877.000	0.000e+000	0.000	0.000
0	1	40	2	876.000	0.000e+000	0.000	0.000
0	1	39	2	876.000	0.000e+000	0.000	0.000
0	1	43	2	878.000	0.000e+000	0.000	0.000
0	1	44	2	879.000	0.000e+000	0.000	0.000
0	1	45	2	880.000	0.000e+000	0.000	0.000
0	1	46	2	880.000	0.000e+000	0.000	0.000
0	1	47	2	881.000	0.000e+000	0.000	0.000
0	1	48	2	881.000	0.000e+000	0.000	0.000
0	1	49	2	882.000	0.000e+000	0.000	0.000
0	1	50	2	883.000	0.000e+000	0.000	0.000
0	1	51	2	883.000	0.000e+000	0.000	0.000
0	1	52	2	884.000	0.000e+000	0.000	0.000
0	1	53	2	886.000	0.000e+000	0.000	0.000
0	1	54	2	887.000	0.000e+000	0.000	0.000
0	1	55	2	880.000	0.000e+000	0.000	0.000
0	1	56	2	878.000	0.000e+000	0.000	0.000
0	1	10	2	865.000	0.000e+000	0.000	0.000
0	1	4	2	862.000	0.000e+000	0.000	0.000
0	47	1	3	840.000	0.000e+000	0.000	0.000
0	47	2	3	835.000	0.000e+000	0.000	0.000
0	47	3	3	830.000	0.000e+000	0.000	0.000
0	47	4	3	825.000	0.000e+000	0.000	0.000
0	47	5	3	823.000	0.000e+000	0.000	0.000
0	47	6	3	822.000	0.000e+000	0.000	0.000
0	47	7	3	821.000	0.000e+000	0.000	0.000
0	47	8	3	820.000	0.000e+000	0.000	0.000
0	47	9	3	820.000	0.000e+000	0.000	0.000
0	47	10	3	820.000	0.000e+000	0.000	0.000
0	47	11	3	819.000	0.000e+000	0.000	0.000
0	47	12	3	819.000	0.000e+000	0.000	0.000
0	47	13	3	819.000	0.000e+000	0.000	0.000
0	47	14	3	819.000	0.000e+000	0.000	0.000
0	47	15	3	818.000	0.000e+000	0.000	0.000
0	47	37	3	817.000	0.000e+000	0.000	0.000
0	47	38	3	817.000	0.000e+000	0.000	0.000
0	47	39	3	817.000	0.000e+000	0.000	0.000
0	47	40	3	817.000	0.000e+000	0.000	0.000
0	47	41	3	817.000	0.000e+000	0.000	0.000
0	47	42	3	817.000	0.000e+000	0.000	0.000
0	47	16	3	818.000	0.000e+000	0.000	0.000
0	47	17	3	818.000	0.000e+000	0.000	0.000
0	47	18	3	818.000	0.000e+000	0.000	0.000
0	47	19	3	818.000	0.000e+000	0.000	0.000
0	47	20	3	818.000	0.000e+000	0.000	0.000
0	47	21	3	818.000	0.000e+000	0.000	0.000
0	47	22	3	818.000	0.000e+000	0.000	0.000
0	47	23	3	818.000	0.000e+000	0.000	0.000
0	47	24	3	818.000	0.000e+000	0.000	0.000
0	47	25	3	818.000	0.000e+000	0.000	0.000
0	47	26	3	818.000	0.000e+000	0.000	0.000
0	47	27	3	818.000	0.000e+000	0.000	0.000
0	47	28	3	818.000	0.000e+000	0.000	0.000

0	47	29	3	818.000	0.000e+000	0.000	0.000
0	47	30	3	818.000	0.000e+000	0.000	0.000
0	47	31	3	818.000	0.000e+000	0.000	0.000
0	47	32	3	818.000	0.000e+000	0.000	0.000
0	47	33	3	818.000	0.000e+000	0.000	0.000
0	47	34	3	818.000	0.000e+000	0.000	0.000
0	47	35	3	818.000	0.000e+000	0.000	0.000
0	47	36	3	818.000	0.000e+000	0.000	0.000
0	47	43	3	817.000	0.000e+000	0.000	0.000
0	47	44	3	817.000	0.000e+000	0.000	0.000
0	47	45	3	817.000	0.000e+000	0.000	0.000
0	47	46	3	817.000	0.000e+000	0.000	0.000
0	47	47	3	817.000	0.000e+000	0.000	0.000
0	47	48	3	817.000	0.000e+000	0.000	0.000
0	47	49	3	817.000	0.000e+000	0.000	0.000
0	47	50	3	817.000	0.000e+000	0.000	0.000
0	47	51	3	817.000	0.000e+000	0.000	0.000
0	47	52	3	817.000	0.000e+000	0.000	0.000
0	47	53	3	817.000	0.000e+000	0.000	0.000
0	47	54	3	817.000	0.000e+000	0.000	0.000
0	47	55	3	817.000	0.000e+000	0.000	0.000
0	47	56	3	818.000	0.000e+000	0.000	0.000
0	1	1	3	857.000	0.000e+000	0.000	0.000
0	1	2	3	855.000	0.000e+000	0.000	0.000
0	1	3	3	856.000	0.000e+000	0.000	0.000
0	1	4	3	853.000	0.000e+000	0.000	0.000
0	1	5	3	851.000	0.000e+000	0.000	0.000
0	1	6	3	851.000	0.000e+000	0.000	0.000
0	1	8	3	850.000	0.000e+000	0.000	0.000
0	1	9	3	851.000	0.000e+000	0.000	0.000
0	1	10	3	851.000	0.000e+000	0.000	0.000
0	1	11	3	851.000	0.000e+000	0.000	0.000
0	1	12	3	851.000	0.000e+000	0.000	0.000
0	1	13	3	851.000	0.000e+000	0.000	0.000
0	1	14	3	851.000	0.000e+000	0.000	0.000
0	1	15	3	852.000	0.000e+000	0.000	0.000
0	1	16	3	851.000	0.000e+000	0.000	0.000
0	1	17	3	852.000	0.000e+000	0.000	0.000
0	1	18	3	852.000	0.000e+000	0.000	0.000
0	1	19	3	853.000	0.000e+000	0.000	0.000
0	1	20	3	853.000	0.000e+000	0.000	0.000
0	1	21	3	854.000	0.000e+000	0.000	0.000
0	1	22	3	854.000	0.000e+000	0.000	0.000
0	1	23	3	855.000	0.000e+000	0.000	0.000
0	1	24	3	855.000	0.000e+000	0.000	0.000
0	1	25	3	855.000	0.000e+000	0.000	0.000
0	1	26	3	855.000	0.000e+000	0.000	0.000
0	1	27	3	856.000	0.000e+000	0.000	0.000
0	1	28	3	856.000	0.000e+000	0.000	0.000
0	1	29	3	856.000	0.000e+000	0.000	0.000
0	1	30	3	856.000	0.000e+000	0.000	0.000
0	1	31	3	856.000	0.000e+000	0.000	0.000
0	1	32	3	857.000	0.000e+000	0.000	0.000
0	1	33	3	857.000	0.000e+000	0.000	0.000
0	1	34	3	857.000	0.000e+000	0.000	0.000
0	1	35	3	857.000	0.000e+000	0.000	0.000
0	1	36	3	857.000	0.000e+000	0.000	0.000
0	1	37	3	858.000	0.000e+000	0.000	0.000
0	1	38	3	858.000	0.000e+000	0.000	0.000
0	1	39	3	858.000	0.000e+000	0.000	0.000
0	1	40	3	858.000	0.000e+000	0.000	0.000
0	1	41	3	858.000	0.000e+000	0.000	0.000
0	1	42	3	858.000	0.000e+000	0.000	0.000
0	1	43	3	860.000	0.000e+000	0.000	0.000
0	1	44	3	860.000	0.000e+000	0.000	0.000
0	1	45	3	861.000	0.000e+000	0.000	0.000
0	1	46	3	861.000	0.000e+000	0.000	0.000
0	1	47	3	862.000	0.000e+000	0.000	0.000
0	1	48	3	862.000	0.000e+000	0.000	0.000
0	1	49	3	862.000	0.000e+000	0.000	0.000
0	1	50	3	863.000	0.000e+000	0.000	0.000
0	1	51	3	863.000	0.000e+000	0.000	0.000
0	1	52	3	864.000	0.000e+000	0.000	0.000
0	1	53	3	865.000	0.000e+000	0.000	0.000
0	1	54	3	866.000	0.000e+000	0.000	0.000
0	1	55	3	861.000	0.000e+000	0.000	0.000
0	1	56	3	860.000	0.000e+000	0.000	0.000
0	1	7	3	850.000	0.000e+000	0.000	0.000
0	40	56	4	807.000	0.000e+000	0.000	0.000
0	41	56	4	808.000	0.000e+000	0.000	0.000
0	42	56	4	810.000	0.000e+000	0.000	0.000

0	43	56	4	813.000	0.000e+000	0.000	0.000
0	44	56	4	815.000	0.000e+000	0.000	0.000
0	45	56	4	820.000	0.000e+000	0.000	0.000
0	47	31	4	819.000	0.000e+000	0.000	0.000
0	47	32	4	820.000	0.000e+000	0.000	0.000
0	47	33	4	820.000	0.000e+000	0.000	0.000
0	47	34	4	820.000	0.000e+000	0.000	0.000
0	47	35	4	820.000	0.000e+000	0.000	0.000
0	47	36	4	820.000	0.000e+000	0.000	0.000
0	47	37	4	820.000	0.000e+000	0.000	0.000
0	47	38	4	820.000	0.000e+000	0.000	0.000
0	47	39	4	820.000	0.000e+000	0.000	0.000
0	47	40	4	820.000	0.000e+000	0.000	0.000
0	47	41	4	820.000	0.000e+000	0.000	0.000
0	47	42	4	820.000	0.000e+000	0.000	0.000
0	47	43	4	820.000	0.000e+000	0.000	0.000
0	47	44	4	820.000	0.000e+000	0.000	0.000
0	47	45	4	820.000	0.000e+000	0.000	0.000
0	47	46	4	820.000	0.000e+000	0.000	0.000
0	47	47	4	820.000	0.000e+000	0.000	0.000
0	47	48	4	821.000	0.000e+000	0.000	0.000
0	47	49	4	821.000	0.000e+000	0.000	0.000
0	47	50	4	821.000	0.000e+000	0.000	0.000
0	47	51	4	821.000	0.000e+000	0.000	0.000
0	47	52	4	821.000	0.000e+000	0.000	0.000
0	47	53	4	821.000	0.000e+000	0.000	0.000
0	46	56	4	822.000	0.000e+000	0.000	0.000
0	47	1	4	816.000	0.000e+000	0.000	0.000
0	47	56	4	823.000	0.000e+000	0.000	0.000
0	47	54	4	821.500	0.000e+000	0.000	0.000
0	47	55	4	822.000	0.000e+000	0.000	0.000
0	47	19	4	816.800	0.000e+000	0.000	0.000
0	47	20	4	816.800	0.000e+000	0.000	0.000
0	47	21	4	816.800	0.000e+000	0.000	0.000
0	47	22	4	816.800	0.000e+000	0.000	0.000
0	47	23	4	816.800	0.000e+000	0.000	0.000
0	47	24	4	816.800	0.000e+000	0.000	0.000
0	47	25	4	816.800	0.000e+000	0.000	0.000
0	47	26	4	816.800	0.000e+000	0.000	0.000
0	47	27	4	816.800	0.000e+000	0.000	0.000
0	47	28	4	816.800	0.000e+000	0.000	0.000
0	47	29	4	816.800	0.000e+000	0.000	0.000
0	47	30	4	816.800	0.000e+000	0.000	0.000
0	47	12	4	816.600	0.000e+000	0.000	0.000
0	47	13	4	816.600	0.000e+000	0.000	0.000
0	47	14	4	816.600	0.000e+000	0.000	0.000
0	47	15	4	816.600	0.000e+000	0.000	0.000
0	47	16	4	816.600	0.000e+000	0.000	0.000
0	47	17	4	816.600	0.000e+000	0.000	0.000
0	47	18	4	816.600	0.000e+000	0.000	0.000
0	47	7	4	816.400	0.000e+000	0.000	0.000
0	47	8	4	816.400	0.000e+000	0.000	0.000
0	47	9	4	816.400	0.000e+000	0.000	0.000
0	47	10	4	816.400	0.000e+000	0.000	0.000
0	47	11	4	816.400	0.000e+000	0.000	0.000
0	47	3	4	816.200	0.000e+000	0.000	0.000
0	47	4	4	816.200	0.000e+000	0.000	0.000
0	47	5	4	816.200	0.000e+000	0.000	0.000
0	47	6	4	816.200	0.000e+000	0.000	0.000
0	47	2	4	816.100	0.000e+000	0.000	0.000
0	39	56	4	806.000	0.000e+000	0.000	0.000
0	1	1	4	830.246	0.000e+000	0.000	0.000
0	38	56	4	805.123	0.000e+000	0.000	0.000
0	1	2	4	829.869	0.000e+000	0.000	0.000
0	1	3	4	829.611	0.000e+000	0.000	0.000
0	1	4	4	829.277	0.000e+000	0.000	0.000
0	1	5	4	828.943	0.000e+000	0.000	0.000
0	1	6	4	828.642	0.000e+000	0.000	0.000
0	1	7	4	828.441	0.000e+000	0.000	0.000
0	1	8	4	828.306	0.000e+000	0.000	0.000
0	1	9	4	828.174	0.000e+000	0.000	0.000
0	1	10	4	828.074	0.000e+000	0.000	0.000
0	1	11	4	828.007	0.000e+000	0.000	0.000
0	1	12	4	827.940	0.000e+000	0.000	0.000
0	1	13	4	827.873	0.000e+000	0.000	0.000
0	1	14	4	827.806	0.000e+000	0.000	0.000
0	1	15	4	827.739	0.000e+000	0.000	0.000
0	1	16	4	827.689	0.000e+000	0.000	0.000
0	1	17	4	827.656	0.000e+000	0.000	0.000
0	1	18	4	827.622	0.000e+000	0.000	0.000
0	1	19	4	827.589	0.000e+000	0.000	0.000

0	1	20	4	827.556	0.000e+000	0.000	0.000
0	1	21	4	827.522	0.000e+000	0.000	0.000
0	1	22	4	827.489	0.000e+000	0.000	0.000
0	1	23	4	827.455	0.000e+000	0.000	0.000
0	1	24	4	827.422	0.000e+000	0.000	0.000
0	1	25	4	827.388	0.000e+000	0.000	0.000
0	1	26	4	827.355	0.000e+000	0.000	0.000
0	1	27	4	827.322	0.000e+000	0.000	0.000
0	1	28	4	827.288	0.000e+000	0.000	0.000
0	1	29	4	827.255	0.000e+000	0.000	0.000
0	1	30	4	827.221	0.000e+000	0.000	0.000
0	1	31	4	827.188	0.000e+000	0.000	0.000
0	1	32	4	827.154	0.000e+000	0.000	0.000
0	1	33	4	827.121	0.000e+000	0.000	0.000
0	1	34	4	827.088	0.000e+000	0.000	0.000
0	1	35	4	827.054	0.000e+000	0.000	0.000
0	1	36	4	827.021	0.000e+000	0.000	0.000
0	1	37	4	826.987	0.000e+000	0.000	0.000
0	1	38	4	826.954	0.000e+000	0.000	0.000
0	1	39	4	826.920	0.000e+000	0.000	0.000
0	1	40	4	826.887	0.000e+000	0.000	0.000
0	1	41	4	826.854	0.000e+000	0.000	0.000
0	1	42	4	826.820	0.000e+000	0.000	0.000
0	1	43	4	826.770	0.000e+000	0.000	0.000
0	1	44	4	826.703	0.000e+000	0.000	0.000
0	1	45	4	826.636	0.000e+000	0.000	0.000
0	1	46	4	826.569	0.000e+000	0.000	0.000
0	1	47	4	826.503	0.000e+000	0.000	0.000
0	1	48	4	826.436	0.000e+000	0.000	0.000
0	1	49	4	826.335	0.000e+000	0.000	0.000
0	1	50	4	826.202	0.000e+000	0.000	0.000
0	1	51	4	826.068	0.000e+000	0.000	0.000
0	1	52	4	825.934	0.000e+000	0.000	0.000
0	1	53	4	825.801	0.000e+000	0.000	0.000
0	1	54	4	825.583	0.000e+000	0.000	0.000
0	1	55	4	825.266	0.000e+000	0.000	0.000
0	22	56	4	812.609	0.000e+000	0.000	0.000
0	23	56	4	812.113	0.000e+000	0.000	0.000
0	24	56	4	811.618	0.000e+000	0.000	0.000
0	25	56	4	811.122	0.000e+000	0.000	0.000
0	26	56	4	810.627	0.000e+000	0.000	0.000
0	27	56	4	810.131	0.000e+000	0.000	0.000
0	28	56	4	809.635	0.000e+000	0.000	0.000
0	29	56	4	809.140	0.000e+000	0.000	0.000
0	30	56	4	808.644	0.000e+000	0.000	0.000
0	31	56	4	808.149	0.000e+000	0.000	0.000
0	32	56	4	807.653	0.000e+000	0.000	0.000
0	33	56	4	807.157	0.000e+000	0.000	0.000
0	34	56	4	806.662	0.000e+000	0.000	0.000
0	35	56	4	806.166	0.000e+000	0.000	0.000
0	36	56	4	805.671	0.000e+000	0.000	0.000
0	37	56	4	805.211	0.000e+000	0.000	0.000
0	14	56	4	813.960	0.000e+000	0.000	0.000
0	15	56	4	813.849	0.000e+000	0.000	0.000
0	16	56	4	813.707	0.000e+000	0.000	0.000
0	17	56	4	813.566	0.000e+000	0.000	0.000
0	18	56	4	813.425	0.000e+000	0.000	0.000
0	19	56	4	813.284	0.000e+000	0.000	0.000
0	20	56	4	813.143	0.000e+000	0.000	0.000
0	21	56	4	813.036	0.000e+000	0.000	0.000
0	1	56	4	824.420	0.000e+000	0.000	0.000
0	2	56	4	822.804	0.000e+000	0.000	0.000
0	3	56	4	820.939	0.000e+000	0.000	0.000
0	4	56	4	819.281	0.000e+000	0.000	0.000
0	5	56	4	818.036	0.000e+000	0.000	0.000
0	6	56	4	817.209	0.000e+000	0.000	0.000
0	7	56	4	816.380	0.000e+000	0.000	0.000
0	8	56	4	815.758	0.000e+000	0.000	0.000
0	9	56	4	815.344	0.000e+000	0.000	0.000
0	10	56	4	814.929	0.000e+000	0.000	0.000
0	11	56	4	814.618	0.000e+000	0.000	0.000
0	12	56	4	814.411	0.000e+000	0.000	0.000
0	13	56	4	814.254	0.000e+000	0.000	0.000
0	2	1	4	828.454	0.000e+000	0.000	0.000
0	3	1	4	826.397	0.000e+000	0.000	0.000
0	4	1	4	824.261	0.000e+000	0.000	0.000
0	5	1	4	822.695	0.000e+000	0.000	0.000
0	6	1	4	821.637	0.000e+000	0.000	0.000
0	7	1	4	820.579	0.000e+000	0.000	0.000
0	8	1	4	819.600	0.000e+000	0.000	0.000
0	9	1	4	819.031	0.000e+000	0.000	0.000

0	10	1	4	818.674	0.000e+000	0.000	0.000
0	11	1	4	818.406	0.000e+000	0.000	0.000
0	12	1	4	818.227	0.000e+000	0.000	0.000
0	13	1	4	818.048	0.000e+000	0.000	0.000
0	14	1	4	817.870	0.000e+000	0.000	0.000
0	15	1	4	817.691	0.000e+000	0.000	0.000
0	16	1	4	817.513	0.000e+000	0.000	0.000
0	17	1	4	817.334	0.000e+000	0.000	0.000
0	18	1	4	817.156	0.000e+000	0.000	0.000
0	19	1	4	816.977	0.000e+000	0.000	0.000
0	20	1	4	816.799	0.000e+000	0.000	0.000
0	21	1	4	816.620	0.000e+000	0.000	0.000
0	22	1	4	816.442	0.000e+000	0.000	0.000
0	23	1	4	816.263	0.000e+000	0.000	0.000
0	24	1	4	816.084	0.000e+000	0.000	0.000
0	25	1	4	815.906	0.000e+000	0.000	0.000
0	26	1	4	815.727	0.000e+000	0.000	0.000
0	27	1	4	815.549	0.000e+000	0.000	0.000
0	28	1	4	815.370	0.000e+000	0.000	0.000
0	29	1	4	815.192	0.000e+000	0.000	0.000
0	30	1	4	815.013	0.000e+000	0.000	0.000
0	31	1	4	814.834	0.000e+000	0.000	0.000
0	32	1	4	814.656	0.000e+000	0.000	0.000
0	33	1	4	814.477	0.000e+000	0.000	0.000
0	34	1	4	814.299	0.000e+000	0.000	0.000
0	35	1	4	814.120	0.000e+000	0.000	0.000
0	36	1	4	814.015	0.000e+000	0.000	0.000
0	37	1	4	814.077	0.000e+000	0.000	0.000
0	38	1	4	814.219	0.000e+000	0.000	0.000
0	39	1	4	814.361	0.000e+000	0.000	0.000
0	40	1	4	814.542	0.000e+000	0.000	0.000
0	41	1	4	814.704	0.000e+000	0.000	0.000
0	42	1	4	814.946	0.000e+000	0.000	0.000
0	43	1	4	815.269	0.000e+000	0.000	0.000
0	44	1	4	815.592	0.000e+000	0.000	0.000
0	45	1	4	816.077	0.000e+000	0.000	0.000
0	46	1	4	816.700	0.000e+000	0.000	0.000

RIVER CELLS:

Reach	Row	Column	Layer	Stage	Bottom	Conductance	Concentration Time	Starting Time	Ending Time
0	37	55	1	800.000	790.000	2.000e+005	0.000e+000	0.000	0.000
0	37	56	1	800.000	790.000	2.000e+005	0.000e+000	0.000	0.000
0	38	55	1	800.000	790.000	2.000e+005	0.000e+000	0.000	0.000
0	38	56	1	800.000	790.000	2.000e+005	0.000e+000	0.000	0.000
0	39	55	1	800.000	790.000	2.000e+005	0.000e+000	0.000	0.000
0	39	56	1	800.000	790.000	2.000e+005	0.000e+000	0.000	0.000
0	40	56	1	800.000	790.000	2.000e+005	0.000e+000	0.000	0.000
0	36	55	1	800.000	790.000	1.000e+005	0.000e+000	0.000	0.000
0	35	55	1	800.000	790.000	1.000e+005	0.000e+000	0.000	0.000
0	31	53	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	32	49	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	32	51	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	32	52	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	32	53	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	32	54	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	33	49	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	33	50	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	33	51	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	33	52	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	33	53	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	33	54	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	34	49	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	34	50	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	34	51	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	34	52	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	34	53	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	34	54	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	35	49	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	35	50	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	35	51	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	35	52	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	35	53	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	35	54	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	36	49	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	36	50	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	36	51	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	36	52	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	36	53	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000

0	36	54	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	31	52	1	800.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	31	49	1	800.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	37	49	1	800.000	790.000	6.000e+004	0.000e+000	0.000	0.000
0	37	50	1	800.000	790.000	6.000e+004	0.000e+000	0.000	0.000
0	37	51	1	800.000	790.000	6.000e+004	0.000e+000	0.000	0.000
0	37	52	1	800.000	790.000	8.000e+004	0.000e+000	0.000	0.000
0	37	53	1	800.000	790.000	8.000e+004	0.000e+000	0.000	0.000
0	37	54	1	800.000	790.000	8.000e+004	0.000e+000	0.000	0.000
0	38	49	1	800.000	790.000	8.000e+004	0.000e+000	0.000	0.000
0	38	50	1	800.000	790.000	8.000e+004	0.000e+000	0.000	0.000
0	38	51	1	800.000	790.000	4.000e+004	0.000e+000	0.000	0.000
0	28	1	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	29	1	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	30	1	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	30	2	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	30	3	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	31	1	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	31	2	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	31	3	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	31	4	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	32	1	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	32	2	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	32	3	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	32	4	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	33	1	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	33	2	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	33	3	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	33	4	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	34	1	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	34	2	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	34	3	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	34	4	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	35	1	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	35	3	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	35	4	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	36	1	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	36	4	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	37	1	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	38	1	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	38	4	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	39	1	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	39	4	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	40	1	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	40	2	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	40	3	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	40	4	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	41	2	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	41	3	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	37	4	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	33	5	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	34	5	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	35	5	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	35	6	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	36	5	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	36	6	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	37	5	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	37	6	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	37	7	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	38	5	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	38	6	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	38	7	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	39	6	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	39	7	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	40	6	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	40	7	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	41	7	1	802.000	790.000	2.000e+004	0.000e+000	0.000	0.000
0	37	33	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	37	34	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	37	35	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	37	36	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	37	37	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	37	38	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	38	6	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	38	27	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	38	28	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	38	29	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	38	30	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	38	31	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	38	32	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	38	33	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000

0	38	34	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	38	35	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	38	36	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	38	37	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	38	38	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	8	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	9	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	10	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	11	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	12	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	13	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	14	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	15	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	16	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	17	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	18	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	19	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	20	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	21	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	22	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	23	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	24	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	25	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	26	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	27	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	28	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	29	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	30	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	31	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	32	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	33	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	34	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	35	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	36	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	37	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	38	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	8	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	9	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	10	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	11	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	12	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	13	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	14	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	15	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	16	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	17	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	18	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	19	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	20	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	21	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	22	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	23	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	24	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	25	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	26	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	27	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	28	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	29	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	30	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	31	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	32	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	33	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	34	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	35	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	36	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	37	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	38	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	8	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	9	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	10	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	11	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	12	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	13	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	14	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	15	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	16	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	17	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	18	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	19	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	20	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	21	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000

0	41	22	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	23	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	24	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	25	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	26	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	27	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	28	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	29	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	30	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	31	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	32	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	33	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	34	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	35	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	36	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	37	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	41	38	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	42	10	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	42	11	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	42	12	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	42	13	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	42	14	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	42	15	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	42	16	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	42	17	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	42	18	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	42	19	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	42	20	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	42	21	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	42	22	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	42	23	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	42	24	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	42	25	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	42	26	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	42	27	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	42	28	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	42	29	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	42	30	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	34	43	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	35	40	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	35	41	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	35	42	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	35	43	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	36	40	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	36	41	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	36	42	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	36	43	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	37	40	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	37	41	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	37	42	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	37	43	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	38	40	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	38	41	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	38	42	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	38	43	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	40	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	41	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	42	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	43	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	40	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	41	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	42	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	43	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	36	39	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	37	39	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	38	39	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	39	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	40	39	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	29	46	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	29	47	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	29	48	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	30	46	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	30	47	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	30	48	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	31	45	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	31	46	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	31	47	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	31	48	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	32	44	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	32	45	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	32	46	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000

0	32	47	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	32	48	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	33	44	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	33	45	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	33	46	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	33	47	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	33	48	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	34	44	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	34	45	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	34	46	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	34	47	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	34	48	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	35	44	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	35	45	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	35	46	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	35	47	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	35	48	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	36	44	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	36	45	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	36	46	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	36	47	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	36	48	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	37	44	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	37	45	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	37	46	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	37	47	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	37	48	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	38	44	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	38	45	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	38	46	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	38	47	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	38	48	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	44	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	45	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	46	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	47	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000
0	39	48	1	801.000	790.000	5.000e+004	0.000e+000	0.000	0.000

DRAIN CELLS:

Reach	Row	Column	Layer	Head	Conductance	Starting Time	Ending Time
0	26	44	1	800.000	1.000e+003	0.000	0.000
0	26	45	1	800.000	1.000e+003	0.000	0.000
0	27	44	1	800.000	1.000e+003	0.000	0.000
0	27	45	1	800.000	1.000e+003	0.000	0.000
0	28	45	1	800.000	2.000e+003	0.000	0.000
0	29	45	1	800.000	2.000e+003	0.000	0.000
0	30	45	1	800.000	2.000e+003	0.000	0.000
0	25	44	1	800.000	1.000e+003	0.000	0.000
0	22	44	1	803.000	5.000e+002	0.000	0.000
0	24	44	1	801.000	1.000e+003	0.000	0.000
0	23	44	1	801.000	1.000e+003	0.000	0.000
0	28	45	3	800.000	5.000e+003	0.000	0.000
0	29	45	3	800.000	5.000e+003	0.000	0.000
0	30	45	3	800.000	5.000e+003	0.000	0.000
0	23	44	3	800.000	5.000e+003	0.000	0.000
0	24	44	3	800.000	5.000e+003	0.000	0.000
0	25	44	3	800.000	5.000e+003	0.000	0.000
0	26	44	3	800.000	5.000e+003	0.000	0.000
0	27	44	3	800.000	5.000e+003	0.000	0.000

WELLS:

Reach	Row	Column	Layer	Flow Rate	Concentration	Starting Time	Ending Time
0	20	48	1	-2700.000	0.000e+000	0.000	158.000
0	31	31	1	-7700.000	0.000e+000	0.000	158.000
0	26	19	1	-7700.000	0.000e+000	0.000	158.000
0	27	38	1	0.000	0.000e+000	0.000	0.000
0	29	35	1	0.000	0.000e+000	0.000	0.000
0	16	29	1	0.000	0.000e+000	0.000	0.000
0	21	49	1	-4235.000	0.000e+000	0.000	0.000
0	21	47	1	0.000	0.000e+000	0.000	0.000
0	22	46	1	0.000	0.000e+000	0.000	0.000
0	23	45	1	0.000	0.000e+000	0.000	0.000
0	31	31	1	-3291.000	0.000e+000	0.000	0.000
0	26	19	1	-7384.000	0.000e+000	0.000	0.000
0	23	45	2	-5000.000	0.000e+000	0.000	158.000

0	22	46	2	-3500.000	0.000e+000	0.000	158.000
0	21	47	2	-6350.000	0.000e+000	0.000	158.000
0	31	31	2	-9000.000	0.000e+000	0.000	158.000
0	27	38	2	0.000	0.000e+000	0.000	0.000
0	21	49	2	0.000	0.000e+000	0.000	0.000
0	26	19	2	0.000	0.000e+000	0.000	0.000
0	31	31	2	-1411.000	0.000e+000	0.000	0.000
0	29	35	2	-14543.000	0.000e+000	0.000	0.000
0	18	29	2	-26.000	0.000e+000	0.000	0.000
0	21	47	2	-1000.000	0.000e+000	0.000	0.000
0	22	46	2	-1000.000	0.000e+000	0.000	0.000
0	23	45	2	-1000.000	0.000e+000	0.000	0.000
0	31	31	3	18700.000	0.000e+000	0.000	158.000
0	2	1	3	-34000.000	0.000e+000	0.000	158.000
0	29	35	3	47700.000	0.000e+000	0.000	158.000
0	27	38	3	0.000	0.000e+000	0.000	0.000
0	21	49	3	0.000	0.000e+000	0.000	0.000
0	26	19	3	0.000	0.000e+000	0.000	0.000
0	2	1	3	-34000.000	0.000e+000	0.000	0.000
0	31	31	3	0.000	0.000e+000	0.000	0.000
0	29	35	3	-24000.000	0.000e+000	0.000	0.000
0	18	29	3	-6100.000	0.000e+000	0.000	0.000
0	23	45	3	-5353.000	0.000e+000	0.000	0.000
0	22	46	3	-4968.000	0.000e+000	0.000	0.000
0	21	47	3	-5545.000	0.000e+000	0.000	0.000
0	2	2	4	-136000.000	0.000e+000	0.000	158.000
0	35	13	4	-7900.000	0.000e+000	0.000	158.000
0	18	29	4	0.000	0.000e+000	0.000	0.000
0	26	19	4	0.000	0.000e+000	0.000	0.000
0	29	35	4	0.000	0.000e+000	0.000	0.000
0	2	2	4	-136000.000	0.000e+000	0.000	0.000
0	34	14	4	-7900.000	0.000e+000	0.000	0.000
0	31	31	4	0.000	0.000e+000	0.000	0.000

CALIBRATION TARGETS:

Head Targets.....: 38
Flux Targets.....: 0
Concentration Targets..: 0

HEAD TARGET DATA:

Well Name	Row	Column	Layer	Head	Standard Deviation	Time
2S	29	15	1	814.000	1.000	0.000	0.000
3S	24	19	1	814.000	1.000	0.000	0.000
6S	32	29	1	812.000	1.000	0.000	0.000
18S	31	38	1	804.000	1.000	0.000	0.000
19S	28	44	1	801.000	1.000	0.000	0.000
27S	33	42	1	802.000	1.000	0.000	0.000
9S	18	29	1	813.000	1.000	0.000	0.000
9S	34	32	1	810.000	1.000	0.000	0.000
20S	20	36	1	814.000	1.000	0.000	0.000
7S	25	15	1	814.000	1.000	0.000	0.000
13S	25	12	1	814.000	1.000	0.000	0.000
14S	22	10	1	815.000	1.000	0.000	0.000
15S	18	12	1	815.000	1.000	0.000	0.000
21S	18	21	1	815.000	1.000	0.000	0.000
4S	16	26	1	814.000	1.000	0.000	0.000
3S	10	28	1	814.000	1.000	0.000	0.000
16I	34	43	2	802.000	1.000	0.000	0.000
5I	16	29	2	809.000	1.000	0.000	0.000
8I	30	34	2	804.000	1.000	0.000	0.000
12I	28	38	2	812.000	1.000	0.000	0.000
13I	27	38	2	811.000	1.000	0.000	0.000
15I	30	42	2	804.000	1.000	0.000	0.000
1I	16	12	2	814.000	1.000	0.000	0.000
2I	16	21	2	813.000	1.000	0.000	0.000
10I	25	15	2	814.000	1.000	0.000	0.000
10D	16	12	3	814.000	1.000	0.000	0.000
5D	25	15	3	814.000	1.000	0.000	0.000
2D	30	15	3	814.000	1.000	0.000	0.000
13D	34	16	3	814.000	1.000	0.000	0.000
4D	33	26	3	805.000	1.000	0.000	0.000
7D	34	32	3	802.000	1.000	0.000	0.000
6D	31	32	3	805.000	1.000	0.000	0.000
8D	31	36	3	804.000	1.000	0.000	0.000
16D	34	42	3	801.000	1.000	0.000	0.000
9D	28	45	3	800.000	1.000	0.000	0.000

17D	27	38	3	805.000	1.000	0.000	0.000
14D	16	29	3	812.000	1.000	0.000	0.000
3D	16	26	3	813.000	1.000	0.000	0.000

EXAMPLE MODFLOW OUTPUT FILE

NR108 SIMULATION OF EXISTING RECOVERY SYSTEM,
OPTIMIZED PUMPING RATES

```
1                U.S. GEOLOGICAL SURVEY MODULAR FINITE-DIFFERENCE GROUND-WATER MODEL
0NR108  EXISTING RECOVERY SYSTEM, OPTIMIZED RATES (60, 100, 200, 100 GPM)
   4 LAYERS       47 ROWS       56 COLUMNS
  1 STRESS PERIOD(S) IN SIMULATION
 MODEL TIME UNIT IS DAYS
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 13 12 16  0  0  0 18 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 NOT BE SAVED -- DRAWDOWN CANNOT BE CALCULATED
   92239 ELEMENTS IN X ARRAY ARE USED BY BAS
   92239 ELEMENTS OF X ARRAY USED OUT OF 9999999
0BCF1 -- BLOCK-CENTERED FLOW PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT 11
 STEADY-STATE SIMULATION
     LAYER  AQUIFER TYPE
     -----  -----------
       1        1
       2        0
       3        0
       4        0
    5268 ELEMENTS IN X ARRAY ARE USED BY BCF
   97507 ELEMENTS OF X ARRAY USED OUT OF 9999999
0WEL1 -- WELL PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM 13
 MAXIMUM OF   35 WELLS
     140 ELEMENTS IN X ARRAY ARE USED FOR WELLS
   97647 ELEMENTS OF X ARRAY USED OUT OF 9999999
0DRN1 -- DRAIN PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT 12
 MAXIMUM OF   19 DRAINS
      95 ELEMENTS IN X ARRAY ARE USED FOR DRAINS
   97742 ELEMENTS OF X ARRAY USED OUT OF 9999999
0RCH1 -- RECHARGE PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT 18
 OPTION 1 -- RECHARGE TO TOP LAYER
    2632 ELEMENTS OF X ARRAY USED FOR RECHARGE
  100374 ELEMENTS OF X ARRAY USED OUT OF 9999999
0RIV1 -- RIVER PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT 16
 MAXIMUM OF  939 RIVER NODES
    5634 ELEMENTS IN X ARRAY ARE USED FOR RIVERS
  106008 ELEMENTS OF X ARRAY USED OUT OF 9999999
0SIP1 -- STRONGLY IMPLICIT PROCEDURE SOLUTION PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT 19
 MAXIMUM OF 150 ITERATIONS ALLOWED FOR CLOSURE
  5 ITERATION PARAMETERS
   42717 ELEMENTS IN X ARRAY ARE USED BY SIP
  148725 ELEMENTS OF X ARRAY USED OUT OF 9999999
1NR108  EXISTING RECOVERY SYSTEM, OPTIMIZED RATES (60, 100, 200, 100 GPM)
0

                    BOUNDARY ARRAY FOR LAYER  1 WILL BE READ ON UNIT  1 USING FORMAT: (25I3)
                    ----------------------------------------------------------------------

0

                    BOUNDARY ARRAY FOR LAYER  2 WILL BE READ ON UNIT  1 USING FORMAT: (25I3)
                    ----------------------------------------------------------------------

0

                    BOUNDARY ARRAY FOR LAYER  3 WILL BE READ ON UNIT  1 USING FORMAT: (25I3)
                    ----------------------------------------------------------------------

0

                    BOUNDARY ARRAY FOR LAYER  4 WILL BE READ ON UNIT  1 USING FORMAT: (25I3)
                    ----------------------------------------------------------------------

0AQUIFER HEAD WILL BE SET TO  2000.0     AT ALL NO-FLOW NODES (IBOUND=0).
0

                    INITIAL HEAD FOR LAYER  1 WILL BE READ ON UNIT  1 USING FORMAT: (10e12.4)
```

0

INITIAL HEAD FOR LAYER 2 WILL BE READ ON UNIT 1 USING FORMAT: (10e12.4)

0

INITIAL HEAD FOR LAYER 3 WILL BE READ ON UNIT 1 USING FORMAT: (10e12.4)

0

INITIAL HEAD FOR LAYER 4 WILL BE READ ON UNIT 1 USING FORMAT: (10e12.4)

0HEAD PRINT FORMAT IS FORMAT NUMBER 0 DRAWDOWN PRINT FORMAT IS FORMAT NUMBER 0
0HEADS WILL BE SAVED ON UNIT 30 DRAWDOWNS WILL BE SAVED ON UNIT 0
0OUTPUT CONTROL IS SPECIFIED EVERY TIME STEP
0 COLUMN TO ROW ANISOTROPY = 1.000000
0

DELR WILL BE READ ON UNIT 11 USING FORMAT: (10E12.4)

1000.0	1000.0	1000.0	1000.0	1000.0	800.00	400.00	400.00	400.00	200.00
200.00	200.00	200.00	200.00	200.00	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	200.00	200.00	200.00	200.00	200.00	200.00	400.00	400.00
400.00	400.00	400.00	900.00	1000.0	1000.0				

0

DELC WILL BE READ ON UNIT 11 USING FORMAT: (10E12.4)

1000.0	1000.0	800.00	800.00	400.00	400.00	400.00	200.00	200.00	200.00
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	200.00	200.00	200.00	200.00
200.00	400.00	400.00	400.00	800.00	1000.0	1000.0			

0

HYD. COND. ALONG ROWS FOR LAYER 1 WILL BE READ ON UNIT 11 USING FORMAT: (10e12.4)

0

BOTTOM FOR LAYER 1 WILL BE READ ON UNIT 11 USING FORMAT: (10e12.4)

0

VERT HYD COND /THICKNESS FOR LAYER 1 WILL BE READ ON UNIT 11 USING FORMAT: (10e12.4)

0

TRANSMIS. ALONG ROWS FOR LAYER 2 WILL BE READ ON UNIT 11 USING FORMAT: (10e12.4)

0

VERT HYD COND /THICKNESS FOR LAYER 2 WILL BE READ ON UNIT 11 USING FORMAT: (10e12.4)

0

TRANSMIS. ALONG ROWS FOR LAYER 3 WILL BE READ ON UNIT 11 USING FORMAT: (10e12.4)

0

VERT HYD COND /THICKNESS FOR LAYER 3 WILL BE READ ON UNIT 11 USING FORMAT: (10e12.4)

0

TRANSMIS. ALONG ROWS FOR LAYER 4 WILL BE READ ON UNIT 11 USING FORMAT: (10e12.4)

0

SOLUTION BY THE STRONGLY IMPLICIT PROCEDURE

0 MAXIMUM ITERATIONS ALLOWED FOR CLOSURE = 150
ACCELERATION PARAMETER = 1.0000
HEAD CHANGE CRITERION FOR CLOSURE = 0.10000E-02
SIP HEAD CHANGE PRINTOUT INTERVAL = 1

0
5 ITERATION PARAMETERS CALCULATED FROM SPECIFIED WSEED = 0.00500000 :

