Hydrogeology and Chemistry Along the Southeast Lease Boundary, IBM Hangar (B953) Dutchess County Airport

Prepared for:

IBM Corporation
Poughkeepsie, New York

February, 1989

Prepared by:

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Milton Chazen Associates
Lawler, Matusky and Skelly Engineers

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1 INTRODUCTION

The purpose of this report is to present the results of an evaluation performed by Groundwater Sciences Corporation (GSC), Milton Chazen Associates (MCA) and Lawler, Matusky and Skelly Engineers (LMS), relative to increasing concentrations of 1,1-dichloroethane (DCA) and other volatile organic compounds (VOC's) detected in monitoring wells located in the southern portion of the hangar facility leased by IBM at the Dutchess County Airport. This report describes the geology, hydrogeology, and groundwater chemistry of this area based on previous investigations and data from 6 new soil borings completed in August, 1988.

1.1 Background Information

The IBM hangar facility at the Dutchess County Airport is located approximately 3.5 miles southeast of the IBM main plant site in the Town of Wappinger, New York (Figure 1). There have been several periods of investigation at this facility, which are summarized in the following paragraphs.

As part of IBM's corporate-wide groundwater investigation program, nine borings were drilled at this site in 1981 and 1982. The locations of these and all other borings drilled on this site to date are shown in Figure 2. Groundwater quality data from these first monitoring wells showed sporadic low concentrations of VOC's. However, the study concluded that there was no significant threat to human health or the environment at this site because there was no temporal or spatial pattern to the occurrence of these VOC's, and therefore, no definable movement of these chemicals.

In February, 1986, IBM detected persistent low levels of VOC's in the site's water supply well (Figure 2) and an investigation was immediately started. The study included the construction of 21 additional monitoring wells on-site (A-10 through A-30). Analytical results of groundwater

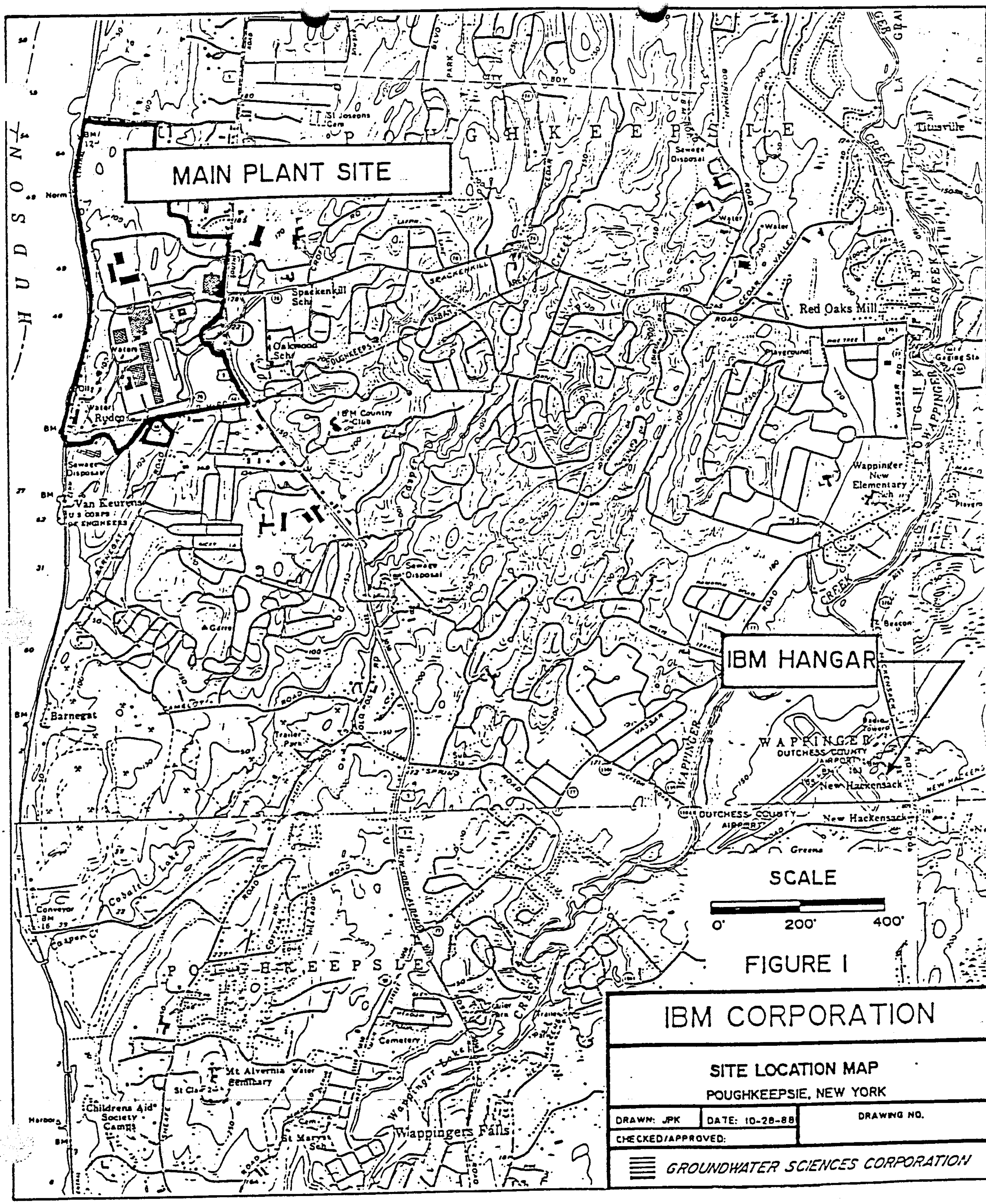

FIGURE I

IBM CORPORATION

SITE LOCATION MAP

POUGHKEEPSIE, NEW YORK

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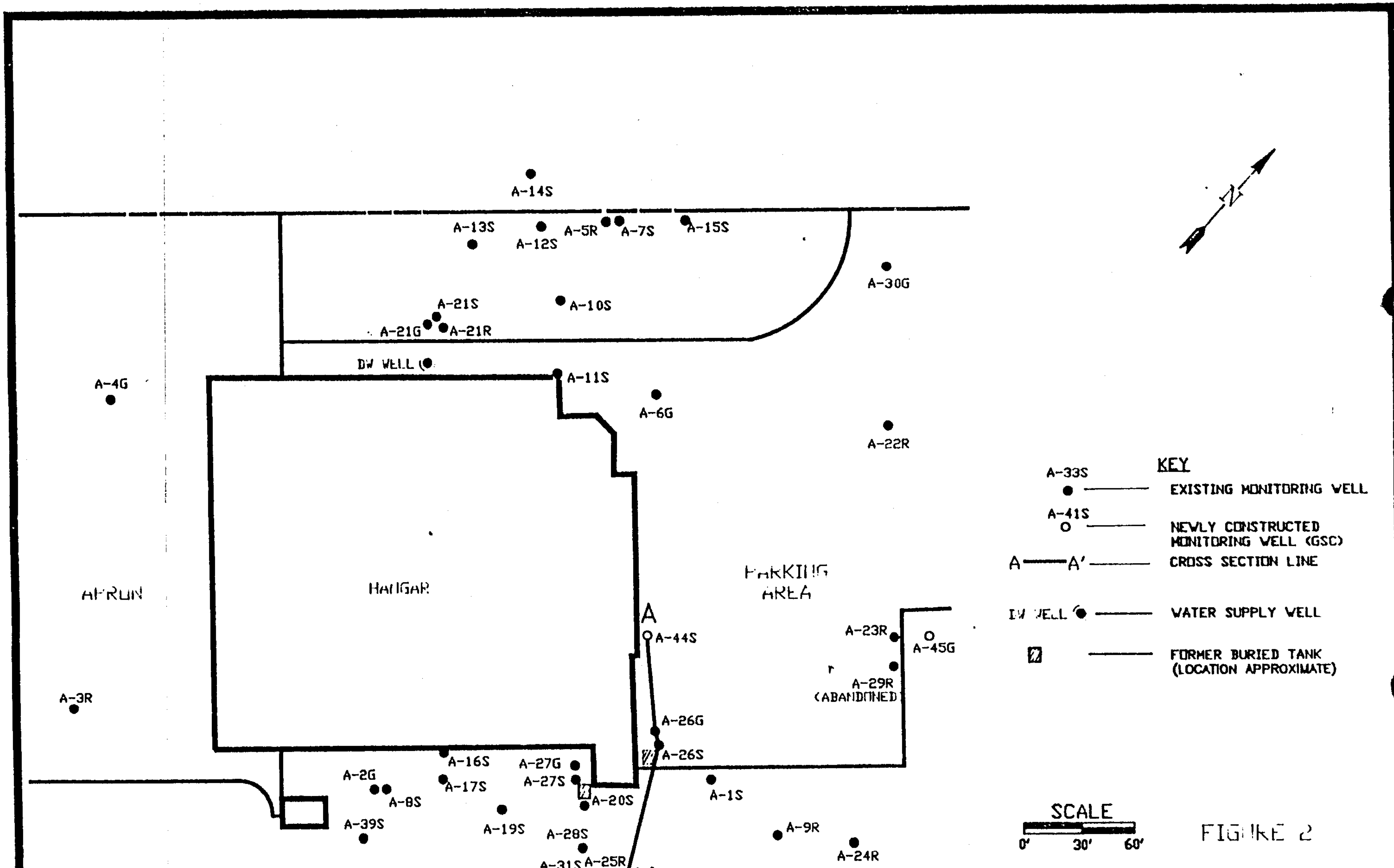

FIGURE 2

IBM CORPORATION

IBM LEASE PROPERTY
DUTCHESS COUNTY AIRPORT
MONITORING WELL & CROSS SECTION
LOCATION MAP

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samples recovered from these wells indicated that somewhat elevated concentrations of VOC's were present in the shallow sand water-bearing zone. The source of these VOC's on the north side of the hangar was believed to be a septic leach field, through which chemicals used during routine cleaning may have been discharged to the shallow sand. A second septic system, located south of the hanger, was also investigated. Monitoring wells constructed in the vicinity of this septic tank and the associated leach field did not indicate the presence of these same elevated concentrations, although occasional low concentrations of some VOC's were detected.

Monitoring wells were also constructed in the vicinity of two buried dilute chemical waste storage tanks, which were previously located at the southeast corner of the hangar (Figure 2) and had been removed. The results of groundwater analyses indicated the presence of elevated VOC concentrations in one of these wells (A-20S), which monitors the shallow sand unit. Based on the vertical head distribution, it was determined that VOC's in this shallow sand unit could move downward into the bedrock unit in which the site's water supply well is constructed.

Actions taken as a result of this investigation included removing and properly disposing of the contents of both septic tanks, modifying chemical use practices inside the hangar, and providing bottled water for potable use inside the facility. Additionally, 13 monitoring wells were chosen for quarterly monitoring to ensure that VOC's dissolved in groundwater do not leave the site undetected. The site's water supply well was placed on a monthly monitoring schedule to confirm that concentrations of VOC's are not increasing.

Subsequently, in 1987, an investigation was performed along the southern property line, after oil and grease were detected in groundwater sampled from monitoring wells nearby. Additional monitoring wells installed at that time (A-31 to A-39) revealed that fuel oil was moving onto the site along the southern property line. Toluene (TOL), benzene (BEN), xylene (XYL), ethylbenzene (EBZ), DCA, TCA, and tetrachloroethylene (PCE) were also detected at low concentrations in the groundwater during this third investigation. This study concluded that the adjacent property to the south was the source of the fuel oil and perhaps the VOC's as well.

In 1987 and 1988, a trend of increasing concentrations of DCA was noted in several monitoring wells near the southeast corner of the hangar facility. (A-20S, A-26S, and A-28S; Figures 3 to 5). Based on the pattern of these increases, it did not appear that the source of these VOC's could be from any known activity on IBM's lease property.

1.2 Purpose and Organization of this Report

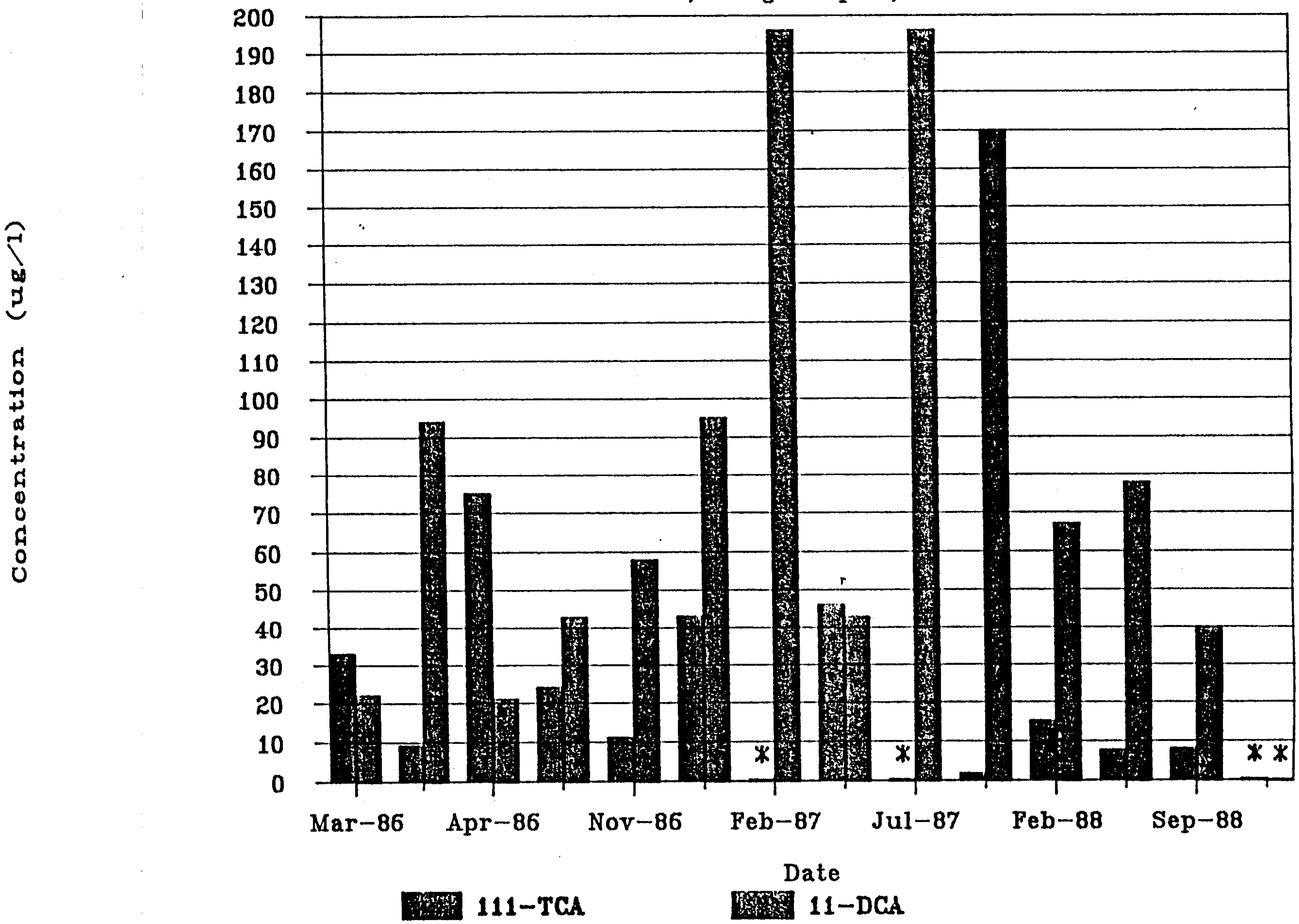
The purpose of this report is to present the results of a subsurface investigation performed in August and September, 1988 at IBM's hangar facility, to determine the possible source of these increasing VOC concentrations. The remainder of this report is organized into three sections: Site Investigation, Impact Assessment, and Conclusions.

