

AlliedSignal Inc.
Aerospace Equipment Systems
717 North Bendix Drive
South Bend, IN 46620

219 231 3000

May 10, 1999



Mr. Ed Joniskan
Project Manager
Indiana Department of Environmental Management
VRP - Section
Post Office Box 6015
Indianapolis, IN 46206-6015

**RE: 1st Quarter 1999 Groundwater Monitoring Report
AlliedSignal - South Bend, Indiana**

Dear Ed:

Please find enclosed two copies of the 1st Quarter 1999 Groundwater Monitoring Report for the AlliedSignal facility located at 717 North Bendix Drive in South Bend, Indiana. Should there be any question in this regard please feel free to contact me at (219) 231-3412.

Very Cordially,
ALLIEDSIGNAL, INC.

Ray White, Manager
Site Remediation
Midwest Region

Enclosure

IDEM Office of Land Quality - Fileroom Stamp
VRP Project Name: <u>Honey well</u>
VRP#: <u>6980601</u> File Code: <u>330</u>
Description: <u>GTL Report Groundwater Quality</u>
Confidential? <u> </u> Yes <u> </u> No <u> </u>
Deliberative? <u> </u> Yes <u> </u> No <u> </u>



May 5, 1999

Mr. Ray White
Manager, Site Remediation
AlliedSignal, Inc.
717 N. Bendix Drive
South Bend, Indiana 46620

Subject: 1st Quarter 1999 Discharge Permit Reporting
AlliedSignal Industrial Complex, South Bend, Indiana
Discharge Permit SB004:4

Dear Mr. White:

This letter documents the 1st Quarter groundwater monitoring activities conducted at the AlliedSignal Industrial Complex (AlliedSignal), South Bend, Indiana. Sampling activities were completed by Harding Lawson Associates (HLA) during the week of March 5th, 1999. Activities during this period involved sampling of operating recovery wells and groundwater level measurements. A discussion of sampling methodologies, analytical procedures, and results follows.

Introduction

Groundwater discharge limitations and monitoring requirements for the AlliedSignal Complex are set forth in Discharge Permit SB004:4, by the Department of Public Works, City of South Bend, Indiana. Under the permit, AlliedSignal must report the analytical results of groundwater samples collected from all wells discharging into city sewers.

Currently, there are three operating VOC Recovery Wells (EW-1, EW-2, EW-3) and four operating Naphtha Recovery Wells (E-3, RWB16, RWB22, and RWB-23). The VOC Recovery Wells were installed and placed into service in the summer of 1998, replacing a network of 21 smaller diameter/shallower depth recovery wells originally installed in 1986. Naphtha Recovery wells E-3, RWB16, and RWB22 were installed in the late 1970's/early 1980's. Additionally, Naphtha Recovery well RWB-23 was placed on-line in January 1999 to enhance containment of groundwater on-site.

The quarterly monitoring program consists of measuring the depth to groundwater in the 78 groundwater monitoring and extraction wells at the facility. Groundwater samples for laboratory analysis are collected from a select group of wells. For compliance with the discharge permit, the 4 naphtha and 3 VOC recovery wells are sampled quarterly for VOCs, and semi-annually for total lead, total nickel, total chromium, total cyanide, and total phenols. In addition to the permit-required sampling, a select group of 31 monitoring wells are also sampled semi-annually for VOCs and annually for dissolved lead, dissolved nickel, dissolved chromium, total cyanide, and total phenols to evaluate groundwater quality trends.

Water Level Measurements

The depth-to-groundwater was measured in the 70 monitoring wells, 4 naphtha recovery wells, 2 former naphtha recovery wells and 3 VOC recovery wells that comprise the groundwater monitoring network at the facility. At each well location, the depth to groundwater was measured from the top of the well casing to the nearest 0.01 foot using an electronic water level indicator.

Groundwater elevations were calculated by subtracting the depth to groundwater at each well from the top of the well casing elevation, which is referenced to U.S. Geological Survey Mean Sea Level. Figure 1 represents the generalized groundwater flow pattern in the water table monitoring wells. Figure 2 presents the generalized groundwater flow pattern in the deep flow system.

As part of the quarterly event, the top of the well casing of the recently installed Naphtha Recovery well RWB-23 and four of the existing Naphtha Recovery wells (RWB6, RWB16, RWB22 and E3) were surveyed by a registered land surveyor. The survey provided more current and reliable elevation data in order to provide more accurate groundwater elevation data.