0.0000000E+00 0.7340852E+00 0.9292893E+00 0.9811970E+00 0.9950000E+00

1 STRESS PERIOD NO. 1, LENGTH = 1.000000

NUMBER OF TIME STEPS = 1

MULTIPLIER FOR DELT = 1.000

INITIAL TIME STEP SIZE = 1.000000

0 35 WELLS

LAYER	ROW	COL	STRESS RATE	WELL NO.
1	29	35	0.00000	1
3	26	19	0.00000	2
2	29	35	-14543.	3
3	29	35	-24000.	4
1	21	47	0.00000	5
1	22	46	0.00000	6
1	23	45	0.00000	7
4	2	2	-0.13600E+06	8
3	2	1	-34000.	9
4	35	13	-7900.0	10
1	16	29	0.00000	11
2	16	29	-49.000	12
3	16	29	-11438.	13
1	27	38	0.00000	14
2	27	38	0.00000	15
3	27	38	0.00000	16
1	26	19	-19251.	17
2	31	31	-9818.0	18
1	31	31	-9433.0	19
3	31	31	0.00000	20
4	26	19	0.00000	21
4	31	32	0.00000	22
4	29	35	0.00000	23
4	16	29	0.00000	24
2	23	45	-1000.0	25
2	22	46	-1000.0	26
2	21	47	-1000.0	27
3	23	45	-5353.0	28
3	22	46	-4968.0	29
3	21	47	-5545.0	30
1	21	49	-4235.0	31
2	21	49	0.00000	32
3	21	49	0.00000	33
1	28	39	0.00000	34

3 28 39 0.00000 35

0

19 DRAINS

0

LAYER	ROW	COL	ELEVATION	CONDUCTANCE	DRAIN NO.
3	28	45	800.0	5000.	1
3	29	45	800.0	5000.	2
3	30	45	800.0	5000.	3
1	26	44	800.0	1000.	4
1	26	45	800.0	1000.	5
1	27	44	800.0	1000.	6
1	27	45	800.0	1000.	7
1	28	45	800.0	2000.	8
1	29	45	800.0	2000.	9
1	30	45	800.0	2000.	10
1	25	44	800.0	1000.	11
1	22	44	803.0	500.0	12
1	24	44	801.0	1000.	13
1	23	44	801.0	1000.	14
3	23	44	800.0	5000.	15
3	24	44	800.0	5000.	16
3	25	44	800.0	5000.	17
3	26	44	800.0	5000.	18
3	27	44	800.0	5000.	19

0

RECHARGE WILL BE READ ON UNIT 18 USING FORMAT: (10e12.4)

0

939 RIVER REACHES

0

LAYER	ROW	COL	STAGE	CONDUCTANCE	BOTTOM ELEVATION	RIVER REACH
1	28	1	804.0	150.0	790.0	1
1	29	1	804.0	150.0	790.0	2
1	29	2	804.0	150.0	790.0	3
1	30	1	804.0	150.0	790.0	4
1	30	2	804.0	150.0	790.0	5
1	30	3	804.0	150.0	790.0	6
1	31	1	804.0	150.0	790.0	7
1	31	2	804.0	150.0	790.0	8
1	31	3	804.0	150.0	790.0	9
1	31	4	804.0	150.0	790.0	10
1	32	1	804.0	150.0	790.0	11
1	32	2	804.0	150.0	790.0	12
1	32	3	804.0	150.0	790.0	13
1	32	4	804.0	150.0	790.0	14
1	33	1	804.0	150.0	790.0	15
1	33	2	804.0	150.0	790.0	16
1	33	3	804.0	150.0	790.0	17
1	33	4	804.0	150.0	790.0	18
1	34	1	804.0	150.0	790.0	19
1	34	3	804.0	150.0	790.0	20
1	34	4	804.0	150.0	790.0	21
1	34	5	804.0	150.0	790.0	22
1	35	1	804.0	150.0	790.0	23
1	35	4	804.0	150.0	790.0	24
1	35	5	804.0	150.0	790.0	25
1	36	4	804.0	150.0	790.0	26
1	36	5	804.0	150.0	790.0	27
1	36	6	804.0	150.0	790.0	28
1	37	1	804.0	150.0	790.0	29
1	37	4	804.0	150.0	790.0	30
1	37	5	804.0	150.0	790.0	31
1	37	6	804.0	150.0	790.0	32
1	37	7	804.0	150.0	790.0	33
1	38	4	804.0	150.0	790.0	34
1	38	5	804.0	150.0	790.0	35

1	38	6	804.0	150.0	790.0	36
1	38	7	804.0	150.0	790.0	37
1	38	8	804.0	150.0	790.0	38
1	39	1	804.0	150.0	790.0	39
1	39	4	804.0	150.0	790.0	40
1	39	6	804.0	150.0	790.0	41
1	39	7	804.0	150.0	790.0	42
1	39	8	804.0	150.0	790.0	43
1	40	1	804.0	150.0	790.0	44
1	40	2	804.0	150.0	790.0	45
1	40	3	804.0	150.0	790.0	46
1	40	4	804.0	150.0	790.0	47
1	40	6	804.0	150.0	790.0	48
1	40	7	804.0	150.0	790.0	49
1	40	8	804.0	150.0	790.0	50
1	41	2	804.0	150.0	790.0	51
1	41	3	804.0	150.0	790.0	52
1	41	6	804.0	150.0	790.0	53
1	41	7	804.0	150.0	790.0	54
1	41	8	804.0	150.0	790.0	55
1	38	1	804.0	150.0	790.0	56
1	38	29	803.0	250.0	790.0	57
1	38	30	803.0	250.0	790.0	58
1	38	31	803.0	250.0	790.0	59
1	38	32	803.0	250.0	790.0	60
1	38	33	803.0	250.0	790.0	61
1	38	34	803.0	250.0	790.0	62
1	39	9	803.0	250.0	790.0	63
1	39	10	803.0	250.0	790.0	64
1	39	11	803.0	250.0	790.0	65
1	39	12	803.0	250.0	790.0	66
1	39	13	803.0	250.0	790.0	67
1	39	14	803.0	250.0	790.0	68
1	39	15	803.0	250.0	790.0	69
1	39	16	803.0	250.0	790.0	70
1	39	17	803.0	250.0	790.0	71
1	39	18	803.0	250.0	790.0	72
1	39	19	803.0	250.0	790.0	73
1	39	20	803.0	250.0	790.0	74
1	39	21	803.0	250.0	790.0	75
1	39	22	803.0	250.0	790.0	76
1	39	23	803.0	250.0	790.0	77
1	39	24	803.0	250.0	790.0	78
1	39	25	803.0	250.0	790.0	79
1	39	26	803.0	250.0	790.0	80
1	39	27	803.0	250.0	790.0	81
1	39	28	803.0	250.0	790.0	82
1	39	29	803.0	250.0	790.0	83
1	39	30	803.0	250.0	790.0	84
1	39	31	803.0	250.0	790.0	85
1	39	32	803.0	250.0	790.0	86
1	39	33	803.0	250.0	790.0	87
1	39	34	803.0	250.0	790.0	88
1	40	9	803.0	250.0	790.0	89
1	40	10	803.0	250.0	790.0	90
1	40	11	803.0	250.0	790.0	91
1	40	12	803.0	250.0	790.0	92
1	40	13	803.0	250.0	790.0	93
1	40	14	803.0	250.0	790.0	94
1	40	15	803.0	250.0	790.0	95
1	40	16	803.0	250.0	790.0	96
1	40	17	803.0	250.0	790.0	97
1	40	18	803.0	250.0	790.0	98
1	40	19	803.0	250.0	790.0	99
1	40	20	803.0	250.0	790.0	100
1	40	21	803.0	250.0	790.0	101
1	40	22	803.0	250.0	790.0	102
1	40	23	803.0	250.0	790.0	103
1	40	24	803.0	250.0	790.0	104
1	40	25	803.0	250.0	790.0	105

1	40	26	803.0	250.0	790.0	106
1	40	27	803.0	250.0	790.0	107
1	40	28	803.0	250.0	790.0	108
1	40	29	803.0	250.0	790.0	109
1	40	30	803.0	250.0	790.0	110
1	40	31	803.0	250.0	790.0	111
1	40	32	803.0	250.0	790.0	112
1	40	33	803.0	250.0	790.0	113
1	40	34	803.0	250.0	790.0	114
1	41	9	803.0	250.0	790.0	115
1	41	10	803.0	250.0	790.0	116
1	41	11	803.0	250.0	790.0	117
1	41	12	803.0	250.0	790.0	118
1	41	13	803.0	250.0	790.0	119
1	41	14	803.0	250.0	790.0	120
1	41	15	803.0	250.0	790.0	121
1	41	16	803.0	250.0	790.0	122
1	41	17	803.0	250.0	790.0	123
1	41	18	803.0	250.0	790.0	124
1	41	19	803.0	250.0	790.0	125
1	41	20	803.0	250.0	790.0	126
1	41	21	803.0	250.0	790.0	127
1	41	22	803.0	250.0	790.0	128
1	41	23	803.0	250.0	790.0	129
1	41	24	803.0	250.0	790.0	130
1	41	25	803.0	250.0	790.0	131
1	41	26	803.0	250.0	790.0	132
1	41	27	803.0	250.0	790.0	133
1	41	28	803.0	250.0	790.0	134
1	41	29	803.0	250.0	790.0	135
1	41	30	803.0	250.0	790.0	136
1	41	31	803.0	250.0	790.0	137
1	41	32	803.0	250.0	790.0	138
1	41	33	803.0	250.0	790.0	139
1	41	34	803.0	250.0	790.0	140
1	42	12	803.0	250.0	790.0	141
1	42	13	803.0	250.0	790.0	142
1	42	14	803.0	250.0	790.0	143
1	42	15	803.0	250.0	790.0	144
1	42	16	803.0	250.0	790.0	145
1	42	17	803.0	250.0	790.0	146
1	42	18	803.0	250.0	790.0	147
1	42	19	803.0	250.0	790.0	148
1	42	20	803.0	250.0	790.0	149
1	42	21	803.0	250.0	790.0	150
1	42	22	803.0	250.0	790.0	151
1	42	23	803.0	250.0	790.0	152
1	42	24	803.0	250.0	790.0	153
1	42	25	803.0	250.0	790.0	154
1	42	26	803.0	250.0	790.0	155
1	35	39	803.0	250.0	790.0	156
1	35	40	803.0	250.0	790.0	157
1	35	41	803.0	250.0	790.0	158
1	35	42	803.0	250.0	790.0	159
1	36	37	803.0	250.0	790.0	160
1	36	38	803.0	250.0	790.0	161
1	36	39	803.0	250.0	790.0	162
1	36	40	803.0	250.0	790.0	163
1	36	41	803.0	250.0	790.0	164
1	36	42	803.0	250.0	790.0	165
1	37	35	803.0	250.0	790.0	166
1	37	36	803.0	250.0	790.0	167
1	37	37	803.0	250.0	790.0	168
1	37	38	803.0	250.0	790.0	169
1	37	39	803.0	250.0	790.0	170
1	37	40	803.0	250.0	790.0	171
1	37	41	803.0	250.0	790.0	172
1	37	42	803.0	250.0	790.0	173
1	38	35	803.0	250.0	790.0	174
1	38	36	803.0	250.0	790.0	175

1	38	37	803.0	250.0	790.0	176
1	38	38	803.0	250.0	790.0	177
1	38	39	803.0	250.0	790.0	178
1	38	40	803.0	250.0	790.0	179
1	38	41	803.0	250.0	790.0	180
1	38	42	803.0	250.0	790.0	181
1	39	35	803.0	250.0	790.0	182
1	39	36	803.0	250.0	790.0	183
1	39	37	803.0	250.0	790.0	184
1	39	38	803.0	250.0	790.0	185
1	39	39	803.0	250.0	790.0	186
1	39	40	803.0	250.0	790.0	187
1	39	41	803.0	250.0	790.0	188
1	39	42	803.0	250.0	790.0	189
1	40	35	803.0	250.0	790.0	190
1	40	36	803.0	250.0	790.0	191
1	40	37	803.0	250.0	790.0	192
1	40	38	803.0	250.0	790.0	193
1	40	39	803.0	250.0	790.0	194
1	40	40	803.0	250.0	790.0	195
1	40	41	803.0	250.0	790.0	196
1	41	35	803.0	250.0	790.0	197
1	41	36	803.0	250.0	790.0	198
1	30	46	803.0	250.0	790.0	199
1	30	47	803.0	250.0	790.0	200
1	30	48	803.0	250.0	790.0	201
1	30	49	803.0	250.0	790.0	202
1	31	45	803.0	250.0	790.0	203
1	31	46	803.0	250.0	790.0	204
1	31	47	803.0	250.0	790.0	205
1	31	48	803.0	250.0	790.0	206
1	31	49	803.0	250.0	790.0	207
1	32	45	803.0	250.0	790.0	208
1	32	46	803.0	250.0	790.0	209
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2	36	54	802.0	5.000	790.0	595

2	36	55	802.0	5.000	790.0	596
2	37	50	802.0	5.000	790.0	597
2	37	51	802.0	5.000	790.0	598
2	37	52	802.0	5.000	790.0	599
2	37	53	802.0	5.000	790.0	600
2	37	54	802.0	5.000	790.0	601
2	37	55	802.0	5.000	790.0	602
2	37	56	802.0	5.000	790.0	603
2	38	50	802.0	5.000	790.0	604
2	38	51	802.0	5.000	790.0	605
2	38	52	802.0	5.000	790.0	606
2	38	53	802.0	5.000	790.0	607
2	38	54	802.0	5.000	790.0	608
2	38	55	802.0	5.000	790.0	609
2	38	56	802.0	5.000	790.0	610
2	39	55	802.0	5.000	790.0	611
2	39	56	802.0	5.000	790.0	612
2	40	56	802.0	5.000	790.0	613
3	28	1	804.0	3000.	790.0	614
3	29	1	804.0	3000.	790.0	615
3	29	2	804.0	3000.	790.0	616
3	30	1	804.0	3000.	790.0	617
3	30	2	804.0	3000.	790.0	618
3	30	3	804.0	3000.	790.0	619
3	31	1	804.0	3000.	790.0	620
3	31	2	804.0	3000.	790.0	621
3	31	3	804.0	3000.	790.0	622
3	31	4	804.0	3000.	790.0	623
3	32	1	804.0	3000.	790.0	624
3	32	2	804.0	3000.	790.0	625
3	32	3	804.0	3000.	790.0	626
3	32	4	804.0	3000.	790.0	627
3	33	1	804.0	3000.	790.0	628
3	33	2	804.0	3000.	790.0	629
3	33	3	804.0	3000.	790.0	630
3	33	4	804.0	3000.	790.0	631
3	34	1	804.0	3000.	790.0	632
3	34	2	804.0	3000.	790.0	633
3	34	3	804.0	3000.	790.0	634
3	34	4	804.0	3000.	790.0	635
3	34	5	804.0	3000.	790.0	636
3	35	1	804.0	3000.	790.0	637
3	35	4	804.0	3000.	790.0	638
3	35	5	804.0	3000.	790.0	639
3	36	4	804.0	3000.	790.0	640
3	36	5	804.0	3000.	790.0	641
3	36	6	804.0	3000.	790.0	642
3	36	7	804.0	3000.	790.0	643
3	37	1	804.0	3000.	790.0	644
3	37	4	804.0	3000.	790.0	645
3	37	5	804.0	3000.	790.0	646
3	37	6	804.0	3000.	790.0	647
3	37	7	804.0	3000.	790.0	648
3	38	1	804.0	3000.	790.0	649
3	38	4	804.0	3000.	790.0	650
3	38	5	804.0	3000.	790.0	651
3	38	6	804.0	3000.	790.0	652
3	38	7	804.0	3000.	790.0	653
3	38	8	804.0	3000.	790.0	654
3	39	1	804.0	3000.	790.0	655
3	39	4	804.0	3000.	790.0	656
3	39	6	804.0	3000.	790.0	657
3	39	7	804.0	3000.	790.0	658
3	39	8	804.0	3000.	790.0	659
3	40	1	804.0	3000.	790.0	660
3	40	2	804.0	3000.	790.0	661
3	40	3	804.0	3000.	790.0	662
3	40	4	804.0	3000.	790.0	663
3	40	6	804.0	3000.	790.0	664
3	40	7	804.0	3000.	790.0	665

3	40	8	804.0	3000.	790.0	666
3	41	2	804.0	3000.	790.0	667
3	41	3	804.0	3000.	790.0	668
3	41	7	804.0	3000.	790.0	669
3	41	8	804.0	3000.	790.0	670
3	38	27	803.0	0.1000E+05	790.0	671
3	38	28	803.0	0.1000E+05	790.0	672
3	38	29	803.0	0.1000E+05	790.0	673
3	38	30	803.0	0.1000E+05	790.0	674
3	38	31	803.0	0.1000E+05	790.0	675
3	38	32	803.0	0.1000E+05	790.0	676
3	38	33	803.0	0.1000E+05	790.0	677
3	38	34	803.0	0.1000E+05	790.0	678
3	39	9	803.0	0.1000E+05	790.0	679
3	39	10	803.0	0.1000E+05	790.0	680
3	39	11	803.0	0.1000E+05	790.0	681
3	39	12	803.0	0.1000E+05	790.0	682
3	39	13	803.0	0.1000E+05	790.0	683
3	39	14	803.0	0.1000E+05	790.0	684
3	39	15	803.0	0.1000E+05	790.0	685
3	39	16	803.0	0.1000E+05	790.0	686
3	39	17	803.0	0.1000E+05	790.0	687
3	39	18	803.0	0.1000E+05	790.0	688
3	39	19	803.0	0.1000E+05	790.0	689
3	39	20	803.0	0.1000E+05	790.0	690
3	39	21	803.0	0.1000E+05	790.0	691
3	39	22	803.0	0.1000E+05	790.0	692
3	39	23	803.0	0.1000E+05	790.0	693
3	39	24	803.0	0.1000E+05	790.0	694
3	39	25	803.0	0.1000E+05	790.0	695
3	39	26	803.0	0.1000E+05	790.0	696
3	39	27	803.0	0.1000E+05	790.0	697
3	39	28	803.0	0.1000E+05	790.0	698
3	39	29	803.0	0.1000E+05	790.0	699
3	39	30	803.0	0.1000E+05	790.0	700
3	39	31	803.0	0.1000E+05	790.0	701
3	39	32	803.0	0.1000E+05	790.0	702
3	39	33	803.0	0.1000E+05	790.0	703
3	39	34	803.0	0.1000E+05	790.0	704
3	40	9	803.0	0.1000E+05	790.0	705
3	40	10	803.0	0.1000E+05	790.0	706
3	40	11	803.0	0.1000E+05	790.0	707
3	40	12	803.0	0.1000E+05	790.0	708
3	40	13	803.0	0.1000E+05	790.0	709
3	40	14	803.0	0.1000E+05	790.0	710
3	40	15	803.0	0.1000E+05	790.0	711
3	40	16	803.0	0.1000E+05	790.0	712
3	40	17	803.0	0.1000E+05	790.0	713
3	40	18	803.0	0.1000E+05	790.0	714
3	40	19	803.0	0.1000E+05	790.0	715
3	40	20	803.0	0.1000E+05	790.0	716
3	40	21	803.0	0.1000E+05	790.0	717
3	40	22	803.0	0.1000E+05	790.0	718
3	40	23	803.0	0.1000E+05	790.0	719
3	40	24	803.0	0.1000E+05	790.0	720
3	40	25	803.0	0.1000E+05	790.0	721
3	40	26	803.0	0.1000E+05	790.0	722
3	40	27	803.0	0.1000E+05	790.0	723
3	40	28	803.0	0.1000E+05	790.0	724
3	40	29	803.0	0.1000E+05	790.0	725
3	40	30	803.0	0.1000E+05	790.0	726
3	40	31	803.0	0.1000E+05	790.0	727
3	40	32	803.0	0.1000E+05	790.0	728
3	40	33	803.0	0.1000E+05	790.0	729
3	40	34	803.0	0.1000E+05	790.0	730
3	41	9	803.0	0.1000E+05	790.0	731
3	41	10	803.0	0.1000E+05	790.0	732
3	41	11	803.0	0.1000E+05	790.0	733
3	41	12	803.0	0.1000E+05	790.0	734
3	41	13	803.0	0.1000E+05	790.0	735

3	41	14	803.0	0.1000E+05	790.0	736
3	41	15	803.0	0.1000E+05	790.0	737
3	41	16	803.0	0.1000E+05	790.0	738
3	41	17	803.0	0.1000E+05	790.0	739
3	41	18	803.0	0.1000E+05	790.0	740
3	41	19	803.0	0.1000E+05	790.0	741
3	41	20	803.0	0.1000E+05	790.0	742
3	41	21	803.0	0.1000E+05	790.0	743
3	41	22	803.0	0.1000E+05	790.0	744
3	41	23	803.0	0.1000E+05	790.0	745
3	41	24	803.0	0.1000E+05	790.0	746
3	41	25	803.0	0.1000E+05	790.0	747
3	41	26	803.0	0.1000E+05	790.0	748
3	41	27	803.0	0.1000E+05	790.0	749
3	41	28	803.0	0.1000E+05	790.0	750
3	41	29	803.0	0.1000E+05	790.0	751
3	41	30	803.0	0.1000E+05	790.0	752
3	41	31	803.0	0.1000E+05	790.0	753
3	41	32	803.0	0.1000E+05	790.0	754
3	41	33	803.0	0.1000E+05	790.0	755
3	41	34	803.0	0.1000E+05	790.0	756
3	42	11	803.0	0.1000E+05	790.0	757
3	42	12	803.0	0.1000E+05	790.0	758
3	42	13	803.0	0.1000E+05	790.0	759
3	42	14	803.0	0.1000E+05	790.0	760
3	42	15	803.0	0.1000E+05	790.0	761
3	42	16	803.0	0.1000E+05	790.0	762
3	42	17	803.0	0.1000E+05	790.0	763
3	42	18	803.0	0.1000E+05	790.0	764
3	42	19	803.0	0.1000E+05	790.0	765
3	42	20	803.0	0.1000E+05	790.0	766
3	42	21	803.0	0.1000E+05	790.0	767
3	42	22	803.0	0.1000E+05	790.0	768
3	42	23	803.0	0.1000E+05	790.0	769
3	42	24	803.0	0.1000E+05	790.0	770
3	42	25	803.0	0.1000E+05	790.0	771
3	42	26	803.0	0.1000E+05	790.0	772
3	42	27	803.0	0.1000E+05	790.0	773
3	34	42	803.0	0.1000E+05	790.0	774
3	34	43	803.0	0.1000E+05	790.0	775
3	35	39	803.0	0.1000E+05	790.0	776
3	35	40	803.0	0.1000E+05	790.0	777
3	35	41	803.0	0.1000E+05	790.0	778
3	35	42	803.0	0.1000E+05	790.0	779
3	35	43	803.0	0.1000E+05	790.0	780
3	36	38	803.0	0.1000E+05	790.0	781
3	36	39	803.0	0.1000E+05	790.0	782
3	36	40	803.0	0.1000E+05	790.0	783
3	36	41	803.0	0.1000E+05	790.0	784
3	36	42	803.0	0.1000E+05	790.0	785
3	36	43	803.0	0.1000E+05	790.0	786
3	37	35	803.0	0.1000E+05	790.0	787
3	37	36	803.0	0.1000E+05	790.0	788
3	37	37	803.0	0.1000E+05	790.0	789
3	37	38	803.0	0.1000E+05	790.0	790
3	37	39	803.0	0.1000E+05	790.0	791
3	37	40	803.0	0.1000E+05	790.0	792
3	37	41	803.0	0.1000E+05	790.0	793
3	37	42	803.0	0.1000E+05	790.0	794
3	37	43	803.0	0.1000E+05	790.0	795
3	38	35	803.0	0.1000E+05	790.0	796
3	38	36	803.0	0.1000E+05	790.0	797
3	38	37	803.0	0.1000E+05	790.0	798
3	38	38	803.0	0.1000E+05	790.0	799
3	38	39	803.0	0.1000E+05	790.0	800
3	38	40	803.0	0.1000E+05	790.0	801
3	38	41	803.0	0.1000E+05	790.0	802
3	38	42	803.0	0.1000E+05	790.0	803
3	38	43	803.0	0.1000E+05	790.0	804
3	39	35	803.0	0.1000E+05	790.0	805

3	39	36	803.0	0.1000E+05	790.0	806
3	39	37	803.0	0.1000E+05	790.0	807
3	39	38	803.0	0.1000E+05	790.0	808
3	39	39	803.0	0.1000E+05	790.0	809
3	39	40	803.0	0.1000E+05	790.0	810
3	39	41	803.0	0.1000E+05	790.0	811
3	39	42	803.0	0.1000E+05	790.0	812
3	39	43	803.0	0.1000E+05	790.0	813
3	40	35	803.0	0.1000E+05	790.0	814
3	40	36	803.0	0.1000E+05	790.0	815
3	40	37	803.0	0.1000E+05	790.0	816
3	40	38	803.0	0.1000E+05	790.0	817
3	40	39	803.0	0.1000E+05	790.0	818
3	40	40	803.0	0.1000E+05	790.0	819
3	40	41	803.0	0.1000E+05	790.0	820
3	40	42	803.0	0.1000E+05	790.0	821
3	40	43	803.0	0.1000E+05	790.0	822
3	41	35	803.0	0.1000E+05	790.0	823
3	41	36	803.0	0.1000E+05	790.0	824
3	41	37	803.0	0.1000E+05	790.0	825
3	32	42	803.0	0.1000E+05	790.0	826
3	32	43	803.0	0.1000E+05	790.0	827
3	32	44	803.0	0.1000E+05	790.0	828
3	32	45	803.0	0.1000E+05	790.0	829
3	32	46	803.0	0.1000E+05	790.0	830
3	33	41	803.0	0.1000E+05	790.0	831
3	33	42	803.0	0.1000E+05	790.0	832
3	33	43	803.0	0.1000E+05	790.0	833
3	33	44	803.0	0.1000E+05	790.0	834
3	33	45	803.0	0.1000E+05	790.0	835
3	33	46	803.0	0.1000E+05	790.0	836
3	34	39	803.0	0.1000E+05	790.0	837
3	34	40	803.0	0.1000E+05	790.0	838
3	34	41	803.0	0.1000E+05	790.0	839
3	34	44	803.0	0.1000E+05	790.0	840
3	34	45	803.0	0.1000E+05	790.0	841
3	34	46	803.0	0.1000E+05	790.0	842
3	35	37	803.0	0.1000E+05	790.0	843
3	35	38	803.0	0.1000E+05	790.0	844
3	35	44	803.0	0.1000E+05	790.0	845
3	35	45	803.0	0.1000E+05	790.0	846
3	35	46	803.0	0.1000E+05	790.0	847
3	36	36	803.0	0.1000E+05	790.0	848
3	36	37	803.0	0.1000E+05	790.0	849
3	36	44	803.0	0.1000E+05	790.0	850
3	36	45	803.0	0.1000E+05	790.0	851
3	36	46	803.0	0.1000E+05	790.0	852
3	37	44	803.0	0.1000E+05	790.0	853
3	37	45	803.0	0.1000E+05	790.0	854
3	37	46	803.0	0.1000E+05	790.0	855
3	31	45	803.0	0.1000E+05	790.0	856
3	31	46	803.0	0.1000E+05	790.0	857
3	31	47	803.0	0.1000E+05	790.0	858
3	31	48	803.0	0.1000E+05	790.0	859
3	31	49	803.0	0.1000E+05	790.0	860
3	32	47	803.0	0.1000E+05	790.0	861
3	32	48	803.0	0.1000E+05	790.0	862
3	32	49	803.0	0.1000E+05	790.0	863
3	33	47	803.0	0.1000E+05	790.0	864
3	33	48	803.0	0.1000E+05	790.0	865
3	33	49	803.0	0.1000E+05	790.0	866
3	34	47	803.0	0.1000E+05	790.0	867
3	34	48	803.0	0.1000E+05	790.0	868
3	34	49	803.0	0.1000E+05	790.0	869
3	35	47	803.0	0.1000E+05	790.0	870
3	35	48	803.0	0.1000E+05	790.0	871
3	35	49	803.0	0.1000E+05	790.0	872
3	36	47	803.0	0.1000E+05	790.0	873
3	36	48	803.0	0.1000E+05	790.0	874
3	36	49	803.0	0.1000E+05	790.0	875

3	37	47	803.0	0.1000E+05	790.0	876
3	37	48	803.0	0.1000E+05	790.0	877
3	37	49	803.0	0.1000E+05	790.0	878
3	38	45	803.0	0.1000E+05	790.0	879
3	38	46	803.0	0.1000E+05	790.0	880
3	38	47	803.0	0.1000E+05	790.0	881
3	38	48	803.0	0.1000E+05	790.0	882
3	38	49	803.0	0.1000E+05	790.0	883
3	39	45	803.0	0.1000E+05	790.0	884
3	38	44	803.0	0.1000E+05	790.0	885
3	39	44	803.0	0.1000E+05	790.0	886
3	30	46	803.0	0.1000E+05	790.0	887
3	30	47	803.0	0.1000E+05	790.0	888
3	30	48	803.0	0.1000E+05	790.0	889
3	31	50	802.0	0.1000E+05	790.0	890
3	31	51	802.0	0.1000E+05	790.0	891
3	31	52	802.0	0.1000E+05	790.0	892
3	31	53	802.0	0.1000E+05	790.0	893
3	31	54	802.0	0.1000E+05	790.0	894
3	32	50	802.0	0.1000E+05	790.0	895
3	32	51	802.0	0.1000E+05	790.0	896
3	32	52	802.0	0.1000E+05	790.0	897
3	32	53	802.0	0.1000E+05	790.0	898
3	32	54	802.0	0.1000E+05	790.0	899
3	33	50	802.0	0.1000E+05	790.0	900
3	33	51	802.0	0.1000E+05	790.0	901
3	33	52	802.0	0.1000E+05	790.0	902
3	33	53	802.0	0.1000E+05	790.0	903
3	33	54	802.0	0.1000E+05	790.0	904
3	34	50	802.0	0.1000E+05	790.0	905
3	34	51	802.0	0.1000E+05	790.0	906
3	34	52	802.0	0.1000E+05	790.0	907
3	34	53	802.0	0.1000E+05	790.0	908
3	34	54	802.0	0.1000E+05	790.0	909
3	34	55	802.0	0.1000E+05	790.0	910
3	35	50	802.0	0.1000E+05	790.0	911
3	35	51	802.0	0.1000E+05	790.0	912
3	35	52	802.0	0.1000E+05	790.0	913
3	35	53	802.0	0.1000E+05	790.0	914
3	35	54	802.0	0.1000E+05	790.0	915
3	35	55	802.0	0.1000E+05	790.0	916
3	36	50	802.0	0.1000E+05	790.0	917
3	36	51	802.0	0.1000E+05	790.0	918
3	36	52	802.0	0.1000E+05	790.0	919
3	36	53	802.0	0.1000E+05	790.0	920
3	36	54	802.0	0.1000E+05	790.0	921
3	36	55	802.0	0.1000E+05	790.0	922
3	37	50	802.0	0.1000E+05	790.0	923
3	37	51	802.0	0.1000E+05	790.0	924
3	37	52	802.0	0.1000E+05	790.0	925
3	37	53	802.0	0.1000E+05	790.0	926
3	37	54	802.0	0.1000E+05	790.0	927
3	37	55	802.0	0.1000E+05	790.0	928
3	37	56	802.0	0.1000E+05	790.0	929
3	38	50	802.0	0.1000E+05	790.0	930
3	38	51	802.0	0.1000E+05	790.0	931
3	38	52	802.0	0.1000E+05	790.0	932
3	38	53	802.0	0.1000E+05	790.0	933
3	38	54	802.0	0.1000E+05	790.0	934
3	38	55	802.0	0.1000E+05	790.0	935
3	38	56	802.0	0.1000E+05	790.0	936
3	39	55	802.0	0.1000E+05	790.0	937
3	39	56	802.0	0.1000E+05	790.0	938
3	40	56	802.0	0.1000E+05	790.0	939

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117 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