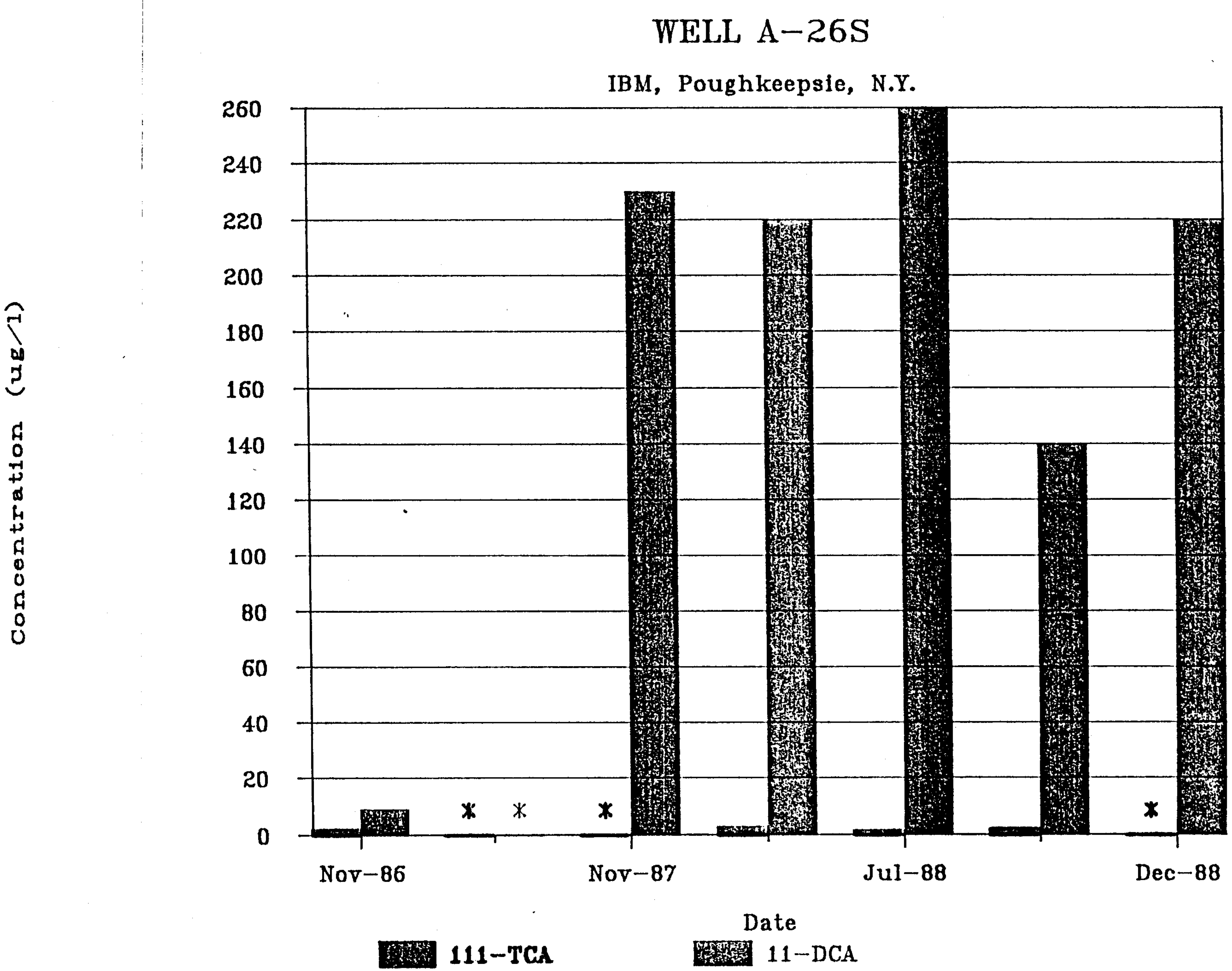
2 SITE INVESTIGATION

In order to evaluate the transport, fate, and potential impact of the VOC's detected in groundwater, a drilling and sampling program was initiated on August 22, 1988, using the protocols contained in Appendices A and B. Four shallow monitoring wells were drilled upgradient from A-28S (A-40 to A-43) along the southern property line (Figure 2). These additional monitoring wells were deemed necessary because wells previously installed in this area were designed to detect fuel oil and did not fully penetrate the shallowest water-bearing unit. A fifth shallow monitoring well (A-44S) was

WELL A-20S

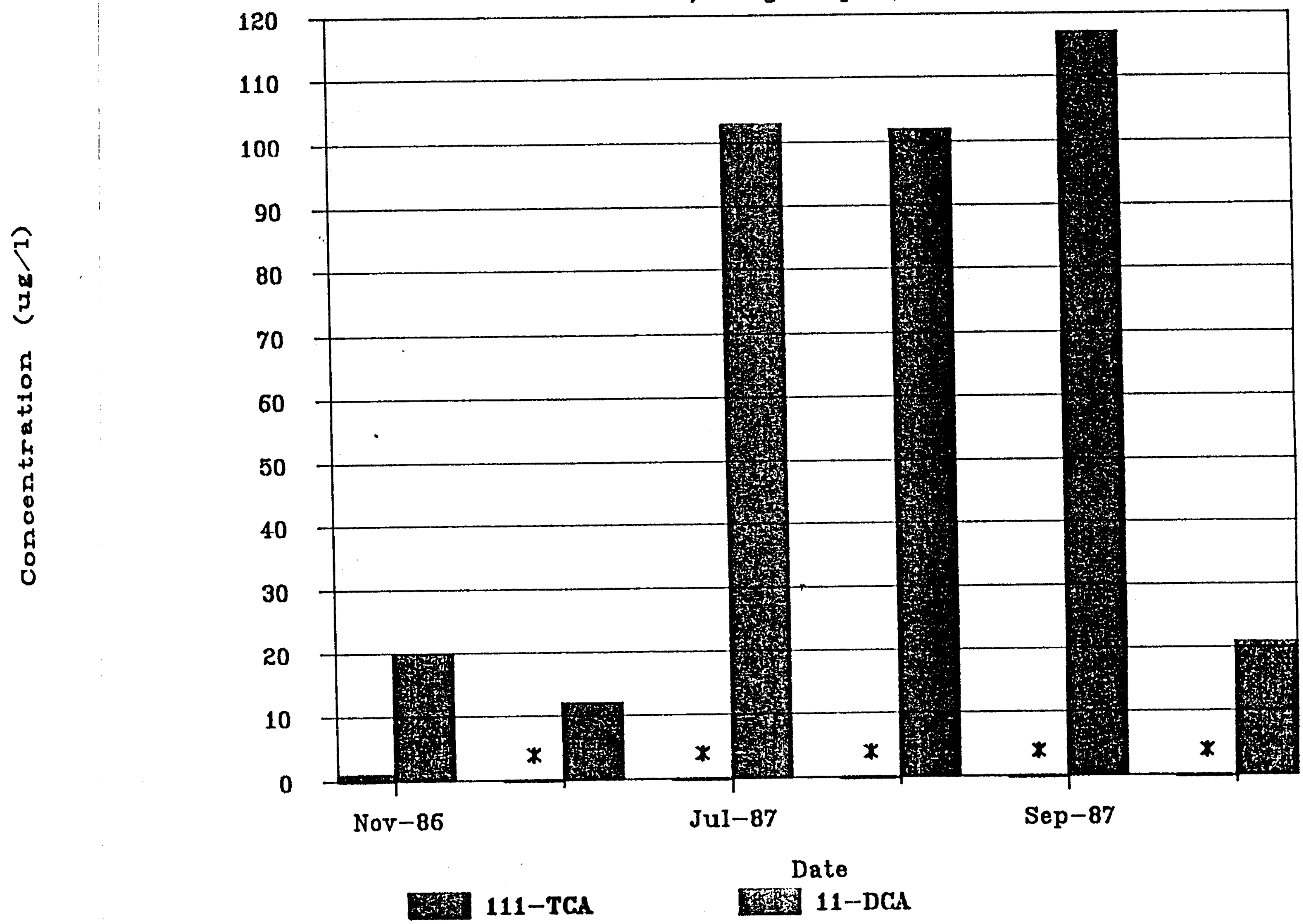
IBM, Poughkeepsie, N.Y.




WELL A-26S
IBM, Poughkeepsie, N.Y.
260
240
220
200
180
160
140
120
100
80
60
40
20
0
Concentration (ug/l)
Nov-86
Nov-87
Jul-88
Dec-88
Date
111-TCA
11-DCA

WELL A-28S

IBM, Poughkeepsie, N.Y.



drilled adjacent to the east side of the hangar to determine groundwater quality downgradient from A-26S. A sixth monitoring well (A-45G), which penetrates a deeper sand and gravel unit, was drilled along the eastern perimeter of the site. The purpose of this well was to install a gravel monitoring well at a location where a previous attempt had failed, and was therefore unrelated to the investigation of increasing VOC concentrations. The locations of all the monitoring wells completed during this and previous investigations are shown on Figure 2. The logs of borings drilled during this investigation are located in Appendix A.

These additional monitoring wells, together with selected existing monitoring wells, were used as sampling points to further characterize the groundwater chemistry in this area. These sampling data provide the basis for the current evaluation of the southern portion of the site. Monitoring well development and sampling procedures used during this investigation are presented in Appendix B.

2.1 Geology

Previous drilling programs at this IBM facility encountered four unconsolidated units overlying argillaceous bedrock of the middle Ordovician Normanskill Formation. Two of these units are shown on cross section A-A', and four are shown on cross section B-B' (Figures 6 and 7, respectively; refer to Figure 2 for cross section locations). They include, from the surface down, a combined sand and sandy silt unit, a combined clay and clayey silt unit, a sand and gravel unit, and a glacial till unit.

Of these four unconsolidated units, the surficial unit comprised of sand and sandy silt layers is the focus of the current investigation. It consists of a 10 to 15 foot thick brown, fine to medium grained

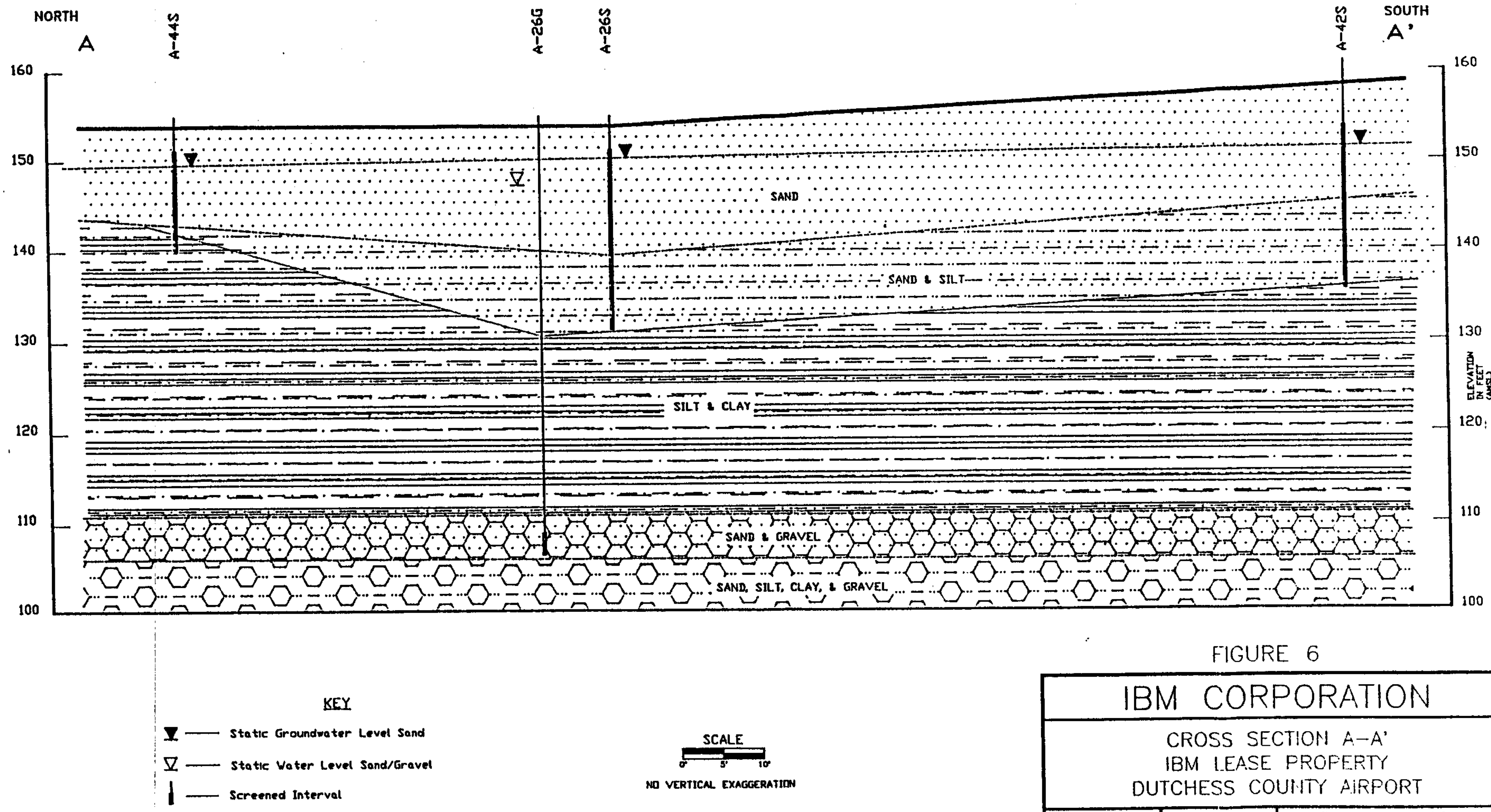


FIGURE 6

IBM CORPORATION

CROSS SECTION A-A'
IBM LEASE PROPERTY
DUTCHESS COUNTY AIRPORT

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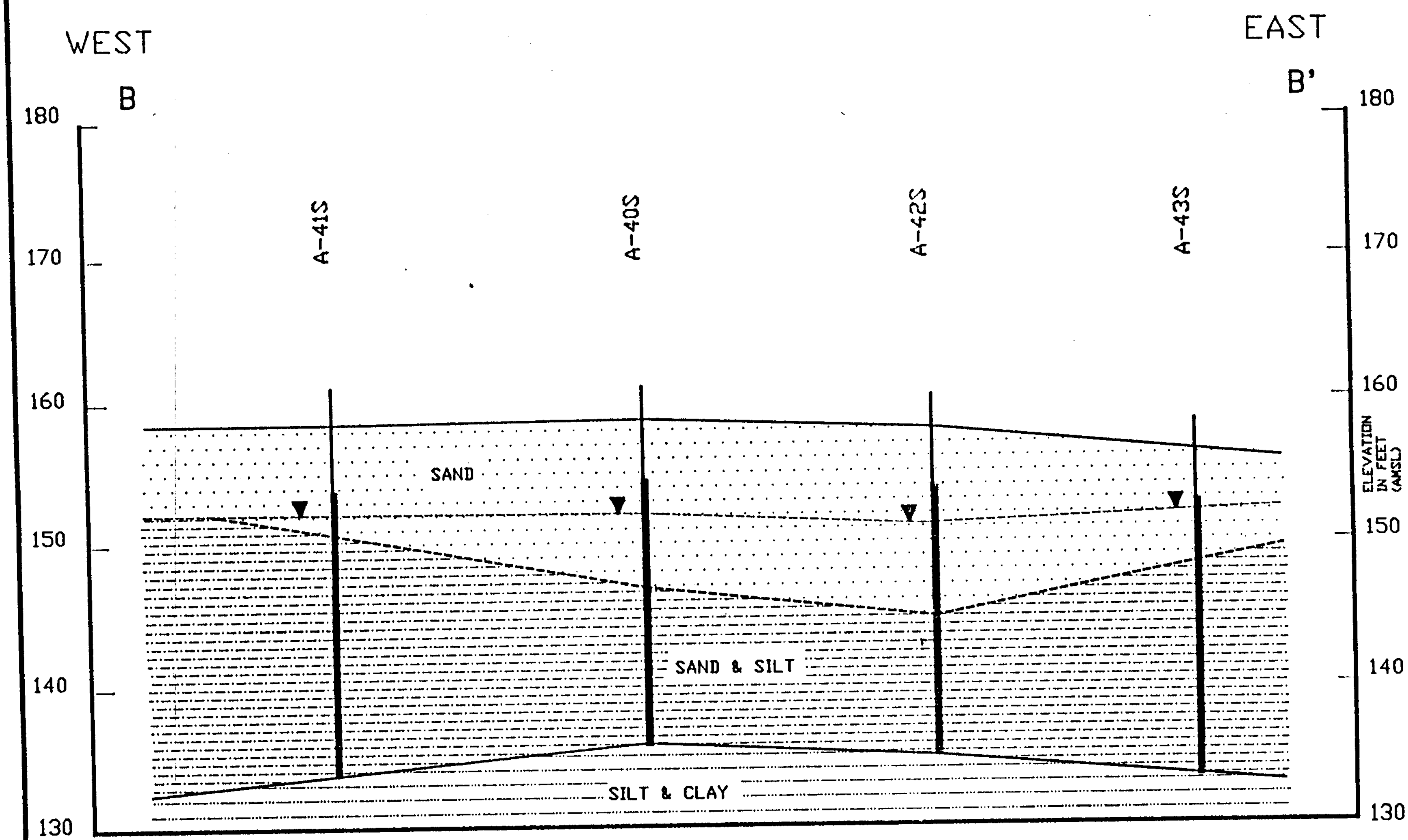