Groundwater Sampling

Groundwater samples were collected from 3 of the 4 normally operating naphtha recovery wells (E3, RWB16, and RWB23). Well RWB-22 was not sampled during this event because the well was not operational due a failed motor. The motor has since been repaired and the well is now operational. Groundwater samples were also collected from the 3 VOC recovery wells (EW-1, EW-2 and EW-3). Sampling procedures are described below.

Recovery wells were purged and sampled through existing spigots on discharge lines. In general, approximately 5 gallons of groundwater were purged from each well prior to sampling. During purging, the pH, specific conductivity and temperature of the groundwater were measured with a Horiba U10 Water Checker. Once purging was completed, a groundwater sample was collected. Collected samples were placed into a cooler on ice until picked up by the laboratory courier.

In accordance with quality control (QC) procedures, a duplicate sample (designated MW-100) was collected from Naphtha Recovery well RWB-23. The duplicate sample was analyzed for the same parameters as sample RWB-23 to assess the homogeneity of sampled media and the precision of the sampling and analytical procedures. Also, a laboratory-prepared trip blank was included in the sample cooler for laboratory analysis. Trip blanks are handled in the same manner as the other sample containers, traveling from the laboratory, to the field, and back to the laboratory with the other containers. Trip blank analytical results are used to determine if collected samples were potentially contaminated during handling or shipping.

Analytical Procedures

The samples collected during the 1st Quarter groundwater monitoring event were submitted to TriMatrix Laboratories, Inc., Grand Rapids, Michigan for VOC analysis by Method 8260.

Results

A potentiometric surface map of the shallow aquifer was developed to evaluate the effectiveness of the naphtha and VOC recovery well systems. As indicated on Figure 1, shallow groundwater from the western portion of the facility flows toward the active naphtha recovery wells. Shallow groundwater in the south-central portion of the site (i.e., Plant 1 and Plant 9 area) flows toward the VOC Recovery wells. The figure indicates that off-site migration of shallow groundwater is being inhibited by the Naphtha and VOC Recovery wells.

Figure 2 is a potentiometric surface map based on water levels measured in deep flow system monitoring wells. As indicated on the figure, the deep groundwater flow direction is northeasterly. It should be noted that the potentiometric map for the deeper portion of the aquifer includes groundwater level data from wells ranging in depth from 50 feet to over 200 feet deep. Considering the range in well depths, the potentiometric map for the deeper portion of the aquifer represents the general direction of groundwater flow and does not consider the potential for vertical gradients within the aquifer.

Analytical summary tables for the March 1999 sampling event are included as Attachment A. In general, VOC concentrations in samples from the existing recovery well were similar to the previous sampling event. Good correlation was observed between the primary and duplicate samples collected from well RWB23, with the exception of toluene and trans-1,2-dichlorethene. The relative percent difference between the two samples exceeded acceptable ranges. Considering this, these compounds within these samples must be considered estimated. The trip blank sample was non-detectable for VOCs, indicating that cross-contamination of collected samples did not occur during sample handling.

* * * * *

The 2nd Quarter 1999 sampling event is scheduled for the week of June 7, 1999. If you have any questions regarding the information contained in this letter, please contact me at (248) 489-8040.