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  43.18    ( 1, 2, 56) -19.55    ( 2, 35, 43) -13.76    ( 1, 29, 44) -11.61    ( 2, 32, 36) -21.01    ( 2, 28, 34)
  4.430    ( 1, 27, 34) -2.247   ( 2, 30, 30) -2.317   ( 1, 34, 36) -3.704    ( 2, 28, 34) -7.200    ( 2, 27, 55)
  2.768    ( 3, 14, 55) 1.304    ( 3, 12, 56) -1.346   ( 2, 28, 34) -1.401    ( 2, 26, 29) -2.946    ( 3, 23, 22)
 -0.5972   ( 2, 8, 55) -0.4509   ( 2, 26, 26) -0.9676   ( 2, 23, 29) -0.6215   ( 2, 23, 15) -1.376    ( 1, 31, 31)
  0.5200   ( 1, 23, 54) -0.3169   ( 2, 23, 25) -0.4223   ( 2, 26, 29) -0.7104   ( 2, 25, 29) -1.011    ( 2, 23, 16)
 -0.2056   ( 1, 34, 25) -0.2257   ( 2, 26, 25) -0.4743   ( 2, 23, 29) -0.3225   ( 2, 21, 26) -1.240    ( 1, 32, 32)
  0.3280   ( 2, 28, 34) -0.1940   ( 1, 33, 30) 0.2251    ( 2, 28, 34) -0.4221   ( 1, 32, 32) -0.4830   ( 3, 25, 16)
 -0.1762   ( 1, 28, 34) -0.1090   ( 2, 25, 25) -0.2781   ( 1, 32, 32) -0.2071   ( 1, 31, 31) -0.7931   ( 1, 32, 32)
  0.2180   ( 2, 28, 34) -0.1481   ( 1, 33, 30) 0.1565    ( 2, 28, 34) -0.2796   ( 1, 32, 32) 0.2478    ( 2, 28, 34)
 -0.1105   ( 1, 28, 34) -0.6506E-01 ( 1, 28, 32) -0.1654   ( 1, 32, 32) -0.1274   ( 1, 31, 31) -0.4512   ( 1, 32, 32)
  0.1252   ( 2, 28, 34) -0.9410E-01 ( 1, 33, 30) 0.9115E-01 ( 2, 28, 34) -0.1637   ( 1, 32, 32) 0.1473    ( 2, 28, 34)
 -0.6136E-01 ( 1, 28, 34) -0.3671E-01 ( 1, 28, 32) -0.9199E-01 ( 1, 32, 32) -0.7205E-01 ( 1, 31, 31) -0.2425   ( 1, 31, 31)
  0.6719E-01 ( 2, 28, 34) -0.5385E-01 ( 1, 33, 30) -0.5045E-01 ( 1, 31, 31) -0.8927E-01 ( 1, 32, 32) 0.7990E-01 ( 2, 28, 34)
 -0.3230E-01 ( 1, 28, 34) -0.1958E-01 ( 1, 28, 32) -0.4894E-01 ( 1, 32, 32) -0.3862E-01 ( 1, 31, 31) -0.1260   ( 1, 31, 31)
 -0.3548E-01 ( 1, 31, 31) -0.2895E-01 ( 1, 33, 30) -0.2709E-01 ( 1, 31, 31) -0.4668E-01 ( 1, 32, 32) 0.4148E-01 ( 2, 28, 34)
 -0.1655E-01 ( 1, 28, 34) -0.1012E-01 ( 1, 28, 32) -0.2533E-01 ( 1, 32, 32) -0.2005E-01 ( 1, 31, 31) -0.6428E-01 ( 1, 31, 31)
 -0.1865E-01 ( 1, 31, 31) -0.1503E-01 ( 1, 33, 30) -0.1405E-01 ( 1, 31, 31) -0.2386E-01 ( 1, 32, 32) 0.2107E-01 ( 2, 28, 34)
 -0.8367E-02 ( 1, 28, 34) -0.5149E-02 ( 1, 28, 32) -0.1291E-01 ( 1, 32, 32) -0.1022E-01 ( 1, 31, 31) -0.3248E-01 ( 1, 31, 31)
 -0.9572E-02 ( 1, 31, 31) -0.7663E-02 ( 1, 33, 30) -0.7157E-02 ( 1, 31, 31) -0.1206E-01 ( 1, 32, 32) 0.1060E-01 ( 2, 28, 34)
 -0.4206E-02 ( 1, 28, 34) -0.2600E-02 ( 1, 28, 32) -0.6535E-02 ( 1, 32, 32) -0.5165E-02 ( 1, 31, 31) -0.1635E-01 ( 1, 31, 31)
 -0.4856E-02 ( 1, 31, 31) -0.3872E-02 ( 1, 33, 30) -0.3613E-02 ( 1, 31, 31) -0.6069E-02 ( 1, 32, 32) 0.5311E-02 ( 2, 28, 34)
 -0.2109E-02 ( 1, 28, 34) -0.1308E-02 ( 1, 28, 32) -0.3292E-02 ( 1, 32, 32) -0.2602E-02 ( 1, 31, 31) -0.8215E-02 ( 1, 31, 31)
 -0.2448E-02 ( 1, 31, 31) -0.1949E-02 ( 1, 33, 30) -0.1819E-02 ( 1, 31, 31) -0.3052E-02 ( 1, 32, 32) 0.2657E-02 ( 2, 28, 34)
 -0.1058E-02 ( 1, 28, 34) -0.6563E-03 ( 1, 28, 32)
0
0HEAD/DRAWDOWN PRINTOUT FLAG = 1    TOTAL BUDGET PRINTOUT FLAG = 0    CELL-BY-CELL FLOW TERM FLAG = 0
0OUTPUT FLAGS FOR ALL LAYERS ARE THE SAME:
  HEAD   DRAWDOWN HEAD DRAWDOWN
 PRINTOUT PRINTOUT SAVE  SAVE
 ---------------------
    1      0     1     0
1                HEAD IN LAYER  1 AT END OF TIME STEP  1 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
          51     52     53     54     55     56
 ..........................................................................................
0 1   868.0   867.0   872.0   870.0   870.0   872.0   873.0   874.0   877.0   878.0
      878.0   878.0   878.0   879.0   880.0   880.0   881.0   882.0   883.0   884.0
      885.0   886.0   887.0   887.0   888.0   888.0   889.0   889.0   890.0   890.0
      890.0   891.0   891.0   891.0   892.0   892.0   893.0   893.0   894.0   894.0
      895.0   895.0   896.0   897.0   898.0   899.0   898.0   898.0   898.0   898.0
      898.0   898.0   898.0   897.0   896.0   895.0
0 2   854.8   855.4   856.6   856.1   855.8   856.4   856.7   857.2   857.8   858.2
      858.5   858.8   859.1   859.5   859.9   860.3   860.6   860.9   861.2   861.5
      861.8   862.1   862.4   862.7   863.0   863.3   863.6   863.8   864.1   864.3
      864.5   864.8   865.0   865.2   865.5   865.7   865.9   866.1   866.4   866.6
      866.8   867.0   867.3   867.7   868.0   868.2   868.4   868.6   868.9   869.5
      871.0   872.4   873.2   873.8   873.4   872.8
0 3   847.5   847.8   847.9   847.6   847.3   847.3   847.4   847.5   847.7   847.9
      848.0   848.1   848.3   848.4   848.6   848.8   848.9   849.0   849.2   849.3
      849.4   849.6   849.7   849.9   850.0   850.2   850.3   850.4   850.6   850.7
      850.8   850.9   851.0   851.1   851.2   851.3   851.4   851.5   851.6   851.6
      851.7   851.8   851.9   852.0   852.1   852.1   852.2   852.2   852.3   852.6
      853.3   855.1   856.6   858.2   858.5   858.4
0 4   844.2   843.8   842.8   842.3   841.8   841.5   841.3   841.2   841.2   841.2
      841.2   841.2   841.2   841.2   841.3   841.3   841.3   841.4   841.4   841.4
      841.4   841.5   841.5   841.5   841.5   841.6   841.6   841.6   841.7   841.7
      841.7   841.7   841.8   841.8   841.8   841.8   841.8   841.9   841.9   841.9
      841.9   841.9   841.9   841.9   841.9   841.9   841.9   841.8   841.8   841.8
      842.0   842.7   844.4   846.6   847.9   848.1
0 5   842.7   842.0   840.7   839.4   838.7   837.8   837.2   836.8   836.6   836.5
      836.4   836.3   836.3   836.3   836.2   836.2   836.2   836.1   836.1   836.1
      836.0   836.0   835.9   835.8   835.8   835.8   835.7   835.7   835.7   835.7
      835.7   835.7   835.7   835.7   835.7   835.7   835.7   835.8   835.8   835.8
      835.9   835.9   835.9   836.0   836.0   836.1   836.1   836.1   836.1   836.1
```

	836.1	836.4	836.8	838.6	841.1	841.8				
0 6	842.1	840.8	839.4	837.7	836.6	835.1	833.8	833.0	832.5	832.3
	832.2	832.1	832.0	831.9	831.9	831.8	831.7	831.7	831.7	831.6
	831.6	831.5	831.4	831.4	831.4	831.3	831.3	831.2	831.2	831.2
	831.2	831.2	831.2	831.2	831.2	831.2	831.3	831.4	831.5	831.6
	831.7	831.8	831.9	832.1	832.3	832.4	832.6	832.6	832.8	832.9
	832.9	832.7	832.6	832.9	836.2	837.2				
0 7	841.8	839.8	838.3	836.6	834.9	832.3	829.4	827.6	826.8	826.6
	826.4	826.3	826.2	826.1	826.0	825.9	825.8	825.8	825.7	825.6
	825.6	825.5	825.4	825.4	825.3	825.3	825.2	825.1	825.1	825.1
	825.0	825.0	825.0	825.1	825.1	825.2	825.4	825.7	826.0	826.3
	826.6	826.9	827.4	827.9	828.3	828.7	829.0	829.2	829.5	829.8
	829.9	829.6	829.5	829.5	831.6	832.8				
0 8	842.2	839.0	837.4	835.7	834.0	829.9	824.6	820.4	819.8	819.6
	819.5	819.4	819.3	819.2	819.0	818.9	818.8	818.8	818.7	818.6
	818.5	818.4	818.3	818.2	818.1	818.0	817.9	817.9	817.8	817.7
	817.6	817.6	817.5	817.5	817.5	817.6	817.8	818.4	819.7	820.7
	821.4	822.1	823.1	824.1	824.9	825.5	826.1	826.5	827.0	827.4
	827.6	827.6	827.6	827.6	828.6	829.7				
0 9	842.7	838.4	836.7	835.1	833.4	828.1	819.7	816.3	816.2	816.1
	816.0	815.9	815.8	815.7	815.5	815.4	815.3	815.2	815.1	815.0
	814.9	814.8	814.6	814.5	814.4	814.3	814.2	814.1	814.0	813.9
	813.8	813.7	813.6	813.5	813.4	813.4	813.3	813.3	814.5	815.7
	816.5	817.3	819.3	820.9	822.0	823.0	823.8	824.5	825.2	825.6
	825.9	826.0	826.1	826.2	826.9	827.7				
0 10	843.6	837.5	835.9	834.3	832.8	825.9	816.2	816.2	816.1	816.0
	815.9	815.9	815.7	815.6	815.4	815.3	815.2	815.1	815.0	814.9
	814.8	814.7	814.6	814.4	814.3	814.2	814.1	814.0	813.9	813.8
	813.7	813.6	813.5	813.4	813.3	813.2	813.1	813.0	812.9	812.8
	812.7	812.6	814.7	817.0	818.2	819.6	821.0	822.1	823.1	823.6
	824.2	824.5	824.8	825.0	825.7	826.3				
0 11	842.9	836.6	835.1	833.5	832.4	824.1	816.1	816.1	816.0	815.9
	815.9	815.8	815.7	815.5	815.4	815.2	815.1	815.0	814.9	814.8
	814.7	814.6	814.4	814.3	814.2	814.1	814.0	813.9	813.8	813.6
	813.5	813.4	813.3	813.2	813.1	813.0	812.9	812.8	812.7	812.6
	812.5	812.4	812.1	813.2	813.8	816.2	818.5	820.0	821.2	822.0
	822.8	823.4	823.8	824.2	825.0	825.6				
0 12	841.9	835.8	834.5	832.9	832.1	822.7	816.0	816.0	816.0	815.9
	815.8	815.7	815.6	815.5	815.3	815.1	815.0	814.9	814.8	814.7
	814.6	814.5	814.4	814.2	814.1	814.0	813.9	813.8	813.6	813.5
	813.4	813.3	813.2	813.1	813.0	812.9	812.8	812.7	812.6	812.5
	812.4	812.2	812.0	811.8	811.6	813.2	816.5	818.4	819.8	820.8
	821.9	822.6	823.1	823.6	824.6	825.2				
0 13	840.3	835.0	833.8	832.2	831.9	821.0	815.8	815.9	815.9	815.8
	815.7	815.7	815.5	815.4	815.2	815.1	815.0	814.9	814.7	814.6
	814.5	814.4	814.3	814.1	814.0	813.9	813.8	813.6	813.5	813.4
	813.3	813.2	813.1	813.0	812.9	812.8	812.7	812.6	812.4	812.3
	812.2	812.1	811.9	811.7	811.5	811.2	814.3	816.8	818.1	819.4
	820.7	821.8	822.3	823.0	824.1	824.8				
0 14	838.2	834.0	833.0	831.4	830.9	817.6	815.7	815.8	815.8	815.7
	815.7	815.6	815.5	815.3	815.2	815.0	814.9	814.8	814.6	814.5
	814.4	814.3	814.1	814.0	813.9	813.8	813.6	813.5	813.4	813.3
	813.1	813.0	812.9	812.8	812.7	812.6	812.5	812.4	812.3	812.2
	812.1	812.0	811.8	811.6	811.4	811.1	812.4	815.0	816.1	817.6
	819.5	820.8	821.5	822.3	823.7	824.4				
0 15	835.3	832.8	832.0	830.4	829.0	814.9	815.6	815.7	815.7	815.7
	815.6	815.5	815.4	815.3	815.1	814.9	814.8	814.7	814.5	814.4
	814.3	814.1	814.0	813.9	813.8	813.6	813.5	813.3	813.2	813.1
	813.0	812.8	812.7	812.6	812.5	812.4	812.3	812.2	812.1	812.0
	812.0	811.9	811.7	811.5	811.3	810.9	810.3	811.8	813.5	815.4
	818.0	819.7	820.6	821.6	823.2	824.0				
0 16	831.3	831.5	831.0	829.3	826.4	814.8	815.4	815.6	815.6	815.6
	815.5	815.4	815.3	815.2	815.0	814.8	814.7	814.6	814.4	814.3
	814.1	814.0	813.9	813.8	813.6	813.5	813.3	813.2	813.0	812.9
	812.8	812.6	812.5	812.4	812.3	812.2	812.1	812.0	811.9	811.9
	811.8	811.7	811.6	811.4	811.2	810.7	810.1	809.2	810.1	812.6
	816.2	818.5	819.6	820.8	822.7	823.7				
0 17	825.8	829.9	829.7	827.9	822.7	814.7	815.2	815.4	815.5	815.5
	815.4	815.3	815.2	815.1	814.9	814.7	814.6	814.5	814.3	814.2
	814.0	813.9	813.8	813.6	813.5	813.3	813.1	813.0	812.8	812.7

	812.5	812.4	812.3	812.2	812.1	812.0	811.9	811.8	811.7	811.7
	811.6	811.6	811.5	811.3	811.0	810.6	809.9	809.0	807.0	808.6
	814.1	817.2	818.4	820.0	822.2	823.3				
0 18	817.5	828.1	828.2	826.2	817.1	814.6	815.1	815.3	815.4	815.4
	815.3	815.2	815.1	815.0	814.8	814.6	814.5	814.3	814.2	814.1
	813.9	813.8	813.6	813.5	813.3	813.1	813.0	812.8	812.6	812.4
	812.3	812.2	812.0	811.9	811.8	811.7	811.6	811.6	811.5	811.5
	811.4	811.4	811.4	811.2	811.0	810.5	809.7	808.7	806.7	805.9
	811.5	815.7	817.1	819.0	821.7	822.9				
0 19	811.7	826.0	826.4	824.2	813.3	814.4	814.9	815.1	815.3	815.2
	815.2	815.1	815.1	814.9	814.7	814.5	814.4	814.3	814.1	814.0
	813.8	813.7	813.5	813.3	813.1	813.0	812.8	812.6	812.4	812.2
	812.0	811.9	811.8	811.6	811.5	811.4	811.4	811.3	811.2	811.2
	811.2	811.3	811.3	811.2	810.9	810.4	809.6	808.5	806.4	805.7
	808.4	813.9	815.5	817.8	821.1	822.5				
0 20	811.6	823.7	824.3	822.0	813.2	814.2	814.7	815.0	815.1	815.1
	815.1	815.0	814.9	814.8	814.6	814.4	814.3	814.2	814.1	813.9
	813.7	813.6	813.4	813.2	813.0	812.8	812.5	812.3	812.1	811.9
	811.8	811.6	811.5	811.4	811.3	811.2	811.0	811.0	810.9	810.9
	811.0	811.1	811.3	811.1	810.9	810.3	809.5	808.4	805.6	805.5
	805.4	811.9	813.5	816.4	820.4	822.1				
0 21	811.4	821.1	821.6	819.5	813.0	814.0	814.6	814.8	815.0	815.0
	815.0	814.9	814.8	814.7	814.5	814.3	814.2	814.1	814.0	813.9
	813.7	813.5	813.2	813.0	812.8	812.6	812.3	812.1	811.9	811.7
	811.5	811.3	811.2	811.1	811.0	810.9	810.7	810.6	810.5	810.5
	810.5	810.7	811.2	809.4	810.1	810.3	809.4	807.9	804.0	805.3
	805.2	808.2	810.9	814.7	819.6	821.6				
0 22	811.2	817.7	818.0	816.6	812.9	813.8	814.4	814.7	814.9	814.9
	814.9	814.8	814.7	814.6	814.4	814.3	814.2	814.1	814.0	813.8
	813.6	813.4	813.1	812.8	812.6	812.3	812.1	811.8	811.6	811.3
	811.1	811.0	810.9	810.8	810.7	810.5	810.3	810.1	810.1	810.0
	810.0	810.2	810.4	803.6	808.7	810.5	809.0	807.5	804.3	805.1
	805.1	804.9	807.2	812.6	818.7	821.0				
0 23	811.0	813.2	813.3	813.0	812.7	813.6	814.2	814.5	814.7	814.8
	814.7	814.7	814.6	814.5	814.3	814.2	814.1	814.0	813.9	813.8
	813.7	813.3	812.9	812.6	812.4	812.1	811.8	811.5	811.2	811.0
	810.8	810.6	810.5	810.4	810.4	810.2	809.8	809.6	809.6	809.5
	809.5	809.6	810.0	803.7	807.8	810.1	808.2	807.4	805.8	805.0
	804.9	804.8	804.7	809.7	817.6	820.4				
0 24	810.7	810.2	810.4	810.8	812.4	813.3	814.0	814.3	814.6	814.6
	814.6	814.6	814.5	814.4	814.2	814.1	814.0	813.9	813.7	813.6
	813.5	813.0	812.7	812.4	812.1	811.8	811.5	811.2	810.8	810.6
	810.4	810.2	810.1	810.1	810.2	809.7	809.1	809.0	809.0	808.9
	808.9	809.1	809.6	803.0	806.9	808.9	807.5	807.1	806.9	804.8
	804.8	804.7	804.7	806.4	816.5	819.8				
0 25	810.5	810.1	810.3	810.8	812.2	813.1	813.7	814.1	814.4	814.5
	814.5	814.5	814.4	814.2	814.1	813.9	813.8	813.5	813.1	813.2
	812.9	812.6	812.3	812.1	811.8	811.5	811.1	810.8	810.4	810.1
	809.9	809.7	809.6	809.6	809.5	808.8	808.4	808.3	808.3	808.3
	808.3	808.4	809.3	802.5	806.0	808.7	806.7	806.5	806.8	804.7
	804.7	804.6	804.6	804.6	815.4	819.2				
0 26	810.3	810.1	810.3	810.7	812.1	812.9	813.5	813.9	814.2	814.3
	814.3	814.3	814.3	814.1	814.0	813.7	813.5	812.9	808.3	811.4
	812.1	812.2	812.0	811.8	811.6	811.2	810.8	810.4	809.9	809.6
	809.3	809.1	809.1	809.2	808.7	808.0	807.6	807.6	807.6	807.6
	807.6	807.8	808.9	802.3	802.6	808.0	806.1	805.8	805.5	804.5
	804.5	804.5	804.5	804.6	814.1	818.5				
0 27	810.1	810.0	810.2	810.6	811.9	812.7	813.3	813.8	814.1	814.2
	814.2	814.2	814.1	814.0	813.8	813.6	813.3	812.5	811.1	811.5
	811.8	811.9	811.8	811.6	811.3	810.9	810.4	809.9	809.4	808.9
	808.5	808.4	808.4	808.7	807.7	807.1	806.9	806.8	806.8	806.8
	806.8	807.0	808.3	802.4	802.3	807.3	805.3	805.0	804.0	804.3
	804.4	804.4	804.4	804.5	812.8	817.7				
0 28	809.9	809.9	810.1	810.5	811.7	812.5	813.1	813.6	814.0	814.1
	814.1	814.1	814.0	813.9	813.6	813.3	813.0	812.5	811.9	811.8
	811.8	811.7	811.6	811.3	811.0	810.6	810.1	809.5	808.8	808.1
	807.6	807.3	807.3	806.5	805.1	806.2	806.1	806.1	806.1	806.2
	806.2	806.3	807.6	802.9	801.7	806.4	804.3	804.2	804.0	804.2
	804.2	804.2	804.3	804.5	811.1	816.7				
0 29	809.7	809.8	810.0	810.4	811.5	812.3	812.9	813.5	813.9	814.0

	814.0	814.0	813.9	813.7	813.5	813.1	812.9	812.5	812.1	811.9
	811.8	811.6	811.4	811.1	810.8	810.4	809.8	809.1	808.2	807.1
	806.3	806.0	806.0	800.9	799.6	803.9	805.4	805.4	805.6	805.6
	805.7	805.8	806.7	803.0	801.7	805.1	803.7	803.7	803.8	804.0
	804.0	804.1	804.1	804.4	809.0	815.6				
0 30	809.6	809.7	809.9	810.2	811.3	812.0	812.7	813.3	813.8	813.9
	813.9	813.9	813.8	813.6	813.3	813.0	812.8	812.5	812.2	812.0
	811.8	811.5	811.3	811.0	810.7	810.2	809.7	808.9	807.6	805.6
	804.2	804.4	804.7	800.8	801.1	804.4	804.7	804.7	804.9	805.0
	805.1	805.3	805.6	803.1	802.1	803.3	803.6	803.6	803.7	803.8
	803.9	803.9	804.0	804.3	806.2	814.3				
0 31	809.5	809.7	809.8	810.1	811.1	811.8	812.4	813.2	813.7	813.8
	813.9	813.8	813.7	813.5	813.2	812.9	812.7	812.5	812.2	812.0
	811.7	811.5	811.3	811.0	810.6	810.2	809.7	809.2	806.6	803.2
	800.4	802.7	803.6	801.3	802.6	804.2	804.2	804.3	804.4	804.3
	804.6	804.7	804.4	803.1	802.7	803.4	803.5	803.6	803.7	803.7
	803.7	803.8	803.9	804.2	804.5	812.8				
0 32	809.4	809.6	809.8	810.0	810.9	811.5	812.2	813.0	813.6	813.7
	813.8	813.7	813.6	813.4	813.1	812.9	812.6	812.4	812.2	812.0
	811.7	811.5	811.3	811.0	810.6	810.2	809.8	809.3	806.2	803.0
	802.1	802.5	803.8	803.7	803.4	803.9	804.1	804.1	804.1	804.0
	804.2	804.3	804.1	803.2	803.1	803.4	803.5	803.5	803.6	803.6
	803.6	803.7	803.8	804.1	804.5	811.5				
0 33	809.4	809.7	809.8	809.9	810.8	811.3	811.8	812.9	813.5	813.7
	813.7	813.7	813.5	813.3	813.0	812.8	812.6	812.4	812.2	811.9
	811.7	811.5	811.3	811.0	810.7	810.3	810.0	808.9	805.6	803.1
	802.6	803.5	804.1	803.6	803.6	803.8	803.9	803.9	803.9	803.9
	803.9	803.9	803.7	803.3	803.3	803.4	803.4	803.5	803.6	803.5
	803.5	803.6	803.7	804.1	804.5	810.3				
0 34	809.4	809.7	809.8	809.8	810.6	811.0	811.5	812.8	813.4	813.6
	813.6	813.6	813.4	813.2	813.0	812.7	812.5	812.3	812.1	811.9
	811.7	811.5	811.3	811.1	810.9	810.6	809.9	808.7	806.4	804.9
	804.1	803.7	803.7	803.6	803.6	803.7	803.7	803.7	803.7	803.7
	803.7	803.6	803.4	803.4	803.4	803.4	803.4	803.5	803.6	803.5
	803.5	803.6	803.7	804.1	804.4	809.0				
0 35	809.4	809.8	809.8	809.8	810.4	810.8	811.1	812.6	813.3	813.5
	813.5	813.5	813.3	813.1	812.9	812.6	812.4	812.3	812.1	811.9
	811.7	811.6	811.5	811.1	810.6	809.3	808.5	807.2	805.6	804.9
	804.1	803.7	803.6	803.6	803.6	803.6	803.6	803.6	803.6	803.6
	803.5	803.4	803.4	803.4	803.4	803.4	803.5	803.5	803.6	803.5
	803.5	803.6	803.7	804.1	804.4	807.7				
0 36	809.4	809.8	809.9	809.8	810.3	810.5	810.6	812.1	812.8	813.0
	813.0	812.9	812.8	812.6	812.3	812.1	811.9	811.7	811.5	811.3
	811.2	811.0	810.3	809.6	808.6	807.3	806.8	806.1	805.4	804.7
	804.0	803.6	803.6	803.6	803.6	803.6	803.5	803.5	803.5	803.5
	803.5	803.4	803.4	803.4	803.4	803.5	803.5	803.6	803.6	803.6
	803.6	803.6	803.7	804.1	804.4	806.1				
0 37	809.5	809.8	809.9	809.8	810.2	810.2	810.0	810.6	811.2	811.2
	811.1	811.0	810.8	810.6	810.4	810.2	810.1	809.9	809.7	809.5
	809.2	808.8	808.1	807.5	807.0	806.6	806.1	805.5	804.9	804.1
	803.6	803.6	803.6	803.5	803.5	803.5	803.5	803.4	803.4	803.4
	803.4	803.4	803.5	803.5	803.5	803.6	803.6	803.6	803.7	803.7
	803.7	803.7	803.8	804.2	804.4	803.4				
0 38	809.5	809.9	810.0	809.8	810.2	809.8	809.3	807.9	808.1	807.7
	807.5	807.3	807.1	806.9	806.7	806.5	806.4	806.3	806.2	806.1
	805.9	805.7	805.5	805.3	805.1	804.8	804.5	804.1	803.6	803.4
	803.4	803.4	803.4	803.4	803.4	803.4	803.4	803.4	803.4	803.4
	803.5	803.5	803.5	803.6	803.6	803.7	803.7	803.8	803.9	803.8
	803.9	803.9	804.1	804.4	804.5	802.6				
0 39	809.6	809.9	810.0	809.9	810.2	809.6	808.6	807.2	806.1	805.3
	805.0	804.7	804.5	804.2	804.1	803.9	803.8	803.7	803.7	803.6
	803.6	803.6	803.5	803.5	803.5	803.5	803.4	803.4	803.4	803.4
	803.4	803.4	803.4	803.4	803.4	803.4	803.4	803.5	803.5	803.5
	803.5	803.6	803.6	803.7	803.8	803.9	803.9	804.0	804.1	804.1
	804.1	804.2	804.3	804.6	804.6	802.5				
0 40	809.7	809.9	810.0	809.9	810.2	809.4	808.3	807.1	806.0	805.3
	804.9	804.6	804.3	804.1	803.9	803.8	803.7	803.6	803.6	803.5
	803.5	803.5	803.5	803.5	803.4	803.4	803.4	803.4	803.4	803.4
	803.4	803.4	803.4	803.5	803.5	803.5	803.5	803.5	803.6	803.6
	803.7	803.7	803.8	803.9	804.0	804.1	804.1	804.2	804.3	804.3

	804.4	804.4	804.5	804.7	804.7	802.7				
0 41	809.9	810.0	810.0	810.1	810.2	809.3	808.1	807.1	806.0	805.3
	804.9	804.6	804.3	804.1	803.9	803.8	803.7	803.6	803.6	803.5
	803.5	803.5	803.5	803.5	803.5	803.5	803.5	803.5	803.5	803.5
	803.5	803.5	803.5	803.5	803.6	803.6	803.7	803.7	803.8	803.8
	803.8	803.9	804.0	804.0	804.1	804.2	804.3	804.3	804.4	804.5
	804.5	804.6	804.7	804.9	804.8	803.9				
0 42	810.1	810.1	810.2	810.2	810.2	809.3	808.2	807.2	806.1	805.5
	805.1	804.7	804.4	804.2	804.0	803.8	803.7	803.7	803.6	803.6
	803.6	803.6	803.6	803.6	803.6	803.6	803.6	803.6	803.7	803.7
	803.7	803.7	803.8	803.8	803.8	803.8	803.9	803.9	804.0	804.0
	804.0	804.1	804.1	804.2	804.3	804.4	804.4	804.5	804.6	804.7
	804.8	804.9	805.0	805.1	809.6	811.4				
0 43	810.3	813.8	814.0	813.4	813.0	812.1	811.2	810.4	809.6	809.0
	808.7	808.3	808.0	807.6	807.1	806.8	806.5	806.2	805.8	805.2
	804.4	803.8	803.7	803.7	803.8	803.8	803.8	803.8	803.8	803.8
	803.8	803.9	803.9	803.9	803.9	804.0	804.0	804.0	804.1	804.1
	804.2	804.2	804.2	804.3	804.4	804.5	804.5	804.6	804.7	804.8
	804.9	805.0	805.1	810.7	819.0	820.4				
0 44	815.2	818.6	818.5	817.5	816.7	816.0	815.3	814.8	814.2	813.8
	813.5	813.2	812.9	812.6	812.1	811.7	811.5	811.2	810.8	810.4
	809.9	809.4	809.0	808.8	808.6	808.5	808.5	808.5	808.5	808.5
	808.5	808.5	808.5	808.5	808.6	808.6	808.6	808.7	808.7	808.7
	808.8	808.8	808.9	808.9	809.0	809.1	809.2	809.3	809.5	809.8
	810.3	811.0	812.6	819.2	828.8	829.7				
0 45	824.7	824.4	823.4	821.8	821.3	820.8	820.3	820.1	819.7	819.4
	819.2	819.0	818.7	818.5	818.2	818.1	817.9	817.8	817.7	817.6
	817.5	817.4	817.3	817.2	817.1	817.0	817.0	816.9	816.9	816.9
	816.9	816.9	816.9	816.9	816.9	816.9	816.9	816.9	816.9	817.0
	817.0	817.0	817.1	817.2	817.3	817.4	817.6	817.8	818.2	819.0
	820.2	822.0	824.9	828.7	835.2	835.3				
0 46	833.1	832.2	829.6	828.2	827.8	827.2	826.9	826.7	826.4	826.2
	826.0	825.8	825.7	825.5	825.4	825.3	825.2	825.2	825.1	825.1
	825.0	825.0	825.0	824.9	824.9	824.8	824.8	824.8	824.8	824.7
	824.7	824.7	824.7	824.7	824.7	824.7	824.7	824.7	824.7	824.7
	824.8	824.8	824.8	824.9	825.0	825.2	825.4	825.7	826.3	827.7
	829.3	832.0	834.9	835.1	835.2	835.3				
0 47	840.0	840.0	839.0	838.5	838.0	837.0	837.0	836.0	836.0	836.0
	836.0	835.0	835.0	835.0	835.0	835.0	835.0	835.0	835.0	835.0
	835.0	835.0	835.0	835.0	835.0	835.0	835.0	835.0	835.0	835.0
	835.0	835.0	835.0	835.0	835.0	835.0	835.0	835.0	835.0	835.0
	835.0	835.0	835.0	835.0	835.0	835.0	835.0	835.0	835.0	835.0
	835.0	835.0	835.0	835.0	835.0	835.0				

1 HEAD IN LAYER 2 AT END OF TIME STEP 1 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
	51	52	53	54	55	56				

0 1	863.0	861.0	864.0	862.0	861.0	862.0	862.0	862.0	864.0	865.0
	865.0	865.0	865.0	865.0	866.0	866.0	866.0	867.0	868.0	869.0
	870.0	870.0	871.0	871.0	872.0	872.0	873.0	873.0	873.0	873.0
	873.0	874.0	874.0	874.0	875.0	875.0	876.0	876.0	876.0	876.0
	877.0	877.0	878.0	879.0	880.0	880.0	881.0	881.0	882.0	883.0
	883.0	884.0	886.0	887.0	880.0	878.0				
0 2	843.9	845.2	846.0	845.4	844.8	844.8	844.8	844.9	845.1	845.3
	845.4	845.6	845.7	845.9	846.1	846.3	846.5	846.6	846.8	847.0
	847.1	847.3	847.5	847.6	847.8	848.0	848.1	848.2	848.4	848.5
	848.6	848.8	848.9	849.0	849.1	849.3	849.4	849.5	849.6	849.7
	849.8	849.9	850.0	850.2	850.3	850.3	850.2	850.1	850.9	849.0
	855.6	859.1	860.2	860.5	859.3	858.6				
0 3	837.6	838.1	838.4	838.2	838.0	837.9	837.9	837.9	838.0	838.0
	838.1	838.2	838.2	838.3	838.4	838.5	838.5	838.6	838.7	838.7
	838.8	838.8	838.9	839.0	839.0	839.1	839.1	839.2	839.2	839.3
	839.3	839.4	839.4	839.5	839.5	839.5	839.6	839.6	839.6	839.6
	839.6	839.6	839.6	839.6	839.6	839.4	839.3	839.1	838.7	838.1

	836.6	842.5	845.8	847.1	846.9	846.5				
0 4	835.6	835.2	833.4	833.3	833.1	833.0	832.9	832.9	832.8	832.8
	832.8	832.8	832.8	832.8	832.8	832.8	832.8	832.8	832.8	832.8
	832.8	832.8	832.8	832.8	832.8	832.8	832.8	832.8	832.8	832.8
	832.8	832.8	832.8	832.8	832.8	832.7	832.7	832.7	832.7	832.7
	832.6	832.6	832.6	832.5	832.4	832.2	832.1	831.9	831.6	831.1
	830.5	829.4	834.1	837.5	838.2	838.1				
0 5	834.2	833.7	832.2	830.3	830.1	829.9	829.8	829.7	829.6	829.5
	829.4	829.4	829.3	829.3	829.2	829.2	829.1	829.1	829.1	829.1
	829.0	829.0	829.0	828.9	828.9	828.9	828.8	828.8	828.8	828.7
	828.7	828.7	828.6	828.6	828.5	828.5	828.5	828.4	828.4	828.3
	828.3	828.3	828.2	828.1	828.0	827.9	827.8	827.6	827.4	827.0
	826.5	825.9	824.3	828.5	832.5	832.9				
0 6	833.4	832.8	831.4	828.5	828.3	828.1	827.9	827.7	827.6	827.4
	827.4	827.3	827.2	827.1	827.0	826.9	826.9	826.8	826.8	826.7
	826.7	826.6	826.6	826.5	826.5	826.4	826.4	826.3	826.2	826.2
	826.1	826.1	826.0	826.0	825.9	825.8	825.8	825.7	825.7	825.6
	825.6	825.5	825.5	825.4	825.3	825.2	825.1	825.0	824.8	824.5
	824.1	823.6	822.6	820.5	828.3	829.4				
0 7	832.6	832.1	830.8	828.6	826.7	826.4	826.1	825.9	825.7	825.5
	825.4	825.3	825.2	825.1	824.9	824.8	824.8	824.7	824.6	824.6
	824.5	824.4	824.3	824.3	824.2	824.1	824.0	823.9	823.9	823.8
	823.7	823.6	823.5	823.5	823.4	823.3	823.2	823.2	823.1	823.0
	823.0	822.9	822.9	822.8	822.7	822.7	822.6	822.6	822.5	822.2
	821.9	821.5	821.1	819.8	823.2	825.2				
0 8	832.1	831.6	830.5	828.6	826.8	825.3	825.0	824.7	824.5	824.3
	824.1	824.0	823.8	823.7	823.5	823.4	823.3	823.2	823.2	823.1
	823.0	822.9	822.8	822.7	822.6	822.5	822.4	822.3	822.2	822.1
	822.0	821.9	821.8	821.7	821.6	821.5	821.4	821.3	821.2	821.2
	821.1	821.0	820.9	820.9	820.8	820.8	820.8	820.8	820.8	820.7
	820.4	820.0	819.7	819.0	816.9	819.8				
0 9	831.8	831.3	830.3	828.6	826.9	825.4	825.0	822.9	822.3	822.1
	821.9	821.8	821.6	821.5	821.3	821.2	821.1	821.0	820.9	820.8
	820.7	820.6	820.5	820.4	820.3	820.2	820.2	820.2	820.4	821.0
	821.8	821.7	821.6	821.5	821.4	821.2	821.1	821.0	820.8	820.6
	820.4	820.2	819.7	819.6	819.6	819.6	819.7	819.7	819.8	819.6
	819.4	819.1	818.8	818.2	816.7	816.3				
0 10	831.6	831.1	830.1	828.6	826.9	825.5	822.9	820.6	820.1	819.8
	819.6	819.5	819.3	819.2	819.0	818.8	818.7	818.6	818.5	818.4
	818.3	818.2	818.1	818.0	817.9	817.8	817.7	817.7	817.9	818.2
	818.8	819.1	819.4	820.2	821.0	821.0	820.9	820.7	820.4	820.2
	819.9	819.6	819.1	818.3	818.3	818.4	818.5	818.6	818.8	818.7
	818.5	818.2	817.9	817.4	816.6	816.3				
0 11	831.4	830.9	830.0	828.6	827.0	825.6	821.4	819.6	819.1	818.8
	818.6	818.4	818.3	818.1	817.9	817.8	817.7	817.5	817.4	817.3
	817.2	817.1	816.9	816.8	816.7	816.5	816.4	816.4	816.4	816.5
	816.7	817.0	817.3	817.9	819.0	819.3	819.4	819.6	820.2	820.0
	819.7	819.4	818.9	818.2	817.5	817.5	817.7	817.9	818.1	818.0
	817.8	817.5	817.2	816.8	816.4	816.2				
0 12	831.2	830.8	829.9	828.6	827.0	825.6	820.5	819.0	818.5	818.2
	818.0	817.9	817.7	817.5	817.3	817.2	817.1	816.9	816.8	816.7
	816.6	816.4	816.3	816.1	816.0	815.8	815.7	815.6	815.5	815.6
	815.7	815.8	816.0	816.4	816.8	817.1	817.3	817.6	818.4	818.8
	819.4	819.2	818.7	818.1	817.5	817.1	817.3	817.4	817.6	817.6
	817.3	817.0	816.7	816.4	816.3	816.2				
0 13	831.1	830.7	829.9	828.6	827.0	824.1	819.5	818.5	818.0	817.7
	817.6	817.4	817.2	817.1	816.9	816.7	816.6	816.5	816.3	816.2
	816.1	815.9	815.8	815.6	815.4	815.2	815.0	814.8	814.7	814.7
	814.8	814.9	815.0	815.2	815.4	815.6	815.7	815.9	816.3	816.8
	817.7	818.0	818.6	818.0	817.6	817.2	817.2	817.0	817.2	817.2
	816.8	816.5	816.3	816.0	816.2	816.1				
0 14	831.0	830.6	829.8	828.6	827.0	821.7	818.7	818.0	817.6	817.3
	817.2	817.0	816.9	816.7	816.5	816.3	816.2	816.1	815.9	815.8
	815.6	815.5	815.3	815.1	814.9	814.7	814.4	814.0	813.8	813.8
	814.0	814.1	814.2	814.3	814.4	814.4	814.5	814.7	814.9	815.1
	815.6	816.0	817.1	817.9	817.6	817.3	817.2	817.0	816.8	816.8
	816.4	816.1	815.9	815.5	816.1	816.1				
0 15	830.9	830.5	829.8	828.6	825.7	819.9	818.1	817.6	817.3	817.0
	816.9	816.7	816.5	816.4	816.2	816.0	815.9	815.7	815.6	815.5
	815.3	815.2	815.0	814.8	814.5	814.2	813.8	813.2	812.5	812.9

	813.3	813.5	813.6	813.6	813.6	813.6	813.6	813.7	813.8	813.9
	814.1	814.4	815.0	816.1	816.0	815.8	816.1	816.9	816.8	816.4
	815.9	815.6	815.4	815.1	816.0	816.1				
0 16	830.8	830.4	829.7	828.6	823.4	818.6	817.5	817.2	816.9	816.7
	816.6	816.4	816.3	816.1	815.9	815.7	815.6	815.5	815.3	815.2
	815.0	814.9	814.7	814.5	814.2	813.9	813.3	812.3	809.9	812.0
	812.7	813.0	813.0	813.0	813.0	813.0	812.9	812.9	812.9	812.9
	813.0	813.1	813.4	813.8	813.6	813.5	814.4	816.9	816.8	816.1
	815.5	815.2	815.0	814.7	815.9	816.0				
0 17	830.7	830.3	829.7	828.6	821.3	817.6	817.0	816.8	816.6	816.4
	816.3	816.2	816.0	815.9	815.6	815.5	815.3	815.2	815.1	814.9
	814.8	814.6	814.4	814.2	814.0	813.7	813.2	812.6	811.9	812.2
	812.5	812.6	812.6	812.6	812.5	812.4	812.3	812.2	812.2	812.1
	812.1	812.1	812.1	812.1	811.7	811.2	812.0	814.8	815.3	816.0
	815.0	814.7	814.5	814.4	815.8	816.0				
0 18	830.6	830.3	829.7	828.6	819.3	816.8	816.5	816.4	816.3	816.2
	816.1	816.0	815.8	815.6	815.4	815.2	815.1	815.0	814.9	814.7
	814.6	814.4	814.2	814.0	813.8	813.5	813.2	812.8	812.4	812.4
	812.4	812.4	812.3	812.2	812.1	811.9	811.8	811.7	811.5	811.4
	811.3	811.3	811.1	810.8	810.1	808.6	809.3	812.0	813.1	814.7
	814.9	814.3	814.2	814.4	815.7	815.9				
0 19	830.5	830.2	829.6	826.2	817.6	816.2	816.1	816.1	816.0	816.0
	815.9	815.8	815.6	815.4	815.2	815.0	814.9	814.8	814.6	814.5
	814.4	814.2	814.0	813.9	813.7	813.4	813.2	812.9	812.6	812.4
	812.3	812.1	812.0	811.8	811.6	811.5	811.3	811.1	811.0	810.8
	810.7	810.5	810.2	809.6	808.6	806.8	807.6	809.9	811.4	812.9
	814.8	814.3	814.2	814.5	815.6	815.9				
0 20	830.4	830.2	829.6	822.6	816.3	815.6	815.7	815.8	815.8	815.7
	815.6	815.5	815.4	815.2	814.9	814.8	814.7	814.5	814.4	814.3
	814.2	814.0	813.9	813.7	813.6	813.4	813.2	812.9	812.7	812.4
	812.2	811.9	811.7	811.4	811.2	811.0	810.8	810.6	810.4	810.2
	810.0	809.8	809.3	808.4	807.5	806.6	807.7	808.7	810.1	811.6
	814.7	814.4	814.3	814.5	815.6	815.8				
0 21	830.4	830.1	829.6	819.8	815.3	815.1	815.3	815.4	815.5	815.5
	815.4	815.3	815.1	814.9	814.6	814.5	814.4	814.3	814.2	814.1
	814.0	813.9	813.7	813.6	813.5	813.3	813.2	813.0	812.8	812.4
	812.0	811.7	811.3	811.0	810.8	810.5	810.3	810.1	809.9	809.6
	809.4	809.1	808.5	807.1	806.2	806.0	806.1	807.7	809.0	810.6
	814.7	814.3	814.3	814.5	815.5	815.8				
0 22	830.3	830.1	825.9	817.4	814.6	814.7	814.9	815.1	815.2	815.2
	815.2	815.1	814.9	814.6	814.2	814.2	814.1	814.1	814.0	813.9
	813.8	813.7	813.6	813.5	813.5	813.4	813.3	813.2	813.0	812.5
	811.9	811.4	810.9	810.6	810.2	810.0	809.8	809.5	809.3	809.0
	808.7	808.3	807.6	805.5	805.3	804.7	806.0	807.1	808.2	809.5
	813.2	814.3	814.3	814.5	815.5	815.8				
0 23	830.3	830.1	820.8	815.4	813.9	814.2	814.6	814.8	814.9	815.0
	815.0	814.9	814.7	814.2	814.0	814.0	814.0	813.9	814.0	813.9
	813.7	813.6	813.5	813.5	813.5	813.5	813.4	813.4	813.4	812.7
	811.7	811.0	810.5	810.0	809.6	809.4	809.1	808.9	808.7	808.4
	808.1	807.6	806.7	803.8	804.3	804.7	805.9	806.7	807.7	808.6
	811.2	814.3	814.3	814.5	815.4	815.7				
0 24	825.7	825.5	817.0	813.8	813.3	813.8	814.2	814.4	814.6	814.7
	814.8	814.7	814.4	813.9	814.0	814.0	814.0	813.9	813.7	813.6
	813.6	813.5	813.5	813.5	813.5	813.5	813.4	813.4	813.4	812.6
	811.4	810.5	809.8	809.2	808.6	808.6	808.5	808.3	808.1	807.8
	807.4	807.0	806.0	803.0	803.8	804.5	805.7	806.4	807.2	807.8
	809.8	814.3	814.3	814.5	815.4	815.7				
0 25	819.5	819.6	814.4	812.6	812.8	813.4	813.8	814.1	814.3	814.5
	814.5	814.4	814.2	813.9	814.0	814.0	813.8	813.5	813.2	813.3
	813.4	813.5	813.5	813.5	813.5	813.4	813.4	813.4	813.4	812.3
	810.7	809.7	808.9	808.2	807.6	807.8	807.7	807.6	807.4	807.1
	806.8	806.4	805.5	802.5	803.2	804.5	805.4	806.0	806.7	807.1
	808.4	812.4	814.3	814.5	815.4	815.7				
0 26	815.3	815.6	812.6	811.7	812.3	813.0	813.4	813.7	814.0	814.2
	814.2	814.2	814.1	813.9	814.0	813.7	813.5	813.0	813.2	813.3
	813.4	813.4	813.5	813.5	813.5	813.4	813.4	813.4	813.4	811.6
	809.6	808.5	807.7	807.3	807.6	807.2	807.0	806.9	806.7	806.5
	806.2	805.8	805.0	802.4	802.7	804.3	805.0	805.6	806.1	806.4
	807.3	809.7	812.3	814.5	815.3	815.7				
0 27	812.3	812.8	811.2	810.9	811.8	812.6	813.0	813.4	813.7	813.9

	813.9	814.0	813.9	813.9	813.8	813.6	813.4	813.1	813.0	813.1
	813.1	813.1	813.1	813.0	812.8	812.6	812.4	811.9	811.2	809.2
	807.6	806.5	805.6	805.0	805.8	805.9	806.1	806.1	806.0	805.8
	805.5	805.2	804.6	802.4	802.3	804.0	804.6	805.1	805.5	805.7
	806.4	807.9	809.5	812.4	815.3	815.7				
0 28	809.9	810.7	810.1	810.2	811.4	812.1	812.6	813.0	813.3	813.5
	813.6	813.7	813.7	813.7	813.6	813.5	813.3	813.1	812.9	812.8
	812.7	812.6	812.4	812.2	811.8	811.3	810.5	809.5	808.1	806.3
	804.7	803.8	802.7	802.4	803.0	804.3	805.3	805.5	805.3	804.9
	804.7	804.5	804.2	802.9	801.8	803.6	804.2	804.6	804.9	805.1
	805.5	806.4	807.5	809.6	815.3	815.6				
0 29	808.5	809.1	809.1	809.5	810.9	811.7	812.2	812.6	813.0	813.2
	813.3	813.4	813.5	813.5	813.5	813.4	813.1	812.9	812.7	812.6
	812.4	812.2	811.9	811.5	810.9	810.0	808.9	807.2	805.0	802.3
	800.1	800.3	800.4	800.9	799.6	803.9	805.4	805.0	804.7	804.3
	804.2	804.1	803.9	803.0	801.7	803.3	803.8	804.1	804.5	804.5
	804.8	805.3	806.0	807.6	813.2	814.3				
0 30	807.6	808.0	808.2	808.8	810.4	811.3	811.8	812.2	812.6	812.9
	813.0	813.1	813.2	813.2	813.3	813.1	812.9	812.7	812.6	812.4
	812.2	811.9	811.5	810.9	810.1	808.9	807.4	805.0	801.4	796.6
	795.8	797.8	800.0	800.8	801.1	804.4	804.7	804.7	804.6	804.4
	804.2	804.1	803.8	803.1	802.1	803.0	803.4	803.6	804.0	804.0
	804.1	804.3	804.8	806.1	810.2	812.3				
0 31	807.1	807.5	807.6	808.0	809.9	810.8	811.3	811.8	812.3	812.5
	812.7	812.8	812.9	813.0	813.0	812.8	812.7	812.5	812.4	812.2
	811.9	811.6	811.1	810.4	809.4	808.1	806.3	803.4	797.8	791.1
	790.8	797.7	800.3	801.3	802.6	804.2	804.2	804.3	804.4	804.3
	804.1	803.9	803.6	803.1	802.7	803.0	803.2	803.3	803.6	803.4
	803.5	803.5	803.7	805.0	808.0	810.7				
0 32	806.8	807.2	807.3	807.5	809.4	810.3	810.8	811.4	811.9	812.1
	812.3	812.5	812.6	812.7	812.7	812.6	812.5	812.3	812.2	811.9
	811.7	811.3	810.8	810.0	808.9	807.6	806.0	803.6	800.1	795.9
	795.5	798.7	800.9	802.9	803.4	803.9	804.1	804.1	804.1	804.0
	803.8	803.6	803.4	803.2	802.9	803.0	803.1	803.2	803.4	803.0
	803.0	803.0	803.1	804.1	806.5	809.3				
0 33	806.7	807.1	807.2	807.1	808.8	809.8	810.3	811.0	811.4	811.7
	811.9	812.0	812.3	812.4	812.4	812.3	812.2	812.1	811.9	811.7
	811.4	811.0	810.4	809.6	808.6	807.4	806.0	804.3	802.1	800.2
	799.7	800.8	802.0	803.3	803.6	803.8	803.9	803.9	803.8	803.6
	803.4	803.3	803.3	803.1	803.0	803.1	803.1	803.1	803.2	802.7
	802.7	802.7	802.8	803.6	805.3	808.2				
0 34	806.7	807.2	807.2	806.9	808.1	809.3	809.7	810.5	811.0	811.2
	811.4	811.6	811.8	812.0	812.1	812.0	811.9	811.7	811.6	811.3
	811.0	810.6	810.0	809.2	808.2	807.1	806.0	804.7	803.4	802.3
	801.8	802.1	802.7	803.5	803.7	803.6	803.7	803.7	803.6	803.4
	803.3	803.2	803.2	803.1	803.1	803.1	803.1	803.1	803.2	802.6
	802.6	802.6	802.7	803.3	804.4	807.1				
0 35	807.0	807.6	807.5	806.8	807.7	808.7	809.1	809.9	810.4	810.6
	810.8	811.0	811.3	811.5	811.6	811.5	811.4	811.2	811.1	810.8
	810.5	810.1	809.5	808.7	807.8	806.8	805.8	804.9	803.9	803.2
	802.8	802.8	803.0	803.3	803.5	803.5	803.5	803.4	803.4	803.3
	803.2	803.2	803.2	803.1	803.1	803.1	803.1	803.1	803.2	802.6
	802.5	802.5	802.6	803.1	803.9	806.1				
0 36	807.5	808.0	807.7	806.8	807.5	808.0	808.4	809.3	809.8	809.9
	810.0	810.2	810.5	810.8	810.9	810.8	810.7	810.6	810.4	810.1
	809.8	809.4	808.8	808.0	807.2	806.3	805.5	804.8	804.1	803.6
	803.3	803.1	803.2	803.3	803.3	803.3	803.3	803.2	803.2	803.2
	803.1	803.1	803.1	803.1	803.1	803.1	803.1	803.1	803.2	802.6
	802.6	802.6	802.6	803.1	803.6	805.2				
0 37	807.0	808.6	807.9	807.0	807.6	807.5	807.2	808.2	808.6	808.7
	808.7	808.9	809.2	809.4	809.5	809.4	809.3	809.2	809.0	808.8
	808.5	808.1	807.5	806.9	806.2	805.6	805.0	804.4	804.0	803.7
	803.4	803.3	803.3	803.2	803.2	803.2	803.2	803.1	803.1	803.1
	803.1	803.1	803.2	803.2	803.2	803.2	803.2	803.2	803.3	802.8
	802.7	802.7	802.8	803.2	803.5	803.9				
0 38	807.0	810.2	808.0	807.2	807.8	807.2	806.4	806.4	806.8	806.6
	806.6	806.6	806.8	807.0	807.0	806.9	806.8	806.7	806.6	806.4
	806.2	806.0	805.6	805.3	804.8	804.4	804.0	803.6	803.4	803.3
	803.2	803.1	803.1	803.1	803.1	803.1	803.1	803.1	803.1	803.1
	803.1	803.1	803.2	803.2	803.3	803.4	803.4	803.5	803.5	803.2

	803.1	803.1	803.2	803.6	803.6	803.2				
0 39	807.2	810.1	808.0	807.4	808.4	807.2	806.1	805.7	805.1	804.6
	804.4	804.4	804.3	804.3	804.2	804.0	804.0	803.9	803.9	803.8
	803.8	803.7	803.6	803.6	803.5	803.4	803.3	803.2	803.2	803.1
	803.1	803.1	803.1	803.1	803.1	803.1	803.1	803.1	803.1	803.2
	803.2	803.2	803.3	803.4	803.6	803.8	804.0	804.1	804.1	804.0
	803.9	804.0	804.1	804.3	804.0	803.2				
0 40	808.1	808.5	807.8	807.9	808.9	807.4	806.1	805.5	804.6	804.0
	803.8	803.7	803.7	803.6	803.5	803.4	803.3	803.3	803.3	803.3
	803.2	803.2	803.2	803.2	803.2	803.2	803.1	803.1	803.1	803.1
	803.1	803.1	803.1	803.1	803.2	803.2	803.2	803.2	803.3	803.3
	803.4	803.5	803.7	804.0	804.2	804.4	804.5	804.6	804.7	804.7
	804.7	804.7	804.8	805.0	804.9	803.9				
0 41	810.5	808.7	808.0	808.7	809.4	808.2	806.4	805.8	804.8	804.1
	803.8	803.7	803.6	803.5	803.4	803.3	803.2	803.2	803.2	803.2
	803.2	803.2	803.2	803.2	803.2	803.2	803.2	803.2	803.2	803.2
	803.3	803.3	803.3	803.3	803.4	803.5	803.7	803.8	803.9	804.0