WEST
B
EAST
B'
180
170
160
150
140
130
ELEVATION IN FEET (AMSL)
A-41S
A-40S
A-42S
A-43S
SAND
SAND & SILT
SILT & CLAY

KEY

FIGURE 7

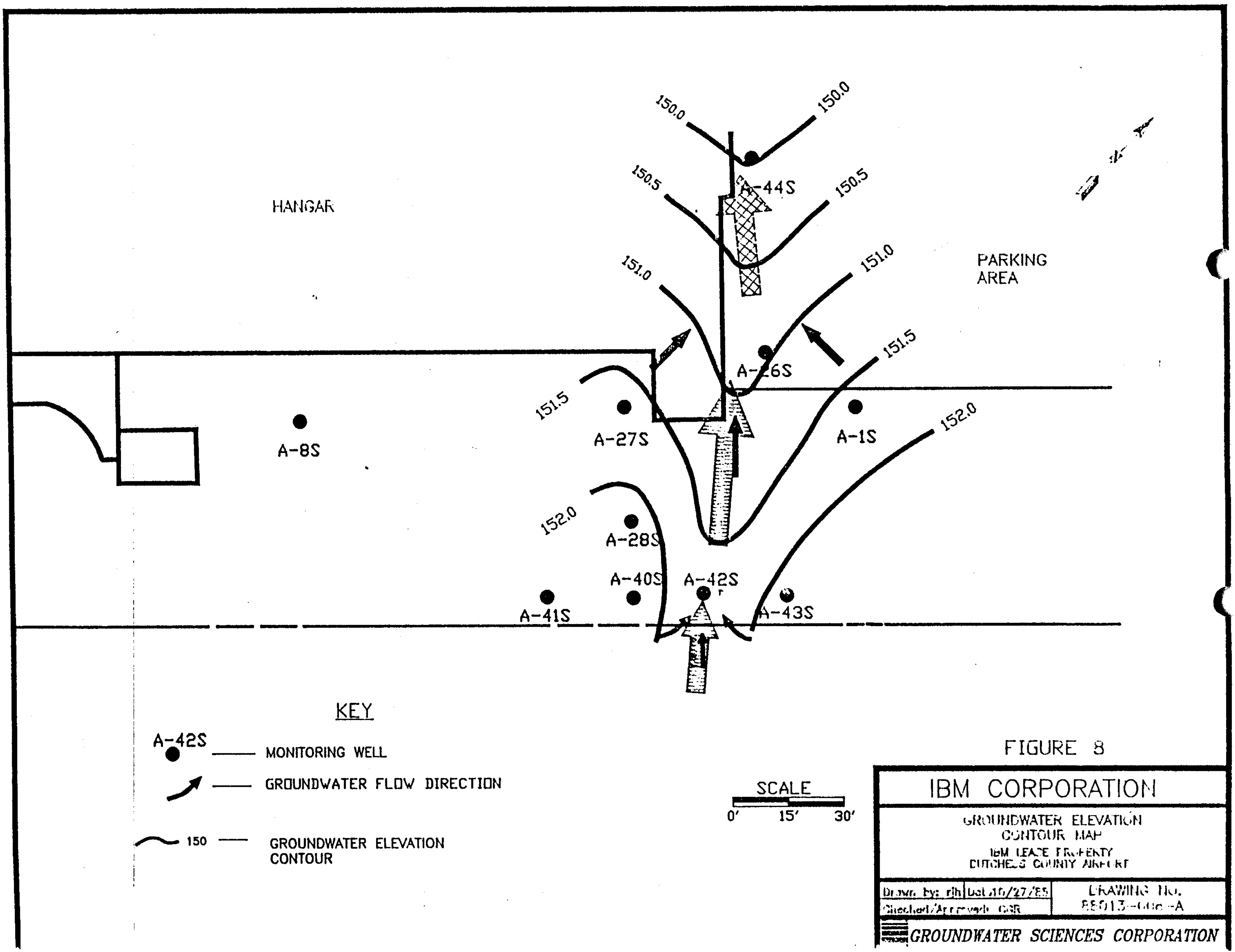

FIGURE 8

IBM CORPORATION

GROUNDWATER ELEVATION
CONTOUR MAP
IBM LEASE PROPERTY
DUTCHESS COUNTY AIRPORT

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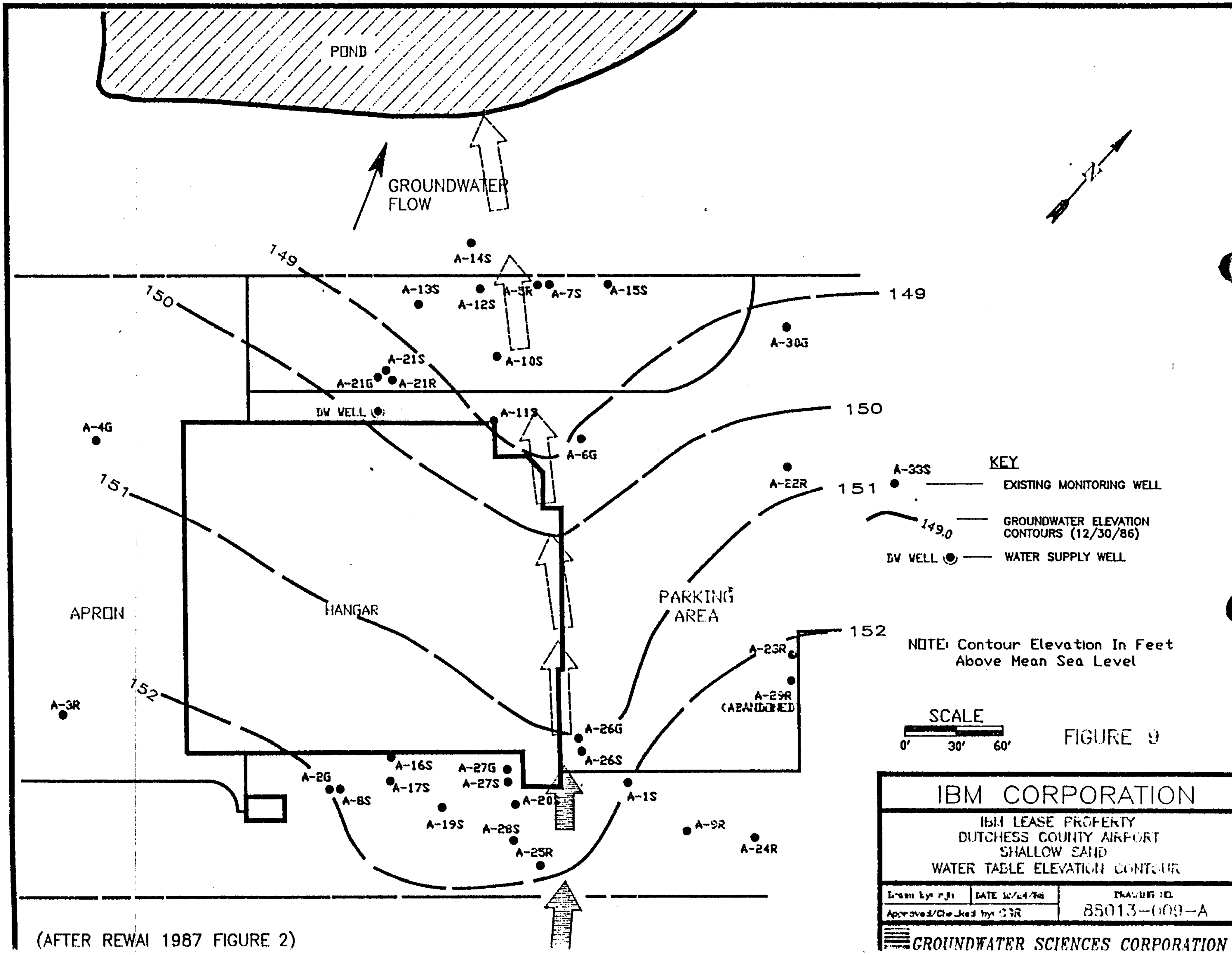


FIGURE 9

(AFTER REWAI 1987 FIGURE 2)

which flows toward A-42S and then northward toward A-26S and A-44S, originates south of the IBM lease property. Previous studies have shown that shallow groundwater flow beneath the IBM site continues northward, and discharges to a pond north of the IBM lease boundary (Figure 9).

Table 1

Static Groundwater Elevations in Feet Above Mean Sea Level

Well	9-8-88	9-9-88	9-20-88	Average
A-1S	151.66	151.64	151.46	151.59
A-8S	152.07	152.02	151.75	151.95
A-26G	149.03	149.12	148.99	149.05
A-26S	151.08	151.03	150.99	151.03
A-27S	151.66	151.70	151.80	151.72
A-28S	152.32	152.26	152.03	152.20
A-40S	152.2	152.15	152.01	152.12
A-41S	152.25	152.19	151.96	152.13
A-42S	151.71	151.66	151.40	151.59
A-43S	152.28	152.21	152.07	152.19
A-44S	150.03	--	149.95	149.99

However, these earlier studies have also identified a vertical groundwater flow component from the shallow sand unit downward through the underlying clay and silt, and into the sand and gravel unit. This vertical gradient is apparent in the static water level data for the nested monitoring wells A-26S and A-26G, which are completed in the shallow sand unit and the deeper sand and gravel unit, respectively. The static water level in A-26G is approximately two feet lower than the water level in A-26S, creating the potential for vertical flow downward from the sand to the sand and gravel. Previous studies (REWAI, 1987) have shown that groundwater entering the sand and gravel unit beneath the IBM site also flows toward the north (Figure 10).

Within the area of the current study, earlier work (REWAI, 1987) has also shown that this downward flow component continues from the sand and gravel unit through the underlying till and into the bedrock. Therefore, a portion of the groundwater flow crossing the southern lease boundary can move downward into the sand and gravel unit and then into the bedrock beneath the IBM site. Within the bedrock, previous studies have also shown horizontal flow directions that are not coincident with that in the shallow sand and the sand and gravel (Figure 11). Based on the combination of all vertical and horizontal flow components shown on Figures 9, 10, and 11 it is apparent that a portion of the groundwater crossing the southern lease boundary at monitoring well A-42S can eventually enter the IBM on-site water supply well and/or move off the IBM site to the east.

2.3 Groundwater Chemistry

In order to characterize the distribution of VOC's in the groundwater beneath the southern portion of the IBM lease property, twenty groundwater samples were collected from nine monitoring wells, including the five newly constructed wells and four existing wells. One sample from monitoring well A-42S was analyzed for the full priority chemical list using EPA methods 624 and 625. The remaining nineteen samples were analyzed using EPA methods 601 and 602 for VOC's. The results of the full scan at well A-42S indicated that naphthalene was present in addition to the VOC's detectable using EPA methods 601 and 602. The results of these analyses are presented in full in Appendix C and are summarized in Table 2.

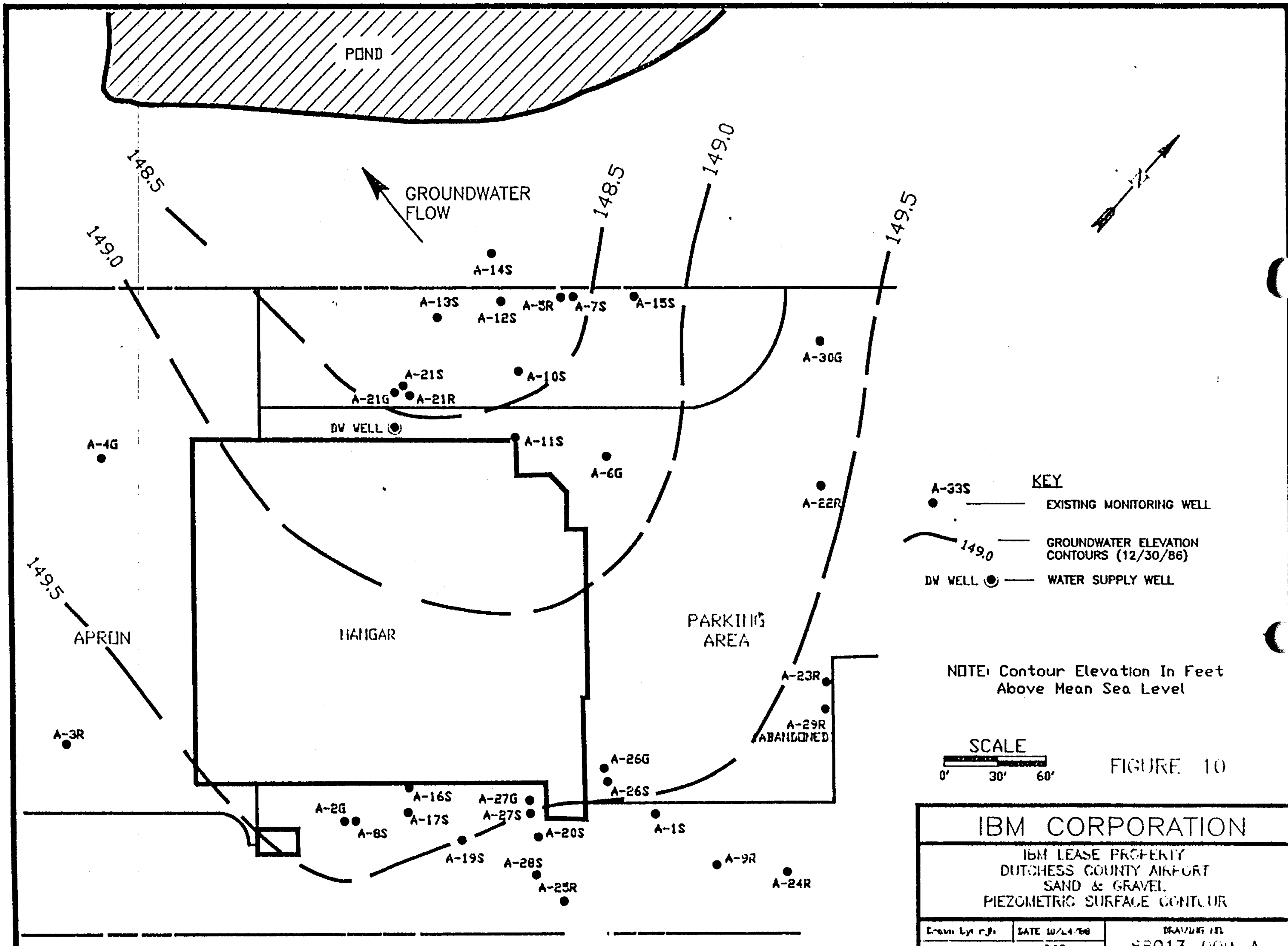
Table 2

Groundwater VOC Concentrations (μg/l)