	804.1	804.2	804.4	804.6	804.8	805.0	805.1	805.2	805.3	805.3
	805.3	805.4	805.5	805.7	806.1	805.5				
0 42	812.1	812.0	809.5	809.8	810.2	809.3	808.0	807.2	806.2	805.4
	804.7	804.3	804.1	804.0	803.8	803.7	803.6	803.6	803.5	803.5
	803.5	803.5	803.5	803.5	803.5	803.5	803.6	803.7	804.0	804.1
	804.3	804.4	804.4	804.5	804.6	804.7	804.8	804.9	805.0	805.0
	805.1	805.2	805.3	805.5	805.7	805.8	805.9	806.0	806.1	806.2
	806.3	806.4	806.5	807.0	808.8	809.2				
0 43	813.3	814.5	814.1	812.1	812.1	811.4	810.5	809.8	809.0	808.4
	808.0	807.7	807.4	807.2	806.9	806.7	806.6	806.4	806.2	806.1
	805.9	805.7	805.7	805.6	805.6	805.6	805.7	805.7	805.8	805.9
	805.9	806.0	806.1	806.1	806.2	806.3	806.3	806.4	806.5	806.5
	806.6	806.7	806.8	806.9	807.0	807.1	807.2	807.3	807.5	807.6
	807.7	807.9	808.3	810.4	813.7	814.3				
0 44	816.0	817.1	816.9	814.6	814.5	814.0	813.3	812.8	812.2	811.7
	811.5	811.2	810.9	810.7	810.4	810.2	810.1	809.9	809.7	809.6
	809.4	809.3	809.1	809.0	809.0	809.0	808.9	809.0	809.0	809.0
	809.0	809.1	809.1	809.2	809.2	809.3	809.3	809.4	809.4	809.5
	809.5	809.6	809.6	809.7	809.9	810.0	810.1	810.2	810.3	810.6
	810.9	811.3	812.2	814.8	817.2	817.6				
0 45	822.4	820.7	819.9	817.6	817.8	817.5	817.0	816.7	816.3	816.0
	815.8	815.6	815.4	815.3	815.1	814.9	814.9	814.8	814.7	814.6
	814.6	814.5	814.5	814.4	814.4	814.3	814.3	814.3	814.3	814.3
	814.3	814.3	814.3	814.3	814.4	814.4	814.4	814.4	814.5	814.5
	814.5	814.6	814.6	814.7	814.8	814.9	815.0	815.2	815.4	815.9
	816.5	817.3	818.1	819.4	814.2	814.6				
0 46	829.6	828.4	823.8	822.8	822.7	822.2	821.7	821.4	821.1	820.9
	820.7	820.6	820.4	820.3	820.1	820.0	820.0	819.9	819.9	819.8
	819.8	819.8	819.7	819.7	819.7	819.7	819.7	819.6	819.6	819.6
	819.6	819.6	819.6	819.6	819.6	819.6	819.5	819.5	819.5	819.5
	819.5	819.6	819.6	819.6	819.7	819.8	819.9	820.1	820.4	820.9
	821.3	820.6	815.9	816.0	816.1	816.6				
0 47	840.0	835.0	830.0	825.0	823.0	822.0	821.0	820.0	820.0	820.0
	819.0	819.0	819.0	819.0	818.0	818.0	818.0	818.0	818.0	818.0
	818.0	818.0	818.0	818.0	818.0	818.0	818.0	818.0	818.0	818.0
	818.0	818.0	818.0	818.0	818.0	818.0	817.0	817.0	817.0	817.0
	817.0	817.0	817.0	817.0	817.0	817.0	817.0	817.0	817.0	817.0
	817.0	817.0	817.0	817.0	817.0	818.0				

1 HEAD IN LAYER 3 AT END OF TIME STEP 1 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
	51	52	53	54	55	56				

0 1	857.0	855.0	856.0	853.0	851.0	851.0	850.0	850.0	851.0	851.0
	851.0	851.0	851.0	851.0	852.0	851.0	852.0	852.0	853.0	853.0
	854.0	854.0	855.0	855.0	855.0	855.0	856.0	856.0	856.0	856.0
	856.0	857.0	857.0	857.0	857.0	857.0	858.0	858.0	858.0	858.0
	858.0	858.0	860.0	860.0	861.0	861.0	862.0	862.0	862.0	863.0

	863.0	864.0	865.0	866.0	861.0	860.0				
0 2	843.9	845.2	845.9	845.4	844.8	844.7	844.7	844.8	845.1	845.3
	845.4	845.5	845.7	845.9	846.1	846.3	846.4	846.6	846.7	846.9
	847.1	847.3	847.4	847.6	847.7	847.9	848.0	848.2	848.3	848.5
	848.6	848.7	848.8	849.0	849.1	849.2	849.3	849.4	849.5	849.6
	849.7	849.8	850.0	850.1	850.2	850.2	850.1	849.9	848.6	847.6
	847.1	846.8	846.6	846.3	844.6	843.6				
0 3	837.6	838.0	838.4	838.2	838.0	837.9	837.9	837.9	838.0	838.0
	838.1	838.2	838.2	838.3	838.4	838.5	838.5	838.6	838.6	838.7
	838.8	838.8	838.9	838.9	839.0	839.1	839.1	839.2	839.2	839.3
	839.3	839.4	839.4	839.4	839.5	839.5	839.5	839.6	839.6	839.6
	839.6	839.6	839.6	839.6	839.5	839.4	839.3	839.1	838.7	837.9
	837.2	836.8	836.4	835.8	834.8	834.1				
0 4	831.5	832.0	833.4	833.3	833.1	833.0	832.9	832.9	832.8	832.8
	832.8	832.8	832.8	832.8	832.8	832.8	832.8	832.8	832.8	832.8
	832.8	832.8	832.8	832.8	832.8	832.8	832.8	832.8	832.8	832.8
	832.8	832.8	832.8	832.8	832.7	832.7	832.7	832.7	832.7	832.7
	832.6	832.6	832.6	832.5	832.4	832.2	832.1	831.9	831.6	831.1
	830.5	830.0	829.7	829.2	828.4	827.8				
0 5	827.7	828.2	829.3	830.3	830.1	829.9	829.8	829.7	829.6	829.5
	829.4	829.4	829.3	829.3	829.2	829.2	829.1	829.1	829.1	829.0
	829.0	829.0	829.0	828.9	828.9	828.9	828.8	828.8	828.8	828.7
	828.7	828.6	828.6	828.6	828.5	828.5	828.5	828.4	828.4	828.3
	828.3	828.3	828.2	828.1	828.0	827.9	827.8	827.6	827.4	827.0
	826.5	825.9	825.7	825.2	824.6	824.2				
0 6	825.4	825.9	826.8	828.5	828.3	828.1	827.9	827.7	827.6	827.4
	827.4	827.3	827.2	827.1	827.0	826.9	826.9	826.8	826.8	826.7
	826.7	826.6	826.6	826.5	826.5	826.4	826.4	826.3	826.2	826.2
	826.1	826.1	826.0	826.0	825.9	825.8	825.8	825.7	825.7	825.6
	825.6	825.5	825.5	825.4	825.3	825.2	825.1	825.0	824.8	824.5
	824.1	823.6	823.3	822.8	822.3	821.9				
0 7	823.2	823.6	824.5	825.7	826.6	826.4	826.1	825.9	825.7	825.5
	825.4	825.3	825.2	825.0	824.9	824.8	824.8	824.7	824.6	824.5
	824.5	824.4	824.3	824.3	824.2	824.1	824.0	823.9	823.9	823.8
	823.7	823.6	823.5	823.5	823.4	823.3	823.2	823.2	823.1	823.0
	823.0	822.9	822.9	822.8	822.7	822.7	822.6	822.6	822.5	822.2
	821.9	821.5	821.1	820.6	820.2	819.9				
0 8	821.5	822.0	822.8	823.8	824.6	825.2	824.9	824.7	824.4	824.2
	824.0	823.9	823.7	823.6	823.4	823.3	823.2	823.1	823.1	823.0
	822.9	822.8	822.7	822.6	822.5	822.4	822.3	822.2	822.1	822.0
	821.9	821.8	821.7	821.6	821.5	821.4	821.3	821.2	821.2	821.1
	821.0	821.0	820.9	820.9	820.8	820.8	820.8	820.8	820.8	820.7
	820.4	820.0	819.7	819.0	818.7	818.4				
0 9	820.5	820.9	821.6	822.6	823.4	823.8	823.6	823.3	823.0	822.7
	822.6	822.4	822.2	822.0	821.8	821.7	821.6	821.5	821.4	821.3
	821.2	821.1	821.0	820.9	820.8	820.6	820.5	820.4	820.3	820.2
	820.0	819.9	819.8	819.7	819.6	819.5	819.4	819.4	819.3	819.3
	819.3	819.3	819.5	819.5	819.6	819.6	819.7	819.7	819.8	819.6
	819.4	819.1	818.8	818.2	817.8	817.5				
0 10	819.4	819.8	820.5	821.4	822.1	822.5	822.3	822.1	821.7	821.3
	821.1	820.9	820.7	820.5	820.3	820.2	820.0	819.9	819.8	819.7
	819.6	819.4	819.3	819.2	819.0	818.9	818.7	818.6	818.5	818.3
	818.2	818.1	817.9	817.8	817.7	817.6	817.5	817.4	817.4	817.3
	817.4	817.4	817.6	818.1	818.3	818.4	818.5	818.6	818.8	818.7
	818.5	818.2	817.9	817.4	816.8	816.5				
0 11	818.5	819.0	819.7	820.5	821.2	821.6	821.4	821.2	820.8	820.3
	820.0	819.8	819.6	819.4	819.2	819.0	818.9	818.8	818.6	818.5
	818.4	818.2	818.1	817.9	817.8	817.6	817.4	817.2	817.1	816.9
	816.8	816.6	816.5	816.4	816.2	816.1	816.0	815.9	815.8	815.8
	815.8	815.8	815.9	816.4	817.1	817.5	817.7	817.9	818.1	818.0
	817.8	817.5	817.2	816.8	816.1	815.8				
0 12	818.0	818.4	819.1	819.9	820.6	821.0	820.8	820.6	820.2	819.5
	819.3	819.0	818.8	818.6	818.4	818.2	818.1	818.0	817.9	817.7
	817.6	817.4	817.2	817.1	816.9	816.7	816.5	816.3	816.2	816.0
	815.8	815.7	815.5	815.4	815.3	815.1	815.0	814.9	814.8	814.7
	814.6	814.6	814.7	815.1	816.0	816.8	817.1	817.4	817.6	817.6
	817.3	817.0	816.7	816.4	815.6	815.4				
0 13	817.4	817.8	818.5	819.3	820.0	820.4	820.3	820.0	819.6	818.8
	818.5	818.3	818.1	817.9	817.7	817.5	817.3	817.2	817.1	816.9
	816.8	816.6	816.4	816.2	816.1	815.8	815.6	815.4	815.2	815.0

	814.9	814.7	814.6	814.4	814.3	814.1	813.9	813.8	813.7	813.6
	813.5	813.4	813.4	813.8	814.8	815.7	816.3	816.8	817.2	817.2
	816.8	816.5	816.3	815.9	815.2	814.9				
0 14	816.8	817.2	817.9	818.7	819.4	819.8	819.7	819.5	819.0	818.2
	818.0	817.8	817.6	817.4	817.1	817.0	816.8	816.7	816.5	816.4
	816.2	816.1	815.9	815.7	815.5	815.2	815.0	814.8	814.5	814.4
	814.2	814.1	813.9	813.7	813.6	813.4	813.2	813.1	812.9	812.8
	812.6	812.6	812.5	812.7	813.7	814.7	815.5	816.1	816.7	816.8
	816.4	816.1	815.9	815.5	814.7	814.5				
0 15	816.2	816.7	817.3	818.1	818.9	819.2	819.2	819.0	818.5	817.9
	817.7	817.5	817.3	817.1	816.9	816.7	816.5	816.4	816.3	816.1
	815.9	815.8	815.6	815.4	815.2	814.9	814.7	814.4	814.1	814.0
	813.9	813.7	813.6	813.4	813.2	813.0	812.8	812.6	812.4	812.3
	812.2	812.0	811.9	812.0	812.7	813.8	814.7	815.4	816.1	816.4
	815.9	815.6	815.4	815.1	814.2	814.0				
0 16	815.6	816.1	816.7	817.5	818.3	818.7	818.6	818.5	818.1	817.6
	817.4	817.2	817.0	816.8	816.6	816.4	816.3	816.1	816.0	815.8
	815.7	815.5	815.3	815.1	814.9	814.6	814.4	814.0	813.4	813.6
	813.5	813.4	813.2	813.0	812.8	812.6	812.4	812.2	812.0	811.8
	811.6	811.5	811.3	811.3	811.6	812.9	813.9	814.7	815.6	816.0
	815.4	815.2	815.0	814.7	813.7	813.5				
0 17	815.0	815.5	816.1	816.9	817.7	818.1	818.1	818.0	817.6	817.3
	817.1	817.0	816.8	816.6	816.3	816.1	816.0	815.8	815.7	815.5
	815.4	815.2	815.0	814.8	814.6	814.4	814.1	813.8	813.5	813.4
	813.3	813.1	812.9	812.7	812.4	812.2	812.0	811.7	811.5	811.3
	811.1	810.9	810.6	810.4	810.4	812.1	813.2	814.2	815.1	815.6
	814.9	814.7	814.5	814.2	813.2	813.1				
0 18	814.4	814.8	815.5	816.3	817.1	817.5	817.6	817.5	817.2	817.0
	816.8	816.7	816.5	816.3	816.1	815.9	815.7	815.6	815.4	815.3
	815.1	815.0	814.8	814.6	814.4	814.2	813.9	813.7	813.4	813.2
	813.0	812.8	812.6	812.3	812.1	811.8	811.5	811.3	811.0	810.7
	810.5	810.2	809.9	809.5	809.2	810.8	812.0	813.1	814.3	814.8
	814.1	814.1	814.0	813.5	812.7	812.6				
0 19	813.7	814.2	814.9	815.7	816.5	817.0	817.0	817.0	816.8	816.6
	816.6	816.4	816.3	816.0	815.8	815.6	815.4	815.3	815.2	815.0
	814.9	814.7	814.5	814.4	814.2	814.0	813.7	813.5	813.3	813.0
	812.8	812.5	812.3	812.0	811.7	811.4	811.1	810.8	810.5	810.2
	809.9	809.6	809.1	808.7	808.4	809.2	810.0	811.6	813.1	813.7
	813.3	813.3	813.2	812.8	812.2	812.1				
0 20	813.1	813.6	814.3	815.1	816.0	816.4	816.5	816.5	816.4	816.3
	816.3	816.2	816.0	815.8	815.6	815.3	815.2	815.0	814.9	814.7
	814.6	814.5	814.3	814.2	814.0	813.8	813.6	813.3	813.1	812.8
	812.6	812.3	812.0	811.7	811.4	811.0	810.7	810.3	810.0	809.6
	809.3	808.9	808.4	807.7	807.4	807.6	807.8	810.2	812.0	812.7
	812.5	812.5	812.4	812.1	811.6	811.7				
0 21	812.4	812.9	813.6	814.4	815.4	815.9	816.0	816.0	816.1	816.1
	816.0	815.9	815.8	815.6	815.3	815.1	814.9	814.8	814.6	814.5
	814.3	814.2	814.1	814.0	813.8	813.6	813.4	813.2	812.9	812.6
	812.4	812.1	811.7	811.4	811.0	810.6	810.2	809.9	809.5	809.1
	808.7	808.2	807.6	806.7	806.4	806.1	806.1	809.0	811.0	811.8
	811.7	811.7	811.6	811.4	811.1	811.2				
0 22	811.7	812.2	813.0	813.8	814.8	815.3	815.5	815.6	815.7	815.8
	815.8	815.7	815.6	815.4	815.1	814.8	814.6	814.5	814.3	814.2
	814.1	814.0	813.9	813.8	813.6	813.4	813.2	813.0	812.8	812.5
	812.2	811.8	811.5	811.1	810.7	810.2	809.8	809.4	809.0	808.5
	808.1	807.6	806.7	805.4	805.3	804.7	806.1	808.2	810.1	810.9
	810.9	810.8	810.8	810.6	810.5	810.7				
0 23	810.9	811.5	812.3	813.1	814.2	814.8	815.0	815.1	815.3	815.5
	815.5	815.5	815.3	815.1	814.9	814.6	814.4	814.2	814.0	813.9
	813.8	813.8	813.7	813.6	813.5	813.3	813.1	812.9	812.6	812.3
	812.0	811.7	811.2	810.8	810.3	809.8	809.3	808.9	808.5	808.0
	807.5	807.0	806.0	803.9	804.3	804.7	805.9	807.6	809.3	810.0
	810.0	810.0	810.0	809.9	810.0	810.2				
0 24	810.2	810.8	811.6	812.4	813.6	814.2	814.4	814.6	814.8	815.3
	815.3	815.3	815.2	815.0	814.7	814.3	814.1	813.9	813.7	813.6
	813.6	813.6	813.6	813.5	813.4	813.2	813.0	812.8	812.5	812.2
	811.9	811.5	811.0	810.5	809.9	809.4	808.8	808.4	807.9	807.5
	807.0	806.4	805.4	803.1	803.7	804.4	805.7	807.1	808.5	809.2
	809.2	809.2	809.1	809.1	809.4	809.7				
0 25	809.4	810.1	810.9	811.7	813.0	813.6	813.9	814.1	814.4	814.8

	814.9	814.9	814.9	814.7	814.4	814.0	813.8	813.5	813.3	813.3
	813.4	813.5	813.4	813.4	813.2	813.1	812.9	812.6	812.4	812.1
	811.7	811.2	810.6	809.9	809.2	808.6	808.0	807.7	807.4	807.0
	806.5	806.0	804.9	802.7	803.2	804.1	805.4	806.5	807.8	808.3
	808.3	808.3	808.3	808.4	808.8	809.2				
0 26	808.6	809.3	810.2	811.0	812.4	813.1	813.4	813.6	813.9	814.3
	814.4	814.5	814.4	814.3	814.0	813.7	813.5	813.1	813.2	813.3
	813.3	813.3	813.3	813.2	813.1	812.9	812.7	812.5	812.2	811.9
	811.5	810.9	810.1	809.1	807.8	807.5	807.2	807.0	806.8	806.5
	806.1	805.6	804.6	802.5	802.8	803.8	805.1	806.0	807.1	807.5
	807.4	807.4	807.4	807.6	808.2	808.7				
0 27	807.7	808.5	809.4	810.3	811.7	812.5	812.8	813.1	813.4	813.7
	813.9	814.0	814.0	813.9	813.8	813.6	813.4	813.2	813.2	813.2
	813.2	813.2	813.2	813.1	812.9	812.8	812.6	812.3	812.0	811.7
	811.3	810.7	809.7	808.2	806.2	806.2	806.3	806.3	806.2	806.0
	805.6	805.2	804.4	802.5	802.4	803.5	804.8	805.6	806.4	806.6
	806.5	806.5	806.6	806.8	807.6	808.2				
0 28	806.8	807.7	808.6	809.5	811.1	811.9	812.2	812.5	812.9	813.2
	813.4	813.6	813.7	813.7	813.6	813.5	813.3	813.3	813.2	813.2
	813.1	813.1	813.1	813.0	812.9	812.7	812.5	812.2	811.9	811.6
	811.2	810.8	808.7	802.5	803.3	804.6	805.4	805.6	805.6	805.5
	805.3	804.9	804.2	802.9	802.0	803.3	804.5	805.1	805.7	805.7
	805.6	805.6	805.7	805.9	807.0	807.7				
0 29	806.2	806.9	807.8	808.7	810.4	811.3	811.6	812.0	812.3	812.7
	812.9	813.1	813.3	813.5	813.5	813.4	813.3	813.2	813.2	813.1
	813.1	813.0	813.0	812.9	812.8	811.9	811.2	810.8	810.5	810.0
	809.2	807.8	804.4	800.9	799.8	803.3	804.7	805.1	805.1	805.1
	804.9	804.6	804.1	803.0	801.9	803.4	804.2	804.6	805.0	804.7
	804.7	804.7	804.7	805.1	806.4	807.2				
0 30	805.7	806.3	807.0	807.9	809.8	810.7	811.0	811.4	811.8	812.1
	812.4	812.7	813.0	813.2	813.3	813.2	813.2	813.2	813.1	813.1
	813.0	813.0	812.9	812.5	811.3	809.1	808.2	807.9	807.9	807.2
	806.0	803.7	800.1	800.9	801.5	803.3	804.4	804.6	804.7	804.7
	804.5	804.3	803.9	803.1	802.2	803.1	803.3	803.4	804.2	803.6
	803.7	803.7	803.8	804.2	805.7	806.7				
0 31	805.4	805.9	806.4	807.0	809.1	810.1	810.4	810.8	811.2	811.5
	811.8	812.2	812.6	813.0	813.1	813.1	813.1	813.1	813.1	813.0
	813.0	812.9	812.8	811.7	809.0	806.7	806.4	806.1	805.8	805.1
	803.8	802.1	800.7	801.5	802.6	803.5	804.2	804.4	804.4	804.3
	804.2	804.0	803.7	803.2	802.7	803.1	803.2	803.2	803.5	802.4
	802.7	802.7	802.8	803.3	805.1	806.2				
0 32	805.1	805.6	806.1	806.4	808.4	809.4	809.7	810.2	810.6	811.0
	811.3	811.7	812.3	812.8	813.0	813.0	813.0	813.0	813.0	812.9
	812.9	812.8	812.7	811.3	808.2	806.3	805.9	805.5	804.8	804.3
	803.6	802.9	802.4	802.9	803.4	803.8	804.0	804.1	804.1	804.0
	803.8	803.5	803.4	803.2	803.0	803.1	803.2	803.2	803.3	802.2
	802.3	802.3	802.3	802.7	804.4	805.6				
0 33	805.0	805.5	805.9	806.0	807.7	808.8	809.0	809.5	810.0	810.3
	810.6	811.1	812.0	812.6	812.9	813.0	813.0	813.0	812.9	812.9
	812.8	812.7	812.7	811.0	807.7	805.9	805.5	805.1	804.6	804.1
	803.7	803.3	803.1	803.3	803.6	803.8	803.9	803.9	803.8	803.6
	803.4	803.3	803.3	803.2	803.1	803.2	803.2	803.2	803.2	802.1
	802.2	802.2	802.2	802.5	803.8	805.1				
0 34	804.9	805.5	805.8	805.7	807.0	808.1	808.2	808.9	809.3	809.7
	810.0	810.4	811.8	812.5	812.8	812.9	812.9	812.9	812.9	812.9
	812.8	812.7	812.6	810.6	807.3	805.5	805.1	804.8	804.4	804.0
	803.7	803.5	803.4	803.5	803.7	803.7	803.6	803.5	803.4	803.3
	803.2	803.2	803.2	803.2	803.1	803.2	803.2	803.2	803.2	802.1
	802.1	802.1	802.1	802.3	803.1	804.7				
0 35	804.8	805.7	806.0	805.5	806.5	807.4	807.3	808.2	808.7	809.0
	809.2	809.5	811.2	812.2	812.6	812.7	812.7	812.7	812.6	812.5
	812.4	812.0	811.4	809.4	806.6	805.1	804.8	804.4	804.1	803.8
	803.6	803.5	803.4	803.5	803.6	803.5	803.3	803.2	803.2	803.2
	803.2	803.1	803.2	803.2	803.2	803.2	803.2	803.2	803.1	802.1
	802.1	802.1	802.1	802.3	802.7	804.2				
0 36	813.7	805.8	806.1	805.5	806.3	806.7	806.4	807.6	808.0	808.2
	808.4	808.6	810.3	811.5	812.0	812.1	812.1	812.0	811.9	811.8
	811.5	811.0	810.1	808.4	806.1	804.7	804.4	804.1	803.8	803.6
	803.5	803.4	803.4	803.4	803.5	803.2	803.2	803.2	803.1	803.1
	803.1	803.1	803.2	803.2	803.2	803.2	803.2	803.1	803.0	802.2

	802.1	802.1	802.1	802.3	802.5	803.7				
0 37	804.6	805.9	806.2	805.5	806.2	806.2	805.7	806.7	807.0	807.1
	807.2	807.3	809.0	810.3	810.8	810.9	810.9	810.8	810.7	810.5
	810.1	809.6	808.7	807.3	805.3	804.1	803.9	803.6	803.4	803.4
	803.3	803.3	803.3	803.3	803.2	803.2	803.2	803.2	803.2	803.2
	803.2	803.2	803.3	803.3	803.2	803.1	803.1	803.1	803.1	802.3
	802.2	802.2	802.2	802.5	802.5	803.0				
0 38	804.6	814.9	806.3	805.7	806.5	805.9	805.3	805.5	805.5	805.4
	805.4	805.5	806.8	807.7	808.1	808.1	808.1	808.1	808.0	807.8
	807.6	807.2	806.7	805.8	804.5	803.4	803.1	803.1	803.1	803.1
	803.1	803.1	803.2	803.2	803.2	803.2	803.2	803.2	803.2	803.2
	803.2	803.2	803.2	803.1	803.2	803.2	803.3	803.3	803.4	802.7
	802.6	802.6	802.6	803.0	802.7	802.7				
0 39	804.7	814.9	806.3	806.1	807.2	806.0	805.1	804.9	803.9	803.6
	803.5	803.5	803.1	803.1	803.1	803.0	803.0	803.0	803.0	803.0
	803.0	803.0	803.0	803.0	803.0	803.0	803.0	803.0	803.0	803.0
	803.0	803.0	803.1	803.1	803.2	803.2	803.2	803.2	803.2	803.2
	803.2	803.1	803.2	803.3	803.4	803.9	804.2	804.3	804.3	804.0
	804.0	803.9	804.0	804.1	803.2	802.8				
0 40	804.7	804.7	806.1	806.7	807.9	806.5	805.3	804.8	803.6	803.2
	803.2	803.1	803.1	803.1	803.1	803.0	803.0	803.0	803.0	803.0
	803.0	803.0	803.0	803.0	803.0	803.0	803.0	803.0	803.0	803.0
	803.0	803.0	803.0	803.1	803.1	803.1	803.1	803.1	803.2	803.2
	803.2	803.3	803.5	804.1	804.5	804.9	805.1	805.2	805.3	805.2
	805.1	805.1	805.2	805.2	804.5	803.4				
0 41	814.5	804.7	806.2	807.6	808.6	807.4	805.8	805.2	803.8	803.4
	803.2	803.1	803.1	803.1	803.1	803.1	803.0	803.0	803.0	803.0
	803.0	803.0	803.0	803.0	803.0	803.1	803.1	803.1	803.1	803.1
	803.2	803.2	803.2	803.2	803.2	803.3	803.4	803.8	804.1	804.3
	804.4	804.6	804.8	805.2	805.5	805.8	806.0	806.1	806.3	806.2
	806.2	806.2	806.3	806.3	805.7	804.8				
0 42	814.8	815.1	806.8	808.9	809.7	808.8	807.7	806.9	805.8	804.9
	803.9	803.6	803.5	803.5	803.4	803.3	803.3	803.3	803.3	803.3
	803.3	803.3	803.3	803.3	803.3	803.4	803.6	804.0	804.4	804.6
	804.8	805.0	805.1	805.2	805.3	805.4	805.6	805.7	805.9	806.0
	806.2	806.3	806.5	806.7	807.0	807.2	807.4	807.5	807.6	807.7
	807.7	807.8	807.8	807.8	807.4	806.9				
0 43	815.2	815.5	815.6	810.5	811.1	810.5	809.7	809.0	808.3	807.6
	807.2	806.9	806.7	806.6	806.5	806.4	806.4	806.4	806.4	806.3
	806.3	806.4	806.4	806.4	806.5	806.6	806.7	806.8	806.9	807.0
	807.2	807.3	807.4	807.5	807.6	807.7	807.8	807.9	808.0	808.1
	808.2	808.3	808.4	808.6	808.8	808.9	809.1	809.2	809.3	809.4
	809.5	809.5	809.6	809.6	809.6	809.3				
0 44	815.6	815.9	816.0	811.7	812.5	812.1	811.5	810.9	810.4	809.9
	809.7	809.5	809.3	809.1	809.0	809.0	808.9	808.9	808.9	808.9
	808.9	808.9	808.9	808.9	808.9	809.0	809.0	809.1	809.2	809.2
	809.3	809.4	809.4	809.5	809.6	809.6	809.7	809.8	809.8	809.9
	810.0	810.0	810.1	810.3	810.4	810.5	810.6	810.7	810.8	810.9
	811.0	811.1	811.2	811.3	811.5	811.5				
0 45	820.6	816.5	816.6	813.0	814.5	814.3	813.9	813.5	813.1	812.9
	812.7	812.5	812.4	812.3	812.1	812.1	812.0	812.0	812.0	812.0
	812.0	811.9	811.9	811.9	811.9	812.0	812.0	812.0	812.0	812.0
	812.0	812.1	812.1	812.1	812.2	812.2	812.2	812.3	812.3	812.3
	812.4	812.4	812.4	812.5	812.6	812.7	812.7	812.8	812.9	813.0
	813.1	813.2	813.4	813.6	814.2	814.6				
0 46	825.9	825.2	817.5	817.5	818.2	817.7	817.2	816.8	816.5	816.3
	816.1	816.0	815.8	815.7	815.6	815.5	815.4	815.4	815.4	815.3
	815.3	815.3	815.3	815.3	815.2	815.2	815.2	815.2	815.2	815.2
	815.2	815.2	815.2	815.2	815.2	815.2	815.1	815.1	815.1	815.1
	815.1	815.1	815.1	815.1	815.2	815.2	815.2	815.3	815.3	815.4
	815.5	815.7	815.9	816.0	816.1	816.6				
0 47	840.0	835.0	830.0	825.0	823.0	822.0	821.0	820.0	820.0	820.0
	819.0	819.0	819.0	819.0	818.0	818.0	818.0	818.0	818.0	818.0
	818.0	818.0	818.0	818.0	818.0	818.0	818.0	818.0	818.0	818.0
	818.0	818.0	818.0	818.0	818.0	818.0	817.0	817.0	817.0	817.0
	817.0	817.0	817.0	817.0	817.0	817.0	817.0	817.0	817.0	817.0
	817.0	817.0	817.0	817.0	817.0	818.0				

1 HEAD IN LAYER 4 AT END OF TIME STEP 1 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
	51	52	53	54	55	56				
0 1	830.3	829.9	829.6	829.3	828.9	828.6	828.4	828.3	828.2	828.1
	828.0	827.9	827.9	827.8	827.7	827.7	827.7	827.6	827.6	827.6
	827.5	827.5	827.5	827.4	827.4	827.4	827.3	827.3	827.3	827.2
	827.2	827.2	827.1	827.1	827.0	827.0	827.0	827.0	826.9	826.9
	826.8	826.8	826.8	826.7	826.6	826.6	826.5	826.4	826.3	826.2
	826.1	825.9	825.8	825.6	825.3	824.4				
0 2	828.5	825.4	828.0	828.7	828.8	828.7	828.6	828.5	828.4	828.3
	828.3	828.2	828.2	828.2	828.1	828.1	828.0	828.0	828.0	828.0
	828.0	827.9	827.9	827.9	827.9	827.8	827.8	827.8	827.8	827.7
	827.7	827.7	827.6	827.6	827.6	827.6	827.5	827.5	827.5	827.4
	827.4	827.4	827.3	827.2	827.2	827.1	827.0	826.9	826.8	826.5
	826.3	826.1	825.8	825.4	824.5	822.8				
0 3	826.4	825.9	826.8	827.3	827.5	827.5	827.4	827.3	827.3	827.2
	827.2	827.1	827.1	827.0	827.0	826.9	826.9	826.9	826.8	826.8
	826.8	826.8	826.7	826.7	826.7	826.7	826.6	826.6	826.6	826.5
	826.5	826.5	826.4	826.4	826.4	826.3	826.3	826.3	826.2	826.2
	826.1	826.1	826.0	826.0	825.9	825.8	825.7	825.6	825.4	825.2
	824.9	824.7	824.4	823.8	822.7	820.9				
0 4	824.3	824.6	825.2	825.7	825.9	825.9	825.8	825.7	825.7	825.6
	825.5	825.5	825.4	825.4	825.3	825.3	825.2	825.2	825.2	825.1
	825.1	825.1	825.0	825.0	824.9	824.9	824.9	824.8	824.8	824.8
	824.7	824.7	824.6	824.6	824.6	824.5	824.5	824.4	824.4	824.3
	824.3	824.3	824.2	824.1	824.0	823.9	823.8	823.7	823.5	823.3
	823.0	822.8	822.5	821.9	820.9	819.3				
0 5	822.7	823.3	823.8	824.2	824.4	824.4	824.4	824.3	824.2	824.1
	824.0	824.0	823.9	823.8	823.8	823.7	823.7	823.6	823.6	823.5
	823.5	823.5	823.4	823.4	823.3	823.3	823.2	823.2	823.1	823.1
	823.0	823.0	823.0	822.9	822.9	822.8	822.8	822.7	822.7	822.6
	822.6	822.5	822.5	822.4	822.3	822.2	822.1	822.0	821.8	821.6
	821.4	821.1	820.8	820.3	819.4	818.0				
0 6	821.6	822.3	822.8	823.2	823.4	823.4	823.3	823.3	823.2	823.1
	823.0	822.9	822.8	822.8	822.7	822.6	822.6	822.5	822.5	822.4
	822.4	822.3	822.3	822.2	822.2	822.1	822.1	822.0	822.0	821.9
	821.9	821.8	821.8	821.7	821.7	821.6	821.5	821.5	821.4	821.4
	821.4	821.3	821.2	821.1	821.0	820.9	820.9	820.8	820.6	820.4
	820.2	820.0	819.7	819.2	818.4	817.2				
0 7	820.6	821.2	821.8	822.2	822.4	822.4	822.3	822.2	822.1	822.0
	821.9	821.8	821.7	821.6	821.5	821.5	821.4	821.3	821.3	821.2
	821.2	821.1	821.1	821.0	821.0	820.9	820.8	820.8	820.7	820.7
	820.6	820.5	820.5	820.4	820.4	820.3	820.3	820.2	820.2	820.1
	820.1	820.0	819.9	819.8	819.7	819.7	819.6	819.5	819.4	819.2
	819.0	818.8	818.5	818.1	817.4	816.4				
0 8	819.6	820.5	821.0	821.4	821.6	821.6	821.5	821.4	821.2	821.1
	821.0	821.0	820.9	820.8	820.7	820.6	820.5	820.5	820.4	820.3
	820.3	820.2	820.1	820.1	820.0	819.9	819.9	819.8	819.8	819.7
	819.6	819.6	819.5	819.4	819.4	819.3	819.3	819.2	819.1	819.1
	819.0	819.0	818.9	818.8	818.7	818.7	818.6	818.5	818.4	818.2
	818.1	817.9	817.7	817.3	816.6	815.8				
0 9	819.0	819.9	820.5	820.8	821.0	821.0	820.9	820.8	820.7	820.6
	820.5	820.4	820.3	820.2	820.1	820.0	819.9	819.8	819.8	819.7
	819.7	819.6	819.5	819.4	819.4	819.3	819.2	819.2	819.1	819.0
	819.0	818.9	818.8	818.8	818.7	818.6	818.6	818.5	818.4	818.4
	818.3	818.3	818.2	818.1	818.0	818.0	817.9	817.8	817.7	817.6
	817.4	817.3	817.1	816.7	816.1	815.3				
0 10	818.7	819.4	819.9	820.3	820.5	820.5	820.4	820.3	820.1	820.0
	819.9	819.8	819.7	819.6	819.5	819.4	819.3	819.2	819.2	819.1
	819.0	819.0	818.9	818.8	818.7	818.7	818.6	818.5	818.4	818.4
	818.3	818.2	818.1	818.1	818.0	817.9	817.9	817.8	817.7	817.7
	817.6	817.6	817.5	817.4	817.3	817.3	817.2	817.2	817.1	817.0
	816.8	816.7	816.5	816.1	815.5	814.9				
0 11	818.4	819.1	819.5	819.9	820.1	820.1	820.0	819.8	819.7	819.6
	819.5	819.4	819.3	819.2	819.0	818.9	818.9	818.8	818.7	818.6
	818.6	818.5	818.4	818.3	818.3	818.2	818.1	818.0	817.9	817.9

	817.8	817.7	817.6	817.6	817.5	817.4	817.3	817.3	817.2	817.1
	817.1	817.0	817.0	816.9	816.8	816.8	816.7	816.7	816.6	816.5
	816.4	816.2	816.0	815.7	815.1	814.6				
0 12	818.2	818.8	819.3	819.6	819.8	819.8	819.7	819.6	819.4	819.3
	819.2	819.1	819.0	818.9	818.7	818.6	818.6	818.5	818.4	818.3
	818.3	818.2	818.1	818.0	817.9	817.9	817.8	817.7	817.6	817.5
	817.4	817.4	817.3	817.2	817.1	817.1	817.0	816.9	816.8	816.8
	816.7	816.7	816.6	816.5	816.5	816.4	816.4	816.3	816.3	816.2
	816.1	815.9	815.7	815.4	814.9	814.4				
0 13	818.0	818.6	819.0	819.4	819.5	819.5	819.4	819.3	819.2	819.0
	818.9	818.8	818.7	818.6	818.4	818.3	818.3	818.2	818.1	818.0
	818.0	817.9	817.8	817.7	817.6	817.5	817.5	817.4	817.3	817.2
	817.1	817.0	816.9	816.9	816.8	816.7	816.6	816.6	816.5	816.4
	816.4	816.3	816.2	816.2	816.1	816.0	816.0	816.0	815.9	815.8
	815.7	815.6	815.5	815.1	814.6	814.3				
0 14	817.9	818.3	818.8	819.1	819.3	819.2	819.1	819.0	818.9	818.7
	818.6	818.5	818.4	818.3	818.2	818.1	818.0	817.9	817.8	817.7
	817.7	817.6	817.5	817.4	817.3	817.2	817.1	817.0	817.0	816.9
	816.8	816.7	816.6	816.5	816.4	816.3	816.3	816.2	816.1	816.1
	816.0	815.9	815.9	815.8	815.7	815.7	815.7	815.6	815.6	815.5
	815.4	815.3	815.2	814.9	814.3	814.0				
0 15	817.7	818.1	818.5	818.8	819.0	819.0	818.9	818.8	818.6	818.5
	818.4	818.3	818.1	818.0	817.9	817.8	817.7	817.6	817.5	817.5
	817.4	817.3	817.2	817.1	817.0	816.9	816.8	816.7	816.6	816.5
	816.4	816.3	816.3	816.2	816.1	816.0	815.9	815.8	815.8	815.7
	815.6	815.6	815.5	815.4	815.4	815.3	815.3	815.3	815.3	815.2
	815.1	815.0	814.9	814.6	814.1	813.8				
0 16	817.5	817.9	818.3	818.6	818.7	818.7	818.6	818.5	818.3	818.2
	818.1	818.0	817.9	817.7	817.6	817.5	817.4	817.3	817.2	817.2
	817.1	817.0	816.9	816.8	816.7	816.6	816.5	816.4	816.3	816.2
	816.1	816.0	815.9	815.8	815.7	815.6	815.5	815.5	815.4	815.3
	815.3	815.2	815.1	815.0	815.0	815.0	814.9	814.9	814.9	814.9
	814.8	814.7	814.6	814.3	813.8	813.7				
0 17	817.3	817.6	818.0	818.3	818.5	818.5	818.3	818.2	818.1	817.9
	817.8	817.7	817.6	817.5	817.3	817.2	817.1	817.0	817.0	816.9
	816.8	816.7	816.6	816.5	816.4	816.3	816.2	816.1	816.0	815.9
	815.8	815.7	815.6	815.5	815.4	815.3	815.2	815.1	815.0	814.9
	814.9	814.8	814.7	814.7	814.6	814.6	814.6	814.6	814.6	814.6
	814.5	814.4	814.3	814.0	813.5	813.6				
0 18	817.2	817.4	817.8	818.1	818.2	818.2	818.1	818.0	817.8	817.7
	817.6	817.4	817.3	817.2	817.0	816.9	816.8	816.8	816.7	816.6
	816.5	816.4	816.3	816.2	816.1	816.0	815.9	815.8	815.7	815.6
	815.4	815.3	815.2	815.1	815.0	814.9	814.8	814.7	814.6	814.6
	814.5	814.4	814.4	814.3	814.3	814.2	814.2	814.2	814.3	814.3
	814.2	814.1	814.0	813.7	813.2	813.4				
0 19	817.0	817.2	817.5	817.8	818.0	817.9	817.8	817.7	817.5	817.4
	817.3	817.2	817.1	816.9	816.8	816.7	816.6	816.5	816.4	816.3
	816.2	816.1	816.0	815.9	815.8	815.7	815.6	815.5	815.4	815.2
	815.1	815.0	814.9	814.8	814.7	814.6	814.5	814.4	814.3	814.2
	814.1	814.1	814.0	813.9	813.9	813.9	813.9	813.9	813.9	814.0
	813.9	813.9	813.7	813.4	812.9	813.3				
0 20	816.8	816.9	817.3	817.6	817.7	817.7	817.6	817.4	817.3	817.1
	817.0	816.9	816.8	816.7	816.5	816.4	816.3	816.2	816.1	816.0
	815.9	815.8	815.7	815.6	815.5	815.4	815.3	815.2	815.0	814.9
	814.8	814.7	814.5	814.4	814.3	814.2	814.1	814.0	813.9	813.8
	813.7	813.7	813.6	813.5	813.5	813.5	813.5	813.5	813.6	813.6
	813.6	813.6	813.4	813.2	812.6	813.1				
0 21	816.6	816.7	817.1	817.4	817.5	817.5	817.4	817.2	817.1	816.9
	816.8	816.7	816.6	816.4	816.3	816.2	816.1	816.0	815.9	815.8
	815.7	815.6	815.5	815.4	815.3	815.2	815.1	814.9	814.8	814.7
	814.5	814.4	814.3	814.1	814.0	813.9	813.8	813.7	813.6	813.5
	813.4	813.4	813.3	813.2	813.2	813.2	813.2	813.3	813.3	813.4
	813.4	813.4	813.2	812.9	812.4	813.0				
0 22	816.4	816.6	817.0	817.2	817.4	817.3	817.2	817.1	816.9	816.8
	816.7	816.6	816.4	816.3	816.2	816.0	816.0	815.9	815.8	815.7
	815.6	815.5	815.4	815.3	815.1	815.0	814.9	814.8	814.6	814.5
	814.4	814.2	814.1	814.0	813.8	813.7	813.6	813.5	813.4	813.3
	813.2	813.1	813.1	813.0	813.0	813.0	813.0	813.1	813.2	813.2
	813.3	813.2	813.1	812.8	812.2	812.6				
0 23	816.3	816.5	816.8	817.1	817.3	817.2	817.1	817.0	816.8	816.7

	816.6	816.4	816.3	816.2	816.0	815.9	815.8	815.7	815.6	815.5
	815.4	815.3	815.2	815.1	815.0	814.9	814.7	814.6	814.5	814.3
	814.2	814.0	813.9	813.8	813.6	813.5	813.4	813.2	813.1	813.1
	813.0	812.9	812.8	812.8	812.8	812.8	812.9	812.9	813.0	813.1
	813.1	813.1	812.9	812.7	812.0	812.1				
0 24	816.1	816.4	816.7	817.0	817.1	817.1	817.0	816.8	816.7	816.5
	816.4	816.3	816.2	816.0	815.9	815.8	815.7	815.6	815.5	815.4
	815.3	815.2	815.1	815.0	814.9	814.7	814.6	814.5	814.3	814.2
	814.0	813.9	813.7	813.6	813.4	813.3	813.2	813.0	812.9	812.8
	812.7	812.7	812.6	812.6	812.6	812.6	812.7	812.7	812.8	812.9
	813.0	812.9	812.8	812.5	811.8	811.6				
0 25	815.9	816.2	816.6	816.9	817.0	817.0	816.8	816.7	816.5	816.4
	816.3	816.2	816.0	815.9	815.8	815.6	815.6	815.5	815.4	815.3
	815.2	815.1	815.0	814.8	814.7	814.6	814.5	814.3	814.2	814.0
	813.9	813.7	813.5	813.4	813.2	813.1	813.0	812.8	812.7	812.6
	812.5	812.4	812.4	812.3	812.3	812.4	812.5	812.5	812.7	812.8
	812.8	812.8	812.7	812.4	811.6	811.1				
0 26	815.7	816.1	816.5	816.8	816.9	816.8	816.7	816.6	816.4	816.3
	816.2	816.0	815.9	815.8	815.6	815.5	815.4	815.3	815.2	815.1
	815.0	814.9	814.8	814.7	814.6	814.5	814.3	814.2	814.0	813.9
	813.7	813.6	813.4	813.2	813.1	812.9	812.8	812.6	812.5	812.4
	812.3	812.2	812.1	812.1	812.1	812.2	812.3	812.4	812.5	812.6
	812.7	812.7	812.6	812.2	811.4	810.6				
0 27	815.5	816.0	816.4	816.6	816.8	816.7	816.6	816.5	816.3	816.1
	816.0	815.9	815.8	815.7	815.5	815.4	815.3	815.2	815.1	815.0
	814.9	814.8	814.7	814.6	814.5	814.3	814.2	814.1	813.9	813.8
	813.6	813.4	813.3	813.1	812.9	812.8	812.6	812.5	812.3	812.2
	812.1	812.0	811.9	811.9	811.9	812.0	812.1	812.2	812.3	812.5
	812.6	812.6	812.4	812.1	811.2	810.1				
0 28	815.4	815.9	816.3	816.5	816.7	816.6	816.5	816.3	816.2	816.0
	815.9	815.8	815.7	815.5	815.4	815.3	815.2	815.1	815.0	814.9
	814.8	814.7	814.6	814.5	814.4	814.2	814.1	813.9	813.8	813.6
	813.5	813.3	813.1	813.0	812.8	812.6	812.5	812.3	812.2	812.1
	812.0	811.9	811.8	811.7	811.7	811.8	811.9	812.0	812.2	812.4
	812.5	812.5	812.3	812.0	811.0	809.6				
0 29	815.2	815.8	816.2	816.4	816.5	816.5	816.4	816.2	816.1	815.9
	815.8	815.7	815.6	815.4	815.3	815.2	815.1	815.0	814.9	814.8
	814.7	814.6	814.5	814.4	814.2	814.1	814.0	813.8	813.7	813.5
	813.4	813.2	813.0	812.9	812.7	812.5	812.3	812.2	812.0	811.9
	811.8	811.7	811.6	811.5	811.5	811.6	811.7	811.8	812.1	812.3
	812.4	812.4	812.2	811.9	810.8	809.1				
0 30	815.0	815.7	816.1	816.3	816.4	816.4	816.2	816.1	816.0	815.8
	815.7	815.6	815.4	815.3	815.2	815.1	815.0	814.9	814.8	814.7
	814.6	814.5	814.4	814.3	814.1	814.0	813.9	813.7	813.6	813.4
	813.3	813.1	812.9	812.7	812.6	812.4	812.2	812.0	811.9	811.8
	811.7	811.6	811.5	811.4	811.4	811.5	811.6	811.7	811.9	812.2
	812.3	812.3	812.1	811.8	810.7	808.6				
0 31	814.8	815.6	816.0	816.2	816.3	816.3	816.1	816.0	815.9	815.7
	815.6	815.5	815.3	815.2	815.1	815.0	814.9	814.8	814.7	814.6
	814.5	814.4	814.3	814.2	814.1	813.9	813.8	813.6	813.5	813.3
	813.2	813.0	812.8	812.6	812.4	812.3	812.1	811.9	811.8	811.7
	811.6	811.5	811.4	811.3	811.3	811.4	811.4	811.6	811.8	812.1
	812.2	812.2	812.1	811.7	810.5	808.2				
0 32	814.7	815.5	815.9	816.1	816.3	816.2	816.0	815.9	815.8	815.6
	815.5	815.3	815.2	815.1	815.0	814.9	814.8	814.7	814.6	814.5
	814.4	814.3	814.2	814.1	814.0	813.8	813.7	813.6	813.4	813.3
	813.1	812.9	812.7	812.5	812.3	812.1	812.0	811.8	811.7	811.6
	811.5	811.4	811.3	811.2	811.2	811.3	811.4	811.5	811.7	812.0
	812.1	812.1	812.0	811.6	810.3	807.7				
0 33	814.5	815.4	815.8	816.1	816.2	816.1	816.0	815.8	815.7	815.5
	815.4	815.2	815.1	815.0	814.9	814.8	814.7	814.6	814.5	814.4
	814.3	814.2	814.1	814.0	813.9	813.8	813.6	813.5	813.3	813.2
	813.0	812.8	812.7	812.5	812.2	812.1	811.9	811.7	811.6	811.5
	811.4	811.3	811.2	811.2	811.2	811.2	811.3	811.4	811.6	812.0
	812.1	812.1	811.9	811.5	810.2	807.2				
0 34	814.3	815.3	815.8	816.0	816.1	816.0	815.9	815.7	815.6	815.4
	815.3	815.1	815.0	814.9	814.8	814.7	814.6	814.5	814.4	814.4
	814.3	814.2	814.0	813.9	813.8	813.7	813.6	813.4	813.3	813.1
	812.9	812.8	812.6	812.4	812.2	812.0	811.8	811.7	811.5	811.4
	811.4	811.3	811.2	811.2	811.2	811.2	811.3	811.4	811.6	811.9

	812.1	812.0	811.9	811.5	810.1	806.7				
0 35	814.1	815.3	815.7	815.9	816.0	815.9	815.8	815.7	815.5	815.3
	815.2	815.1	814.8	814.8	814.7	814.6	814.5	814.5	814.4	814.3
	814.2	814.1	814.0	813.9	813.7	813.6	813.5	813.4	813.2	813.1
	812.9	812.7	812.5	812.3	812.1	811.9	811.8	811.6	811.5	811.4
	811.3	811.3	811.2	811.2	811.2	811.2	811.3	811.4	811.7	811.9
	812.0	812.0	811.9	811.4	810.0	806.2				
0 36	814.0	815.2	815.6	815.9	815.9	815.9	815.7	815.6	815.4	815.3
	815.1	815.0	814.8	814.7	814.6	814.5	814.5	814.4	814.3	814.2
	814.1	814.0	813.9	813.8	813.7	813.6	813.4	813.3	813.2	813.0
	812.8	812.7	812.5	812.3	812.1	811.9	811.7	811.6	811.5	811.4
	811.3	811.3	811.2	811.2	811.2	811.3	811.4	811.5	811.7	811.9
	812.0	812.0	811.8	811.4	809.9	805.7				
0 37	814.1	815.2	815.6	815.8	815.9	815.8	815.6	815.5	815.3	815.1
	815.0	814.9	814.8	814.7	814.5	814.4	814.4	814.3	814.2	814.1
	814.0	813.9	813.8	813.7	813.6	813.5	813.4	813.2	813.1	812.9
	812.8	812.6	812.4	812.2	812.0	811.9	811.7	811.6	811.5	811.4
	811.4	811.3	811.3	811.3	811.3	811.4	811.5	811.6	811.8	811.9
	812.0	812.0	811.8	811.4	809.8	805.2				
0 38	814.2	815.1	815.5	815.7	815.8	815.7	815.5	815.4	815.2	815.0
	814.9	814.8	814.7	814.6	814.5	814.3	814.3	814.2	814.1	814.0
	813.9	813.9	813.8	813.7	813.5	813.4	813.3	813.2	813.1	812.9
	812.8	812.6	812.4	812.2	812.1	811.9	811.8	811.7	811.6	811.6
	811.5	811.5	811.5	811.5	811.5	811.6	811.7	811.8	811.9	812.0
	812.1	812.0	811.9	811.4	809.9	805.1				
0 39	814.4	815.1	815.5	815.6	815.7	815.6	815.4	815.3	815.1	815.0
	814.9	814.7	814.6	814.5	814.4	814.3	814.2	814.1	814.1	814.0
	813.9	813.8	813.7	813.6	813.5	813.4	813.3	813.2	813.1	812.9
	812.8	812.7	812.5	812.3	812.2	812.1	812.0	811.9	811.8	811.8
	811.7	811.7	811.7	811.7	811.8	811.8	811.9	811.9	812.0	812.1
	812.2	812.1	812.0	811.5	810.0	806.0				
0 40	814.5	815.1	815.4	815.6	815.7	815.5	815.4	815.2	815.1	814.9
	814.8	814.7	814.6	814.5	814.3	814.2	814.2	814.1	814.0	814.0
	813.9	813.8	813.7	813.6	813.5	813.4	813.3	813.2	813.1	813.0
	812.9	812.8	812.7	812.5	812.4	812.3	812.3	812.2	812.1	812.1
	812.0	812.0	812.0	812.0	812.0	812.0	812.1	812.1	812.2	812.3
	812.3	812.2	812.1	811.7	810.3	807.0				
0 41	814.7	815.2	815.4	815.6	815.6	815.5	815.3	815.2	815.0	814.9
	814.8	814.7	814.6	814.5	814.3	814.2	814.2	814.1	814.0	814.0
	813.9	813.8	813.7	813.7	813.6	813.5	813.4	813.3	813.2	813.1
	813.0	812.9	812.8	812.7	812.6	812.6	812.5	812.4	812.4	812.3
	812.3	812.3	812.3	812.2	812.3	812.3	812.3	812.3	812.4	812.4
	812.5	812.4	812.3	811.9	810.7	808.0				
0 42	815.0	815.3	815.5	815.6	815.6	815.5	815.3	815.2	815.0	814.9
	814.8	814.7	814.6	814.5	814.4	814.3	814.2	814.2	814.1	814.0
	814.0	813.9	813.8	813.8	813.7	813.6	813.5	813.5	813.4	813.3
	813.2	813.2	813.1	813.0	813.0	812.9	812.8	812.8	812.7	812.7
	812.7	812.7	812.6	812.6	812.6	812.6	812.6	812.7	812.7	812.7
	812.7	812.7	812.6	812.3	811.4	810.0				
0 43	815.3	815.5	815.7	815.7	815.7	815.6	815.5	815.3	815.2	815.1
	815.0	814.9	814.8	814.7	814.6	814.5	814.5	814.4	814.4	814.3
	814.3	814.2	814.1	814.1	814.0	814.0	813.9	813.9	813.8	813.8
	813.7	813.7	813.6	813.6	813.5	813.5	813.4	813.4	813.4	813.3
	813.3	813.3	813.3	813.3	813.3	813.3	813.3	813.3	813.3	813.4
	813.4	813.4	813.3	813.2	812.8	813.0				
0 44	815.6	815.8	816.0	816.0	816.0	815.9	815.7	815.6	815.5	815.4
	815.3	815.2	815.2	815.1	815.0	814.9	814.9	814.9	814.8	814.8
	814.7	814.7	814.7	814.6	814.6	814.6	814.5	814.5	814.4	814.4
	814.4	814.4	814.3	814.3	814.3	814.2	814.2	814.2	814.2	814.2
	814.2	814.2	814.1	814.1	814.2	814.2	814.2	814.2	814.2	814.3
	814.3	814.4	814.4	814.4	814.5	815.0				
0 45	816.1	816.3	816.4	816.4	816.4	816.3	816.2	816.2	816.1	816.0
	815.9	815.9	815.8	815.8	815.8	815.7	815.7	815.7	815.7	815.6
	815.6	815.6	815.6	815.6	815.5	815.5	815.5	815.5	815.5	815.5
	815.5	815.5	815.5	815.5	815.5	815.5	815.5	815.5	815.5	815.5
	815.5	815.5	815.5	815.5	815.5	815.5	815.6	815.6	815.7	815.7
	815.8	815.9	816.0	816.3	817.1	820.0				
0 46	816.7	817.1	817.2	817.3	817.3	817.2	817.2	817.2	817.2	817.1
	817.1	817.1	817.1	817.1	817.1	817.1	817.1	817.1	817.1	817.1
	817.1	817.1	817.1	817.1	817.1	817.1	817.2	817.2	817.2	817.2

```
     817.3     817.3     817.3     817.4     817.4     817.4     817.4     817.5     817.5     817.5
     817.5     817.5     817.6     817.6     817.6     817.7     817.8     817.9     818.0     818.1
     818.2     818.3     818.5     818.9     819.8     822.0
0 47 818.0     818.1     818.2     818.2     818.2     818.2     818.4     818.4     818.4     818.4
     818.4     818.6     818.6     818.6     818.6     818.6     818.6     818.6     818.8     818.8
     818.8     818.8     818.8     818.8     818.8     818.8     818.8     818.8     818.8     818.8
     819.0     820.0     820.0     820.0     820.0     820.0     820.0     820.0     820.0     820.0
     820.0     820.0     820.0     820.0     820.0     820.0     820.0     821.0     821.0     821.0
     821.0     821.0     821.0     821.5     822.0     823.0
0HEAD WILL BE SAVED ON UNIT 30 AT END OF TIME STEP  1, STRESS PERIOD  1
0

                    VOLUMETRIC BUDGET FOR ENTIRE MODEL AT END OF TIME STEP  1 IN STRESS PERIOD  1
                    ----------------------------------------------------------------------------

0              CUMULATIVE VOLUMES      L**3                    RATES FOR THIS TIME STEP      L**3/T
                ----------------                                ------------------------

                     IN:                                             IN:
                     ---                                             ---
                       STORAGE =  0.00000                              STORAGE =  0.00000
                     CONSTANT HEAD =  0.16825E+07                    CONSTANT HEAD =  0.16825E+07
                         WELLS =  0.00000                                WELLS =  0.00000
                        DRAINS =  0.00000                               DRAINS =  0.00000
                      RECHARGE =  0.15654E+06                         RECHARGE =  0.15654E+06
                    RIVER LEAKAGE =  2762.8                         RIVER LEAKAGE =  2762.8
0                      TOTAL IN =  0.18419E+07                         TOTAL IN =  0.18419E+07
0                    OUT:                                            OUT:
                     ---                                             ---
                       STORAGE =  0.00000                              STORAGE =  0.00000
                     CONSTANT HEAD =  0.39599E+06                    CONSTANT HEAD =  0.39599E+06
                         WELLS =  0.28953E+06                            WELLS =  0.28953E+06
                        DRAINS =  0.13137E+06                           DRAINS =  0.13137E+06
                      RECHARGE =  0.00000                             RECHARGE =  0.00000
                    RIVER LEAKAGE =  0.10255E+07                    RIVER LEAKAGE =  0.10255E+07
0                      TOTAL OUT =  0.18424E+07                        TOTAL OUT =  0.18424E+07
0                      IN - OUT =  -518.38                             IN - OUT =  -518.38
0            PERCENT DISCREPANCY =          -0.03                   PERCENT DISCREPANCY =          -0.03


0

          TIME SUMMARY AT END OF TIME STEP  1 IN STRESS PERIOD  1
                              SECONDS      MINUTES      HOURS       DAYS        YEARS
                              -------------------------------------------------------
       TIME STEP LENGTH       86400.0      1440.00      24.0000     1.00000     0.273785E-02
     STRESS PERIOD TIME       86400.0      1440.00      24.0000     1.00000     0.273785E-02
    TOTAL SIMULATION TIME     86400.0      1440.00      24.0000     1.00000     0.273785E-02
1
```

EXAMPLE OF PATH3D PARTICLE TRACKING MODEL OUTPUT

NR108 LAYERS 1, 2, 3

NR108A SHALLOW DRIFT (10FEET) INITIAL POSITIONS

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+                                                              +
+                          P A T H 3 D                         +
+   A Ground-Water Path and Travel-Time Simulator              +
+                          (V. 3.10)                           +
+                                                              +
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
```

NR108 EXISTING RECOVERY SYSTEM, OPTIMIZED RATES (60, 100, 200, 100 GPM)

FLOW MODEL CONSISTS OF 4 LAYERS 47 ROWS 56 COLUMNS
NUMBER OF STRESS PERIOD(S) IN SIMULATION = 1
TIME UNIT USED IN THE MODEL IS DAYS
PACKAGE: BCF WEL DRN RIV EVT GHB RCH STR
UNIT: 11 13 12 16 0 0 18 0
FLOW FIELD IS STEADY-STATE (ISS NOT 0)
MAXIMUM NUMBER OF WELLS = 35
MAXIMUM NUMBER OF DRAINS = 19
MAXIMUM NUMBER OF RIVER CELLS = 939
RCH OPTION 1: RECHARGE APPLIED TO THE TOP LAYER
MAXIMUM NUMBER OF PARTICLES ALLOWED = 75
FILE [P3DPLOT.DAT] SAVED IN UNIT 4 FOR PLOTTING PATH LINES
FILE [P3DCAPT.DAT] SAVED IN UNIT 9 WITH FINAL & INITIAL POSITIONS OF CAPTURED PARTICLES
INITIAL PARTICLE POSITIONS ARE ENTERED IN J, I, K CELL INDICES
117263 ELEMENTS OF THE Y ARRAY USED OUT OF 9999999

BOUNDARY ARRAY (IBOUND) FOR LAYER 1 READ ON UNIT 1 USING FORMAT: "(25I3)

BOUNDARY ARRAY (IBOUND) FOR LAYER 2 READ ON UNIT 1 USING FORMAT: "(25I3)

BOUNDARY ARRAY (IBOUND) FOR LAYER 3 READ ON UNIT 1 USING FORMAT: "(25I3)

BOUNDARY ARRAY (IBOUND) FOR LAYER 4 READ ON UNIT 1 USING FORMAT: "(25I3)

HEAD AT INACTIVE CELLS = 2000.000

STARTING HYDRAULIC HEADS FOR LAYER 1 READ ON UNIT 1 USING FORMAT: "(10e12.4)

STARTING HYDRAULIC HEADS FOR LAYER 2 READ ON UNIT 1 USING FORMAT: "(10e12.4)

STARTING HYDRAULIC HEADS FOR LAYER 3 READ ON UNIT 1 USING FORMAT: "(10e12.4)

STARTING HYDRAULIC HEADS FOR LAYER 4 READ ON UNIT 1 USING FORMAT: "(10e12.4)

LAYER NUMBER	AQUIFER TYPE
1	1
2	0
3	0
4	0

ANISOTROPY RATIO (Ky/Kx) = 1.000000

WIDTH ALONG ROWS (DELR) READ ON UNIT 11 USING FORMAT: "(10E12.4)

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
	51	52	53	54	55	56				
1	1000.	1000.	1000.	1000.	1000.	800.0	400.0	400.0	400.0	200.0
	200.0	200.0	200.0	200.0	200.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	200.0	200.0	200.0	200.0	200.0	200.0	400.0	400.0
	400.0	400.0	400.0	900.0	1000.	1000.				

WIDTH ALONG COL. (DELC) READ ON UNIT 11 USING FORMAT: "(10E12.4)

	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			
1	1000.	1000.	800.0	800.0	400.0	400.0	400.0	200.0	200.0	200.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	100.0	100.0	100.0	100.0	200.0	200.0	200.0	200.0
	200.0	400.0	400.0	400.0	800.0	1000.	1000.			

HY. COND. ALONG ROW (Kx) FOR LAYER 1 READ ON UNIT 11 USING FORMAT: "(10e12.4)

BOT (NOT USED BY PATH3D) FOR LAYER 1 READ ON UNIT 11 USING FORMAT: "(10e12.4)

VERT. HYD. COND./THICK. FOR LAYER 1 READ ON UNIT 11 USING FORMAT: "(10e12.4)

TRANS. ALONG ROWS (Tx) FOR LAYER 2 READ ON UNIT 11 USING FORMAT: "(10e12.4)

VERT. HYD. COND./THICK. FOR LAYER 2 READ ON UNIT 11 USING FORMAT: "(10e12.4)

TRANS. ALONG ROWS (Tx) FOR LAYER 3 READ ON UNIT 11 USING FORMAT: "(10e12.4)

VERT. HYD. COND./THICK. FOR LAYER 3 READ ON UNIT 11 USING FORMAT: "(10e12.4)

TRANS. ALONG ROWS (Tx) FOR LAYER 4 READ ON UNIT 11 USING FORMAT: "(10e12.4)

TOP ELEV. OF 1ST LAYER = 817.0000 FOR LAYER 1
CELL THICKNESS (DZ) = 20.00000 FOR LAYER 1
CELL THICKNESS (DZ) = 20.00000 FOR LAYER 2
CELL THICKNESS (DZ) = 75.00000 FOR LAYER 3
CELL THICKNESS (DZ) = 200.0000 FOR LAYER 4
POROSITY*RETARD. FACTOR = 0.2000000 FOR LAYER 1
POROSITY*RETARD. FACTOR = 0.5000000E-01 FOR LAYER 2
POROSITY*RETARD. FACTOR = 0.2000000 FOR LAYER 3
POROSITY*RETARD. FACTOR = 0.1000000 FOR LAYER 4

TRACKING START TIME (TIME1) = 0.0000000
TRACKING END TIME (TIME2) = 0.1000000E+08
ERROR CRITERION (EPS) = 0.3000000E-02
INITIAL TRACKING STEPSIZE = 10.00000
MAXIMUM TRACKING STEPS ALLOWED = 300
INTERVAL FOR SAVING INTERMEDIATE RESULTS = 1

OPTION FOR PRINTING INTERMEDIATE RESULTS = 3

PARTICLE STARTING POSITIONS

PARTICLE NO.	X	Y	Z
1	7900.0	5950.0	10.000
2	8450.0	5950.0	10.000
3	8950.0	5950.0	10.000
4	9450.0	5950.0	10.000
5	9950.0	5950.0	10.000
6	7900.0	6450.0	10.000
7	8450.0	6450.0	10.000
8	8950.0	6450.0	10.000
9	9450.0	6450.0	10.000
10	9950.0	6450.0	10.000
11	7900.0	6950.0	10.000
12	8450.0	6950.0	10.000
13	8950.0	6950.0	10.000
14	9450.0	6950.0	10.000
15	9950.0	6950.0	10.000
16	10450.	6950.0	10.000
17	7900.0	7450.0	10.000
18	8450.0	7450.0	10.000
19	8950.0	7450.0	10.000
20	9450.0	7450.0	10.000
21	9950.0	7450.0	10.000
22	10450.	7450.0	10.000
23	9750.0	7750.0	10.000
24	10250.	7750.0	10.000
25	10750.	7750.0	10.000
26	10750.	6950.0	10.000

STRESS PERIOD NO. 1

NUMBER OF WELLS IN CURRENT STRESS PERIOD = 35

WELL NO.	LAYER	ROW	COLUMN	Q
1	1	29	35	0.0000000
2	3	26	19	0.0000000
3	2	29	35	-14543.00
4	3	29	35	-24000.00
5	1	21	47	0.0000000
6	1	22	46	0.0000000
7	1	23	45	0.0000000
8	4	2	2	-136000.0
9	3	2	1	-34000.00
10	4	35	13	-7900.000
11	1	16	29	0.0000000
12	2	16	29	-49.00000
13	3	16	29	-11438.00
14	1	27	38	0.0000000
15	2	27	38	0.0000000
16	3	27	38	0.0000000
17	1	26	19	-19251.00
18	2	31	31	-9818.000
19	1	31	31	-9433.000
20	3	31	31	0.0000000
21	4	26	19	0.0000000
22	4	31	32	0.0000000
23	4	29	35	0.0000000
24	4	16	29	0.0000000
25	2	23	45	-1000.000
26	2	22	46	-1000.000
27	2	21	47	-1000.000
28	3	23	45	-5353.000
29	3	22	46	-4968.000
30	3	21	47	-5545.000
31	1	21	49	-4235.000

32	2	21	49	0.0000000
33	3	21	49	0.0000000
34	1	28	39	0.0000000
35	3	28	39	0.0000000

NUMBER OF DRAINS IN CURRENT STRESS PERIOD = 19

DRAIN NO.	LAYER	ROW	COLUMN
1	3	28	45
2	3	29	45
3	3	30	45
4	1	26	44
5	1	26	45
6	1	27	44
7	1	27	45
8	1	28	45
9	1	29	45
10	1	30	45
11	1	25	44
12	1	22	44
13	1	24	44
14	1	23	44
15	3	23	44
16	3	24	44
17	3	25	44
18	3	26	44
19	3	27	44

NUMBER OF RIVER CELLS IN CURRENT STRESS PERIOD = 939

RIVER NO.	LAYER	ROW	COLUMN
1	1	28	1
2	1	29	1
3	1	29	2
4	1	30	1
5	1	30	2
6	1	30	3
7	1	31	1
8	1	31	2
9	1	31	3
10	1	31	4
11	1	32	1
12	1	32	2
13	1	32	3
14	1	32	4
15	1	33	1
16	1	33	2
17	1	33	3
18	1	33	4
19	1	34	1
20	1	34	3
21	1	34	4
22	1	34	5
23	1	35	1
24	1	35	4
25	1	35	5
26	1	36	4
27	1	36	5
28	1	36	6
29	1	37	1
30	1	37	4
31	1	37	5
32	1	37	6
33	1	37	7
34	1	38	4
35	1	38	5
36	1	38	6
37	1	38	7
38	1	38	8

39	1	39	1
40	1	39	4
41	1	39	6
42	1	39	7
43	1	39	8
44	1	40	1
45	1	40	2
46	1	40	3
47	1	40	4
48	1	40	6
49	1	40	7
50	1	40	8
51	1	41	2
52	1	41	3
53	1	41	6
54	1	41	7
55	1	41	8
56	1	38	1
57	1	38	29
58	1	38	30
59	1	38	31
60	1	38	32
61	1	38	33
62	1	38	34
63	1	39	9
64	1	39	10
65	1	39	11
66	1	39	12
67	1	39	13
68	1	39	14
69	1	39	15
70	1	39	16
71	1	39	17
72	1	39	18
73	1	39	19
74	1	39	20
75	1	39	21
76	1	39	22
77	1	39	23
78	1	39	24
79	1	39	25
80	1	39	26
81	1	39	27
82	1	39	28
83	1	39	29
84	1	39	30
85	1	39	31
86	1	39	32
87	1	39	33
88	1	39	34
89	1	40	9
90	1	40	10
91	1	40	11
92	1	40	12
93	1	40	13
94	1	40	14
95	1	40	15
96	1	40	16
97	1	40	17
98	1	40	18
99	1	40	19
100	1	40	20
101	1	40	21
102	1	40	22
103	1	40	23
104	1	40	24
105	1	40	25

106	1	40	26
107	1	40	27
108	1	40	28
109	1	40	29
110	1	40	30
111	1	40	31
112	1	40	32
113	1	40	33
114	1	40	34
115	1	41	9
116	1	41	10
117	1	41	11
118	1	41	12
119	1	41	13
120	1	41	14
121	1	41	15
122	1	41	16
123	1	41	17
124	1	41	18
125	1	41	19
126	1	41	20
127	1	41	21
128	1	41	22
129	1	41	23
130	1	41	24
131	1	41	25
132	1	41	26
133	1	41	27
134	1	41	28
135	1	41	29
136	1	41	30
137	1	41	31
138	1	41	32
139	1	41	33
140	1	41	34
141	1	42	12
142	1	42	13
143	1	42	14
144	1	42	15
145	1	42	16
146	1	42	17
147	1	42	18
148	1	42	19
149	1	42	20
150	1	42	21
151	1	42	22
152	1	42	23
153	1	42	24
154	1	42	25
155	1	42	26
156	1	35	39
157	1	35	40
158	1	35	41
159	1	35	42
160	1	36	37
161	1	36	38
162	1	36	39
163	1	36	40
164	1	36	41
165	1	36	42
166	1	37	35
167	1	37	36
168	1	37	37
169	1	37	38
170	1	37	39
171	1	37	40
172	1	37	41

173	1	37	42
174	1	38	35
175	1	38	36
176	1	38	37
177	1	38	38
178	1	38	39
179	1	38	40
180	1	38	41
181	1	38	42
182	1	39	35
183	1	39	36
184	1	39	37
185	1	39	38
186	1	39	39
187	1	39	40
188	1	39	41
189	1	39	42
190	1	40	35
191	1	40	36
192	1	40	37
193	1	40	38
194	1	40	39
195	1	40	40
196	1	40	41
197	1	41	35
198	1	41	36
199	1	30	46
200	1	30	47
201	1	30	48
202	1	30	49
203	1	31	45
204	1	31	46
205	1	31	47
206	1	31	48
207	1	31	49
208	1	32	45
209	1	32	46
210	1	32	47
211	1	32	48
212	1	32	49
213	1	33	44
214	1	33	45
215	1	33	46
216	1	33	47
217	1	33	48
218	1	33	49
219	1	34	43
220	1	34	44
221	1	34	45
222	1	34	46
223	1	34	47
224	1	34	48
225	1	34	49
226	1	35	43
227	1	35	44
228	1	35	45
229	1	35	46
230	1	35	47
231	1	35	48
232	1	35	49
233	1	36	43
234	1	36	44
235	1	36	45
236	1	36	46
237	1	36	47
238	1	36	48
239	1	36	49

240	1	37	43
241	1	37	44
242	1	37	45
243	1	37	46
244	1	37	47
245	1	37	48
246	1	37	49
247	1	38	43
248	1	38	44
249	1	38	45
250	1	38	46
251	1	38	47
252	1	38	48
253	1	38	49
254	1	39	43
255	1	39	44
256	1	39	45
257	1	31	50
258	1	31	51
259	1	31	52
260	1	31	53
261	1	31	54
262	1	32	50
263	1	32	51
264	1	32	52
265	1	32	53
266	1	32	54
267	1	33	50
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RECHARGE RATES (RECH) READ ON UNIT 18 USING FORMAT: "(10e12.4)

TIME STEP NO. 1

HEADS FOR CURRENT TIME STEP READ UNFORMATTED ON UNIT 3

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PARTICLE COORDINATES, TRAVEL TIMES, AND NODAL INDICES

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PARTICLE NO. 1

X	Y	Z	TIME	J	I	K	
7900.000	5950.000	10.00000	0.0000000		14	16	1
7902.389	5952.463	10.05384	10.00000		14	16	1
7912.046	5962.358	10.26619	50.00000		14	16	1
7952.429	6002.625	11.06989	210.0000		14	17	1
8095.740	6135.436	13.13732	693.0093		15	18	1
8368.057	6358.155	15.56226	1478.480		17	20	1
8869.451	6532.979	16.85328	2561.676		22	22	1
9440.317	6981.103	16.69569	3170.658		28	26	1
9639.565	7174.796	16.67816	3286.182		30	28	1
9813.384	7597.838	16.98395	3401.393		32	32	1
9724.786	7599.754	17.82597	3545.168		31	32	1
9738.221	7471.126	18.09301	3594.335		31	31	1

REMOVED: PARTICLE INSIDE DIVIDING STREAMLINE AT WELL K= 1, I= 31, J= 31

PARTICLE NO. 2

X	Y	Z	TIME	J	I	K	
8450.000	5950.000	10.00000	0.0000000		18	16	1
8454.232	5953.141	10.05581	10.00000		18	16	1
8471.339	5965.719	10.27585	50.00000		18	16	1
8541.830	6017.141	11.11373	210.0000		19	17	1
8679.906	6115.066	11.79485	543.3748		20	18	1

8835.847	6222.584	11.76628	899.6749	22	19	1
9213.958	6543.515	11.71631	1549.858	26	22	1
9548.826	6889.631	11.64596	1915.802	29	25	1
9712.731	7168.498	11.62476	2055.509	31	28	1
9761.038	7405.152	16.60315	2097.241	31	31	1

REMOVED: PARTICLE INSIDE DIVIDING STREAMLINE AT WELL K= 1, I= 31, J= 31

PARTICLE NO. 3

X	Y	Z	TIME	J	I	K
8950.000	5950.000	10.00000	0.0000000	23	16	1
8953.843	5953.786	10.05820	10.00000	23	16	1
8969.245	5969.022	10.28752	50.00000	23	16	1
9033.518	6033.362	10.72537	210.0000	24	17	1
9188.047	6181.500	10.70681	526.3044	25	18	1
9453.113	6442.509	10.68313	952.8792	28	21	1
9795.342	7113.691	10.63837	1448.883	31	28	1
9880.210	7583.674	14.54974	1761.530	32	32	1
9799.990	7568.777	15.79596	1900.323	31	32	1
9768.935	7505.805	16.82492	1939.999	31	32	1
9756.760	7469.422	17.01667	1960.967	31	31	1

REMOVED: PARTICLE INSIDE DIVIDING STREAMLINE AT WELL K= 1, I= 31, J= 31

PARTICLE NO. 4

X	Y	Z	TIME	J	I	K
9450.000	5950.000	10.00000	0.0000000	28	16	1
9454.471	5955.595	10.06246	10.00000	28	16	1
9472.295	5978.325	10.30857	50.00000	28	16	1
9547.298	6076.801	10.39503	210.0000	29	17	1
9659.867	6240.096	10.39795	444.2367	30	19	1
9838.158	6572.939	10.38399	817.9723	32	22	1
9909.207	7122.720	10.39121	1162.824	33	28	1
9868.991	7423.608	14.30450	1243.131	32	31	1
9767.821	7465.278	16.60315	1265.318	31	31	1

REMOVED: PARTICLE INSIDE DIVIDING STREAMLINE AT WELL K= 1, I= 31, J= 31

PARTICLE NO. 5

X	Y	Z	TIME	J	I	K
9950.000	5950.000	10.00000	0.0000000	33	16	1
9953.434	5956.645	10.06381	10.00000	33	16	1
9967.082	5983.744	10.31490	50.00000	33	16	1
10021.13	6098.804	10.38676	210.0000	34	17	1
10097.45	6283.624	10.38192	444.1281	34	19	1
10268.44	6616.520	10.38911	830.0471	36	23	1
10343.72	6829.333	10.39396	954.4659	37	25	1
10348.16	7101.000	10.88916	1076.730	37	28	1
10304.95	7421.912	12.77429	1248.531	37	31	1
10195.34	7552.329	15.28548	1434.988	35	32	1
10166.70	7542.075	29.15452	1468.766	35	32	2
10158.68	7532.224	43.63203	1486.072	35	32	3
10139.11	7504.768	49.38917	1507.434	35	32	3
10114.06	7473.974	49.92973	1527.349	35	31	3
10100.80	7453.807	50.03517	1538.893	35	31	3
10092.88	7447.896	41.60605	1546.252	34	31	3
10077.34	7417.152	25.11646	1552.081	34	31	2
10035.10	7381.352	23.17560	1556.780	34	30	2
9897.088	7364.362	22.44579	1562.709	32	30	2
9718.745	7461.941	22.48409	1568.885	31	31	2

REMOVED: PARTICLE TRAPPED AT WELL K= 2, I= 31, J= 31

PARTICLE NO. 6

X	Y	Z	TIME	J	I	K
7900.000	6450.000	10.00000	0.0000000	14	21	1
7902.591	6453.136	10.05616	10.00000	14	21	1
7913.029	6465.646	10.27763	50.00000	14	21	1
7954.035	6515.217	11.11858	210.0000	14	22	1
8031.575	6606.019	12.55907	518.8583	15	23	1
8142.759	6750.912	14.29822	973.0652	15	24	1