Well	Date	DCA	TR12 DCE	CEA	TCA	PCE	VC	TOL	TCM	XYL
A-1S	9-8-88	3.9			3.5					
	12-1-88	11			1.8					
A-26S	2-19-88	220			2.8					
	7-29-88	260		6.0	1.5				1.6	
	9-8-88	140		7	2.2					
	12-2-88	220								
A-27S	9-8-88	70								
A-28S	9-8-88	21								
A-40S	8-26-88	87	15							
	9-8-88	51	19			1.1				
	9-21-88	71	23	1.5						
A-41S	8-26-88									
	9-8-88	1.2			1.6					
	9-21-88									
A-42S	8-26-88	610	74	43			23	39		52
	9-8-88	510	59						15	
	9-14-88	790	52					51		
	9-21-88	590	49						33	
A-43S	8-26-88	84		2.3						
	9-8-88	84		7.7						
	9-21-88	73								
A-44S	8-26-88	13								
	9-8-88	9.9								
	9-21-88	3.7								

DCA = 1,1-Dichloroethane
CEA = Chloroethane
PCE = Tetrachloroethylene
TOL = Toluene
XYL = Total Xylene
*Blanks indicate not detected at 1 ug/l

TR12 DCE = Trans-1,2-dichloroethylene
TCA = 1,1,1-Trichloroethane
VC = Vinyl chloride
TCM = Chloroform



(AFTER REWAI 1987 FIGURE 3)

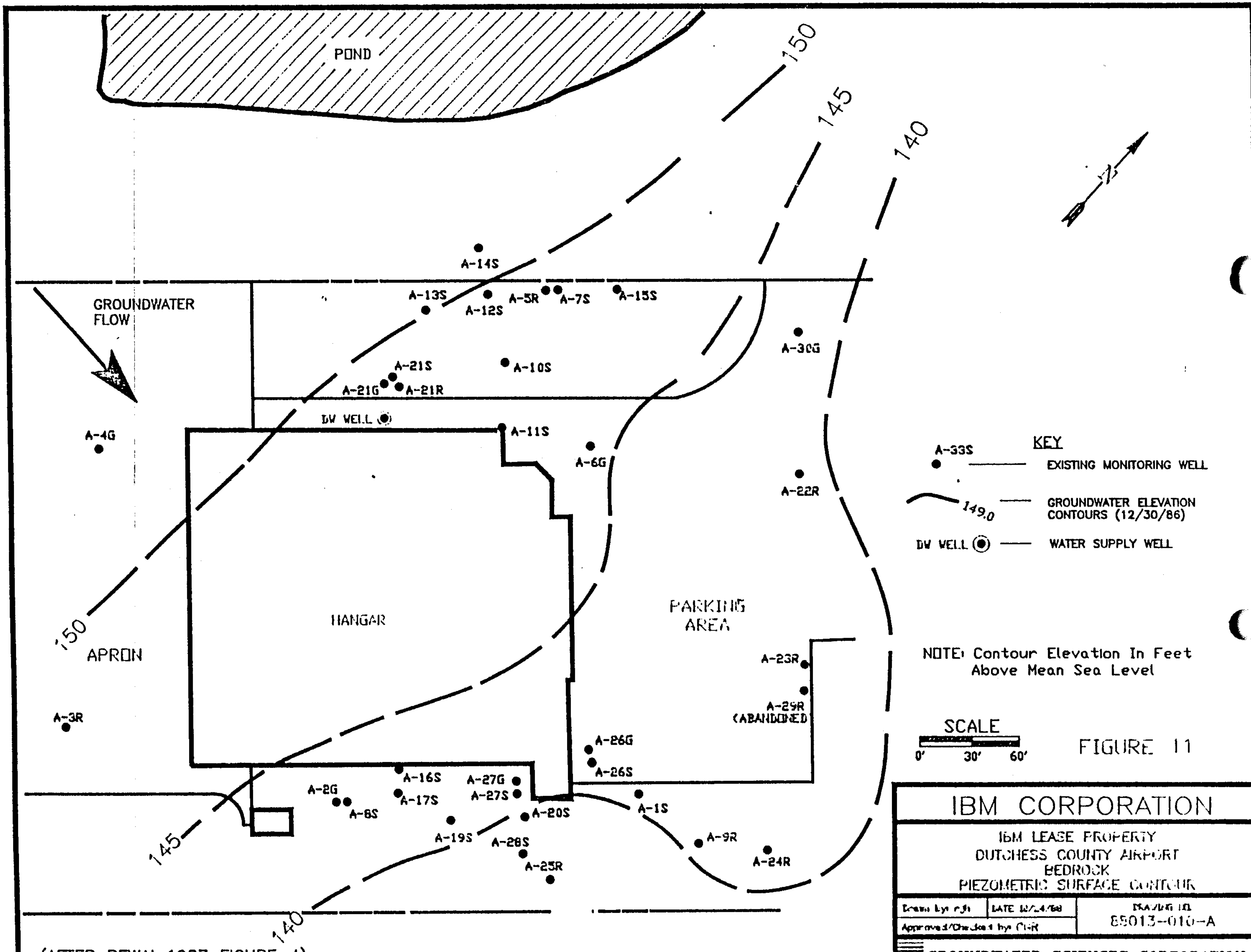


FIGURE 11

IBM CORPORATION

IBM LEASE PROPERTY
DUTCHESS COUNTY AIRPORT
BEDROCK
PIEZOMETRIC SURFACE CONTOUR

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Approved/Checked by: CHR		

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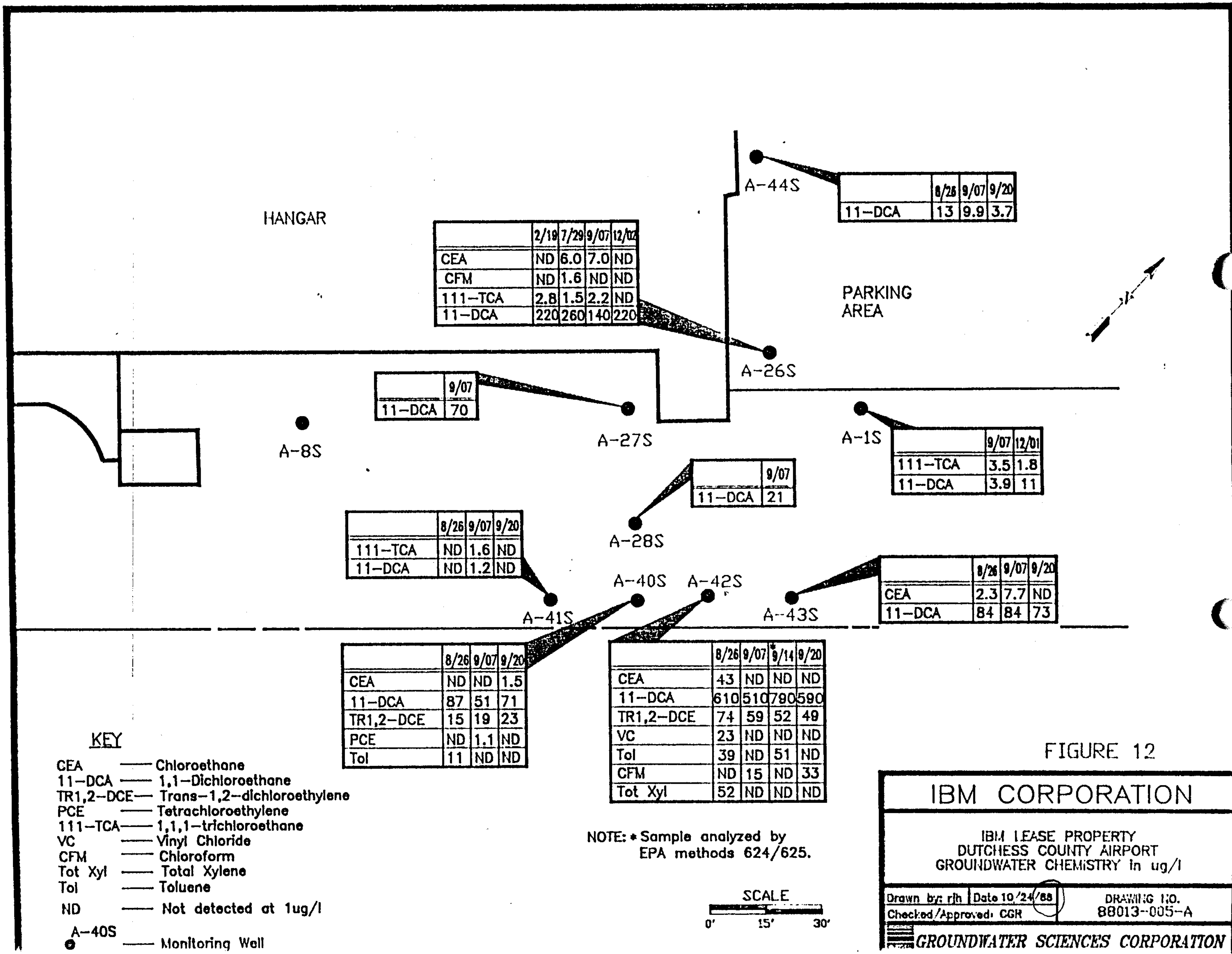
(AFTER REWAI 1987 FIGURE 4)

Figure 12 shows the areal distribution of chemical concentrations. The VOC with the highest concentration and most frequent detection is DCA. As shown, monitoring well A-42S exhibited the maximum reported concentration of DCA in the eight wells sampled (790 micrograms per liter (ug/l)). This is also the highest concentration of any VOC reported in any of the more than 40 monitoring wells sampled at this site to date. Monitoring well A-42S is adjacent to the southern lease boundary line for the IBM facility and concentrations of DCA in the shallow groundwater decrease in all directions, including directly down-gradient in A-26S and A-44S. Groundwater at A-42S also exhibits the highest concentrations of the following VOC's: chloroethane (CEA), chloroform (CFM), toluene (TOL), trans-1,2-dichloroethylene (TR12 DCE), and vinyl chloride (VC). Based on this distribution of VOC's and the previous discussion of the direction of groundwater flow (Figure 8), with which it is consistent, it is concluded that these chemicals are moving onto the IBM lease property from the adjacent property to the south.



A-44S

	8/26	9/07	9/20
11-DCA	13	9.9	3.7

A-26S

	2/19	7/29	9/07	12/02
CEA	ND	6.0	7.0	ND
CFM	ND	1.6	ND	ND
111-TCA	2.8	1.5	2.2	ND
11-DCA	220	260	140	220

A-27S

	9/07
11-DCA	70

A-1S

	9/07	12/01
111-TCA	3.5	1.8
11-DCA	3.9	11

A-28S

	9/07
11-DCA	21

A-41S

	8/26	9/07	9/20
111-TCA	ND	1.6	ND
11-DCA	ND	1.2	ND

A-43S

	8/26	9/07	9/20
CEA	2.3	7.7	ND
11-DCA	84	84	73

A-40S

	8/26	9/07	9/20
CEA	ND	ND	1.5
11-DCA	87	51	71
TR1,2-DCE	15	19	23
PCE	ND	1.1	ND
Tol	11	ND	ND

A-42S

	8/26	9/07	*9/14	9/20
CEA	43	ND	ND	ND
11-DCA	610	510	790	590
TR1,2-DCE	74	59	52	49
VC	23	ND	ND	ND
Tol	39	ND	51	ND
CFM	ND	15	ND	33
Tot Xyl	52	ND	ND	ND

NOTE: * Sample analyzed by EPA methods 624/625.

KEY

CEA —— Chloroethane
11-DCA —— 1,1-Dichloroethane
TR1,2-DCE —— Trans-1,2-dichloroethylene
PCE —— Tetrachloroethylene
111-TCA —— 1,1,1-trichloroethane
VC —— Vinyl Chloride
CFM —— Chloroform
Tot Xyl —— Total Xylene
Tol —— Toluene
ND —— Not detected at 1ug/l
A-40S —— Monitoring Well

FIGURE 12

IBM CORPORATION

IBM LEASE PROPERTY
DUTCHESS COUNTY AIRPORT
GROUNDWATER CHEMISTRY in ug/l

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DRAWING NO. 88013-005-A

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3 IMPACT ASSESSMENT

Table 3 shows the maximum concentrations of VOC's detected in this investigation, together with their New York State groundwater standards and guidance values. As noted, one groundwater standard and seven guidance values are exceeded in the results from these new wells. The VOC which exceeds the New York State guidance value most frequently is DCA in monitoring wells A-26S, A-27S, A-40S, A-42S, and A-43S. DCA exceeded the guidance value in all samples from the last three of these monitoring wells. Table 2 indicates that the VC standard is exceeded in only one out of four samples at monitoring well A-42S. This is the only sample in this study in which VC was detected.

The area over which these standards and guidance values are exceeded is relatively small. However, unless the source of these VOC's is either removed or controlled, the vertical and horizontal spread of these chemicals may result in increased concentrations over a greater area and to a greater depth than is presently the case. Within the shallow sand unit itself, concentrations may begin to increase farther downgradient in monitoring wells on the north side of the hangar, which might eventually result in higher concentrations crossing the northern lease boundary and discharging into the pond.

Also, as noted above, IBM's groundwater supply well has been impacted by low concentrations of VOC's in groundwater migrating downward into the bedrock, most probably from the shallow sand unit in the area of the current investigation. VOC's from this same area could also impact perimeter monitoring wells in the sand and gravel and bedrock, although data collected to date from these wells shows no evidence of these VOC's moving off the site to the east toward private water supply

Table 3

Maximum Concentrations of Organic Detected Chemicals in Groundwater Compared with New York State Standard/Guidance Values for Groundwater

Parameter	Maximum Concentration (μg/l)	New York Standard/ Guidance Value (μg/l)
Vinyl Chloride	23	5 (2*)
Chloroform	33	100
1,1-dichloroethane	790	50**
Trans-1,2-dichloroethylene	74	50**
Chloroethane	43	50*
Tetrachloroethylene	1.1	0.7**
1,1,1-trichloroethane	3.9	50**
Toluene	51	50**
Total Xylene	52	50**
Naphthalene	620	10**
Total Organics	1513***	100**

* Federal MCL
** Guidance Value
*** A-42S, September 14, 1988

wells. Nevertheless, the increased concentrations observed in the shallow sand monitoring wells over the past year may eventually be reflected as concentration increases in IBM's supply well and/or these perimeter monitoring wells.

To understand or predict the impact that these VOC's may be having on groundwater quality in the area upgradient from IBM's lease property or other areas downgradient from the actual off-site source of these chemicals would require off-site investigations not within the scope of the current study. It should be noted, however, that water supply wells other than IBM's may be impacted now or in the future by this off-site source of VOC's. Assurances that this is not the case can only be provided by appropriate groundwater investigations to locate, identify and remove or control the source of these chemicals.

4 CONCLUSIONS

Based on the results of the investigation described above, the following conclusions have been drawn:

1. VOC's in groundwater are migrating onto the IBM lease property in the shallow sand unit from an upgradient source to the south of the IBM lease boundary.
2. Low concentrations of VOC's identified in IBM's groundwater supply well may be due, at least in part, to this migration of groundwater containing chemicals onto the site and the subsequent vertical migration of this groundwater downward through intervening unconsolidated units into the bedrock beneath the site.
3. Existing flow directions in the bedrock could result in the subsequent off-site migration of this groundwater containing dissolved chemicals to the east and southeast in the direction of private water supply wells. However, IBM's perimeter monitoring well data indicates this is not yet occurring.
4. Increasing concentrations of these VOC's in shallow sand monitoring wells over the last year could result in similar increases in the concentrations present in the IBM supply well and/or the deeper perimeter monitoring wells.

APPENDIX A

SOIL BORING AND MONITORING WELL CONSTRUCTION PROTOCOLS; WELL LOGS

Soil Boring and Monitoring Well Construction Protocols

SOIL BORING AND MONITORING WELL CONSTRUCTION PROTOCOL

Soil Boring

Drilling equipment and operators were provided by Soiltesting, Inc. One geologist, provided by Groundwater Sciences Corporation (GSC), was assigned to each drilling crew.

Two hollow-stem auger drilling rigs were used by Soiltesting during most of the drilling procedures. One was a Mobil B-57 and the other, a Dietrich D-52. These units were powered by a Detroit diesel and White engine, respectively. Both used 140-pound hammers to drive the split-spoon samplers, were capable of coring with water, and used the same sized hollow-stem augers. Similarities between these rigs thus assured that a uniform drilling procedure was followed.

Continuous split-spoon sampling of the overlying soils was conducted with a 2-inch O.D., 2-foot split-spoon sampler. After being advanced 2 feet, the spoon and sample were removed and the augers advanced through the same 2-foot interval. In this way, only undisturbed soil samples were collected. Acker hollow-stem augers with a 7-3/4-inch O.D. and 3-3/8-inch I.D. were used during the drilling procedures.

Soil samples were logged in the field prior to removal from the spoon, the amount of recovery was measured and the blow counts noted. Once logged, the samples were transferred to unused 8-ounce glass jar with metal screw caps. The soil samples were then transported to GSC's Harrisburg office for storage.

Monitoring Well Construction

In the construction of all soil monitoring wells, a basic design was followed to maintain uniformity. This basic soil monitoring well design includes the following elements:

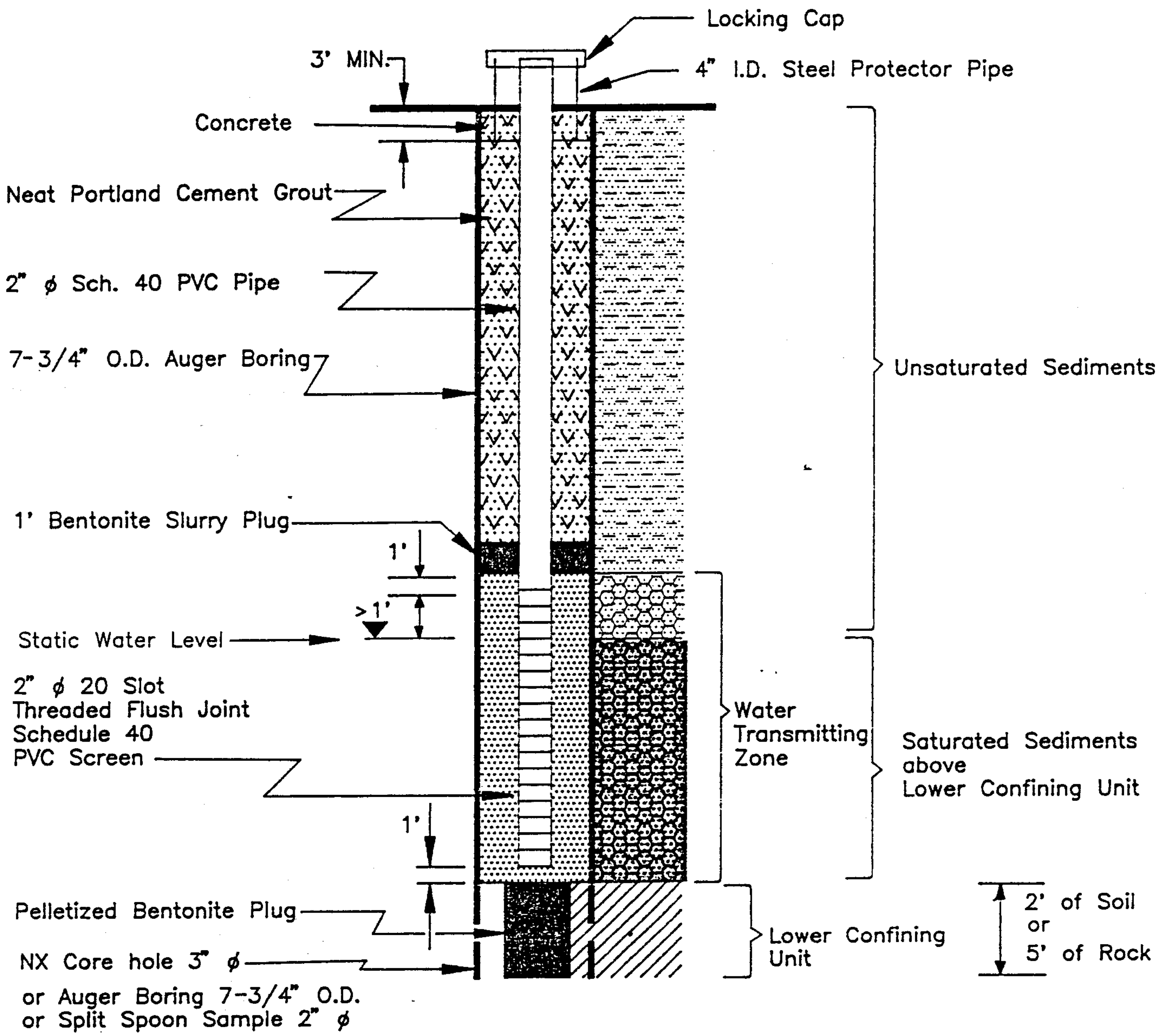
- 2" diameter schedule 40 threaded flush joint PVC screen and riser pipe.
- Silica sand pack material graded to specifications for the screen slot size.
- Bentonite slurry or pellets as appropriate, to seal all specified intervals of the borehole below the static water level, and any interval less than one foot above the static water level.
- Neat cement grout to seal all specified intervals of the borehole one foot or more above the static water level.
- A 4" I.D. steel protector pipe with a locking cap extending to a desired height above grade and encased in concrete to a minimum of three feet below grade; or , a properly-designed, commercially available monitoring well manhole, with interval locking cap, encased in concrete at grade, with proper provisions for seepage water drainage based on site-specific conditions.

Variations on this basic design were determined by the elevation of the static water level (SWL) with regard to the site stratigraphy.

The first variation of this basic monitoring well design is the soil standpipe, which was used to monitor unconfined water table conditions in the shallow sand unit. In this variation, the top of the screen extends above the static water level (Figure A-1). It was used in the construction of monitoring wells A-40S to A-44S.

Figure A-1

SOIL STANDPIPE



The second variation used in this investigation was the construction of a soil piezometer (Figure A-2) at location A-45G. In this variation, the well monitors a confined water-transmitting unit, where the static water level is above both the top of the unit (in this case the sand and gravel) and the top of the screened interval.

Decontamination

In order to reduce the potential for contamination of groundwater samples from drilling equipment and well construction materials, several precautions were taken, as follows:

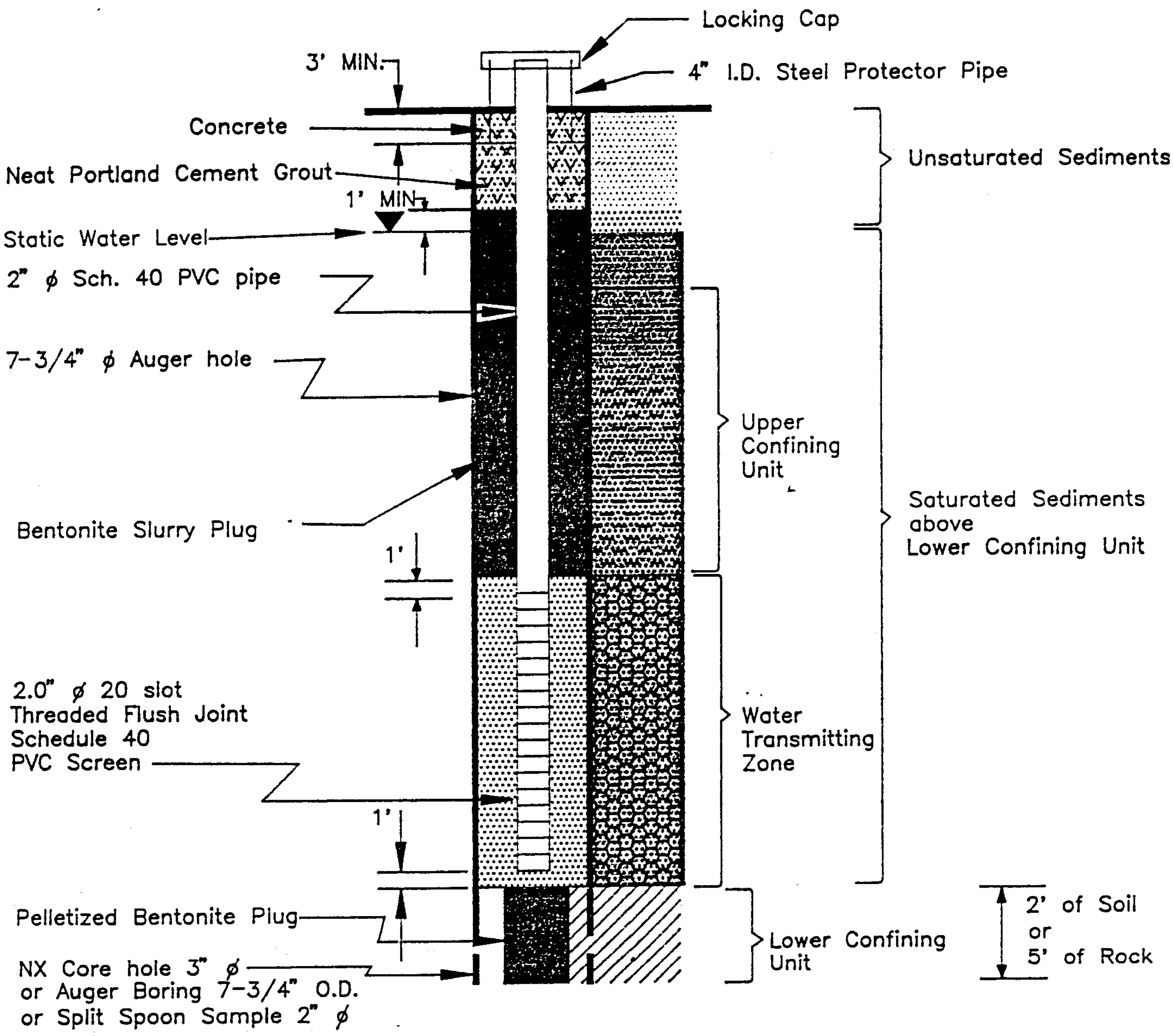
1. The threaded flush joint PVC pipe and screen used in all soil borings was steam-cleaned immediately prior to being used.
2. The screen and pipe were lowered into the borehole by hand, so they did not contact the drilling equipment during the installation process. Additionally, all workers handling these materials wore new, clean surgical gloves.
3. The drilling rigs and tools were also thoroughly steam-cleaned, both prior to mobilization to IBM's property and during drilling operations before equipment was moved from one drill site to another. In addition, the split-spoon samplers were steam-cleaned on site before being used or reused.

Quality Control

Each two-man crew of drill rig operators was supervised by one GSC geologist. Both the drillers and supervisors maintained separate records of the blow counts required to drive the spoon. In addition, separate field logs of the soil samples were maintained. It was the responsibility of the GSC geologist to select an appropriate boring design, and ensure that the well was constructed according to protocol. Additional responsibilities included: measurement and recording of static water levels; field logging of soil samples with respect to odor, color, and texture; and implementation of decontamination procedures.

Figure A-2

SOIL PIEZOMETER



Well Logs

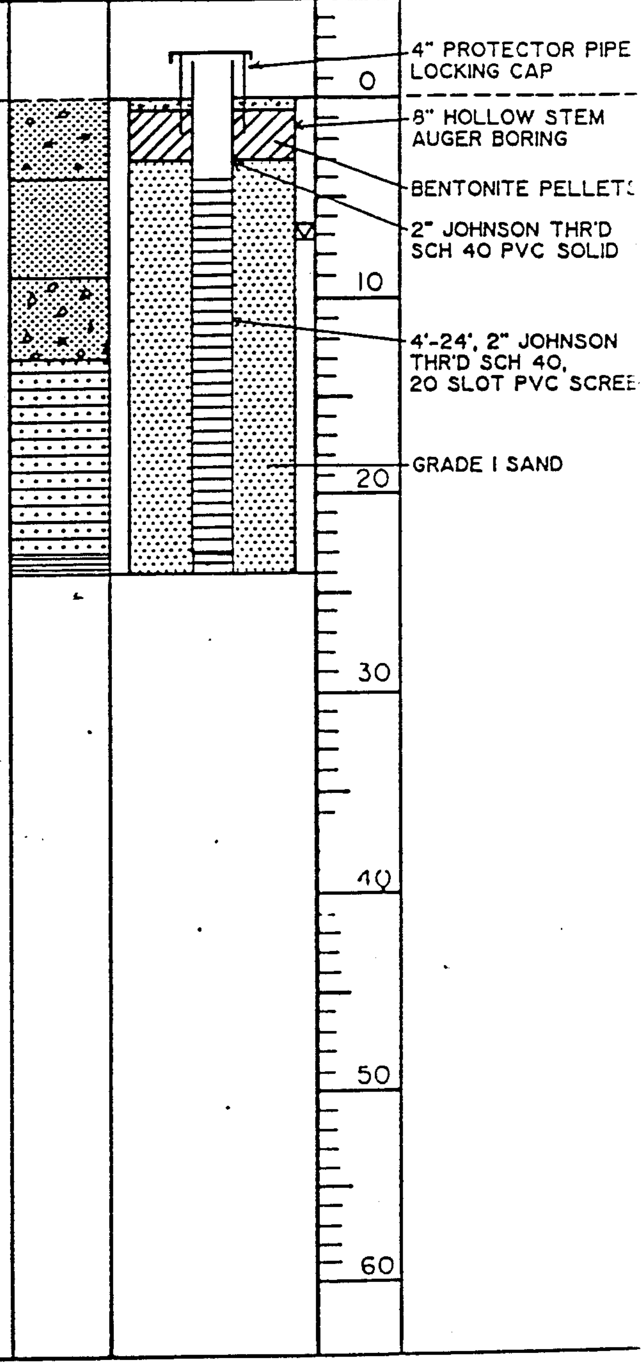
SOIL AUGERING LOG

Client: IBM-POUGHKEEPSIE
Project No. 88013 | Phase - | Task

Boring No. A-40S | Piezometer No.
Location: IBM[illegible]ngar, Dutchess County Airport
Surface Elev. 161.41 TOC | Page 1 of

Depth Feet	Blow Counts	Recovery / RQD	Overburden/Lithologic Description	Volatile Scan
0	Ground Surface			
	Hand Augered		OVERBURDEN: c-f brn sand w/ gravel.	
			SAND: f-m brn, dense; moist.	
	1-1-6-7	12"		
	6-5-4-5	20"		
10	5-2-1-3	13"	SAND: c, brn, loose, w/ angular gravel; wet @ 10'.	
	5-5-5-4	18"		
	1-2-1-1	17"	SAND and SILT: gr, dense, clay stringers common; very wet.	
	3-2-2-3	18"		
	1-2-3-2	20"		
20	1-3-3-2	18"		
	3-3-4-4	20"	Light chemical odor 22-24'.	
			SILT: m brn, v. dense, w/ clay stringers; wet.	
			Total Depth 24'	
30				
40				
50				
60				

Graphic Log | Well Construction Graphic | Depth Feet | Well Construction Details



Driller: SOILTESTING, INC./P.D.,T.N.
Logged By: GSC/SMF, JPK
Drilling Started: 8/22/88
Drilling Completed: 8/22/88
Well Construction: 8/22/88
Well Developed: 8/23/88

Notes

Water Bearing Zones

Static Water Level Elev. 152.15' MSL Date 9/9/88
Est. Yield Piezometer 450 ml/hr during well purging.