8189.347	6818.249	14.88165	1156.332	15	25	1
8202.396	6836.909	14.71615	1203.913	16	25	1
8218.392	6866.377	11.32393	1256.795	16	25	1
8331.863	6986.954	8.238545	1454.603	17	26	1
8400.877	7009.349	6.294022	1498.383	18	27	1
8527.672	7027.802	6.629185	1536.518	19	27	1
8547.412	6983.354	8.741150	1542.783	19	26	1

REMOVED: PARTICLE TRAPPED AT WELL K= 1, I= 26, J= 19

PARTICLE NO. 7

X	Y	Z	TIME	J	I	K
8450.000	6450.000	10.00000	0.0000000	18	21	1
8453.504	6451.845	10.05800	10.00000	18	21	1
8467.647	6459.216	10.28664	50.00000	18	21	1
8526.778	6485.090	11.15173	210.0000	19	21	1
8635.771	6512.534	11.89154	473.4212	20	22	1
8819.013	6530.696	11.88528	769.3093	22	22	1
9139.954	6764.065	11.85159	1158.094	25	24	1
9541.528	7133.177	11.78533	1481.613	29	28	1
9663.764	7260.044	11.79162	1531.595	30	29	1
9752.570	7466.453	16.60315	1572.011	31	31	1

REMOVED: PARTICLE INSIDE DIVIDING STREAMLINE AT WELL K= 1, I= 31, J= 31

PARTICLE NO. 8

X	Y	Z	TIME	J	I	K
8950.000	6450.000	10.00000	0.0000000	23	21	1
8956.732	6454.276	9.999510	10.00000	23	21	1
8983.501	6471.512	9.997553	50.00000	23	21	1
9093.980	6558.667	9.987934	210.0000	24	22	1
9297.174	6741.743	9.963349	457.7971	26	24	1
9636.886	7121.392	9.919142	739.7107	30	28	1
9749.692	7358.906	12.81573	795.7299	31	30	1
9756.281	7430.708	16.60315	803.3455	31	31	1

REMOVED: PARTICLE INSIDE DIVIDING STREAMLINE AT WELL K= 1, I= 31, J= 31

PARTICLE NO. 9

X	Y	Z	TIME	J	I	K
9450.000	6450.000	10.00000	0.0000000	28	21	1
9456.914	6457.960	9.999223	10.00000	28	21	1
9484.185	6490.394	9.996115	50.00000	28	21	1
9599.451	6644.207	9.975556	210.0000	29	23	1
9775.162	7017.751	9.954453	457.5971	31	27	1
9793.134	7405.732	16.60315	573.3513	31	31	1

REMOVED: PARTICLE INSIDE DIVIDING STREAMLINE AT WELL K= 1, I= 31, J= 31

PARTICLE NO. 10

X	Y	Z	TIME	J	I	K
9950.000	6450.000	10.00000	0.0000000	33	21	1
9953.685	6459.289	9.999889	10.00000	33	21	1
9968.239	6497.057	9.999451	50.00000	33	21	1
10011.83	6653.820	10.00096	210.0000	34	23	1
10008.73	6937.501	10.01549	437.5910	34	26	1
9981.242	7270.117	10.98419	572.7592	33	29	1
9983.131	7327.557	12.30078	587.5690	33	30	1
9977.174	7425.217	13.35779	617.6637	33	31	1
9922.641	7482.129	13.44454	663.1630	33	31	1
9854.035	7511.636	14.54974	702.8734	32	32	1
9830.091	7532.316	14.90867	739.8802	32	32	1
9801.710	7687.827	15.89067	887.9076	32	33	1
9797.639	7642.454	16.81700	1033.716	31	33	1
9779.178	7509.314	17.20798	1098.597	31	32	1
9757.070	7470.402	17.41242	1123.042	31	31	1

REMOVED: PARTICLE INSIDE DIVIDING STREAMLINE AT WELL K= 1, I= 31, J= 31

PARTICLE NO. 11

X	Y	Z	TIME	J	I	K
7900.000	6950.000	10.00000	0.0000000	14	26	1

7902.298	6953.864	10.05845	10.00000	14	26	1
7911.553	6969.388	10.28887	50.00000	14	26	1
7954.534	7032.275	11.16138	210.0000	14	27	1
8051.270	7150.502	12.48329	482.1981	15	28	1
8244.440	7294.920	13.89282	825.4546	16	29	1
8626.030	7319.090	15.38516	1303.893	20	30	1
9044.428	7380.092	15.34815	1953.740	24	30	1
9342.561	7403.699	15.39972	2195.017	27	31	1
9378.222	7400.000	15.41246	2218.278	27	30	1
9612.992	7430.030	15.45910	2283.697	30	31	1
9760.357	7481.690	16.60315	2319.469	31	31	1

REMOVED: PARTICLE INSIDE DIVIDING STREAMLINE AT WELL K= 1, I= 31, J= 31

PARTICLE NO. 12

X	Y	Z	TIME	J	I	K
8450.000	6950.000	10.00000	0.0000000		18	26	1
8526.316	6959.621	8.741150	7.122571		19	26	1

REMOVED: PARTICLE TRAPPED AT WELL K= 1, I= 26, J= 19

PARTICLE NO. 13

X	Y	Z	TIME	J	I	K
8950.000	6950.000	10.00000	0.0000000		23	26	1
8955.058	6958.453	9.998799	10.00000		23	26	1
8976.458	6990.526	9.993999	50.00000		23	26	1
9083.180	7106.906	9.977292	210.0000		24	28	1
9478.928	7285.464	9.978075	468.8415		28	29	1
9712.373	7456.150	16.60315	529.9259		31	31	1

REMOVED: PARTICLE INSIDE DIVIDING STREAMLINE AT WELL K= 1, I= 31, J= 31

PARTICLE NO. 14

X	Y	Z	TIME	J	I	K
9450.000	6950.000	10.00000	0.0000000		28	26	1
9462.613	6962.811	9.998083	10.00000		28	26	1
9517.974	7020.688	9.992246	50.00000		29	27	1
9609.751	7129.239	9.987721	109.5835		30	28	1
9753.332	7421.935	16.60315	178.9806		31	31	1

REMOVED: PARTICLE INSIDE DIVIDING STREAMLINE AT WELL K= 1, I= 31, J= 31

PARTICLE NO. 15

X	Y	Z	TIME	J	I	K
9950.000	6950.000	10.00000	0.0000000		33	26	1
9949.413	6969.500	10.00061	10.00000		33	26	1
9937.002	7062.262	10.00352	50.00000		33	27	1
9943.158	7275.574	10.98419	110.2481		33	29	1
9941.827	7323.554	12.30078	122.5849		33	30	1
9930.518	7397.771	12.34352	143.9771		33	30	1
9928.872	7402.133	13.35779	145.3581		33	31	1
9922.275	7411.486	13.36412	148.5265		33	31	1
9888.521	7448.062	14.30450	161.2001		32	31	1
9801.219	7486.219	14.33877	179.1511		32	31	1
9799.134	7486.075	16.60315	179.4554		31	31	1

REMOVED: PARTICLE INSIDE DIVIDING STREAMLINE AT WELL K= 1, I= 31, J= 31

PARTICLE NO. 16

X	Y	Z	TIME	J	I	K
10450.00	6950.000	10.00000	0.0000000		38	26	1
10450.45	6972.436	10.09392	10.00000		38	26	1
10453.00	7063.022	10.47658	50.00000		38	27	1
10441.47	7267.060	11.55072	146.4191		38	29	1
10404.01	7448.956	12.98769	278.2735		38	31	1
10354.41	7547.408	13.83185	439.8808		37	32	1
10298.35	7635.282	14.22351	595.0817		36	33	1
10244.05	7675.874	15.43888	754.7336		36	33	1
10166.47	7690.108	17.79240	998.3084		35	33	1
10145.35	7671.841	21.36643	1111.810		35	33	2
10144.04	7671.351	32.90092	1218.497		35	33	2
10129.31	7665.182	41.13879	1317.695		35	33	3

10071.21	7615.559	41.66297	1416.958	34	33	3
10031.13	7553.381	41.18027	1486.023	34	32	3
10012.88	7514.595	40.84801	1519.248	34	32	3
10008.41	7502.770	40.75699	1528.338	34	32	3
9890.445	7501.053	21.29688	1541.355	32	32	2
9841.899	7499.920	21.33573	1552.953	32	31	2
9707.814	7498.644	21.38999	1559.528	31	31	2

REMOVED: PARTICLE TRAPPED AT WELL K= 2, I= 31, J= 31

PARTICLE NO. 17

X	Y	Z	TIME	J	I	K
7900.000	7450.000	10.00000	0.0000000		14	31	1
7903.666	7453.085	10.06088	10.00000		14	31	1
7918.574	7465.364	10.30080	50.00000		14	31	1
7982.072	7513.483	11.20860	210.0000		14	32	1
8216.621	7646.297	13.54490	699.9767		16	33	1
8683.786	7785.641	16.19892	1490.999		20	34	1
8868.386	7779.335	17.03854	1831.263		22	34	1
9084.226	7760.664	17.74675	2162.914		24	34	1
9269.662	7681.020	18.21745	2466.581		26	33	1
9485.339	7663.216	18.81813	2765.864		28	33	1
9737.500	7642.582	19.28533	3003.555		31	33	1
9794.422	7666.897	19.70032	3232.854		31	33	1
9773.664	7532.454	19.84145	3325.916		31	32	1
9751.488	7470.096	19.93056	3359.805		31	31	1

REMOVED: PARTICLE INSIDE DIVIDING STREAMLINE AT WELL K= 1, I= 31, J= 31

PARTICLE NO. 18

X	Y	Z	TIME	J	I	K
8450.000	7450.000	10.00000	0.0000000		18	31	1
8457.471	7450.897	10.06439	10.00000		18	31	1
8487.451	7454.522	10.31783	50.00000		18	31	1
8605.652	7456.958	11.20974	210.0000		20	31	1
8769.095	7458.992	11.20533	447.3939		21	31	1
9082.872	7481.384	11.20884	843.2545		24	31	1
9414.952	7445.511	11.25784	1095.754		28	31	1
9535.182	7397.890	11.28832	1172.220		29	30	1
9579.754	7409.501	11.29390	1198.909		29	31	1
9632.009	7465.801	13.77417	1224.901		30	31	1
9737.048	7470.786	16.60315	1244.303		31	31	1

REMOVED: PARTICLE INSIDE DIVIDING STREAMLINE AT WELL K= 1, I= 31, J= 31

PARTICLE NO. 19

X	Y	Z	TIME	J	I	K
8950.000	7450.000	10.00000	0.0000000		23	31	1
8958.187	7450.906	10.00013	10.00000		23	31	1
8991.948	7454.430	10.00063	50.00000		23	31	1
9150.606	7462.524	10.00981	210.0000		25	31	1
9479.989	7422.446	10.04826	442.5267		28	31	1
9573.794	7416.516	10.42389	502.2933		29	31	1
9640.867	7476.867	13.77417	534.3758		30	31	1
9738.003	7473.028	16.60315	551.9172		31	31	1

REMOVED: PARTICLE INSIDE DIVIDING STREAMLINE AT WELL K= 1, I= 31, J= 31

PARTICLE NO. 20

X	Y	Z	TIME	J	I	K
9450.000	7450.000	10.00000	0.0000000		28	31	1
9463.760	7444.267	10.00259	10.00000		28	31	1
9513.760	7435.822	10.40057	50.00000		29	31	1
9577.787	7450.098	10.40057	97.25682		29	31	1
9624.480	7482.970	13.77417	122.3313		30	31	1
9755.014	7481.250	16.60315	150.9256		31	31	1

REMOVED: PARTICLE INSIDE DIVIDING STREAMLINE AT WELL K= 1, I= 31, J= 31

PARTICLE NO. 21

X	Y	Z	TIME	J	I	K
9950.000	7450.000	13.35779	0.0000000		33	31	1

9934.163	7463.552	13.37777	10.00000	33	31	1
9800.528	7485.732	14.42847	50.00000	32	31	1
9799.673	7485.680	16.60315	50.12434	31	31	1

REMOVED: PARTICLE INSIDE DIVIDING STREAMLINE AT WELL K= 1, I= 31, J= 31

PARTICLE NO. 22

X	Y	Z	TIME	J	I	K
10450.00	7450.000	12.65216	0.0000000	38	31	1
10447.58	7458.638	12.75221	10.00000	38	31	1
10437.27	7491.187	13.15332	50.00000	38	31	1
10423.07	7600.661	14.44345	210.0000	38	33	1
10405.09	7727.046	16.09847	452.1978	38	34	1
10408.59	7889.611	17.99781	894.2227	38	35	1
10438.54	8001.088	19.18424	1461.681	38	37	1

REMOVED: PARTICLE ENTERS RIVER K= 1, I= 37, J= 38

PARTICLE NO. 23

X	Y	Z	TIME	J	I	K
9750.000	7750.000	12.94019	0.0000000	31	34	1
9750.197	7749.628	13.03952	10.00000	31	34	1
9750.984	7748.116	13.42383	50.00000	31	34	1
9754.134	7741.638	14.77104	210.0000	31	34	1
9766.719	7707.379	18.01851	850.0000	31	34	1
9799.432	7649.121	19.58302	1565.557	31	33	1
9797.448	7600.000	19.66395	1622.953	31	32	1
9729.731	7521.655	19.79743	1683.269	31	32	1
9754.273	7469.813	19.86614	1708.404	31	31	1

REMOVED: PARTICLE INSIDE DIVIDING STREAMLINE AT WELL K= 1, I= 31, J= 31

PARTICLE NO. 24

X	Y	Z	TIME	J	I	K
10250.00	7750.000	13.31561	0.0000000	36	34	1
10248.80	7752.083	13.41487	10.00000	36	34	1
10243.99	7760.363	13.79739	50.00000	36	34	1
10224.57	7792.617	15.11801	210.0000	36	34	1
10219.52	7913.091	18.15248	850.0000	36	36	1
10260.45	8027.872	19.37413	1530.995	36	37	1

REMOVED: PARTICLE ENTERS RIVER K= 1, I= 37, J= 36

PARTICLE NO. 25

X	Y	Z	TIME	J	I	K
10750.00	7750.000	13.29480	0.0000000	41	34	1
10750.24	7755.792	13.39407	10.00000	41	34	1
10751.20	7778.107	13.77681	50.00000	41	34	1
10757.85	7851.492	15.11733	210.0000	41	35	1

REMOVED: PARTICLE ENTERS RIVER K= 1, I= 35, J= 41

PARTICLE NO. 26

X	Y	Z	TIME	J	I	K
10750.00	6950.000	10.00000	0.0000000	41	26	1
10749.51	6972.080	10.09412	10.00000	41	26	1
10747.34	7060.507	10.47736	50.00000	41	27	1
10740.89	7232.839	11.42769	146.8623	41	29	1
10674.35	7506.501	13.88029	328.9136	40	32	1
10661.04	7544.819	19.01207	375.2314	40	32	1
10680.22	7588.001	25.65975	385.3514	40	32	2
10711.32	7641.347	27.40044	393.4842	41	33	2
10753.26	7697.883	33.01402	405.7597	41	33	2
10776.72	7748.702	42.37957	434.4146	41	34	3

REMOVED: PARTICLE ENTERS RIVER K= 3, I= 34, J= 41

>>ALL PARTICLES HAVE ALREADY BEEN REMOVED

P3NR108B INTERMEDIATE DRIFT INITIAL POSITIONS, DEPTH OF 45 FEET

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+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+                                                             +
+                        P A T H 3 D                          +
+  A Ground-Water Path and Travel-Time Simulator              +
+                        (V. 3.10)                            +
+                                                             +
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NR108 EXISTING RECOVERY SYSTEM, OPTIMIZED RATES (60, 100, 200, 100 GPM)

FLOW MODEL CONSISTS OF 4 LAYERS 47 ROWS 56 COLUMNS
NUMBER OF STRESS PERIOD(S) IN SIMULATION = 1
TIME UNIT USED IN THE MODEL IS DAYS
PACKAGE: BCF WEL DRN RIV EVT GHB RCH STR
UNIT: 11 13 12 16 0 0 18 0
FLOW FIELD IS STEADY-STATE (ISS NOT 0)
MAXIMUM NUMBER OF WELLS = 35
MAXIMUM NUMBER OF DRAINS = 19
MAXIMUM NUMBER OF RIVER CELLS = 939
RCH OPTION 1: RECHARGE APPLIED TO THE TOP LAYER
MAXIMUM NUMBER OF PARTICLES ALLOWED = 75
FILE [P3DPLOT.DAT] SAVED IN UNIT 4 FOR PLOTTING PATH LINES
FILE [P3DCAPT.DAT] SAVED IN UNIT 9 WITH FINAL & INITIAL POSITIONS OF CAPTURED PARTICLES
INITIAL PARTICLE POSITIONS ARE ENTERED IN X, Y, Z COORDINATES
117263 ELEMENTS OF THE Y ARRAY USED OUT OF 9999999

BOUNDARY ARRAY (IBOUND) FOR LAYER 1 READ ON UNIT 1 USING FORMAT: "(2513) "

BOUNDARY ARRAY (IBOUND) FOR LAYER 2 READ ON UNIT 1 USING FORMAT: "(2513) "

BOUNDARY ARRAY (IBOUND) FOR LAYER 3 READ ON UNIT 1 USING FORMAT: "(2513) "

BOUNDARY ARRAY (IBOUND) FOR LAYER 4 READ ON UNIT 1 USING FORMAT: "(2513) "

HEAD AT INACTIVE CELLS = 2000.000

STARTING HYDRAULIC HEADS FOR LAYER 1 READ ON UNIT 1 USING FORMAT: "(10e12.4) "

STARTING HYDRAULIC HEADS FOR LAYER 2 READ ON UNIT 1 USING FORMAT: "(10e12.4) "

STARTING HYDRAULIC HEADS FOR LAYER 3 READ ON UNIT 1 USING FORMAT: "(10e12.4) "

STARTING HYDRAULIC HEADS FOR LAYER 4 READ ON UNIT 1 USING FORMAT: "(10e12.4) "

LAYER NUMBER	AQUIFER TYPE
1	1
2	0
3	0
4	0

ANISOTROPY RATIO (Ky/Kx) = 1.000000

WIDTH ALONG ROWS (DELR) READ ON UNIT 11 USING FORMAT: "(10E12.4) "

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
	51	52	53	54	55	56				

1	1000.	1000.	1000.	1000.	1000.	800.0	400.0	400.0	400.0	200.0
	200.0	200.0	200.0	200.0	200.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	200.0	200.0	200.0	200.0	200.0	200.0	400.0	400.0
	400.0	400.0	400.0	900.0	1000.	1000.				

WIDTH ALONG COL. (DELC) READ ON UNIT 11 USING FORMAT: *(10E12.4) *

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			

1	1000.	1000.	800.0	800.0	400.0	400.0	400.0	200.0	200.0	200.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	100.0	100.0	100.0	100.0	200.0	200.0	200.0	200.0
	200.0	400.0	400.0	400.0	800.0	1000.	1000.			

HY. COND. ALONG ROW (Kx) FOR LAYER 1 READ ON UNIT 11 USING FORMAT: *(10e12.4) *

BOT (NOT USED BY PATH3D) FOR LAYER 1 READ ON UNIT 11 USING FORMAT: *(10e12.4) *

VERT. HYD. COND./THICK. FOR LAYER 1 READ ON UNIT 11 USING FORMAT: *(10e12.4) *

TRANS. ALONG ROWS (Tx) FOR LAYER 2 READ ON UNIT 11 USING FORMAT: *(10e12.4) *

VERT. HYD. COND./THICK. FOR LAYER 2 READ ON UNIT 11 USING FORMAT: *(10e12.4) *

TRANS. ALONG ROWS (Tx) FOR LAYER 3 READ ON UNIT 11 USING FORMAT: *(10e12.4) *

VERT. HYD. COND./THICK. FOR LAYER 3 READ ON UNIT 11 USING FORMAT: *(10e12.4) *

TRANS. ALONG ROWS (Tx) FOR LAYER 4 READ ON UNIT 11 USING FORMAT: *(10e12.4) *

TOP ELEV. OF 1ST LAYER = 817.0000 FOR LAYER 1
CELL THICKNESS (DZ) = 20.00000 FOR LAYER 1
CELL THICKNESS (DZ) = 20.00000 FOR LAYER 2
CELL THICKNESS (DZ) = 75.00000 FOR LAYER 3
CELL THICKNESS (DZ) = 200.0000 FOR LAYER 4
POROSITY*RETARD. FACTOR = 0.2000000 FOR LAYER 1
POROSITY*RETARD. FACTOR = 0.5000000E-01 FOR LAYER 2
POROSITY*RETARD. FACTOR = 0.2000000 FOR LAYER 3
POROSITY*RETARD. FACTOR = 0.1000000 FOR LAYER 4

TRACKING START TIME (TIME1) = 0.0000000
TRACKING END TIME (TIME2) = 0.1000000E+08
ERROR CRITERION (EPS) = 0.3000000E-02
INITIAL TRACKING STEPSIZE = 10.00000
MAXIMUM TRACKING STEPS ALLOWED = 300
INTERVAL FOR SAVING INTERMEDIATE RESULTS = 1
OPTION FOR PRINTING INTERMEDIATE RESULTS = 3

PARTICLE STARTING POSITIONS

PARTICLE NO.	X	Y	Z
1	8000.0	6000.0	45.000
2	8500.0	6000.0	45.000
3	9000.0	6000.0	45.000
4	9500.0	6000.0	45.000
5	10000.	6000.0	45.000
6	8000.0	6500.0	45.000
7	8500.0	6500.0	45.000
8	9000.0	6500.0	45.000
9	9500.0	6500.0	45.000
10	10000.	6500.0	45.000
11	8000.0	7000.0	45.000
12	8500.0	7000.0	45.000
13	9000.0	7000.0	45.000
14	9500.0	7000.0	45.000
15	10000.	7000.0	45.000
16	10500.	7000.0	45.000
17	8000.0	7500.0	45.000
18	8500.0	7500.0	45.000
19	9000.0	7500.0	45.000
20	9500.0	7500.0	45.000
21	10000.	7500.0	45.000
22	10500.	7500.0	45.000
23	9750.0	7750.0	45.000
24	10250.	7750.0	45.000
25	10750.	7750.0	45.000
26	10750.	7000.0	45.000

STRESS PERIOD NO. 1

NUMBER OF WELLS IN CURRENT STRESS PERIOD = 35

WELL NO.	LAYER	ROW	COLUMN	Q
1	1	29	35	0.0000000
2	3	26	19	0.0000000
3	2	29	35	-14543.00
4	3	29	35	-24000.00
5	1	21	47	0.0000000
6	1	22	46	0.0000000
7	1	23	45	0.0000000
8	4	2	2	-136000.0
9	3	2	1	-34000.00
10	4	35	13	-7900.000
11	1	16	29	0.0000000
12	2	16	29	-49.00000
13	3	16	29	-11438.00
14	1	27	38	0.0000000
15	2	27	38	0.0000000
16	3	27	38	0.0000000
17	1	26	19	-19251.00
18	2	31	31	-9818.000
19	1	31	31	-9433.000
20	3	31	31	0.0000000
21	4	26	19	0.0000000
22	4	31	32	0.0000000
23	4	29	35	0.0000000
24	4	16	29	0.0000000
25	2	23	45	-1000.000
26	2	22	46	-1000.000
27	2	21	47	-1000.000
28	3	23	45	-5353.000
29	3	22	46	-4968.000
30	3	21	47	-5545.000
31	1	21	49	-4235.000
32	2	21	49	0.0000000
33	3	21	49	0.0000000

34	1	28	39	0.0000000
35	3	28	39	0.0000000

NUMBER OF DRAINS IN CURRENT STRESS PERIOD = 19

DRAIN NO.	LAYER	ROW	COLUMN
1	3	28	45
2	3	29	45
3	3	30	45
4	1	26	44
5	1	26	45
6	1	27	44
7	1	27	45
8	1	28	45
9	1	29	45
10	1	30	45
11	1	25	44
12	1	22	44
13	1	24	44
14	1	23	44
15	3	23	44
16	3	24	44
17	3	25	44
18	3	26	44
19	3	27	44

NUMBER OF RIVER CELLS IN CURRENT STRESS PERIOD = 939

RIVER NO.	LAYER	ROW	COLUMN
1	1	28	1
2	1	29	1
3	1	29	2
4	1	30	1
5	1	30	2
6	1	30	3
7	1	31	1
8	1	31	2
9	1	31	3
10	1	31	4
11	1	32	1
12	1	32	2
13	1	32	3
14	1	32	4
15	1	33	1
16	1	33	2
17	1	33	3
18	1	33	4
19	1	34	1
20	1	34	3
21	1	34	4
22	1	34	5
23	1	35	1
24	1	35	4
25	1	35	5
26	1	36	4
27	1	36	5
28	1	36	6
29	1	37	1
30	1	37	4
31	1	37	5
32	1	37	6
33	1	37	7
34	1	38	4
35	1	38	5
36	1	38	6
37	1	38	7
38	1	38	8
39	1	39	1
40	1	39	4

41	1	39	6
42	1	39	7
43	1	39	8
44	1	40	1
45	1	40	2
46	1	40	3
47	1	40	4
48	1	40	6
49	1	40	7
50	1	40	8
51	1	41	2
52	1	41	3
53	1	41	6
54	1	41	7
55	1	41	8
56	1	38	1
57	1	38	29
58	1	38	30
59	1	38	31
60	1	38	32
61	1	38	33
62	1	38	34
63	1	39	9
64	1	39	10
65	1	39	11
66	1	39	12
67	1	39	13
68	1	39	14
69	1	39	15
70	1	39	16
71	1	39	17
72	1	39	18
73	1	39	19
74	1	39	20
75	1	39	21
76	1	39	22
77	1	39	23
78	1	39	24
79	1	39	25
80	1	39	26
81	1	39	27
82	1	39	28
83	1	39	29
84	1	39	30
85	1	39	31
86	1	39	32
87	1	39	33
88	1	39	34
89	1	40	9
90	1	40	10
91	1	40	11
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100	1	40	20
101	1	40	21
102	1	40	22
103	1	40	23
104	1	40	24
105	1	40	25
106	1	40	26
107	1	40	27

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109	1	40	29
110	1	40	30
111	1	40	31
112	1	40	32
113	1	40	33
114	1	40	34
115	1	41	9
116	1	41	10
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138	1	41	32
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143	1	42	14
144	1	42	15
145	1	42	16
146	1	42	17
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153	1	42	24
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156	1	35	39
157	1	35	40
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162	1	36	39
163	1	36	40
164	1	36	41
165	1	36	42
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171	1	37	40
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173	1	37	42
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635	3	34	4
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637	3	35	1
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652	3	38	6
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665	3	40	7
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668	3	41	3
669	3	41	7
670	3	41	8
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717	3	40	21
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719	3	40	23
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727	3	40	31
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729	3	40	33
730	3	40	34
731	3	41	9
732	3	41	10
733	3	41	11
734	3	41	12
735	3	41	13
736	3	41	14
737	3	41	15
738	3	41	16
739	3	41	17
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741	3	41	19
742	3	41	20
743	3	41	21
744	3	41	22
745	3	41	23
746	3	41	24
747	3	41	25
748	3	41	26
749	3	41	27
750	3	41	28
751	3	41	29
752	3	41	30
753	3	41	31
754	3	41	32
755	3	41	33
756	3	41	34
757	3	42	11
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934	3	38	54
935	3	38	55
936	3	38	56
937	3	39	55
938	3	39	56
939	3	40	56

RECHARGE RATES (RECH) READ ON UNIT 18 USING FORMAT: "(10e12.4)

TIME STEP NO. 1

HEADS FOR CURRENT TIME STEP READ UNFORMATTED ON UNIT 3

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PARTICLE COORDINATES, TRAVEL TIMES, AND NODAL INDICES

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PARTICLE NO. 1

X	Y	Z	TIME	J	I	K
8000.000	6000.000	45.00000	0.0000000		14	16	3
8006.396	6014.301	44.99511	10.00000		15	17	3
8032.215	6071.156	44.97554	50.00000		15	17	3
8141.939	6291.871	44.89985	210.0000		15	19	3
8287.478	6533.642	44.81308	389.9146		16	22	3
8366.362	6651.492	44.76963	470.0453		17	23	3
8396.327	6696.630	44.75358	499.3445		17	23	3
8482.801	6808.330	14.66592	546.3098		18	25	1
8536.498	6903.028	8.741150	573.4702		19	26	1

REMOVED: PARTICLE TRAPPED AT WELL K= 1, I= 26, J= 19

PARTICLE NO. 2

X	Y	Z	TIME	J	I	K
8500.000	6000.000	45.00000	0.0000000		18	16	3
8507.868	6014.662	44.99435	10.00000		19	17	3
8539.563	6073.030	44.97178	50.00000		19	17	3
8666.070	6302.390	44.88427	210.0000		20	20	3
8760.930	6493.753	44.81347	345.1970		21	21	3
8781.365	6556.929	44.79030	388.2570		21	22	3
8790.294	6588.098	44.77942	408.4991		21	22	3
8793.435	6600.473	44.29707	416.3650		21	23	3
8793.480	6608.325	40.21172	421.4111		21	23	3
8810.634	6610.506	32.48684	428.2473		22	23	2

8827.697	6611.620	32.48516	435.1295	22	23	2
8881.846	6617.297	32.47844	462.6584	22	23	2
9002.913	6634.587	32.43976	572.7741	24	23	2
9122.837	6655.831	32.36086	764.1954	25	23	2
9266.254	6676.506	32.21095	1107.823	26	23	2
9444.594	6703.496	31.91492	1753.024	28	24	2
9592.682	6774.053	31.34049	2768.482	29	24	2
9681.422	6797.319	30.50717	3902.617	30	24	2
9772.490	6842.720	29.31412	5222.535	31	25	2
9877.223	6969.735	27.87402	7286.715	32	26	2
9892.813	7000.000	27.67402	7640.302	32	26	2
9900.000	7016.798	27.58055	7815.135	32	27	2
9936.231	7100.000	27.21118	8624.419	33	27	2
9963.351	7200.000	27.40020	9300.466	33	28	2
9981.391	7300.000	27.69113	9743.211	33	29	2
9902.323	7400.000	27.71251	9754.310	33	30	2
9900.000	7399.647	27.67042	9754.365	32	30	2
9895.040	7400.000	27.67063	9754.481	32	30	2
9800.000	7406.799	27.67466	9756.717	31	31	2

REMOVED: PARTICLE TRAPPED AT WELL K= 2, I= 31, J= 31

PARTICLE NO. 3

X	Y	Z	TIME	J	I	K
9000.000	6000.000	45.00000	0.0000000	23	16	3
9010.430	6013.935	44.99307	10.00000	24	17	3
9053.148	6068.380	44.96535	50.00000	24	17	3
9230.273	6262.391	44.85866	210.0000	26	19	3
9530.005	6483.781	44.70374	454.9164	29	21	3
10267.16	7059.344	42.74595	833.8873	36	27	3
10240.92	7123.830	42.60270	855.0645	36	28	3
10204.72	7163.899	42.59965	868.6008	36	28	3
10197.77	7175.169	41.30734	871.1183	35	28	3
10194.40	7190.216	39.32799	872.4504	35	28	2
10195.45	7249.442	34.44358	873.8767	35	29	2

REMOVED: PARTICLE TRAPPED AT WELL K= 2, I= 29, J= 35

PARTICLE NO. 4

X	Y	Z	TIME	J	I	K
9500.000	6000.000	45.00000	0.0000000	28	16	3
9523.705	5997.244	44.98351	10.00000	29	16	3

REMOVED: PARTICLE INSIDE DIVIDING STREAMLINE AT WELL K= 3, I= 16, J= 29

PARTICLE NO. 5

X	Y	Z	TIME	J	I	K
10000.00	6000.000	45.00000	0.0000000	33	16	3
10011.39	6018.484	44.99049	10.00000	34	17	3
10045.77	6072.799	44.96246	39.53096	34	17	3
10215.91	6296.142	44.84836	157.6548	36	19	3
10518.73	6650.691	44.52182	308.6852	39	23	3
11041.73	7084.650	42.06644	501.3888	43	27	3
11102.16	7092.853	41.37482	514.3448	44	27	3

REMOVED: PARTICLE ENTERS DRAIN K= 3, I= 27, J= 44

PARTICLE NO. 6

X	Y	Z	TIME	J	I	K
8000.000	6500.000	45.00000	0.0000000	14	21	3
8007.342	6512.297	44.99453	10.00000	15	22	3
8032.612	6553.167	44.97586	43.66946	15	22	3
8148.699	6704.503	44.89890	178.3473	15	24	3
8238.982	6786.979	44.85539	256.7466	16	24	3
8256.287	6802.239	44.32228	271.1298	16	25	3
8260.081	6810.805	40.20931	279.5758	16	25	3
8293.613	6829.029	24.39578	292.2473	16	25	2
8333.638	6884.153	21.87486	302.4380	17	25	2
8380.013	6926.954	20.05385	310.7050	17	26	2
8387.041	6930.767	19.74701	314.2758	17	26	1
8395.454	6934.809	19.36944	319.8254	17	26	1

8400.760	6937.424	18.56900	323.1827	18	26	1
8407.609	6942.515	12.90071	326.4720	18	26	1
8451.421	6956.519	6.301454	335.6853	18	26	1
8538.578	6962.757	8.741150	344.7331	19	26	1

REMOVED: PARTICLE TRAPPED AT WELL K= 1, I= 26, J= 19

PARTICLE NO. 7

X	Y	Z	TIME	J	I	K
8500.000	6500.000	45.00000	0.0000000	18	21	3
8508.518	6515.782	44.99452	10.00000	19	22	3
8536.862	6572.472	44.97562	44.39349	19	22	3
8615.908	6700.394	3.368042	181.9674	20	24	1
8650.625	6828.123	3.768311	310.3644	20	25	1
8607.960	6948.472	5.598389	343.3137	20	26	1
8593.689	6952.625	8.741150	344.9168	19	26	1

REMOVED: PARTICLE TRAPPED AT WELL K= 1, I= 26, J= 19

PARTICLE NO. 8

X	Y	Z	TIME	J	I	K
9000.000	6500.000	45.00000	0.0000000	23	21	3
9006.757	6509.547	44.99447	10.00000	24	22	3
9027.559	6537.373	44.97778	40.25651	24	22	3
9117.053	6636.556	44.91311	161.2825	25	23	3
9299.944	6750.564	44.81943	361.8993	26	24	3
9481.768	6847.240	44.72987	599.5001	28	25	3
9651.048	6952.922	43.95648	885.6819	30	26	3
9772.768	7000.489	43.20214	1024.940	31	27	3
9910.979	7029.354	42.63008	1118.172	33	27	3
10097.82	7078.012	42.15787	1181.693	34	27	3
10073.38	7259.717	25.36757	1191.253	34	29	2
10147.63	7268.272	23.61378	1195.170	35	29	2

REMOVED: PARTICLE TRAPPED AT WELL K= 2, I= 29, J= 35

PARTICLE NO. 9

X	Y	Z	TIME	J	I	K
9500.000	6500.000	45.00000	0.0000000	28	21	3
9513.537	6508.122	44.99429	10.00000	29	22	3
9569.547	6539.757	44.97171	50.00000	29	22	3
9841.896	6666.390	44.43237	210.0000	32	23	3
10046.31	6757.252	43.82402	292.6551	34	24	3
10165.14	6878.279	43.30021	351.0131	35	25	3
10174.10	6896.692	43.23684	357.8979	35	25	3
10178.59	6954.824	20.83332	373.5014	35	26	2
10178.61	7054.386	20.25931	377.7781	35	27	2
10179.45	7270.138	20.30026	383.2088	35	29	2

REMOVED: PARTICLE TRAPPED AT WELL K= 2, I= 29, J= 35

PARTICLE NO. 10

X	Y	Z	TIME	J	I	K
10000.00	6500.000	45.00000	0.0000000	33	21	3
10021.10	6515.654	44.98934	10.00000	34	22	3
10077.29	6556.077	44.96155	35.90867	34	22	3
10355.96	6784.371	44.05464	139.5434	37	24	3
10471.69	7173.911	42.71852	246.0133	38	28	3
10405.26	7323.454	42.40531	303.7396	38	30	3
10250.25	7381.208	42.18280	366.6757	36	30	3
10205.72	7376.028	42.18452	379.5786	36	30	3
10195.46	7353.063	30.83447	383.9724	35	30	2
10195.68	7278.853	23.58349	388.1266	35	29	2

REMOVED: PARTICLE TRAPPED AT WELL K= 2, I= 29, J= 35

PARTICLE NO. 11

X	Y	Z	TIME	J	I	K
8000.000	7000.000	45.00000	0.0000000	14	26	3
8001.617	7004.048	44.88912	10.00000	15	27	3
8005.015	7012.505	44.61845	32.58743	15	27	3
8019.144	7044.962	43.53291	122.9371	15	27	3

8053.717	7117.387	42.18724	348.6600	15	28	3
8079.829	7186.596	44.83271	584.4980	15	28	3
8086.117	7201.957	45.84816	638.8153	15	29	3
8090.251	7218.402	51.85811	695.2396	15	29	3
8108.577	7294.554	70.76040	920.9368	15	29	3
8109.287	7352.060	71.02245	1076.410	15	30	3
8108.079	7400.176	70.47813	1217.178	15	31	3
8083.314	7486.624	69.36663	1502.845	15	31	3
7887.739	7681.629	66.28444	2268.702	14	33	3
7684.958	7752.667	64.89428	2569.276	13	34	3
7506.013	8148.882	62.35300	2858.926	12	37	3
7495.639	8555.778	58.81907	3121.778	12	39	3

REMOVED: PARTICLE ENTERS RIVER K= 3, I= 39, J= 12

PARTICLE NO. 12

X	Y	Z	TIME	J	I	K
8500.000	7000.000	45.00000	0.0000000	18	26	3
8499.583	6999.190	40.53401	3.085315	18	26	3
8499.604	6999.259	29.15978	4.838958	18	26	2
8500.954	6999.453	19.04846	6.056479	19	26	1

REMOVED: PARTICLE TRAPPED AT WELL K= 1, I= 26, J= 19

PARTICLE NO. 13

X	Y	Z	TIME	J	I	K
9000.000	7000.000	45.00000	0.0000000	23	26	3
9001.694	7002.584	44.99475	10.00000	24	27	3
9008.625	7012.757	44.97361	50.00000	24	27	3
9038.661	7050.751	44.88990	210.0000	24	27	3
9207.153	7162.754	44.48617	850.0000	26	28	3
9357.235	7354.376	43.79469	1922.265	27	30	3
9633.227	7605.506	42.86859	2994.896	30	33	3
9718.659	7623.883	42.55976	3271.690	31	33	3
9855.253	7555.654	42.10577	3699.200	32	32	3
9895.110	7501.416	41.96656	3819.757	32	32	3
9897.901	7498.815	41.96064	3824.788	32	31	3
9900.236	7497.405	41.58341	3827.321	33	31	3
9876.682	7496.406	38.36989	3828.676	32	31	2
9804.686	7496.426	38.36506	3830.010	32	31	2
9711.963	7498.313	38.30700	3835.346	31	31	2

REMOVED: PARTICLE TRAPPED AT WELL K= 2, I= 31, J= 31

PARTICLE NO. 14

X	Y	Z	TIME	J	I	K
9500.000	7000.000	45.00000	0.0000000	28	26	3
9505.562	7002.970	44.99216	10.00000	29	27	3
9528.268	7014.697	44.95945	50.00000	29	27	3
9626.872	7058.625	44.41106	210.0000	30	27	3
9795.462	7096.762	43.23639	400.0746	31	27	3
9928.542	7085.130	42.72475	479.7362	33	27	3
10037.27	7118.628	34.41829	531.5856	34	28	2
10015.67	7224.195	25.16797	538.1035	34	29	2
9973.185	7298.079	25.10398	544.5130	33	29	2
9772.610	7323.757	24.20834	550.4099	31	30	2
9714.414	7420.755	24.22658	554.5018	31	31	2

REMOVED: PARTICLE TRAPPED AT WELL K= 2, I= 31, J= 31

PARTICLE NO. 15

X	Y	Z	TIME	J	I	K
10000.00	7000.000	45.00000	0.0000000	33	26	3
10030.41	7015.096	44.83755	10.00000	34	27	3
10084.70	7036.178	44.59773	24.98254	34	27	3
10103.40	7043.207	43.96855	29.58018	35	27	3
10112.13	7053.539	40.27584	31.86316	35	27	3
10114.27	7285.427	26.01821	38.39409	35	29	2

REMOVED: PARTICLE TRAPPED AT WELL K= 2, I= 29, J= 35

PARTICLE NO. 16

X	Y	Z	TIME	J	I	K	
10500.00	7000.000	45.00000	0.0000000		38	26	3
10506.78	7031.494	44.80026	10.00000		39	27	3
10521.46	7096.133	44.39713	31.37097		39	27	3
10523.67	7252.155	43.40667	88.58550		39	29	3
10517.71	7303.431	42.35454	110.0521		39	30	3
10517.08	7316.018	39.07516	115.9251		39	30	2
10527.67	7321.026	31.35975	121.6133		39	30	2
10570.91	7341.984	23.02971	136.1058		39	30	2
10651.13	7357.563	21.51296	153.2824		40	30	2
10710.93	7354.446	21.52320	169.7475		41	30	2
10784.02	7387.654	21.54606	196.9852		41	30	2
10856.38	7509.360	21.37933	226.0435		42	32	2
10892.51	7652.061	26.53098	254.2684		42	33	2
10902.78	7673.716	28.06116	264.4475		43	33	2
10911.46	7679.689	27.81318	273.6811		43	33	2
10929.66	7708.175	28.29990	310.6155		43	34	2

REMOVED: PARTICLE ENTERS RIVER K= 2, I= 34, J= 43

PARTICLE NO. 17

X	Y	Z	TIME	J	I	K	
8000.000	7500.000	45.00000	0.0000000		14	31	3
7997.768	7504.117	44.99218	10.00000		14	32	3
7989.652	7518.076	44.96509	44.62089		14	32	3
7953.954	7569.623	44.85817	183.1044		14	32	3
7619.175	7750.427	44.39225	737.0386		13	34	3
7512.806	8221.785	43.96671	1022.933		12	38	3
7507.689	8582.264	43.35229	1288.665		12	39	3

REMOVED: PARTICLE ENTERS RIVER K= 3, I= 39, J= 12

PARTICLE NO. 18

X	Y	Z	TIME	J	I	K	
8500.000	7500.000	45.00000	0.0000000		18	31	3
8500.674	7501.158	44.99269	10.00000		19	32	3
8503.356	7505.734	44.96341	50.00000		19	32	3
8514.385	7523.740	44.84752	210.0000		19	32	3
8563.634	7591.167	44.40295	850.0000		19	32	3
8807.511	7761.636	43.03086	2741.828		22	34	3
8981.891	7919.013	41.72285	4353.445		23	36	3
9210.212	8024.132	41.32316	5958.167		26	37	3
9392.424	8321.521	41.13065	7410.570		27	38	3

REMOVED: PARTICLE ENTERS RIVER K= 3, I= 38, J= 27

PARTICLE NO. 19

X	Y	Z	TIME	J	I	K	
9000.000	7500.000	45.00000	0.0000000		23	31	3
9001.791	7500.389	44.98792	10.00000		24	32	3
9006.961	7501.148	44.95316	38.23126		24	32	3
9028.012	7504.170	44.81591	151.1563		24	32	3
9118.445	7516.907	44.33280	602.8564		25	32	3
9292.716	7660.175	44.38164	1361.858		26	33	3
9480.448	7856.378	44.31546	2189.917		28	35	3
9634.457	8057.286	44.13684	3122.110		30	37	3
9691.982	8273.215	43.17405	3988.114		30	38	3