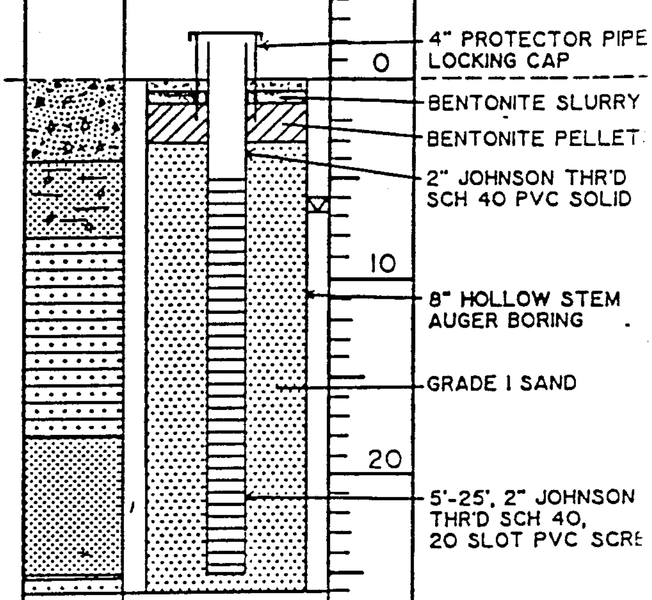
SOIL AUGERING LOG

Client: IBM-POUGHKEEPSIE
Project No. 88013 Phase Task

Boring No. S Piezometer No.
Location: IBM Hangar, Dutchess County Airport
Surface Elev. 161.07' TOC Page 1 of

Depth Feet	Blow Counts	Recovery/ RQD.	Overburden/Lithologic Description
0	Ground Surface		
	Hand Augered		OVERBURDEN: f brn sand; w/ carbonate fill gravel.
	4-5-6-5	18"	SAND: f, brn, dense; mottled; w/ tr of silt and gravel; moist.
	7-7-5-4	19"	SAND and SILT: f, brn, dense; very wet; clay stringers becoming more common with depth.
10	3-3-3-3	12"	
	4-3-5-4	20"	
	3-3-3-3	18"	
	3-2-3-3	15"	
	1-2-3-4	12"	
20	2-3-3-2	16"	SAND: f-m, dk brn, dense; very wet; some clay stringers.
	3-4-5-5	20"	
	3-4-5-6	15"	SAND and SILT: gr, dense, v. wet; w/ clay stringers.
			Total Depth 26'
30			
40			
50			
60			

Volatile Scan | Graphic Log | Well Construction Graphic | Depth Feet | Well Construction Details



Driller: SOILTESTING, INC./P.D.,T.N.
Logged By: GSC/ SMF,JPK
Drilling Started: 8/22/88
Drilling Completed: 8/22/88
Well Construction: 8/22/88
Well Developed: 8/23/88

Notes

Water Bearing Zones

Static Water Level Elev. 152.19' MSL Date 9/9/88
Est. Yield Piezometer 450 ml/hr during well purging.

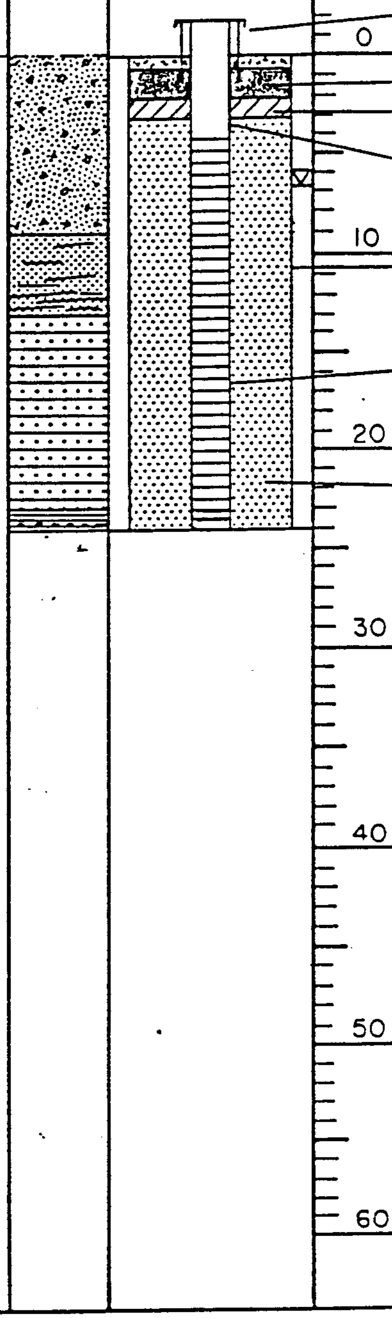
SOIL AUGER[illegible]G LOG

Client: IBM-POUGHKEEPSIE
Project No. 88013 | Phase | Task

Boring No. A[illegible]3S | Piezometer No.
Location: IBM [illegible]ngar, Dutchess County Airport
Surface Elev. 160.53' TOC | Page 1 of

Depth Feet	Blow Counts	Recovery/ RQD.	Overburden/Lithologic Description
0	Ground Surface		
	Hand Augered		OVERBURDEN: c-m, orange to dk brn, loose sand w/ fine gravel; saturated @ 6'.
	4-7-8-5	18"	
	5-3-3-4	14"	
10	2-2-6-9	14"	SAND: f-m, gr to brn, w/ some silt; silt content increases w/ depth; or-brn & wet @ 11'8".
	7-7-7-8	18"	
	2-3-3-2	18"	SAND and SILT: f-m, gr to brn, dense; w/ lt tan clay interbeds; wet.
	3-2-2-2	17"	
	3-4-4-4	20"	
20	1-2-4-7	18"	
	6-6-5-8	20"	SILT: gr-brn, dense, wet; interbedded tan clay.
			Total Depth 24'
30			
40			
50			
60			

Volatile Scan | Graphic Log | Well Construction Graphic | Depth Feet | Well Construction Details



Well Construction Details:
- 4" PROTECTOR PIPE / LOCKING CAP
- BENTONITE SLURRY
- BENTONITE PELLETS
- 2" JOHNSON THR'D SCH 40 PVC SOLID
- 8" HOLLOW STEM AUGER BORING
- 4'-24', 2" JOHNSON THR'D SCH 40, 20 SLOT PVC SCREE[N]
- GRADE I SAND

Driller: SOILTESTING, INC./B.D.,T.N.
Logged By: GSC/JPK
Drilling Started: 8/23/88
Drilling Completed: 8/23/88
Well Construction: 8/23/88
Well Developed: 8/24/88

Notes

Water Bearing Zones

Static Water Level Elev. 151.66' MSL Date 9/9/88
Est. Yield Piezometer 450 ml/hr during well purging.

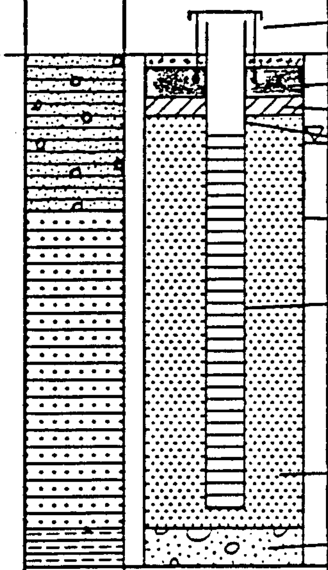
SOIL AUGER[illegible]G LOG

Client: IBM-POUGHKEEPSIE
Project No. 88013 Phase Task

Boring No. [illegible]3S Piezometer No.
Location: IBM Hangar, Dutchess County Airport
Surface Elev. 158.54' TOC Page 1 of

Depth Feet	Blow Counts	Recovery/ RQD	Overburden/Lithologic Description
0	Ground Surface		
	Hand Augered		OVERBURDEN: c-m, dk brn sand w/ silt and f gravel; loose; moist; wet @ 6'.
	3-4-4-4	13"	
	3-3-4-4	20"	
10	5-6-7-7	20"	SAND and SILT: f-m, brn; or-tan mottling @ 10'; dense; thin clay interbeds appearing @ 11'; some gray sand stringers.
	4-5-5-6	20"	
	3-3-4-4	16"	
	4-3-4-4	18"	
	1-2-3-3	20"	
20	2-4-5-4	20"	
	3-5-7-7	18"	
	3-3-3-4	17"	CLAY and SILT: gr, dense; interbedded; wet.
			Total Depth 26'
30			
40			
50			
60			

Volatile Scan | Graphic Log | Well Construction Graphic



Well Construction Details:
- 4" PROTECTOR PIPE LOCKING CAP
- BENTONITE SLURRY
- BENTONITE PELLETS
- 2" JOHNSON THR'D SCH 40 PVC SOLID
- 8" HOLLOW STEM AUGER BORING
- 4'-23', 2" JOHNSON THR'D SCH 40, 20 SLOT PVC SCREEN
- GRADE I SAND
- CAVED FORMATION AND BENTONITE

Driller: SOILTESTING, INC./B.D.,T.N.
Logged By: GSC/JPK
Drilling Started: 8/23/88
Drilling Completed: 8/23/88
Well Construction: 8/23/88
Well Developed: 8/23/88

Notes: Formation caved in bottom of bore hole during bentonite placement and auger retrieval.

Water Bearing Zones

Static Water Level Elev. 152.21' MSL Date 9/9/88

Est. Yield Piezometer 450 ml/hr during well purging.

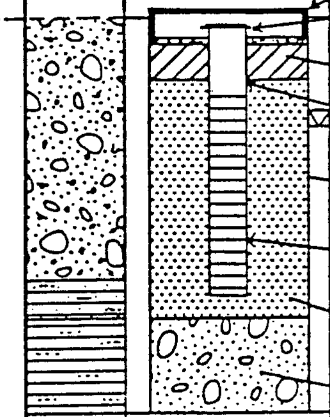
SOIL AUGERING LOG

Client: IBM-POUGHKEEPSIE
Project No. 88013 Phase Task

Boring No. A[illegible] Piezometer No.
Location: IBM Hangar, Dutchess County Airport
Surface Elev. 155.30' GS Page 1 of

Depth Feet	Blow Counts	Recovery/RQD.	Overburden/Lithologic Description
0	Ground Surface		
	Hand Augered		OVERBURDEN: (Fill Material), c-m, or-brn sand w/ gravel & cobbles; wet @ 6'.
	8-7-3-4	20"	
	4-3-5-6	18"	
10	3-4-4-3	15"	
	4-5-4-3	14"	
	4-6-6-6	18"	SILT: gr, dense; tr. fine sand & clay; wet.
	4-4-7-6	17"	SILT: gr, dense; tr. clay; wet.
	6-6-7-7	19"	
20			Total Depth 20'
30			
40			
50			
60			

Volatile Scan | Graphic Log | Well Construction Graphic | Depth Feet | Well Construction Details



Well Construction Details:
- 9" ACCESS MANHOLE
- ALUMINUM MORRISON CAP W/ BRASS ADAPTOR & LOCK
- BENTONITE PELLETS
- 2" JOHNSON THR'D SCH 40 PVC SOLID
- 8" HOLLOW STEM AUGER BORING
- 4'-14', 2" JOHNSON THR'D SCH 40, 20 SLOT PVC SCREEN
- GRADE I SAND
- CAVED FORMATION AND BENTONITE

Driller: SOILTESTING, INC./B.D.-T.N.
Logged By: GSC/JPK
Drilling Started: 8/23/88
Drilling Completed: 8/24/88
Well Construction: 8/24/88
Well Developed: 8/24/88

Notes: Formation caved in bottom of bore hole during bentonite placement and auger retrieval.

Water Bearing Zones

Static Water Level Elev. 149.95' MSL Date 9/20/88
Est. Yield Piezometer 450 ml/hr during well purging.

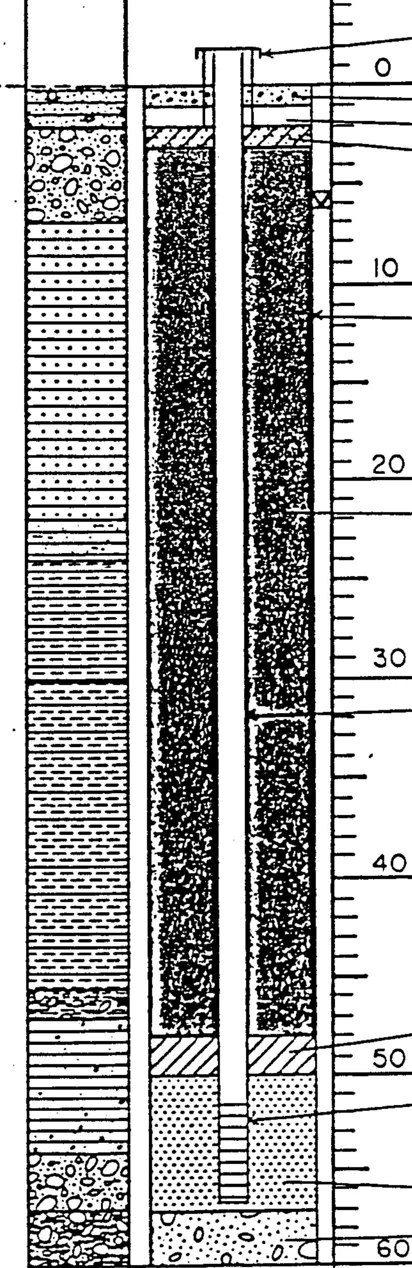
SOIL AUGERING LOG

Client: IBM-POUGHKEEPSIE
Project No. 88013 | Phase | Task

Boring No. A[illegible]G | Piezometer No.
Location: IBM Hangar, Dutchess County Airport
Surface Elev. 156.58' TOC | Page 1 of

Depth Feet	Blow Counts	Re-covery/RQD.	Overburden/Lithologic Description
0	Ground Surface		
	Hand Augered		OVERBURDEN: (Fill Material), c, brn sand & silt; tr. gravel; loose.
			SAND and GRAVEL: c-m, brn sand & f. grvl; v. loose; saturated @ 3' w/ oily film.
	4-4-5-5	16"	
	3-2-4-3	16"	SAND and SILT: f-m, brn-or. brn; sl. dense; small tan clay stringers becoming more common w/ depth.
10	2-2-4-5	14"	
	3-4-5-6	20"	
	2-2-2-4	18"	
	4-4-5-6	19"	
	3-6-8-8	17"	
20	8-7-7-6	20"	
	4-8-9-10	22"	SILT: gr., dense; some f. sand; tr. clay; wet.
	4-4-4-4	20"	SILT and CLAY: gray, dense; interbedded w/ v.f. sand.
	4-4-8-9	17"	
	7-8-8-9	16"	
30	3-4-6-5	14"	
	4-4-4-3	20"	CLAY: gray, dense; w/ some silt; wet.
	1-3-3-4	19"	
	4-3-4-5	22"	
	3-4-5-4	23"	
40			
	5-4-5-8	6"	
	7-6-10-21	20"	CLAY and GRAVEL: c-f, grvl, angular; gray clay w/ silt; wet.
	8-10-19-20	18"	SILT: gray, dense; w/ some c-f sand & c-f gravel; moist.
50	9-30-17-24	14"	
	11-13-19-19	16"	
	8-11-9-9	8"	SAND and GRAVEL: c-f, gray sand & c-f grvl, w/ some silt; wet.
	5-9-43-66	6"	
	75-100/3-Augered	9"	SAND and GRAVEL: gray, v. dense c-m sand & c-f grvl, w/ silt & clay; moist.
60	165-100/2	8"	
			Total Depth 60'

Volatile Scan | Graphic Log | Well Construction Graphic | Depth Feet | Well Construction Details



Well Construction Details:
- 4" PROTECTOR PIPE / LOCKING CAP
- SOIL FILL
- GROUT
- GRADE I SAND & BENTONITE PELLETS
- 8" HOLLOW STEM AUGER BORING
- BENTONITE SLURRY
- 2" JOHNSON THR'D SCH 40 PVC SOLID
- BENTONITE PELLETS
- 51.5'-56.5', 2" JOHNSC THR'D SCH 40, 20 SLOT PVC SCREE
- GRADE I SAND
- CAVED FORMATION AND BENTONITE

Driller: SOILTESTING, INC./B.D._T.N.
Logged By: GSC/JPK
Drilling Started: 8/24/88
Drilling Completed: 8/25/88
Well Construction: 8/25/88
Well Developed: 8/26/88

Notes: Formation caved in bottom of bore hole during bentonite placement and auger retrieval.

Water Bearing Zones: 54'-57'

Static Water Level Elev. 148.33' MSL Date 9/20/88

Est. Yield Piezometer

APPENDIX B

WELL DEVELOPMENT, SAMPLING AND QA/QC PROTOCOLS

Well Development Protocol

High Yielding Wells

1. Record all physical information as listed on the header of the well development field data sheet.
2. Determine and record the static water level and the depth to the bottom of the well.
3. Determine the volume of water present in the column by taking the difference between the static water level and the depth to the bottom of the well times the volume per foot of casing based on its diameter.

   1.5" = 0.092 gals/ft.
   2.0" = 0.163 gals/ft.
   4.0" = 0.65 gals/ft.
   6.0" = 1.6 gals/ft.
   8.0" = 2.6/gals ft.

4. Small diameter wells (<4.0") with a static water level of less than 25 feet from the top of the casing will be developed using a peristaltic pump. Small diameter wells with a static water level of greater than 25 feet from the top of the casing will be developed using a bailer. Large diameter wells (>4.0") will be developed using a four-inch 1/2 HP stainless steel submersible pump. Regardless of the method, any equipment that is placed in a well must be steam cleaned.
5. The pump or tubing should be kept at the top of the water column so as to ensure that the water is being drawn through the entire length of the screen. However, when cutting the tubing, it must be cut to a length that will reach to bottom of the well for sampling purposes.

6. The pump rate should be set, when possible, so that the well will not be dewatered, thereby delivering a constant yield. The water level should not be allowed to drop below the depth of the top of the screen. If a flow rate cannot be maintained, follow low yielding well development procedures.

7. Upon completion of development, the well is ready to be sampled. Since the water present in the column is representative of the formation water, it can be sampled immediately after the well has sufficiently recovered. If it has not recovered, it can be sampled up to a maximum of seven days from time of completion.

Low Yielding Wells

1. Record all physical information as listed on the header of the well development field data sheet.

2. Determine and record the static water level and the depth to the bottom of the well.

3. Determine the volume of water present in the column by taking the difference between the static water level and the depth to the bottom of the well times the volume per foot of casing based on its diameter.

   1.5" = 0.09 gals/ft.

   2.0" = 0.16 gals/ft.

   4.0" = 0.65 gals/ft.

   6.0" = 1.6 gals/ft.

   8.0" = 2.6/gals ft.

4. Small diameter wells (<4.0") with a static water level of less than 25 feet from the top of the casing will be developed using a peristaltic pump. Small diameter wells with a static water level of greater than 25 feet from the top of the casing will be developed

using a bailer. Large diameter wells (>4.0") will be developed using a four-inch 1/2 HP stainless steel submersible pump. Regardless of the method, any equipment that is placed in a well must be steam cleaned.

5. Evacuate the well two times.
6. Record the recovery rate of the well following the first evacuation. The next evacuation can begin as soon as the well has recovered to 90% of the original volume or after 24 hours.
7. Upon completion of development, the well is ready to be sampled. Since the water present in the column is representative of the formation water, it can be sampled immediately once the well has sufficiently recovered. If it has not recovered, it can be sampled up to a maximum of 7 days from time of completion.

Groundwater Monitoring Well Sampling Procedures

Wells With Static Water Levels <30 Feet

1. Determine the static water level with a water level indicator and record depth to water. Record reference point, i.e., top of casing, ground, etc.
2. Determine depth to bottom by lowering a water level indicator to bottom. Record reference point.
3. Measure and record height of casing
4. A clean sheet of plastic should be placed around the well to be sampled so that there is a clean surface on which to place sampling equipment.
5. Set up peristaltic pump on wells that contain Teflon tubing. Those wells that do not contain tubing may be bailed manually with a stainless steel bailer attached to a nylon cord. Bailer and cord must be steam cleaned before they are used in a well.
6. Attach Teflon tubing (dedicated to that boring) and start purging, using peristaltic pump. If boring is air rotary type (diameter 6-8 inches), use a submersible pump to purge. Pump should be cleaned before use.
7. Sampler must wear new disposable latex gloves while bailing or inserting Teflon tubing into a well.
8. Purge three volumes of the well as determined by diameter of the well and the difference between the static water level and the depth to bottom, using the purging procedure appropriate for that well. If well yields less than three calculated volumes, purge until borehole is evacuated. Formula used to determine volume: ___ gal/ft. x (depth to bottom - depth to water before purge).

9. After purging, determine and record the static water level. Allow well to recover to 90% or greater of the original water column depth. If recovery is proceeding slowly, go on to another well. The well must be allowed to recover before sampling, but the maximum allowable elapsed time between purging and sampling cannot exceed 7 days.
10. Once the well has recovered, begin sampling from the bottom one-third of the water column. Record sample depth. Collect a sample in the properly preserved bottle, equal to 1/3 of the total required sample volume. Cap appropriate bottles securely, making sure that there are no air bubbles present for VOC samples. If air bubbles are present, refill until they are removed. VOC samples should be collected first with a stainless steel bailer. All metal samples must be field filtered and placed in a plastic liter bottle preserved with nitric acid. Repeat for the middle 1/3 and the upper 1/3 of the column.
11. After collecting samples in bottles, collect in a clean bottle 1/3 of the bottle's total volume to be used later for taking field measurements.
12. Determine and record the pH, specific conductivity, and temperature of the water in the well directly, using an instrument capable of being placed down the borehole after sampling is complete. Determine and record the static water level after sampling.
13. Upon completion of the sampling, place all tubing into a large plastic bag labeled for that particular well.
14. Pack and label all samples in a cooler for analysis by laboratory. The bottles should be labeled with the site location, date, time, sampler's initials, analysis parameters, and sample I.D. that includes the date and well I.D.
15. A laboratory chain of custody must be filled out completely and properly.

Wells With Static Water Levels >30 Feet

1. Determine the static water level with a water level indicator and record depth to water. Record reference point, i.e., casing, ground, etc.
2. Determine depth to bottom by lowering a water level indicator to bottom. Record reference point.
3. Measure and record height of casing.
4. A clean sheet of plastic should be placed around the well to be sampled so that there is a clean surface on which to place sampling equipment.
5. If the well is 4" in diameter or larger and has a high yield, go to step 10.
6. Lower bladder pump and tubing into boring and connect to air pump.
7. Make sure hoses are connected to both pump air line and controller.
8. Start air compressor, regulate flow via the controller.
9. Regulate water flow with controller.
10. Use submersible pump to purge. Pump should be steam cleaned before use.
11. Purge three volumes of the well as determined by diameter of the well and the difference between the static water level and the depth to bottom. Use the purging procedure appropriate for that well. Formula to determine volume: __ gal/ft. x (depth to bottom - depth to water before purge).
12. After purging, determine and record the static water level. Allow well to recover to 90% or greater of original water column height. If recovery is proceeding slowly, go on to another well. The well must be allowed to recover before sampling, but the maximum allowable elapsed time between purging and sampling cannot exceed 7 days.

13. Once the well has recovered, begin sampling using a steam cleaned teflon or stainless steel bailer from the bottom 1/3 of the water column. Record sample depth. Based on analyses to be performed, collect a sample in the properly preserved bottle, equal to 1/3 of the total required sample volume. Cap bottles securely. For volatile samples, fill 2 VOAS at each 1/3 of well volume (lower, middle, and upper), making sure that there are no air bubbles present. If air bubbles are present, refill until they disappear. If well shows significant drawdown, then the VOAS should be taken first.
14. For wells with a water column of less than 5 feet, only 2 VOAS need to be taken. For those with a water column between 5 and 10 feet, 2 sets of VOAS or 4 all total need to be taken. Any well with a water column greater than 10 feet will need to have VOAS taken at all three levels for a total of 6.
15. After collecting samples in bottles, collect in a clean bottle 1/3 of the bottle's total volume to be used later for taking field measurements.
16. Repeat steps 13 and 14 for the middle 1/3 and the upper 1/3 of the column. Record sample depths.
17. Determine and record the static water level after sampling.
18. Determine and record the pH, specific conductivity, and temperature of the water in the borehole directly, using an instrument with a probe capable of being placed into the borehole after sampling is complete.
19. Upon completion of the sampling, the bladder pump and tubing/submersible pump should be rinsed inside and outside and placed in a large plastic bag.
20. Pack and label all samples in a cooler for analysis by a laboratory. The bottles should be labeled with the site location, date, time, sampler's initials, analysis parameters, and sample I.D. that includes the date and well I.D.

21. A laboratory chain of custody must be filled out completely and properly.

Quality Assurance/Quality Control for Groundwater Samples

1. Development and sampling protocols will be strictly followed.
2. Trip blanks are to be carried in the same container as collected samples and will be analyzed as required. A new trip blank should be obtained from the lab each three to seven days.
3. Field blanks will represent approximately 5% of all samples taken. The location for the field blank will include both "clean" wells and those known from previous sampling to contain VOC's.
4. These samples will be included on the chain of custody and will be surrendered to the laboratory in the same fashion as the other samples taken that day. Some will be blind and others will not be.
5. Split samples will be taken and sent to different laboratories for approximately 2% of the samples.
6. Blind replicates will be taken for approximately 1% of the samples.
7. All unreasonable results will be challenged and the laboratories will be visited to review in-house QA/QC and inspect equipment.

APPENDIX C

GROUNDWATER CHEMISTRY DATA

IBM POUGHKEEPSIE - GROUNDWATER MONITORING PROGRAM
WELL NO. A40S

WELL DATE LAB ID LAB PARAMETER	UNIT	A40S 08/26/88 67912005 ENVIRO.	A40S 09/07/88 68231005 ENVIRO.	A40S 09/20/88 68695005 ENVIRO.	1980 - 3rd Qrtr 1988 MAX	MIN	NO. PTS.	NO. BMRL	NO. N.D.
1) VOLATILE ORGANIC COMPOUNDS									
Benzene	ug/l	ND@1.0	NA	NA	0.00	0.00	1	0	1
Bromodichloromethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Bromoform	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Bromomethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Carbon tetrachloride	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Chlorobenzene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Chloroethane	ug/l	ND@1.0	ND@1.0	1.5	1.50	0.00	3	0	2
2-Chloroethylvinyl ether	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Chloroform	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Chloromethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Dibromochloromethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,2-dichlorobenzene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,3-dichlorobenzene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,4-dichlorobenzene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Dichlorodifluoromethane	ug/l	NA	ND@1.0	ND@1.0	0.00	0.00	2	0	2
1,1-Dichloroethane	ug/l	87	51	71	87.00	51.00	3	0	0
1,2-Dichloroethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,1-Dichloroethylene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,2-Trans-dichloroethylene	ug/l	15	19	23	23.00	15.00	3	0	0
1,2-Dichloropropane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
cis-1,3-Dichloropropene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
trans-1,3-Dichloropropene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Ethylbenzene	ug/l	ND@1.0	NA	NA	0.00	0.00	1	0	1
Methylene chloride	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,1,2,2-Tetrachloroethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Tetrachloroethylene	ug/l	ND@1.0	1.1	ND@1.0	1.10	0.00	3	0	2
Toluene	ug/l	11	NA	NA	11.00	11.00	1	0	0
1,1,2,-trichloro-1,2,2,trifluoroethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,1,1-Trichloroethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,1,2-Trichloroethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Trichloroethylene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Trichlorofluoromethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Vinyl chloride	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Xylenes, Total	ug/l	ND@1.0	NA	NA	0.00	0.00	1	0	1
7) OIL AND GREASE									
Fuel Oil #1	ul/l	ND@0.1	NA	NA	0.00	0.00	1	0	1
Fuel Oil #2	ul/l	ND@0.1	NA	NA	0.00	0.00	1	0	1
Fuel Oil #3	ul/l	ND@0.1	NA	NA	0.00	0.00	1	0	1
Fuel Oil #4	ul/l	ND@0.1	NA	NA	0.00	0.00	1	0	1
Fuel Oil #5	ul/l	ND@0.1	NA	NA	0.00	0.00	1	0	1
Fuel Oil #6	ul/l	ND@0.1	NA	NA	0.00	0.00	1	0	1
Oil & Grease	mg/l	ND@0.5	NA	NA	0.00	0.00	1	0	1

IBM POUGHKEEPSIE - GROUNDWATER MONITORING PROGRAM
WELL NO. A41S

WELL		A41S	A41S	A41S					
DATE		08/26/88	09/07/88	09/20/88	1980 - 3rd Qrtr 1988				
LAB ID		67912004	68231004	68695001			NO.	NO.	NO.
LAB		ENVIRO.	ENVIRO.	ENVIRO.	MAX	MIN	PTS.	BHRL	N.D.
PARAMETER	UNIT								
1) VOLATILE ORGANIC COMPOUNDS									
Benzene	ug/l	ND@1.0	NA	NA	0.00	0.00	1	0	1
Bromodichloromethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Bromoform	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Bromomethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Carbon tetrachloride	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Chlorobenzene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Chloroethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
2-Chloroethylvinyl ether	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Chloroform	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Chloromethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Dibromochloromethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,2-dichlorobenzene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,3-dichlorobenzene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,4-dichlorobenzene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Dichlorodifluoromethane	ug/l	NA	ND@1.0	ND@1.0	0.00	0.00	2	0	2
1,1-Dichloroethane	ug/l	ND@1.0	1.2	ND@1.0	1.20	0.00	3	0	2
1,2-Dichloroethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,1-Dichloroethylene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,2-Trans-dichloroethylene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,2-Dichloropropane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
cis-1,3-Dichloropropene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
trans-1,3-Dichloropropene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Ethylbenzene	ug/l	ND@1.0	NA	NA	0.00	0.00	1	0	1
Methylene chloride	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,1,2,2-Tetrachloroethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Tetrachloroethylene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Toluene	ug/l	ND@1.0	NA	NA	0.00	0.00	1	0	1
1,1,2,-trichloro-1,2,2,trifluoroethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,1,1-Trichloroethane	ug/l	ND@1.0	1.6	ND@1.0	1.60	0.00	3	0	2
1,1,2-Trichloroethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Trichloroethylene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Trichlorofluoromethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Vinyl chloride	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Xylenes, Total	ug/l	ND@1.0	NA	NA	0.00	0.00	1	0	1
7) OIL AND GREASE									
Fuel Oil #1	ul/l	ND@0.1	NA	NA	0.00	0.00	1	0	1
Fuel Oil #2	ul/l	ND@0.1	NA	NA	0.00	0.00	1	0	1
Fuel Oil #3	ul/l	ND@0.1	NA	NA	0.00	0.00	1	0	1
Fuel Oil #4	ul/l	ND@0.1	NA	NA	0.00	0.00	1	0	1
Fuel Oil #5	ul/l	ND@0.1	NA	NA	0.00	0.00	1	0	1
Fuel Oil #6	ul/l	ND@0.1	NA	NA	0.00	0.00	1	0	1
Oil & Grease	mg/l	ND@0.5	NA	NA	0.00	0.00	1	0	1