REMOVED: PARTICLE ENTERS RIVER K= 3, I= 38, J= 30

PARTICLE NO. 20

X	Y	Z	TIME	J	I	K	
9500.000	7500.000	45.00000	0.0000000		28	31	3
9503.922	7501.407	44.98659	10.00000		29	32	3
9514.319	7504.378	44.95250	34.70629		29	32	3
9555.178	7516.508	44.81650	133.5315		29	32	3
9717.441	7555.171	44.08660	528.8322		31	32	3
9878.844	7492.373	43.47658	869.5551		32	31	3
9895.679	7483.639	43.45042	889.6968		32	31	3
9899.673	7481.901	43.44473	894.0756		32	31	3
9891.833	7479.546	37.98901	896.5601		32	31	2

```
  9767.229     7486.806     37.97309     898.9691      31   31    2
REMOVED: PARTICLE TRAPPED AT WELL  K=   2,  I=  31,  J=  31

PARTICLE NO.      21
     X            Y            Z          TIME         J    I    K
  10000.00     7500.000     45.00000     0.0000000      33   31    3
  9873.005     7496.106     25.54672     6.094957       32   31    2
  9709.843     7498.347     25.56678     11.98997       31   31    2
REMOVED: PARTICLE TRAPPED AT WELL  K=   2,  I=  31,  J=  31

PARTICLE NO.      22
     X            Y            Z          TIME         J    I    K
  10500.00     7500.000     45.00000     0.0000000      38   31    3
  10500.93     7515.651     44.54572     10.00000       39   32    3
  10503.22     7546.319     43.80204     28.52274       39   32    3
  10518.19     7634.459     43.73116     79.58551       39   33    3
  10546.39     7726.417     44.22206     125.7933       39   34    3
REMOVED: PARTICLE ENTERS RIVER K=   3,  I=  34,  J=  39

PARTICLE NO.      23
     X            Y            Z          TIME         J    I    K
  9750.000     7750.000     45.00000     0.0000000      31   34    3
  9751.854     7750.284     44.99258     10.00000       31   34    3
  9759.160     7751.438     44.96296     50.00000       31   34    3
  9786.676     7756.370     44.84511     210.0000       31   34    3
  9864.779     7715.940     44.45056     850.0000       32   34    3
  9891.252     7685.323     44.26406     1111.332       32   33    3
  9931.587     7522.493     44.02761     1501.539       33   32    3
  9932.486     7502.187     44.01566     1520.296       33   32    3
  9932.665     7499.437     43.67547     1522.654       33   31    3
  9903.830     7497.123     36.67413     1525.225       33   31    2
  9817.457     7497.083     35.84958     1526.847       32   31    2
  9752.746     7497.845     35.83792     1528.329       31   31    2
REMOVED: PARTICLE TRAPPED AT WELL  K=   2,  I=  31,  J=  31

PARTICLE NO.      24
     X            Y            Z          TIME         J    I    K
  10250.00     7750.000     45.00000     0.0000000      36   34    3
  10250.87     7753.160     44.73149     10.00000       36   34    3
  10254.68     7766.455     43.79401     50.00000       36   34    3
  10301.10     7844.136     41.55687     210.0000       37   35    3
REMOVED: PARTICLE ENTERS RIVER K=   3,  I=  35,  J=  37

PARTICLE NO.      25
     X            Y            Z          TIME         J    I    K
  10750.00     7750.000     45.00000     0.0000000      41   34    3
REMOVED: PARTICLE ENTERS RIVER K=   3,  I=  34,  J=  41

PARTICLE NO.      26
     X            Y            Z          TIME         J    I    K
  10750.00     7000.000     45.00000     0.0000000      41   26    3
  10771.47     7022.530     44.78883     10.00000       41   27    3
  10829.36     7072.015     44.29626     34.53300       42   27    3
  10958.90     7135.275     43.40291     83.20811       43   28    3
  11142.64     7173.003     43.06350     140.5696       44   28    3
  11265.08     7112.033     46.58136     181.8683       44   28    3
  11282.98     7097.623     46.74016     189.1445       44   27    3
REMOVED: PARTICLE ENTERS DRAIN K=   3,  I=  27,  J=  44

> >ALL PARTICLES HAVE ALREADY BEEN REMOVED
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NR108C DEEP DRIFT (85 FEET) INITIAL POSITIONS

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+                                                          +
+                        P A T H 3 D                       +
+  A Ground-Water Path and Travel-Time Simulator           +
+                        (V. 3.10)                         +
+                                                          +
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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NR108 EXISTING RECOVERY SYSTEM, OPTIMIZED RATES (60, 100, 200, 100 GPM)

FLOW MODEL CONSISTS OF 4 LAYERS 47 ROWS 56 COLUMNS
NUMBER OF STRESS PERIOD(S) IN SIMULATION = 1
TIME UNIT USED IN THE MODEL IS DAYS
PACKAGE: BCF WEL DRN RIV EVT GHB RCH STR
UNIT: 11 13 12 16 0 0 18 0
FLOW FIELD IS STEADY-STATE (ISS NOT 0)
MAXIMUM NUMBER OF WELLS = 35
MAXIMUM NUMBER OF DRAINS = 19
MAXIMUM NUMBER OF RIVER CELLS = 939
RCH OPTION 1: RECHARGE APPLIED TO THE TOP LAYER
MAXIMUM NUMBER OF PARTICLES ALLOWED = 75
FILE [P3DPLOT.DAT] SAVED IN UNIT 4 FOR PLOTTING PATH LINES
FILE [P3DCAPT.DAT] SAVED IN UNIT 9 WITH FINAL & INITIAL POSITIONS OF CAPTURED PARTICLES
INITIAL PARTICLE POSITIONS ARE ENTERED IN X, Y, Z COORDINATES
117263 ELEMENTS OF THE Y ARRAY USED OUT OF 9999999

BOUNDARY ARRAY (IBOUND) FOR LAYER 1 READ ON UNIT 1 USING FORMAT: "(25I3) "

BOUNDARY ARRAY (IBOUND) FOR LAYER 2 READ ON UNIT 1 USING FORMAT: "(25I3) "

BOUNDARY ARRAY (IBOUND) FOR LAYER 3 READ ON UNIT 1 USING FORMAT: "(25I3) "

BOUNDARY ARRAY (IBOUND) FOR LAYER 4 READ ON UNIT 1 USING FORMAT: "(25I3) "

HEAD AT INACTIVE CELLS = 2000.000

STARTING HYDRAULIC HEADS FOR LAYER 1 READ ON UNIT 1 USING FORMAT: "(10e12.4) "

STARTING HYDRAULIC HEADS FOR LAYER 2 READ ON UNIT 1 USING FORMAT: "(10e12.4) "

STARTING HYDRAULIC HEADS FOR LAYER 3 READ ON UNIT 1 USING FORMAT: "(10e12.4) "

STARTING HYDRAULIC HEADS FOR LAYER 4 READ ON UNIT 1 USING FORMAT: "(10e12.4) "

LAYER NUMBER	AQUIFER TYPE
1	1
2	0
3	0
4	0

ANISOTROPY RATIO (Ky/Kx) = 1.000000

WIDTH ALONG ROWS (DELR) READ ON UNIT 11 USING FORMAT: "(10E12.4) "

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
	51	52	53	54	55	56				

1	1000.	1000.	1000.	1000.	1000.	800.0	400.0	400.0	400.0	200.0
	200.0	200.0	200.0	200.0	200.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	200.0	200.0	200.0	200.0	200.0	200.0	400.0	400.0
	400.0	400.0	400.0	900.0	1000.	1000.				

WIDTH ALONG COL. (DELC) READ ON UNIT 11 USING FORMAT: "(10E12.4)

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			

1	1000.	1000.	800.0	800.0	400.0	400.0	400.0	200.0	200.0	200.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	100.0	100.0	100.0	100.0	200.0	200.0	200.0	200.0
	200.0	400.0	400.0	400.0	800.0	1000.	1000.			

HY. COND. ALONG ROW (Kx) FOR LAYER 1 READ ON UNIT 11 USING FORMAT: "(10e12.4)

BOT (NOT USED BY PATH3D) FOR LAYER 1 READ ON UNIT 11 USING FORMAT: "(10e12.4)

VERT. HYD. COND./THICK. FOR LAYER 1 READ ON UNIT 11 USING FORMAT: "(10e12.4)

TRANS. ALONG ROWS (Tx) FOR LAYER 2 READ ON UNIT 11 USING FORMAT: "(10e12.4)

VERT. HYD. COND./THICK. FOR LAYER 2 READ ON UNIT 11 USING FORMAT: "(10e12.4)

TRANS. ALONG ROWS (Tx) FOR LAYER 3 READ ON UNIT 11 USING FORMAT: "(10e12.4)

VERT. HYD. COND./THICK. FOR LAYER 3 READ ON UNIT 11 USING FORMAT: "(10e12.4)

TRANS. ALONG ROWS (Tx) FOR LAYER 4 READ ON UNIT 11 USING FORMAT: "(10e12.4)

TOP ELEV. OF 1ST LAYER = 817.0000 FOR LAYER 1
CELL THICKNESS (DZ) = 20.00000 FOR LAYER 1
CELL THICKNESS (DZ) = 20.00000 FOR LAYER 2
CELL THICKNESS (DZ) = 75.00000 FOR LAYER 3
CELL THICKNESS (DZ) = 200.0000 FOR LAYER 4
POROSITY*RETARD. FACTOR = 0.2000000 FOR LAYER 1
POROSITY*RETARD. FACTOR = 0.5000000E-01 FOR LAYER 2
POROSITY*RETARD. FACTOR = 0.2000000 FOR LAYER 3
POROSITY*RETARD. FACTOR = 0.1000000 FOR LAYER 4

TRACKING START TIME (TIME1) = 0.0000000
TRACKING END TIME (TIME2) = 0.1000000E+08
ERROR CRITERION (EPS) = 0.3000000E-02
INITIAL TRACKING STEPSIZE = 10.00000
MAXIMUM TRACKING STEPS ALLOWED = 100
INTERVAL FOR SAVING INTERMEDIATE RESULTS = 1
OPTION FOR PRINTING INTERMEDIATE RESULTS = 3

PARTICLE STARTING POSITIONS

PARTICLE NO.	X	Y	Z
1	8000.0	6000.0	85.000
2	8500.0	6000.0	85.000
3	9000.0	6000.0	85.000
4	9500.0	6000.0	85.000
5	10000.	6000.0	85.000
6	8000.0	6500.0	85.000
7	8500.0	6500.0	85.000
8	9000.0	6500.0	85.000
9	9500.0	6500.0	85.000
10	10000.	6500.0	85.000
11	8000.0	7000.0	85.000
12	8500.0	7000.0	85.000
13	9000.0	7000.0	85.000
14	9500.0	7000.0	85.000
15	10000.	7000.0	85.000
16	10500.	7000.0	85.000
17	8000.0	7500.0	85.000
18	8500.0	7500.0	85.000
19	9000.0	7500.0	85.000
20	9500.0	7500.0	85.000
21	10000.	7500.0	85.000
22	10500.	7500.0	85.000
23	9750.0	7750.0	85.000
24	10250.	7750.0	85.000
25	10750.	7750.0	85.000
26	10750.	7000.0	85.000

STRESS PERIOD NO. 1

NUMBER OF WELLS IN CURRENT STRESS PERIOD = 35

WELL NO.	LAYER	ROW	COLUMN	Q
1	1	29	35	0.0000000
2	3	26	19	0.0000000
3	2	29	35	-14543.00
4	3	29	35	-24000.00
5	1	21	47	0.0000000
6	1	22	46	0.0000000
7	1	23	45	0.0000000
8	4	2	2	-136000.0
9	3	2	1	-34000.00
10	4	35	13	-7900.000
11	1	16	29	0.0000000
12	2	16	29	-49.00000
13	3	16	29	-11438.00
14	1	27	38	0.0000000
15	2	27	38	0.0000000
16	3	27	38	0.0000000
17	1	26	19	-19251.00
18	2	31	31	-9818.000
19	1	31	31	-9433.000
20	3	31	31	0.0000000
21	4	26	19	0.0000000
22	4	31	32	0.0000000
23	4	29	35	0.0000000
24	4	16	29	0.0000000
25	2	23	45	-1000.000
26	2	22	46	-1000.000
27	2	21	47	-1000.000
28	3	23	45	-5353.000
29	3	22	46	-4968.000
30	3	21	47	-5545.000
31	1	21	49	-4235.000
32	2	21	49	0.0000000
33	3	21	49	0.0000000

34	1	28	39	0.0000000
35	3	28	39	0.0000000

NUMBER OF DRAINS IN CURRENT STRESS PERIOD = 19

DRAIN NO.	LAYER	ROW	COLUMN
1	3	28	45
2	3	29	45
3	3	30	45
4	1	26	44
5	1	26	45
6	1	27	44
7	1	27	45
8	1	28	45
9	1	29	45
10	1	30	45
11	1	25	44
12	1	22	44
13	1	24	44
14	1	23	44
15	3	23	44
16	3	24	44
17	3	25	44
18	3	26	44
19	3	27	44

NUMBER OF RIVER CELLS IN CURRENT STRESS PERIOD = 939

RIVER NO.	LAYER	ROW	COLUMN
1	1	28	1
2	1	29	1
3	1	29	2
4	1	30	1
5	1	30	2
6	1	30	3
7	1	31	1
8	1	31	2
9	1	31	3
10	1	31	4
11	1	32	1
12	1	32	2
13	1	32	3
14	1	32	4
15	1	33	1
16	1	33	2
17	1	33	3
18	1	33	4
19	1	34	1
20	1	34	3
21	1	34	4
22	1	34	5
23	1	35	1
24	1	35	4
25	1	35	5
26	1	36	4
27	1	36	5
28	1	36	6
29	1	37	1
30	1	37	4
31	1	37	5
32	1	37	6
33	1	37	7
34	1	38	4
35	1	38	5
36	1	38	6
37	1	38	7
38	1	38	8
39	1	39	1
40	1	39	4

41	1	39	6
42	1	39	7
43	1	39	8
44	1	40	1
45	1	40	2
46	1	40	3
47	1	40	4
48	1	40	6
49	1	40	7
50	1	40	8
51	1	41	2
52	1	41	3
53	1	41	6
54	1	41	7
55	1	41	8
56	1	38	1
57	1	38	29
58	1	38	30
59	1	38	31
60	1	38	32
61	1	38	33
62	1	38	34
63	1	39	9
64	1	39	10
65	1	39	11
66	1	39	12
67	1	39	13
68	1	39	14
69	1	39	15
70	1	39	16
71	1	39	17
72	1	39	18
73	1	39	19
74	1	39	20
75	1	39	21
76	1	39	22
77	1	39	23
78	1	39	24
79	1	39	25
80	1	39	26
81	1	39	27
82	1	39	28
83	1	39	29
84	1	39	30
85	1	39	31
86	1	39	32
87	1	39	33
88	1	39	34
89	1	40	9
90	1	40	10
91	1	40	11
92	1	40	12
93	1	40	13
94	1	40	14
95	1	40	15
96	1	40	16
97	1	40	17
98	1	40	18
99	1	40	19
100	1	40	20
101	1	40	21
102	1	40	22
103	1	40	23
104	1	40	24
105	1	40	25
106	1	40	26
107	1	40	27

108	1	40	28
109	1	40	29
110	1	40	30
111	1	40	31
112	1	40	32
113	1	40	33
114	1	40	34
115	1	41	9
116	1	41	10
117	1	41	11
118	1	41	12
119	1	41	13
120	1	41	14
121	1	41	15
122	1	41	16
123	1	41	17
124	1	41	18
125	1	41	19
126	1	41	20
127	1	41	21
128	1	41	22
129	1	41	23
130	1	41	24
131	1	41	25
132	1	41	26
133	1	41	27
134	1	41	28
135	1	41	29
136	1	41	30
137	1	41	31
138	1	41	32
139	1	41	33
140	1	41	34
141	1	42	12
142	1	42	13
143	1	42	14
144	1	42	15
145	1	42	16
146	1	42	17
147	1	42	18
148	1	42	19
149	1	42	20
150	1	42	21
151	1	42	22
152	1	42	23
153	1	42	24
154	1	42	25
155	1	42	26
156	1	35	39
157	1	35	40
158	1	35	41
159	1	35	42
160	1	36	37
161	1	36	38
162	1	36	39
163	1	36	40
164	1	36	41
165	1	36	42
166	1	37	35
167	1	37	36
168	1	37	37
169	1	37	38
170	1	37	39
171	1	37	40
172	1	37	41
173	1	37	42
174	1	38	35

175	1	38	36
176	1	38	37
177	1	38	38
178	1	38	39
179	1	38	40
180	1	38	41
181	1	38	42
182	1	39	35
183	1	39	36
184	1	39	37
185	1	39	38
186	1	39	39
187	1	39	40
188	1	39	41
189	1	39	42
190	1	40	35
191	1	40	36
192	1	40	37
193	1	40	38
194	1	40	39
195	1	40	40
196	1	40	41
197	1	41	35
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201	1	30	48
202	1	30	49
203	1	31	45
204	1	31	46
205	1	31	47
206	1	31	48
207	1	31	49
208	1	32	45
209	1	32	46
210	1	32	47
211	1	32	48
212	1	32	49
213	1	33	44
214	1	33	45
215	1	33	46
216	1	33	47
217	1	33	48
218	1	33	49
219	1	34	43
220	1	34	44
221	1	34	45
222	1	34	46
223	1	34	47
224	1	34	48
225	1	34	49
226	1	35	43
227	1	35	44
228	1	35	45
229	1	35	46
230	1	35	47
231	1	35	48
232	1	35	49
233	1	36	43
234	1	36	44
235	1	36	45
236	1	36	46
237	1	36	47
238	1	36	48
239	1	36	49
240	1	37	43
241	1	37	44

242	1	37	45
243	1	37	46
244	1	37	47
245	1	37	48
246	1	37	49
247	1	38	43
248	1	38	44
249	1	38	45
250	1	38	46
251	1	38	47
252	1	38	48
253	1	38	49
254	1	39	43
255	1	39	44
256	1	39	45
257	1	31	50
258	1	31	51
259	1	31	52
260	1	31	53
261	1	31	54
262	1	32	50
263	1	32	51
264	1	32	52
265	1	32	53
266	1	32	54
267	1	33	50
268	1	33	51
269	1	33	52
270	1	33	53
271	1	33	54
272	1	34	50
273	1	34	51
274	1	34	52
275	1	34	53
276	1	34	54
277	1	34	55
278	1	35	50
279	1	35	51
280	1	35	52
281	1	35	53
282	1	35	54
283	1	35	55
284	1	36	50
285	1	36	51
286	1	36	52
287	1	36	53
288	1	36	54
289	1	36	55
290	1	37	50
291	1	37	51
292	1	37	52
293	1	37	53
294	1	37	54
295	1	37	55
296	1	37	56
297	1	38	50
298	1	38	51
299	1	38	52
300	1	38	53
301	1	38	54
302	1	38	55
303	1	38	56
304	1	39	55
305	1	39	56
306	1	40	56
307	1	41	56
308	2	28	1

309	2	29	1
310	2	29	2
311	2	30	1
312	2	30	2
313	2	30	3
314	2	31	1
315	2	31	2
316	2	31	3
317	2	31	4
318	2	32	1
319	2	32	2
320	2	32	3
321	2	32	4
322	2	33	1
323	2	33	2
324	2	33	3
325	2	33	4
326	2	34	1
327	2	34	2
328	2	34	3
329	2	34	4
330	2	34	5
331	2	35	1
332	2	35	4
333	2	35	5
334	2	36	4
335	2	36	5
336	2	36	6
337	2	37	1
338	2	37	4
339	2	37	5
340	2	37	6
341	2	37	7
342	2	38	1
343	2	38	4
344	2	38	5
345	2	38	6
346	2	38	7
347	2	38	8
348	2	39	1
349	2	39	4
350	2	39	6
351	2	39	7
352	2	39	8
353	2	40	1
354	2	40	2
355	2	40	3
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357	2	40	6
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939	3	40	56

RECHARGE RATES (RECH) READ ON UNIT 18 USING FORMAT: "(10e12.4)"

TIME STEP NO. 1

HEADS FOR CURRENT TIME STEP READ UNFORMATTED ON UNIT 3

PARTICLE COORDINATES, TRAVEL TIMES, AND NODAL INDICES

PARTICLE NO. 1

X	Y	Z	TIME	J	I	K
8000.000	6000.000	85.00000	0.0000000		14	16	3
8006.396	6014.301	84.96978	10.00000		15	17	3
8032.215	6071.156	84.84827	50.00000		15	17	3
8141.939	6291.871	84.37312	210.0000		15	19	3
8319.623	6576.567	83.68117	421.0270		17	22	3
8392.008	6681.890	83.38615	491.1573		17	23	3
8410.933	6711.083	81.72770	510.1313		18	24	3
8427.479	6735.815	78.09875	527.3000		18	24	3
8483.291	6818.116	61.93721	595.9747		18	25	3
8495.850	6844.057	57.27216	621.4979		18	25	3
8500.510	6853.125	54.80580	631.0336		19	25	3
8504.854	6859.563	44.34175	640.2258		19	25	3
8506.274	6861.596	40.40097	643.3413		19	25	3
8514.918	6867.787	29.81101	645.2111		19	25	2
8521.038	6876.430	18.99950	646.9378		19	25	1
8522.293	6896.624	16.12435	648.5115		19	25	1
8550.290	6947.541	14.57268	654.8065		19	26	1

REMOVED: PARTICLE TRAPPED AT WELL K= 1, I= 26, J= 19

PARTICLE NO. 2

X	Y	Z	TIME	J	I	K
8500.000	6000.000	85.00000	0.0000000		18	16	3
8507.868	6014.662	84.96167	10.00000		19	17	3

8539.563	6073.030	84.80815	50.00000	19	17	3
8666.070	6302.390	84.19124	210.0000	20	20	3
8744.500	6459.259	83.75035	321.3669	21	21	3
8791.669	6589.528	83.37437	409.9486	21	22	3
8794.197	6605.651	81.72372	420.2115	21	23	3
8794.246	6619.588	78.07375	429.4588	21	23	3
8794.420	6668.279	59.11613	466.4479	21	23	3
8794.511	6692.958	43.27155	488.8357	21	23	3
8795.418	6698.112	38.98784	493.0707	21	23	2
8797.145	6707.421	30.66215	495.6343	21	24	2
8799.209	6719.477	18.93606	499.2633	21	24	1
8804.357	6722.263	18.72056	502.6036	22	24	1
8810.394	6725.642	18.72008	506.5902	22	24	1
8833.368	6739.892	18.71813	522.5364	22	24	1
8907.613	6808.846	18.70969	586.3214	23	25	1
8983.901	6908.332	18.68203	690.8105	23	26	1
9122.883	7055.843	18.61537	883.0746	25	27	1
9481.963	7248.417	18.60116	1114.306	28	29	1
9730.018	7419.797	18.69631	1179.264	31	31	1

REMOVED: PARTICLE INSIDE DIVIDING STREAMLINE AT WELL K= 1, I= 31, J= 31

PARTICLE NO. 3

X	Y	Z	TIME	J	I	K
9000.000	6000.000	85.00000	0.0000000	23	16	3
9010.430	6013.935	84.94987	10.00000	24	17	3
9053.148	6068.380	84.74922	50.00000	24	17	3
9230.273	6262.391	83.96267	210.0000	26	19	3
9530.005	6483.781	82.71020	454.9164	29	21	3
9780.170	6616.082	81.11566	615.1615	31	23	3
10127.93	6814.599	70.98050	767.3215	35	25	3
10169.88	6891.159	68.49515	798.2032	35	25	3
10175.58	6903.732	66.63019	802.8101	35	26	3
10180.20	6915.508	62.98673	807.0181	35	26	3
10195.59	6965.552	46.42166	823.8505	35	26	3
10200.53	6986.695	38.90747	831.0528	36	26	2
10200.80	6987.112	38.90595	837.9136	36	26	2
10201.88	6988.788	38.89987	865.3568	36	26	2
10206.12	6995.660	38.87564	975.1296	36	26	2
10205.30	7024.991	38.76995	1414.221	36	27	2
10201.30	7083.309	38.58573	2210.731	36	27	2
10200.25	7100.000	38.53750	2425.938	36	27	2
10200.00	7104.122	38.52615	2477.461	35	28	2
10199.79	7200.000	30.93491	2479.145	35	28	2
10199.56	7300.000	27.02766	2480.614	35	29	2

REMOVED: PARTICLE TRAPPED AT WELL K= 2, I= 29, J= 35

PARTICLE NO. 4

X	Y	Z	TIME	J	I	K
9500.000	6000.000	85.00000	0.0000000	28	16	3
9523.705	5997.244	84.91380	10.00000	29	16	3

REMOVED: PARTICLE INSIDE DIVIDING STREAMLINE AT WELL K= 3, I= 16, J= 29

PARTICLE NO. 5

X	Y	Z	TIME	J	I	K
10000.00	6000.000	85.00000	0.0000000	33	16	3
10011.39	6018.484	84.91640	10.00000	34	17	3
10045.77	6072.799	84.66977	39.53096	34	17	3
10215.91	6296.142	83.66337	157.6548	36	19	3
10464.24	6576.709	82.41492	281.7821	38	22	3
10839.60	6969.273	65.53403	432.6095	42	26	3
11035.13	7049.218	59.62215	487.5062	43	27	3
11116.33	7063.324	57.34999	504.9279	44	27	3

REMOVED: PARTICLE ENTERS DRAIN K= 3, I= 27, J= 44

PARTICLE NO. 6

X	Y	Z	TIME	J	I	K
8000.000	6500.000	85.00000	0.0000000	14	21	3

8007.342	6512.297	84.96717	10.00000	15	22	3
8032.612	6553.167	84.85515	43.66946	15	22	3
8148.699	6704.503	84.38937	178.3473	15	24	3
8243.718	6790.647	84.06620	260.5231	16	24	3
8263.817	6829.323	75.43755	299.6022	16	25	3
8279.316	6858.197	64.62143	335.3054	16	25	3
8296.081	6884.694	48.93481	375.6011	16	25	3
8301.117	6891.840	43.52012	388.0630	17	25	3
8306.739	6900.009	41.81254	401.6239	17	26	3
8317.898	6912.154	40.07012	423.0078	17	26	3
8369.162	6949.471	37.47387	431.4500	17	26	2
8392.707	6960.997	36.52528	434.3935	17	26	2
8421.174	6972.019	14.46156	438.6356	18	26	1
8443.360	6977.861	9.731875	442.6732	18	26	1
8524.944	6979.282	8.741150	450.3634	19	26	1

REMOVED: PARTICLE TRAPPED AT WELL K= 1, I= 26, J= 19

PARTICLE NO. 7

X	Y	Z	TIME	J	I	K
8500.000	6500.000	85.00000	0.0000000		18	21	3
8508.518	6515.782	84.95638	10.00000		19	22	3
8536.862	6572.472	84.80499	44.39349		19	22	3
8552.807	6607.403	84.31265	64.59864		19	23	3
8569.278	6642.511	78.15621	85.86049		19	23	3
8614.754	6753.684	54.42500	170.9079		20	24	3
8632.374	6798.929	43.66904	215.0939		20	24	3
8632.707	6802.797	41.50839	219.0960		20	25	3
8632.060	6805.984	39.32634	221.3896		20	25	2
8627.642	6820.326	30.75694	223.7853		20	25	2
8622.409	6847.439	13.10848	231.0734		20	25	1
8622.528	6883.147	8.367686	240.1084		20	25	1
8570.861	6954.134	8.741150	253.4220		19	26	1

REMOVED: PARTICLE TRAPPED AT WELL K= 1, I= 26, J= 19

PARTICLE NO. 8

X	Y	Z	TIME	J	I	K
9000.000	6500.000	85.00000	0.0000000		23	21	3
9006.757	6509.547	84.95541	10.00000		24	22	3
9027.559	6537.373	84.82035	40.25651		24	22	3
9117.053	6636.556	84.28314	161.2825		25	23	3
9299.944	6750.564	83.39204	361.8993		26	24	3
9481.768	6847.240	82.29757	599.5001		28	25	3
9595.602	6921.723	81.30359	801.8605		29	26	3
9812.820	7009.769	69.31725	1057.978		32	27	3
9983.692	7045.157	64.39651	1146.534		33	27	3
10078.06	7075.129	62.25531	1175.329		34	27	3
10106.82	7084.244	61.07685	1182.462		35	27	3
10115.44	7123.677	53.47104	1189.251		35	28	3
10112.47	7163.846	46.74550	1195.643		35	28	3
10110.77	7191.708	41.94376	1199.834		35	28	3
10113.33	7213.222	39.34977	1201.755		35	29	2

REMOVED: PARTICLE TRAPPED AT WELL K= 2, I= 29, J= 35

PARTICLE NO. 9

X	Y	Z	TIME	J	I	K
9500.000	6500.000	85.00000	0.0000000		28	21	3
9513.537	6508.122	84.94408	10.00000		29	22	3
9569.547	6539.757	84.72024	50.00000		29	22	3
9722.979	6616.943	83.68551	149.0298		31	23	3
9931.151	6707.917	77.29397	251.3762		33	24	3
10126.99	6815.087	72.24126	324.2710		35	25	3
10165.64	6884.812	69.86354	352.5678		35	25	3
10203.06	6995.587	37.11309	403.0283		36	26	2
10205.21	6999.177	37.10606	458.7256		36	26	2
10204.81	7013.954	37.08197	681.5148		36	27	2
10202.49	7046.107	37.03407	1142.506		36	27	2
10200.00	7082.224	36.98298	1643.258		35	27	2

10200.00	7100.000	35.00722	1643.610	35	27	2
10199.99	7200.000	26.20786	1645.381	35	28	2
10199.80	7300.000	23.99097	1646.851	35	29	2

REMOVED: PARTICLE TRAPPED AT WELL K= 2, I= 29, J= 35

PARTICLE NO. 10

X	Y	Z	TIME	J	I	K
10000.00	6500.000	85.00000	0.0000000	33	21	3
10021.10	6515.654	84.91393	10.00000	34	22	3
10077.29	6556.077	84.68971	35.90867	34	22	3
10355.96	6784.371	76.63324	139.5434	37	24	3
10470.51	7169.730	64.65644	245.2406	38	28	3
10398.29	7324.533	58.50830	305.5949	37	30	3
10205.43	7361.137	44.93795	385.6068	36	30	3
10198.22	7360.126	44.67575	387.6251	35	30	3
10190.38	7353.802	40.68640	389.9405	35	30	3
10190.08	7278.965	24.77971	394.9108	35	29	2

REMOVED: PARTICLE TRAPPED AT WELL K= 2, I= 29, J= 35

PARTICLE NO. 11

X	Y	Z	TIME	J	I	K
8000.000	7000.000	85.00000	0.0000000	14	26	3
8001.617	7004.048	84.90344	10.00000	15	27	3
8005.266	7013.117	84.65874	34.23626	15	27	3
8020.478	7047.818	83.67717	131.1813	15	27	3
8067.128	7156.591	82.21376	479.9444	15	28	3
8086.759	7206.545	82.92301	654.2997	15	29	3
8099.569	7258.909	89.73435	821.1461	15	29	3
8110.378	7309.183	93.66573	958.7180	15	30	3
8110.082	7362.818	92.68230	1106.219	15	30	3
8048.393	7537.412	88.79385	1696.221	15	32	3
7790.878	7721.220	83.58649	2440.196	13	34	3
7540.286	7805.608	81.40714	2676.576	12	35	3
7511.375	8199.378	77.39183	2897.310	12	37	3
7504.806	8601.809	70.09895	3214.332	12	40	3

REMOVED: PARTICLE ENTERS RIVER K= 3, I= 40, J= 12

PARTICLE NO. 12

X	Y	Z	TIME	J	I	K
8500.000	7000.000	85.00000	0.0000000	18	26	3
8498.691	6997.472	78.27409	10.00000	18	26	3
8496.437	6993.240	60.43375	29.65682	18	26	3
8495.302	6991.175	46.42592	41.03964	18	26	3
8494.911	6990.475	40.39860	45.24197	18	26	3
8495.567	6991.794	28.70108	47.03230	18	26	2
8497.268	6992.736	18.39881	48.26040	18	26	1
8511.858	6986.432	17.99630	49.39721	19	26	1

REMOVED: PARTICLE TRAPPED AT WELL K= 1, I= 26, J= 19

PARTICLE NO. 13

X	Y	Z	TIME	J	I	K
9000.000	7000.000	85.00000	0.0000000	23	26	3
9001.694	7002.584	84.95420	10.00000	24	27	3
9008.625	7012.757	84.77160	50.00000	24	27	3
9038.661	7050.751	84.04856	210.0000	24	27	3
9207.153	7162.754	81.24684	850.0000	26	28	3
9316.588	7221.575	79.53554	1298.416	27	29	3
9334.272	7297.341	79.11789	1710.857	27	29	3
9423.165	7491.831	77.72437	2532.363	28	31	3
9692.404	7650.977	75.69657	3355.422	30	33	3
9830.026	7634.545	74.37052	3848.704	32	33	3
9890.158	7568.564	73.74928	4081.924	32	32	3
9906.005	7535.127	73.59266	4139.943	33	32	3
9912.017	7506.024	73.52103	4168.430	33	32	3
9913.369	7499.229	73.01117	4174.325	33	31	3
9917.523	7492.516	65.95930	4180.281	33	31	3
9925.443	7479.236	46.07510	4193.354	33	31	3

9926.896	7476.724	41.06055	4196.053	33	31	3
9894.217	7475.367	35.90554	4197.261	32	31	2
9835.456	7476.101	35.90282	4198.366	32	31	2
9716.286	7494.984	35.86710	4202.784	31	31	2

REMOVED: PARTICLE TRAPPED AT WELL K= 2, I= 31, J= 31

PARTICLE NO. 14

X	Y	Z	TIME	J	I	K
9500.000	7000.000	85.00000	0.0000000	28	26	3
9505.562	7002.970	84.94380	10.00000	29	27	3
9528.268	7014.697	84.71777	50.00000	29	27	3
9603.146	7049.147	83.50603	173.8160	30	27	3
9694.058	7080.408	76.79704	297.7189	30	27	3
9888.460	7081.733	67.47194	477.8746	32	27	3
10030.10	7095.097	63.96824	534.3073	34	27	3
10055.69	7101.134	63.03094	542.3260	34	28	3
10056.82	7107.402	57.52637	551.1678	34	28	3
10058.71	7117.727	46.27153	566.8908	34	28	3
10059.42	7121.553	41.21779	573.1343	34	28	3
10058.49	7123.632	39.25043	575.0248	34	28	2
10045.10	7144.117	33.62426	577.0539	34	28	2
10040.00	7274.780	27.26259	584.7448	34	29	2
10098.22	7295.025	26.76389	589.5248	34	29	2
10161.12	7267.237	23.59520	593.3943	35	29	2

REMOVED: PARTICLE TRAPPED AT WELL K= 2, I= 29, J= 35

PARTICLE NO. 15

X	Y	Z	TIME	J	I	K
10000.00	7000.000	85.00000	0.0000000	33	26	3
10030.41	7015.096	83.60046	10.00000	34	27	3
10093.36	7038.979	81.24505	27.13463	34	27	3
10124.01	7132.881	65.76475	45.77458	35	28	3
10111.93	7228.862	52.55733	61.53370	35	29	3

REMOVED: PARTICLE INSIDE DIVIDING STREAMLINE AT WELL K= 3, I= 29, J= 35

PARTICLE NO. 16

X	Y	Z	TIME	J	I	K
10500.00	7000.000	85.00000	0.0000000	38	26	3
10506.78	7031.494	83.20611	10.00000	39	27	3
10521.46	7096.133	79.58568	31.37097	39	27	3
10524.21	7265.746	69.96109	94.12635	39	29	3
10519.87	7304.041	67.44549	110.3211	39	30	3
10515.59	7341.778	60.06562	127.6801	39	30	3
10507.24	7398.708	46.82940	157.8778	39	30	3
10502.61	7443.202	44.45344	184.1352	39	31	3
10497.91	7481.583	43.24003	208.9667	38	31	3
10496.44	7530.489	41.70442	245.6640	38	32	3
10501.25	7595.313	40.27557	290.5319	39	32	3
10512.96	7640.771	41.58474	315.9758	39	33	3
10530.66	7707.145	43.03146	349.0383	39	34	3

REMOVED: PARTICLE ENTERS RIVER K= 3, I= 34, J= 39

PARTICLE NO. 17

X	Y	Z	TIME	J	I	K
8000.000	7500.000	85.00000	0.0000000	14	31	3
7997.768	7504.117	84.93030	10.00000	14	32	3
7989.652	7518.076	84.68900	44.62089	14	32	3
7953.954	7569.623	83.73667	183.1044	14	32	3
7619.175	7750.427	79.59044	737.0386	13	34	3
7512.806	8221.785	75.06076	1022.933	12	38	3
7507.689	8582.264	69.18417	1288.665	12	39	3

REMOVED: PARTICLE ENTERS RIVER K= 3, I= 39, J= 12

PARTICLE NO. 18

X	Y	Z	TIME	J	I	K
8500.000	7500.000	85.00000	0.0000000	18	31	3
8500.674	7501.158	84.95052	10.00000	19	32	3

8503.356	7505.734	84.75378	50.00000	19	32	3
8514.385	7523.740	83.97507	210.0000	19	32	3
8563.634	7591.167	80.98778	850.0000	19	32	3
8807.511	7761.636	73.53108	2741.828	22	34	3
8942.038	7853.659	69.81596	3585.025	23	35	3
9039.407	7929.175	63.21740	4499.613	24	36	3
9175.771	7969.098	59.88143	5393.723	25	36	3
9294.543	8141.360	59.17743	6152.646	26	37	3
9362.932	8253.188	55.71659	6629.397	27	38	3

REMOVED: PARTICLE ENTERS RIVER K= 3, I= 38, J= 27

PARTICLE NO. 19

X	Y	Z	TIME	J	I	K
9000.000	7500.000	85.00000	0.0000000	23	31	3
9001.791	7500.389	84.91882	10.00000	24	32	3
9006.931	7501.144	84.68337	38.06603	24	32	3
9027.855	7504.148	83.75337	150.3302	24	32	3
9117.711	7516.813	80.42861	599.3867	25	32	3
9239.211	7599.623	79.55118	1136.293	26	32	3
9358.232	7733.748	78.56792	1637.572	27	34	3
9536.121	7908.681	76.82750	2435.479	29	36	3
9679.304	8170.395	74.52273	3475.921	30	37	3
9687.734	8350.765	59.32835	4429.545	30	38	3

REMOVED: PARTICLE ENTERS RIVER K= 3, I= 38, J= 30

PARTICLE NO. 20

X	Y	Z	TIME	J	I	K
9500.000	7500.000	85.00000	0.0000000	28	31	3
9503.922	7501.407	84.96999	10.00000	29	32	3
9514.319	7504.378	84.89495	34.70629	29	32	3
9555.178	7516.508	84.59557	133.5315	29	32	3
9717.441	7555.171	83.29438	528.8322	31	32	3
9878.844	7492.373	82.10704	869.5551	32	31	3
9894.742	7484.063	82.03930	888.6482	32	31	3
9901.653	7480.728	81.50730	896.2183	33	31	3
9908.162	7473.706	74.14250	903.8347	33	31	3
9918.304	7462.296	56.27672	917.7560	33	31	3
9922.879	7456.924	43.85169	925.1304	33	31	3
9923.986	7455.600	40.22244	927.0428	33	31	3
9821.106	7455.125	34.98986	929.1772	32	31	2
9739.205	7479.261	34.97525	931.2842	31	31	2

REMOVED: PARTICLE TRAPPED AT WELL K= 2, I= 31, J= 31

PARTICLE NO. 21

X	Y	Z	TIME	J	I	K
10000.00	7500.000	85.00000	0.0000000	33	31	3
9994.747	7488.893	76.04914	10.00000	33	31	3
9985.843	7468.892	47.05922	31.35517	33	31	3
9984.678	7466.139	40.82442	34.72973	33	31	3
9925.044	7461.807	30.17105	36.68013	33	31	2
9816.769	7462.177	28.36790	38.75145	32	31	2
9735.897	7483.023	28.36838	40.95646	31	31	2

REMOVED: PARTICLE TRAPPED AT WELL K= 2, I= 31, J= 31

PARTICLE NO. 22

X	Y	Z	TIME	J	I	K
10500.00	7500.000	85.00000	0.0000000	38	31	3
10500.93	7515.651	82.68032	10.00000	39	32	3
10503.38	7548.287	78.45049	29.70138	39	32	3
10530.92	7691.571	66.88340	108.5069	39	33	3
10576.07	7803.102	57.74831	186.4209	39	35	3

REMOVED: PARTICLE ENTERS RIVER K= 3, I= 35, J= 39

PARTICLE NO. 23

X	Y	Z	TIME	J	I	K
9750.000	7750.000	85.00000	0.0000000	31	34	3
9751.854	7750.284	84.97038	10.00000	31	34	3

9759.160	7751.438	84.85207	50.00000	31	34	3
9786.676	7756.370	84.38145	210.0000	31	34	3
9864.779	7715.940	82.56081	850.0000	32	34	3
9897.356	7679.646	81.69040	1151.912	32	33	3
9914.166	7622.675	81.16036	1343.158	33	33	3
9926.034	7556.506	80.79789	1469.183	33	32	3
9929.636	7513.981	80.65932	1515.838	33	32	3
9930.395	7500.340	80.62323	1528.010	33	32	3
9934.142	7490.250	72.30520	1537.020	33	31	3
9937.403	7481.813	62.01868	1545.303	33	31	3
9941.761	7470.060	40.76183	1558.263	33	31	3
9799.628	7469.434	33.53228	1561.303	31	31	2

REMOVED: PARTICLE TRAPPED AT WELL K= 2, I= 31, J= 31

PARTICLE NO. 24

X	Y	Z	TIME	J	I	K
10250.00	7750.000	85.00000	0.0000000	36	34	3
10250.87	7753.160	82.58463	10.00000	36	34	3
10254.68	7766.455	74.15177	50.00000	36	34	3
10301.10	7844.136	54.01702	210.0000	37	35	3

REMOVED: PARTICLE ENTERS RIVER K= 3, I= 35, J= 37

PARTICLE NO. 25

X	Y	Z	TIME	J	I	K
10750.00	7750.000	85.00000	0.0000000	41	34	3

REMOVED: PARTICLE ENTERS RIVER K= 3, I= 34, J= 41

PARTICLE NO. 26

X	Y	Z	TIME	J	I	K
10750.00	7000.000	85.00000	0.0000000	41	26	3
10771.47	7022.530	83.10201	10.00000	41	27	3
10829.36	7072.015	78.67252	34.53300	42	27	3
10957.77	7134.805	70.68983	82.83965	43	28	3
11139.96	7172.266	63.30148	139.8529	44	28	3
11275.52	7101.374	61.24164	185.9286	44	28	3
11285.87	7078.373	54.91629	198.4401	44	27	3

REMOVED: PARTICLE ENTERS DRAIN K= 3, I= 27, J= 44

> >ALL PARTICLES HAVE ALREADY BEEN REMOVED

APPENDIX B

RESPONSES TO USEPA AND MPCA COMMENTS ON 90-DAY DETERMINATION DOCUMENT

RESPONSES TO COMMENTS ON DOCUMENT TITLED "DETERMINATION OF GROUNDWATER CONTAINMENT SYSTEM EFFECTIVENESS FOR THE NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT, FRIDLEY, MINNESOTA, REVISION 0, DECEMBER 1992."

Comments Provided by Gary Pulford,
Manager, Site Response Section, Groundwater
and Solid Waste Division, MPCA,
Dated January 20, 1993

Comment No.	Reference	Comment	Response
1	--	Due to various mechanical and electrical problems, since the startup, the system has not been stabilized for a sufficient time to collect the data required to fully determine the effectiveness of capture of the plume. The 21 days of continuous operation used for the evaluation is not sufficient time for the groundwater flow regime in the site area to reach equilibrium from the pumping that has occurred.	Comment noted. Model is now calibrated to December 1993 data.
2	--	The report states that the MODFLOW groundwater model that is being used to evaluate capture has not been successfully calibrated to accurately replicate the pre-pumping conditions or the reaction of the aquifers to pumping. The report does state, based on existing information collected, that plume capture has not been attained particularly in the area south of AT-3A. A number of downgradient monitoring wells have shown significant increases since the system began operation rather than show a decrease in contaminant concentrations. These wells include 22-S, 18-S, 8-D, 16-I, 16-D, and 15-I. Additionally, particle trace maps from the MODFLOW modeling results, shown in Figures B-10 through B-12, also indicate that capture has not bee attained at the southern edge of the site at all vertical aquifer intervals.	Comment noted. Most of these issues are discussed in the 1993 Annual Report issued in May 1994. Revised model runs presented in the June 1994 Workplan address the need for additional area of capture near the facility.

Comment No.	Reference	Comment	Response
3	--	MPCA staff feels that the document does not at present contain enough information to make an accurate determination of the system effectiveness; as the report was intended to do. There is however, enough preliminary data to indicate that capture has not been achieved over an areal as well as possibly the vertical extent of the plume.	Comment noted.
4	--	MPCA staff believes that due to the limited data that has been gathered, it is premature to make evaluations of upgradient sources.	Comment noted.

RESPONSES TO COMMENTS ON DOCUMENT TITLED "DETERMINATION OF GROUNDWATER CONTAINMENT SYSTEM EFFECTIVENESS FOR THE NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT, FRIDLEY, MINNESOTA, REVISION 0, DECEMBER 1992."

Comments Provided by Thomas Bloom,
Remedial Project Manager, USEPA-Region 5,
Dated January 20, 1993

Comment No.	Reference	Comment	Response
1	Page 11, Para. 2, Sentence 2	Were water level measurements collected at the river? See Comment 9.	Water levels of the river elevation were measured within key time frames to allow proper calibration of the model.
2	Page 22, Para. 1	This paragraph addresses the computer groundwater model, then actual sampling results, then makes statements probably associated with the model. It is hard to follow. For clarity, separate computer modeling concepts from measured values.	Comment noted. Detailed descriptions of the model are included in the Workplan for upgrading the Groundwater Extraction System (Workplan), June 1994.
3	Page 22, Para. 1, Sentence 1	Capture of upgradient contamination is good but the highest concentrations are found cross-gradient on the south end or downgradient. Please include this information as a part of this general statement.	Comment incorporated in the June 1994 Workplan.
4	Page 22, Para. 1, Sentence 5	Capture zone does appear to extend west of East River Road; drawdowns in MW-18S are 1.26 to 1.30 feet. Trichloroethene (TCE) concentrations, which elevated at the onset of pumping, may indicate unidentified source(s) to the west.	The model does predict a slight capture zone west of East River Road, but most of the contaminant plume is not captured in this area under current conditions. At the present time there is not sufficient data to draw conclusions regarding another source of trichloroethene (TCE). It is possible that shifting groundwater flow lines can cause the types of variations observed. There is no consistent pattern of concentration and no specific evidence of other sources.

Comment No.	Reference	Comment	Response
5	Page 22, Para. 1, Sentence 6	If contaminant concentrations present in the lower sand layer are above remediation goals specified in the ROD, the extraction well system should be optimized to capture flow in the northwestern corner of the site.	The upgrade scenario is addressed in detail in the June 1994 Workplan.
6	Page 22, Para. 3, Sentence 3	Hydraulic tests would be needed to determine the maximum pumping capacity (gpm) of each individual extraction well; USEPA believed that during remedial design, hydraulic tests were performed to determine maximum pumping capacity of each individual extraction well. Please clarify.	The hydraulic evaluation required goes beyond the individual well tests. The elevation should include a system assessment of the recovery well, conveyance system, and treatment plumbing configurations. The volume of water pumped will affect the capture efficiency and does require a more timely and thorough review.
7	Page 23, Para. 2, Sentence 4	On page 22, paragraph 1, sentence 4, it is stated that significant concentrations of VOCs are still present in groundwater up to approximately 1,000 feet south of AT-3A. This sentence states that preliminary results indicate that the capture zone for the modified extraction well system would extend to a point about 800 feet south of AT-3A. This modification appears to be 200 feet short of capturing the southern edge of the plume.	The extraction well modification described in December 1992 was not final. The system upgrade is now modified to provide more complete capture of the contaminated plume. These modifications are described in the June 1994 Workplan.
8	Page 23, Para. 4, Sentence 1	Reword to allow exceptions, particularly the river datum.	Comment noted. Collection of river level elevations will be collected each time groundwater elevations are measured in the upcoming monitoring period.
9	Page 24, Bullet 1	The RAMP states river levels will be collected the first sixty days of Phase I (page 4-5, third paragraph). Were these readings collected?	River elevations were collected periodically since 1992.

Comment No.	Reference	Comment	Response
10	Page 23, Para. 4, Sentence 1	The monitoring well network does not appear to be adequate, because the plume is undefined on the southernmost edge of the west side. This is stated on page 29, paragraph four of the 90 day document. See additional recommendations concerning network in comment 19.	Subsequent data collected over time have allowed better definition of the plume boundary in the southernmost area, especially in the shallow drift sands. Additional reassessment of the adequacy of the upgraded system should be performed after the installation and start-up of the upgraded recovery well systems.
11	Page 27, Area 1	Concentrations of TCE in MW-1I are interpreted to indicate an upgradient source. This interpretation may be correct. However, this statement should be qualified; the possibility of free-phase DNAPLs moving upgradient should also be discussed. This is justified by USEPA publication "Estimating Potential for Occurrence of DNAPL at Superfund Sites," Table 5, Condition 4, (USEPA, Office of Solid Waste and Emergency Response, Publication: 0355.4-07FS, January 1992) and by the statement in the last paragraph on page 29 of the 90 day document that free-phase TCE may be present in the aquifer.	Comment noted.
12	Page 27, Area 2, Para. 1	Please include example values here.	Comment noted. Examples will be included as possible in future submittals.
13	Page 28, Para. 1, Last Sentence	Have any other factors been considered? Please specify.	Yes. Factors included selective biodegradation, isolated small sources, dynamic shifting plumes, and variable contact with unsaturated soils.
14	Page 28, Para. 2	The TCE concentrations in MW-22S appear to be highest when nearby extraction well AT-1A is not pumping. The argument that a hydraulic gradient from MW-22S to AT-1A is affecting these concentrations does not seem justified. Could the variations of TCE concentrations in MW-22S be associated with the "other factors" at MW-9S?	Many factors could explain the variability. However, a detailed evaluation is not expected at this time since the upgrade of the system is designed to capture the contaminant plume.

Comment No.	Reference	Comment	Response
15	Page 28, Para. 2, Sentence 3	It is our understanding that extraction well AT-1 is abandoned in place, not removed.	Comment noted.
16	Page 28, Para. 4, Sentence 2	Change the word "between" to "below."	Comment noted for future drafts.
17	Page 29, Para. 1	The AT-1A pumping rate of 100 gpm used here is different from the average pumping rate of 57 gpm, for the first three weeks, identified on page 13. Please reconcile these figures	This calculation was developed to project long-term performance, not actual operating conditions in the short period since startup.
18	Page 29, Para. 3	Can any interpretations be made from the TCE concentration data for MW-5S and MW-6D as is done for other wells? During the RMT groundwater modeling meeting, conducted February 26, 1992, the possibility a "hydraulic dam" in the vicinity of AT-2 was discussed. This possible phenomena may be a factor in the consistently low TCE concentrations in MW-5S. A restructuring of the monitoring network in this area may be appropriate. It is recommended that MW-5S be retained as the shallow well downgradient of the possible hydraulic dam; that MW-17S be eliminated as downgradient of the possible hydraulic dam, and redundant; and that MW-10S be substituted. MW-10S is upgradient of the possible hydraulic dam and has yielded samples with concentrations of TCE ranging from 640 ppb (1990) to 550 ppb (1991) and concentrations of 1,2-dichloroethene (total) from 3,800 ppb (1990) to 3,200 ppb (1991). Or, MW-10S could simply be added to the network to monitor the upgradient side of the possible hydraulic dam.	Revisions to the monitoring network have been addressed in the 1993 Annual Report, dated May 1994. Since monitoring is being performed at the Recovery Wells, it does not appear to be necessary to monitor at MW-10S, because it is upgradient of, and relatively close to, AT-2.

Comment No.	Reference	Comment	Response
19	Page 29, Last Para., Sentence 6	The statement that monitoring data indicates free-phase or residual TCE in the soil/aquifer matrix is significant and warrants further discussion. Can this statement be developed? Was the effective solubility calculated, or was this conclusion made because the concentration of TCE (a dense nonaqueous phase liquid or DNAPL) increases with depth?	The intent of this work was not to completely assess the presence of DNAPLs at this time. However, the presence of consistent TCE concentrations which approach 1% of the compound's water solubility in large volumes of groundwater suggest a large source of TCE which may be DNAPL. No additional interpretations can be made without additional monitoring data.
20	Page 30, Para. 2	See Comment 18.	See Response to Comment 18.
21	Page 30, Para. 4, Sentence 5 and Page 31, Sentence 3.4	This is not the only conclusion that can be drawn from these concentrations. It is also possible there is a source of TCE near the intermediate well.	Comment noted; however, the concentrations patterns appear more consistent with seasonal shifting of plume patterns over time as opposed to a localized source.
22	Page 31, Section 3.4	Sampling of the off gases from the stripping column should be mentioned in this document.	Monitoring of the pretreatment system air emissions is discussed in Subsection 6.1.4 of the June 1994 Workplan.
23	Page 32, Para. 2, Sentence 2	Is this extraction well system designed to effectively operate at the maximum capacity of the existing equipment?	Yes, design capacity exists; however, operational interferences may affect capture efficiencies.
24	Page 34, Section 4.3	When the extraction well system is upgraded, will the existing pretreatment facilities be capable of handling the increased flow and VOC concentrations. If not, when the proposed extraction well system improvements are presented to the USEPA and MPCA, an upgrade to the pretreatment system should be included with the proposal.	As discussed in Subsection 4.2 of the June 1994 Workplan, adequate design capacity exists and will be further evaluated as needed.

COMMENTS CONCERNING APPENDIX B			
Comment No.	Reference	Comment	Response
25	General Comment	The report is preliminary and does not include descriptions of model calibration or parameter sensitivities. Copies of input files (Modflow/ModelCad files or spreadsheet printouts of parameter arrays) would help the reviewer make a more rigorous inspection of the model output. An understanding of the distribution of the calibrated input values (such as those for hydraulic conductivity, transmissivity, recharge, specified heads, and leakance) would allow a more detailed review.	Comment noted. Complete model documentation is included in the June 1994 Workplan.
26	Page B-2, Middle Para.	The literature (e.g. Lindgren, 1990; Schoenberg, 1990) suggests that the basal portion of the St. Peter formation is a siltstone/shale confining bed. Is this hydrogeologic aspect included in the flow model? Has a siltstone been logged at site-specific monitoring wells or local private wells?	Siltstone, if present, would affect the hydraulic heads and has been addressed in the calibration model by adjusting the leakance factors. However, head data from wells in the underlying bedrock and overlying glacial drift indicates that the heads are generally very similar (e.g., at 2-PC and 5-PC) above and below the sandstone. This implies that the St. Peter formation does not contain a low permeability confining bed at this location. Siltstone has not been logged as a separate unit in the few monitoring points that extend through this unit.
27	Figure B-1	How was the modeling study area chosen? Explain why the east modeling boundary appears to coincide with the edge of the Minneapolis North USGS topographic map. State whether any hydrogeologic boundaries were available.	No obvious hydrogeologic boundaries exist in the area. Therefore, the model boundaries were extended more than 5,000 feet beyond the NIROP facility to minimize boundary effects.

Comment No.	Reference	Comment	Response
28	Table B-1	By what method was the vertical hydraulic conductivity of clay determined? The reference list on page B-30 contains only one 1988 RMT document, and it is not clear if this is the document which presents the vertical hydraulic conductivity of clay. What ranges of values were used for the minor units that comprise portions of some of the layers? For examples, what hydraulic conductivity, etc. values were used for the morainal eastern portion of Layer 1? The reference list at bottom of the table shows two RMT 1988 references; the reference section on page B-30 lists only one. USACE (1990) is not listed on page B-30.	Vertical hydraulic conductivity in the model is addressed in the leakance term which was adjusted during calibration to fit measured hydraulic heads. The initial vertical hydraulic conductivity values were based upon boring log descriptions, grain size analysis, and field-measured conductivity, when available. Other comments are noted. See the complete documentation in the June 1994 Workplan.
29	Page B-6, Fifth Line	Delete the work "and"?	Comment noted.
30	Page B-6, Second Para.	Unit 3 includes the lower sand and the St. Peter formation. Is a basal siltstone assumed for the St. Peter? If not, what evidence is there for the lithology of the St. Peter formation being a sandstone in the study area?	See Response to Comment 26.

Comment No.	Reference	Comment	Response
31	Page B-7	This description is inadequate for Layers 2, 3, and 4. How are cell-by-cell values for the changing elevation of the base of Layer 1 determined? Are the contents between deeper units assumed to be planer, or are the transmissivities of deeper layers affected by varying cell-by-cell contact elevations between Layers 2 and 3 and Layers 3 and 4? Is the Layer 1/Layer 2 contact elevation arbitrary beneath the eastern morainal upland? Is Layer 3 a till/clay beneath the eastern uplands? See general comment.	Refer to complete model description in the June 1994 Workplan.
32	Page B-9, First Para.	Second line: delete "s" in "corresponds." Are the hydraulic head values for western and eastern boundaries "constant" (each with the same head value), or are they "specified" head boundaries that impose a gradient on each edge? How were the values determined? See general comment.	a) Comment noted. b) Hydraulic head values are specified and constant over time, but they are not uniform spatially. These values were determined based upon measured hydraulic heads where available with consideration given to specific topography and stratigraphy.
33	Page B-9, Second Para.	Does this imply groundwater could flow from west of the Mississippi River to the extraction system?	This possibility was considered by setting model boundaries beyond the River.
34	Page B-10, First Para.	Has the vertical conductance (Vcont) value for each cell been carefully determined? The stratigraphic and lateral changes of the study area would result in complex arrays of Vcont values. (See discussion of concept beginning on p. 5-11 of McDonald and Harbaugh, 1988.) Again, how was the cell-by-cell basal elevation determined for each Layer 1 cell?	Refer to the complete model description in the June 1994 Workplan.

Comment No.	Reference	Comment	Response
35	Table B-2	Does Layer 3 contain basal siltstone of the St. Peter formation in some locations? The test does not explain how the storage coefficient, recharge, or leakance were determined. Please include this information. Estimates for the storage coefficient of the associated Anoka Sandplain sands presented by Norwitch and others (1974, p. 171) and by Helgesen and Lincholm (MDNR Technical Paper No. 6, December 1977) are higher than the Layer 1 value given here. The storage values appear to be order of magnitude approximations. How sensitive is the model to this parameter?	a) See Response to Comment 26. b) Refer to the complete model description in the June 1994 Workplan. c) Storage coefficient is no longer included because conditions are at steady state.
36	Page B-12, First Para.	The calibrated recharge values appear to be based on regional values in the literature. Helgesen and Lindholm (1977, p. 13) investigated recharge to the Anoka Sandplain, which is adjacent to and associated with the Mississippi valley train sands at NIROP. They determined a value of 11 inches per year for the sandplain. Could this value be assigned to appropriate Layer 1 cells? How sensitive is the model to recharge?	a) Refer to the complete model description in the June 1994 Workplan. b) The model is sensitive to recharge. c) The reference is now included in the June 1994 Workplan. d) At locations where runoff is directed into the storm sewer, the recharge is set to zero.
	Page B-12, First Para.	Walton (1970) is not referenced on page B-30. During a 2/26/92 meeting in Madison, RMT said that NIROP's roof and parking lots probably discharge precipitation to storm sewers. Has this been looked into? Is recharge to Layer 1 set equal to zero in cells beneath these areas? See general comment.	

Comment No.	Reference	Comment	Response
37	Page B-12, Second Para.	What aquifer(s) are pumped by Fridley #13 and the FMC recovery wells? These and the other Fridley wells that are mentioned should be located on a figure.	Fridley Well #13 pumps from the Prairie du Chien formation (model layer #4). For details regarding locations and geologic units of FMC and all other recovery wells, see Attachment 1 of the June 1994 Workplan.
38	Page B-14, Top Para.	Are the head data from August 13, 1992, that are used for calibration, typical head values for the aquifer? Do they represent "average" levels or are they affected by a dry period or precipitation event? Is lake level data available from MDNR for Sullivan and Moore Lakes? This data could indicate whether the lake levels indicated on the USGS topos are average.	a) Head values used are apparently representative of typical climatic conditions, and were not taken during a period of drought or heavy precipitation. b) The model is relatively insensitive to the small variability in lake levels, which are outside of the concentrated area of impacts.
39	Figures B-4 through B-7	How were the contours produced (what method/software)? Model results for Layer 1 heads show the 805- and 810-foot contours crossing the Mississippi just north of the facility and with a distance between contours of approximately 1,500 feet. These values are inconsistent with an earlier statement (page B-12, last paragraph) concerning river stage and gradient. On USGS	a) Contours are produced with SURFER™ software. b) River stage levels do not equate to hydraulic head in the aquifer. They are related through the conductance term for the River. Contoured head data from monitoring wells were used to help calibrate the model. In some places, the river levels closely approximate the measured head values; in other locations, they do not. Higher head values in the groundwater indicate groundwater discharge to the river, as is expected. c) Please refer to the complete model description in the June 1994 Workplan.

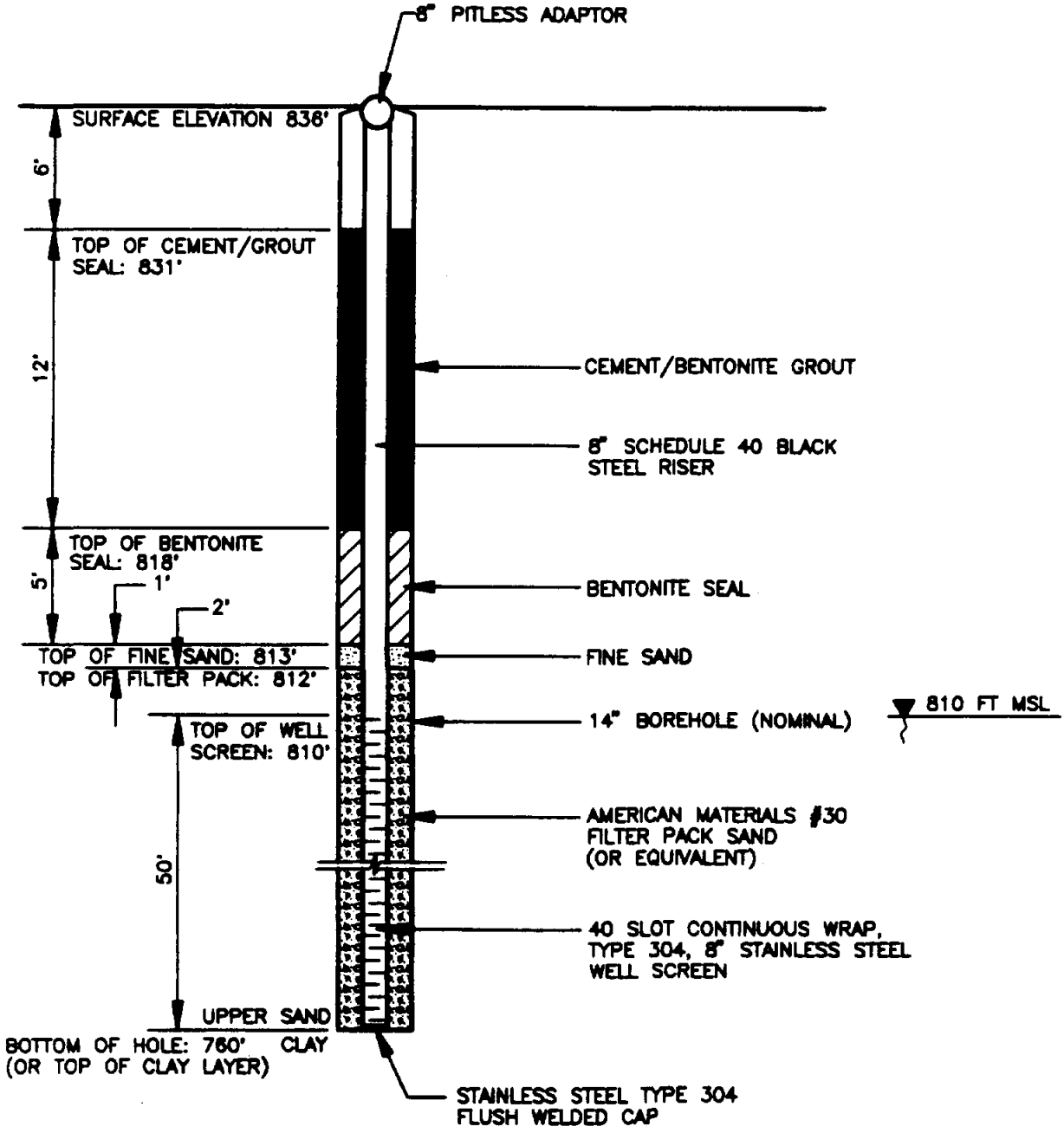
Comment No.	Reference	Comment	Response
39 (Continued)	Figures B-4 through B-7	topographic maps, the 800-foot contour is shown crossing the Mississippi within the study area on the USGS Minneapolis North quadrangle, but the 810-foot contour is shown about eight miles upstream, on the Coon Rapids quadrangle. The calibrated model does not come close to matching the river stage or gradient indicated by the topographic maps. Gaging station data may be available for the Mississippi to aid in validating the stage suggested by the topographic maps. The USGS 1:100,000 planimetric map of the Anoka area shows a gaging station by the Coon Rapids dam. No discussion has been presented regarding input parameters to MODFLOW's River package. A discussion of parameter calibration and sensitivity is needed.	
40	Figure B-6	Remove the elevation values on Sullivan and Moore Lakes.	Comment noted.
41	Page B-19, Top	How was the discharge value of 700 gpm determined? Will there be an investigation into whether a sewer or other "drain" is in this area? perhaps the flow pattern suggested by Figure 3-1 for this area results from the focusing of groundwater flow into the embayment on the river bank. (See, for example, Cherkauer and McKereghan, 1991, "Groundwater Discharge to Lakes: Focusing in Embayments": Groundwater, Vol. 29, No. 1, Page 72-80). The MODFLOW Drain cells should be identified in a figure. No drain input values are presented. No calibration or sensitivity analysis is demonstrated for the drain modeling.	a) The output was determined by the MODFLOW model summary of the area water budget. b) Attempts to model the area with high hydraulic conductivities did not adequately simulate site conductivities. This necessitated use of the drain feature in MODFLOW. At this time there are no plans to investigate specific drain features at the NIROP or United Defense facilities.

Comment No.	Reference	Comment	Response
42	Page B-20, First Para., Last Sentence	Change table number from 3.3 to 2.1.	Comment noted.
43	Figures B-8, B-9	The measured drawdowns in the two main cones of depression on each figure are not readable.	Comment noted.
44	Page B-23, Top Para.	Should the last sentence read "Figure B-4?"	Yes.
45	Page B-23 and Figures B-10 to B-12	The array of colored dots on the figures may not be the best way to indicate capture zones. Does PATH3D perform backward particle tracking? If so, then a better illustration of the capture zones could be produced by tracking particles backward from the well screens to indicate the predicted areal zone of capture. This would be useful for determining all theoretical zones of contribution to each well, both in the present 4-well case and in the case of an additional fifth extraction well. This sort of illustrative approach has been used in other preliminary RMT reports of the NIROP (e.g. Remedial Action Workplan [Sept. 1992], Feasibility Study Report [August 1988]). Can PATH3D label flowlines with time-of-travel indicators? (Another particle tracker, MODPATH, can.) Has a determination been made as to how long pumping must continue until steady-state conditions are reached? Is PATH3D useable only with a steady-state flow model?	a) Backward tracking was attempted but was not feasible since the particles transcend multiple layers, presenting graphical difficulties. The forward tracking of particles distributed across the site is considered the most effective approach to determining whether contaminants in those areas will be captured. b) Yes; however, these labeling features obscure the other information on the figures. Refer to the complete model description in the June 1994 Workplan, which will present the results for the time of travel evaluation. c) Monitoring at the site indicates that steady state conditions are reached relatively quickly (within 1 month). d) No. e) Comment noted. f) Comment noted.

Comment No.	Reference	Comment	Response
45 (Continued)	Page B-23 and Figures B-10 to B-12	It may be worth including some figures of particle traces through vertical cross sections. On each figure, delete the straight line near the west edge.	
46	Figure B-11	Did some particles begin within the clay of Layer 2? If so, it seems surprising that the particles would be calculated to flow out of the clay and into the extraction wells unless pumping were to continue for a very long time.	The particle tracking simulation is not limited by the time constraints evaluated. Refer to the June 1994 Workplan for complete model documentation.
47	Page B-29	If the south edge of the plume is undefined (as stated on page 29 of the main text), it is unknown whether the extraction wells would extract the leading edge of the plume. Without additional data, one or more hypothetical additional extractions wells cannot be properly located. The proposed location of the hypothetical additional well should be shown on a figure. In what layer is the concentration of 100 ppb TCE identified? (Would the additional well in Layer 3 be expected to extract TCE from Layer 1 or 2?) A figure of the results (preferably including backward particle tracking) would be helpful.	a) See Figure 2-1 of the June 1994 Workplan. b) See Figures 2-7, 2-8, and 2-9 from the June 1994 Workplan which show the distribution of TCE in various layers. There are now two new wells, shallow and deep, recommended, which would extract TCE from Layers 1, 2, and 3.
48	Page B-30	McDonald and Harbaugh are not cited in the text. Only one RMT 1988 reference is listed.	Comment noted.

APPENDIX C

CONSTRUCTION DETAILS FOR PROPOSED EXTRACTION WELLS



NOTE: THE ELEVATION OF THE SCREENED INTERVAL MAY CHANGE, BASED ON THE SUBSURFACE SOILS ENCOUNTERED IN THE FIELD. THE BOTTOM OF THE WELL WILL EXTEND DOWN TO THE TOP OF THE CLAY LAYER.

PROPOSED EXTRACTION WELL AT-5A CONSTRUCTION DETAIL

NOT TO SCALE

DWN. BY:	RBN
APPROVED BY:	
DATE:	JANUARY 1995
PROJ. #	3315.04
FILE #	33150422

FIGURE C-1

Drawing File = \3315_04\33150422
Plot File = \33150422.PRF
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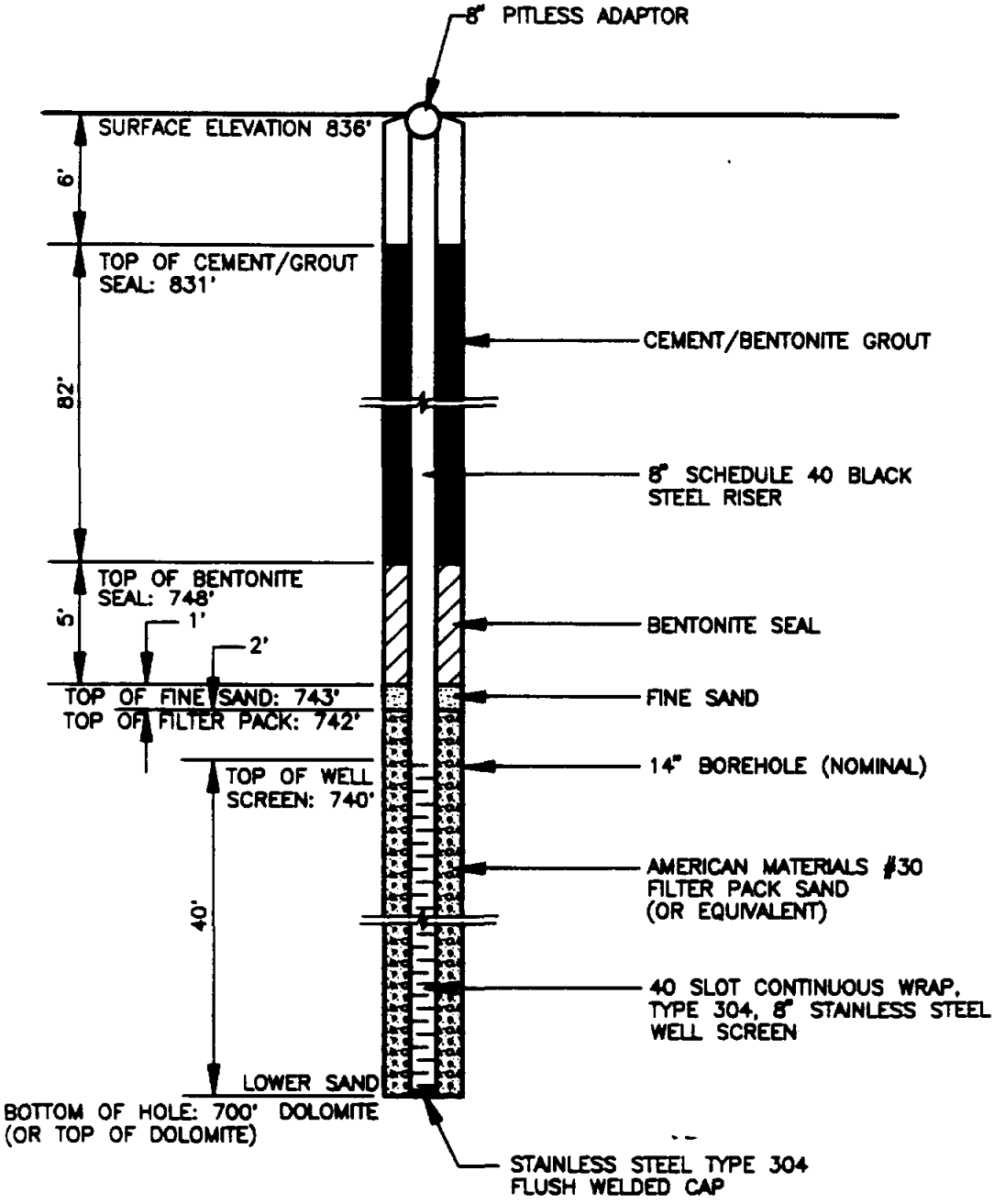

NOTE: THE ELEVATION OF THE SCREENED INTERVAL MAY CHANGE, BASED ON THE SUBSURFACE SOILS ENCOUNTERED IN THE FIELD. THE BOTTOM OF THE WELL WILL EXTEND DOWN TO THE TOP OF THE CLAY LAYER.

PROPOSED EXTRACTION WELL AT-5B CONSTRUCTION DETAIL

NOT TO SCALE

DWN. BY:	RBN
APPROVED BY:	TEG
DATE:	JANUARY 1995
PROJ. #	3315.04
FILE #	33150423

FIGURE C-2

Drawing File = \3315_04\33150423
Plot File = \33150423.PRF
Scale = 10=0000.000000

APPENDIX D

HEALTH AND SAFETY PLAN

HAZARD ASSESSMENT

This hazard assessment is provided to assist in preparing a site-specific Health and Safety Plan (SSHP) as required by OSHA Standard 1910.20 for the activities associated with on-site construction of the GWES and pretreatment system improvements.

The hazard assessment addresses known and potential hazards which may be associated with the work, but is not intended to be all-inclusive. The contractor performing the work must ensure that their SSHP developed for the work activities includes control measures for hazards present at the site and hazards arising as a results of the work activities.

Potential hazards for personnel working at the site include chemical and physical hazards.

Physical Hazards

For the anticipated activities, the greatest potential physical hazards are typical construction site slip, trip, and fall accidents.

Additional potential physical hazards include the following:

- Temperature extremes. Cold or heat stress may be a hazard depending on the time of year the work activities are performed.
- Heavy equipment operation.
- On-site traffic associated with the manufacturing operation.
- Noise
- Underground or overhead utilities, process lines, etc.
- Ballistics testing in Building 37. The U.S. Army Corps of Engineers (USACE) has provided information regarding ballistics tests which may be conducted by United Defense in Building 37 located near work zones in the "north 40" area. According to this information, United Defense conducts one to two ballistics tests per day, 3 to 5 days per week, for a maximum of 10 tests per week. According to the USACE, plant safety procedures established by United Defense require all personnel to evacuate the area to the north of Building 37, between the building and the northern security fence, whenever an audible alarm is sounded prior to each ballistics test. Only the area to the east of the paved access road near Building 37 must be evacuated; work can continue in the area to the west of this access road in the north 40 area. The time required for each test, from sounding of the alarm until work can resume, is

expected to be 15 minutes. According to the USACE, the area is evacuated before each test as a precaution due to the noise from the test, rather than due to danger from flying debris. Schedules for these ballistics tests should be checked with the United Defense Environmental Manager before work begins in this area.

Chemical Hazards

Detectable concentrations of metals, organic compounds, and PCBs have been measured in previous groundwater and soil samples. Trichloroethene (TCE) was found more frequently and at higher concentrations in groundwater than any other organic compound, and has been considered to be an indicator chemical.

Organic Compounds

The volatile organic compounds detected in previous groundwater and soil samples pose a potential health hazard through inhalation of gases or vapors. Organic compounds such as benzene may also be absorbed through the skin. Chloroform, tetrachloroethene, trichloroethene, and benzene have previously been detected and are known or suspected carcinogens.

Volatile organic compounds that have been detected include the following:

Compound	PEL[1] (ppm)	TLV®[2] (ppm)	Groundwater C_{max}[3] (ppm)	Soils C_{max} (mg/kg)
Benzene	1	10	0.022	<0.63[4]
Chloroform	2	10	0.0026	<0.63[4]
1,1-Dichloroethane	100	200	0.170	3.0[3]
1,2-Dichloroethene	200	200	3.80	62[3]
Ethylbenzene	100	100	0.037	10.6[4]
Methylene chloride	500*	50	6.0	7.0[3]
Tetrachloroethene	25	50	0.37	16.5[4]
1,1,1-Trichloroethane	350	350	0.75	14[3]
Trichloroethene	50	50	21.0	207[4]
Trichlorofluoromethane	1,000	1,000	0.0077	7.0[3]
Toluene	100	100	0.063	7.9[4]

1 OSHA Permissible Exposure Limit - 8-hour time-weighted average.
2 ACGIH Threshold Limit Value® - 8-hour time-weighted average.
3 Maximum concentration found during previous investigations performed by RMT.
4 Maximum concentration found during previous investigations performed by others.
* In process of rule making.

The primary potential routes of exposure for personnel performing work at the site would be inhalation of vapors and gases, skin contact with contaminated materials, and accidental ingestion from contact with contaminated materials.

Metals

The metals previously detected in groundwater and soil samples at the project site have varying degrees of toxicity based on chronic exposures.

Metals that have been detected in previous sampling rounds include the following:

Compound	PEL[1] (ppm)	TLV®[2] (ppm)	Groundwater C_{max}[3] (ppm)	Soils C_{max} (mg/kg)
Arsenic	0.5	0.2	0.008	0.0277[4]
Barium	0.5	0.5	0.256	0.300[4]
Cadmium	0.2	0.05	0.0092	0.0052[3]
Chromium[5]	0.5	0.05	0.057	0.130[4]
Copper[5]	0.1	0.2	0.084	14.0[4]
Lead	0.05	0.15	0.334	2.33[3]
Mercury[5]	0.1	0.01	0.0013	0.001[3]
Nickel[5]	0.1	0.1	0.107	0.110[4]
Silver	0.01	0.01	0.005	0.004[4]
Zinc[5]	5.0	5.0	9.250	1.6[3]

1 OSHA Permissible Exposure Limit - 8-hour time-weighted average.
2 ACGIH Threshold Limit Value® - 8-hour time-weighted average.
3 Maximum concentration of dissolved metals found during previous investigations performed by RMT.
4 Maximum concentration found during previous investigations performed by others.
5 PELs and/or TLV®s have multiple values. The most restrictive value is given.

The primary potential route of exposure would be through accidental ingestion from contact with contaminated liquids and soil and inhalation of airborne metal particulates.

Polychlorinated Biphenyls (PCBs)

Concentration levels of PCBS that have been detected at the site to date have been near the detection limits of the laboratory analytical method. There has been a lack of spatial or temporal patterns for the locations where PCBs have been detected.

The vapor pressure range of PCB compounds is reported by the National Institute for Occupational Safety and Health (NIOSH) as 0.0006 to 0.001 millimeters of mercury (mm Hg) depending on the specific PCB compound. Because of the low vapor pressure, it is unlikely that PCBs which may be present in the groundwater and soil will volatilize significantly.

The main routes of exposure are skin contact, accidental ingestion, and inhalation of airborne particulate matter contaminated with PCBs.