IBM POUGHKEEPSIE - GROUNDWATER MONITORING PROGRAM
WELL NO. A42S

WELL / DATE / LAB ID / LAB / PARAMETER	UNIT	A42S 08/26/88 67912003 ENVIRO.	A42S 09/07/88 68231003 ENVIRO.	A42S 09/14/88 68523001 ENVIRO.	A42S 09/14/88 68523001 ENVIRO.	A42S 09/20/88 68695002 ENVIRO.	1980 - 3rd Qrtr 1988 MAX	MIN	NO. PTS.	NO. BMRL	NO. N.D.
1) VOLATILE ORGANIC COMPOUNDS											
Acrolein	ug/l	NA	NA	ND@1000	NA	NA	0.00	0.00	1	0	1
Acrylonitrile	ug/l	NA	NA	ND@1000	NA	NA	0.00	0.00	1	0	1
Benzene	ug/l	ND@10	NA	ND@50	NA	NA	0.00	0.00	2	0	2
Bromodichloromethane	ug/l	ND@10	ND@10	ND@50	NA	ND@10	0.00	0.00	4	0	4
Bromoform	ug/l	ND@10	ND@10	ND@50	NA	ND@10	0.00	0.00	4	0	4
Bromomethane	ug/l	ND@10	ND@10	ND@50	NA	ND@10	0.00	0.00	4	0	4
Carbon tetrachloride	ug/l	ND@10	ND@10	ND@50	NA	ND@10	0.00	0.00	4	0	4
Chlorobenzene	ug/l	ND@10	ND@10	ND@50	NA	ND@10	0.00	0.00	4	0	4
Chloroethane	ug/l	43	ND@10	ND@50	NA	ND@10	43.00	0.00	4	0	3
2-Chloroethylvinyl ether	ug/l	ND@10	ND@10	ND@50	NA	ND@10	0.00	0.00	4	0	4
Chloroform	ug/l	ND@10	15	ND@50	NA	33	33.00	0.00	4	0	2
Chloromethane	ug/l	ND@10	ND@10	ND@50	NA	ND@10	0.00	0.00	4	0	4
Dibromochloromethane	ug/l	ND@10	ND@10	ND@50	NA	ND@10	0.00	0.00	4	0	4
1,2-dichlorobenzene	ug/l	ND@10	ND@10	ND@50	ND@10	ND@10	0.00	0.00	5	0	5
1,3-dichlorobenzene	ug/l	ND@10	ND@10	ND@50	ND@10	ND@10	0.00	0.00	5	0	5
1,4-dichlorobenzene	ug/l	ND@10	ND@10	ND@50	ND@10	ND@10	0.00	0.00	5	0	5
Dichlorodifluoromethane	ug/l	NA	ND@10	NA	NA	ND@10	0.00	0.00	2	0	2
1,1-Dichloroethane	ug/l	610	510	790	NA	590	790.00	510.00	4	0	0
1,2-Dichloroethane	ug/l	ND@10	ND@10	ND@50	NA	ND@10	0.00	0.00	4	0	4
1,1-Dichloroethylene	ug/l	ND@10	ND@10	ND@50	NA	ND@10	0.00	0.00	4	0	4
1,2-Trans-dichloroethylene	ug/l	74	59	52	NA	49	74.00	49.00	4	0	0
1,2-Dichloropropane	ug/l	ND@10	ND@10	ND@50	NA	ND@10	0.00	0.00	4	0	4
cis-1,3-Dichloropropene	ug/l	ND@10	ND@10	ND@50	NA	ND@10	0.00	0.00	4	0	4
trans-1,3-Dichloropropene	ug/l	ND@10	ND@10	ND@50	NA	ND@10	0.00	0.00	4	0	4
Ethylbenzene	ug/l	ND@10	NA	ND@50	NA	NA	0.00	0.00	2	0	2
Methylene chloride	ug/l	ND@10	ND@10	21	NA	ND@10	21.00	0.00	4	0	3
1,1,2,2-Tetrachloroethane	ug/l	ND@10	ND@10	ND@50	NA	ND@10	0.00	0.00	4	0	4
Tetrachloroethylene	ug/l	ND@10	ND@10	ND@50	NA	ND@10	0.00	0.00	4	0	4
Toluene	ug/l	39	NA	51	NA	NA	51.00	39.00	2	0	0
1,1,2,-trichloro-1,2,2,trifluoroethane	ug/l	ND@10	ND@10	NA	NA	ND@10	0.00	0.00	3	0	3
1,1,1-Trichloroethane	ug/l	ND@10	ND@10	ND@50	NA	ND@10	0.00	0.00	4	0	4
1,1,2-Trichloroethane	ug/l	ND@10	ND@10	ND@50	NA	ND@10	0.00	0.00	4	0	4
Trichloroethylene	ug/l	ND@10	ND@10	ND@50	NA	ND@10	0.00	0.00	4	0	4
Trichlorofluoromethane	ug/l	ND@10	ND@10	ND@50	NA	ND@10	0.00	0.00	4	0	4
Vinyl chloride	ug/l	23	ND@10	ND@50	NA	ND@10	23.00	0.00	4	0	3
Xylenes, Total	ug/l	52	NA	ND@50	NA	NA	52.00	0.00	2	0	1
2) METALS											
Antimony (Sb)	mg/l	NA	NA	ND@0.060	NA	NA	0.00	0.00	1	0	1
Arsenic (As)	mg/l	NA	NA	0.050	NA	NA	0.05	0.05	1	0	0
Beryllium (Be)	mg/l	NA	NA	ND@0.005	NA	NA	0.00	0.00	1	0	1
Cadmium (Cd)	mg/l	NA	NA	ND@0.002	NA	NA	0.00	0.00	1	0	1
Chromium (Cr)	mg/l	NA	NA	0.03	NA	NA	0.03	0.03	1	0	0
Copper (Cu)	mg/l	NA	NA	ND@0.05	NA	NA	0.00	0.00	1	0	1
Lead (Pb)	mg/l	NA	NA	ND@0.005	NA	NA	0.00	0.00	1	0	1
Mercury (Hg)	mg/l	NA	NA	ND@0.0004	NA	NA	0.00	0.00	1	0	1
Nickel (Ni)	mg/l	NA	NA	ND@0.05	NA	NA	0.00	0.00	1	0	1

IBM POUGHKEEPSIE - GROUNDWATER MONITORING PROGRAM
WELL NO. A43S

WELL DATE LAB ID LAB PARAMETER	UNIT	A43S 08/26/88 67912002 ENVIRO.	A43S 09/07/88 682321002 ENVIRO.	A43S 09/20/88 68695003 ENVIRO.	1980 - 3rd Qrtr 1988 MAX	MIN	NO. PTS.	NO. BHRL	NO. N.D.
1) VOLATILE ORGANIC COMPOUNDS									
Benzene	ug/l	ND@1.0	NA	NA	0.00	0.00	1	0	1
Bromodichloromethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Bromoform	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Bromomethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Carbon tetrachloride	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Chlorobenzene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Chloroethane	ug/l	2.3	7.7	ND@1.0	7.70	0.00	3	0	1
2-Chloroethylvinyl ether	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Chloroform	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Chloromethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Dibromochloromethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,2-dichlorobenzene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,3-dichlorobenzene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,4-dichlorobenzene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Dichlorodifluoromethane	ug/l	NA	ND@1.0	ND@1.0	0.00	0.00	2	0	2
1,1-Dichloroethane	ug/l	84	84	73	84.00	73.00	3	0	0
1,2-Dichloroethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,1-Dichloroethylene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,2-Trans-dichloroethylene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,2-Dichloropropane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
cis-1,3-Dichloropropene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
trans-1,3-Dichloropropene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Ethylbenzene	ug/l	ND@1.0	NA	NA	0.00	0.00	1	0	1
Methylene chloride	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,1,2,2-Tetrachloroethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Tetrachloroethylene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Toluene	ug/l	ND@1.0	NA	NA	0.00	0.00	1	0	1
1,1,2,-trichloro-1,2,2,trifluoroethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,1,1-Trichloroethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,1,2-Trichloroethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Trichloroethylene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Trichlorofluoromethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Vinyl chloride	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Xylenes, Total	ug/l	ND@1.0	NA	NA	0.00	0.00	1	0	1
7) OIL AND GREASE									
Fuel Oil #1	ul/l	ND@1.0	NA	NA	0.00	0.00	1	0	1
Fuel Oil #2	ul/l	ND@1.0	NA	NA	0.00	0.00	1	0	1
Fuel Oil #3	ul/l	ND@1.0	NA	NA	0.00	0.00	1	0	1
Fuel Oil #4	ul/l	ND@1.0	NA	NA	0.00	0.00	1	0	1
Fuel Oil #5	ul/l	ND@1.0	NA	NA	0.00	0.00	1	0	1
Fuel Oil #6	ul/l	ND@1.0	NA	NA	0.00	0.00	1	0	1
Oil & Grease	mg/l	1.5	NA	NA	1.50	1.50	1	0	0

IBM POUGHKEEPSIE - GROUNDWATER MONITORING PROGRAM
WELL NO. A44S

WELL DATE LAB ID LAB PARAMETER	UNIT	A44S 08/26/88 67912001 ENVIRO.	A44S 09/07/88 68231001 ENVIRO.	A44S 09/20/88 68695004 ENVIRO.	1980 - 3rd Qrtr 1988 MAX	MIN	NO. PTS.	NO. BHRL	NO. N.D.
1) VOLATILE ORGANIC COMPOUNDS									
Benzene	ug/l	ND@1.0	NA	NA	0.00	0.00	1	0	1
Bromodichloromethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	1	0	1
Bromoform	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Bromomethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Carbon tetrachloride	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Chlorobenzene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Chloroethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
2-Chloroethylvinyl ether	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Chloroform	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Chloromethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Dibromochloromethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,2-dichlorobenzene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,3-dichlorobenzene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,4-dichlorobenzene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Dichlorodifluoromethane	ug/l	NA	ND@1.0	ND@1.0	0.00	0.00	2	0	2
1,1-Dichloroethane	ug/l	13	9.9	3.7	13.00	3.70	3	0	0
1,2-Dichloroethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,1-Dichloroethylene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,2-Trans-dichloroethylene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,2-Dichloropropane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
cis-1,3-Dichloropropene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
trans-1,3-Dichloropropene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Ethylbenzene	ug/l	ND@1.0	NA	NA	0.00	0.00	1	0	1
Methylene chloride	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,1,2,2-Tetrachloroethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Tetrachloroethylene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Toluene	ug/l	ND@1.0	NA	NA	0.00	0.00	1	0	1
1,1,2,-trichloro-1,2,2,trifluoroethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,1,1-Trichloroethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,1,2-Trichloroethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Trichloroethylene	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Trichlorofluoromethane	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Vinyl chloride	ug/l	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Xylenes, Total	ug/l	ND@1.0	NA	NA	0.00	0.00	1	0	1
7) OIL AND GREASE									
Fuel Oil #1	ul/l	ND@0.1	NA	NA	0.00	0.00	1	0	1
Fuel Oil #2	ul/l	ND@0.1	NA	NA	0.00	0.00	1	0	1
Fuel Oil #3	ul/l	ND@0.1	NA	NA	0.00	0.00	1	0	1
Fuel Oil #4	ul/l	ND@0.1	NA	NA	0.00	0.00	1	0	1
Fuel Oil #5	ul/l	ND@0.1	NA	NA	0.00	0.00	1	0	1
Fuel Oil #6	ul/l	ND@0.1	NA	NA	0.00	0.00	1	0	1
Oil & Grease	mg/l	4.0	NA	NA	4.00	4.00	1	0	0

IBM POUGHKEEPSIE - GROUNDWATER MONITORING PROGRAM
MAIN PLANT WELL NO. 145G

WELL		145G	145G	145G	145G	-------------	1980 - 3rd Qrtr 1988	---------------		
DATE		09/01/88	09/01/88	09/13/88	09/20/88					
LAB ID		68093002	68093002	68445003	68746001			NO.	NO.	NO.
LAB		ENVIRO.	ENVIRO.	ENVIRO.	ENVIRO.	MAX	MIN	PTS.	>MRL	N.D.
PARAMETER	UNIT									
1) VOLATILE ORGANIC COMPOUNDS										
Benzene	ug/l	ND@0.5	NA	NA	NA	0.00	0.00	1	0	1
Bromodichloromethane	ug/l	ND@1.0	NA	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Bromoform	ug/l	ND@1.0	NA	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Bromomethane	ug/l	ND@1.0	NA	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Carbon tetrachloride	ug/l	ND@1.0	NA	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Chlorobenzene	ug/l	ND@0.5	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	4	0	4
Chloroethane	ug/l	ND@1.0	NA	ND@1.0	ND@1.0	0.00	0.00	3	0	3
2-Chloroethylvinyl ether	ug/l	ND@1.0	NA	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Chloroform	ug/l	ND@1.0	NA	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Chloromethane	ug/l	ND@1.0	NA	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Dibromochloromethane	ug/l	ND@1.0	NA	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,2-dichlorobenzene	ug/l	ND@0.5	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	4	0	4
1,3-dichlorobenzene	ug/l	ND@0.5	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	4	0	4
1,4-dichlorobenzene	ug/l	ND@0.5	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	4	0	4
Dichlorodifluoromethane	ug/l	ND@1.0	NA	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,1-Dichloroethane	ug/l	ND@1.0	NA	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,2-Dichloroethane	ug/l	ND@1.0	NA	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,1-Dichloroethylene	ug/l	ND@1.0	NA	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,2-Trans-dichloroethylene	ug/l	ND@1.0	NA	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,2-Dichloropropane	ug/l	ND@1.0	NA	ND@1.0	ND@1.0	0.00	0.00	3	0	3
cis-1,3-Dichloropropene	ug/l	ND@1.0	NA	ND@1.0	ND@1.0	0.00	0.00	3	0	3
trans-1,3-Dichloropropene	ug/l	ND@1.0	NA	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Ethylbenzene	ug/l	ND@0.5	NA	NA	NA	0.00	0.00	1	0	1
Methylene chloride	ug/l	ND@1.0	NA	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,1,2,2-Tetrachloroethane	ug/l	ND@1.0	NA	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Tetrachloroethylene	ug/l	ND@0.5	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	4	0	4
Toluene	ug/l	ND@0.5	NA	NA	NA	0.00	0.00	1	0	1
1,1,2,-trichloro-1,2,2,trifluoroethane	ug/l	ND@1.0	NA	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,1,1-Trichloroethane	ug/l	ND@1.0	NA	ND@1.0	ND@1.0	0.00	0.00	3	0	3
1,1,2-Trichloroethane	ug/l	ND@1.0	NA	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Trichloroethylene	ug/l	ND@0.5	ND@1.0	ND@1.0	ND@1.0	0.00	0.00	4	0	4
Trichlorofluoromethane	ug/l	ND@1.0	NA	ND@1.0	ND@1.0	0.00	0.00	3	0	3
Vinyl chloride	ug/l	ND@1.0	NA	ND@1.0	ND@1.0	0.00	0.00	3	0	3
m-Xylene	ug/l	ND@0.5	NA	NA	NA	0.00	0.00	1	0	1
4) BASE NEUTRAL COMPOUNDS										
Hexachlorobutadiene	ug/l	ND@0.5	NA	NA	NA	0.00	0.00	1	0	1
Naphthalene	ug/l	ND@0.5	NA	NA	NA	0.00	0.00	1	0	1
1,2,4,-Trichlorobenzene	ug/l	ND@0.5	NA	NA	NA	0.00	0.00	1	0	1
7) OIL AND GREASE										
Fuel Oil #1	mg/l	ND@0.1	NA	NA	NA	0.00	0.00	1	0	1
Fuel Oil #2	mg/l	ND@0.1	NA	NA	NA	0.00	0.00	1	0	1
Fuel Oil #3	mg/l	ND@0.1	NA	NA	NA	0.00	0.00	1	0	1
Fuel Oil #4	mg/l	ND@0.1	NA	NA	NA	0.00	0.00	1	0	1
Fuel Oil #5	mg/l	ND@0.1	NA	NA	NA	0.00	0.00	1	0	1
Fuel Oil #6	mg/l	ND@0.1	NA	NA	NA	0.00	0.00	1	0	1
Oil & Grease	mg/l	1.0	NA	NA	NA	1.00	1.00	1	1	0