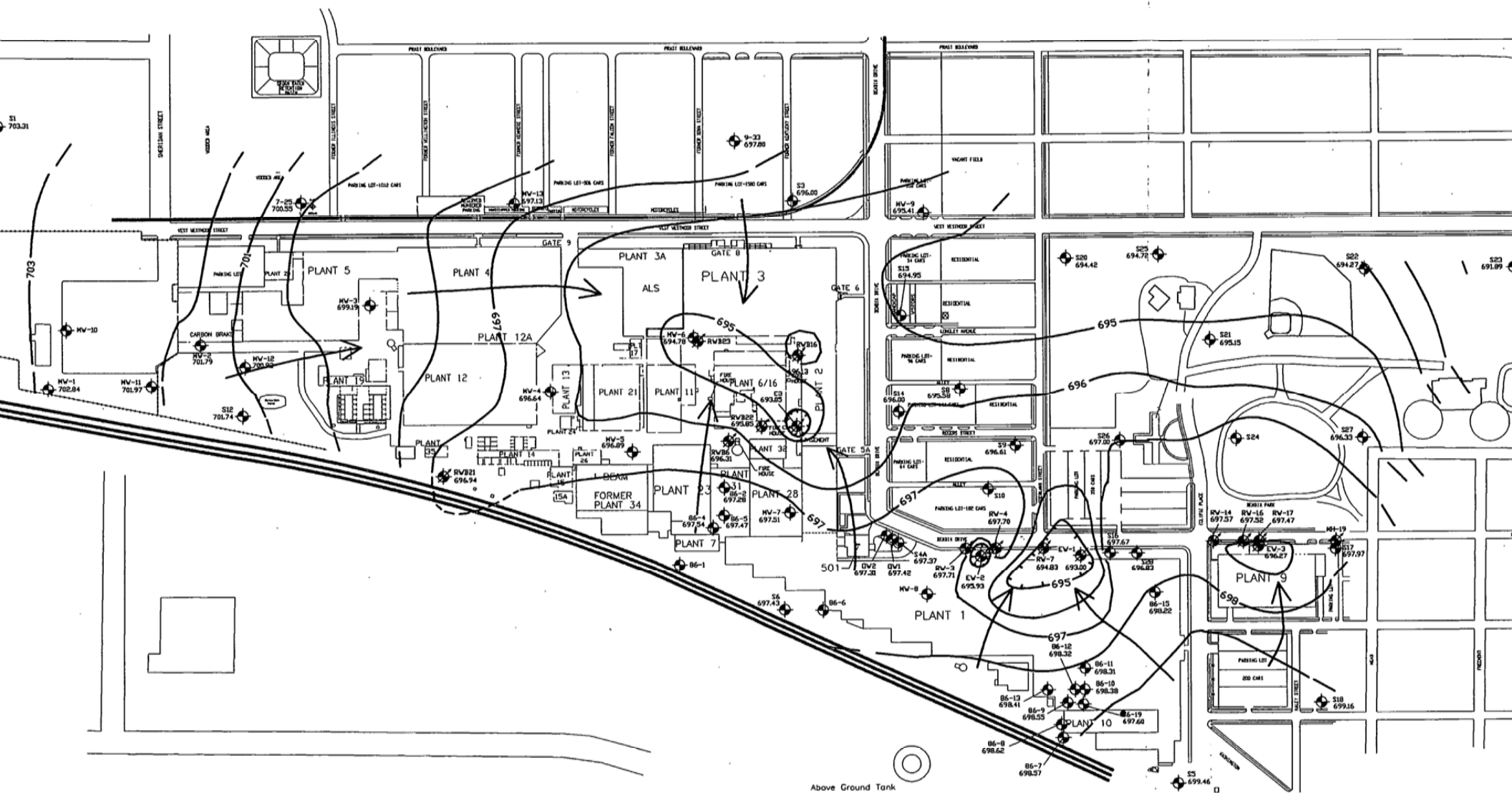
Sincerely,

HARDING LAWSON ASSOCIATES



Donald A. Walsh
Associate Project Manager

attachments



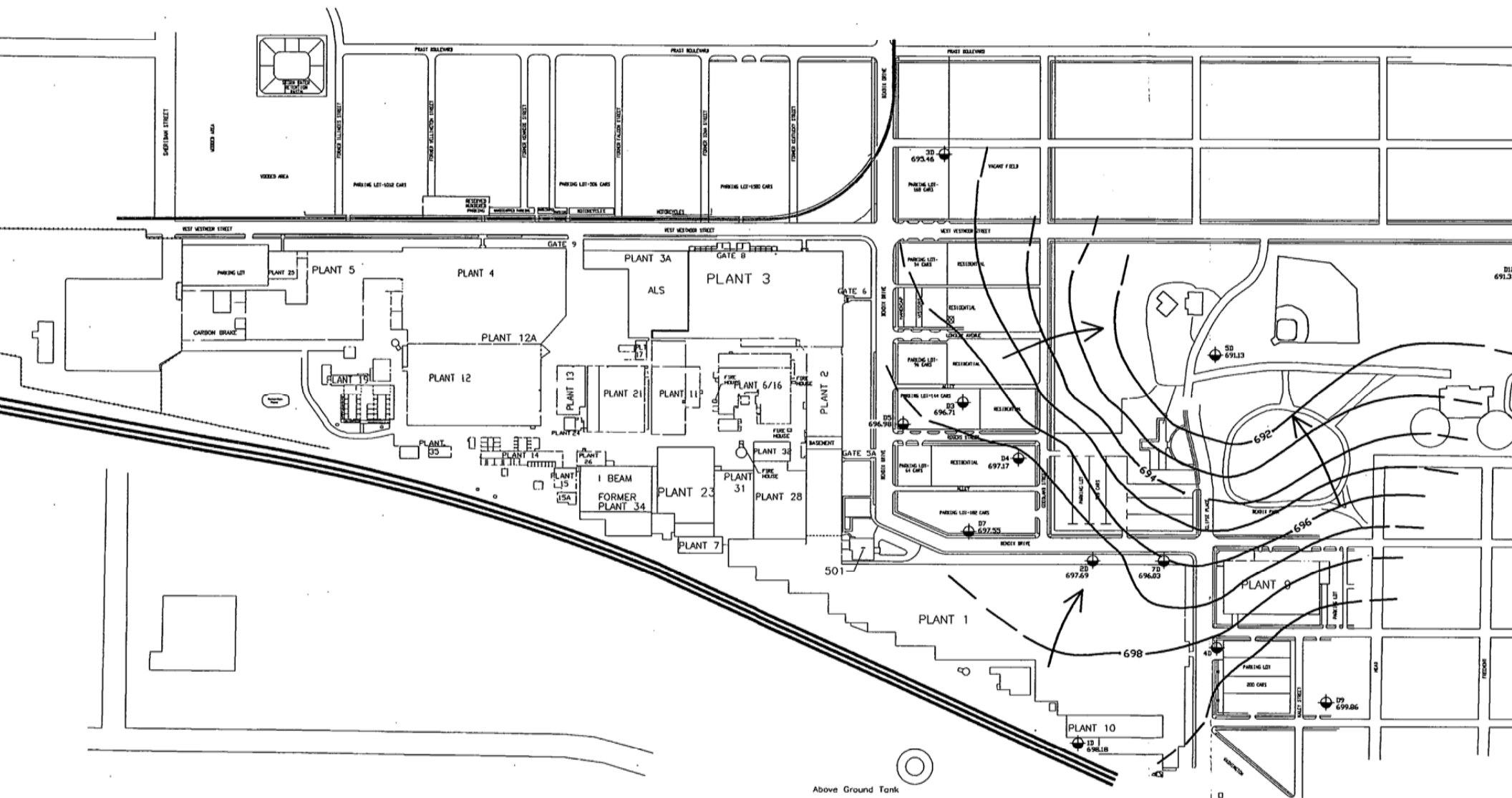
Monitoring Well Location
Elevation Measured on April 22, 1999

Groundwater Contour
Elevation Measured on April 22, 1999

Groundwater Potentiometric Contour, feet above
Sea Level

Groundwater Flow Direction

FIG 1
POTENTIOMETRIC SURFACE MAP, SHALLOW WELLS, APRIL 1999
QUARTERLY GROUNDWATER MONITORING DATA
ALLIEDSIGNAL INDUSTRIAL COMPANY
SOUTH BEND, INDIANA
 Prepared by: **Harding Lawson Associates**



Monitoring Well Location
 Water Elevation Measured on April 22, 1999
 Water Potentiometric Contour, feet above
 Sea Level
 Water Flow Direction

0 250 500
 Scale in feet

FIG
POTENTIOMETRIC SURFACE MAP, DEEP WELLS, APRIL 1999
QUARTERLY GROUNDWATER MONITORING
ALLIEDSIGNAL INDUSTRIAL COMPANY
SOUTH BEND, INDIANA
 Harding Lawson Associates

ATTACHMENT A

GROUNDWATER ANALYTICAL RESULTS

Analytical Summary Table
 Naptha Recovery Wells
 Quarterly Monitoring Program - 3/99
 AlliedSignal Industrial Complex
 South Bend, Indiana

CONSTITUENT (Units in µg/L)	SITE	DATE	RESULT TYPE	Primary	Primary	Primary	Duplicate
Acrolein	E3	3/2/99	Primary	< 100	< 100	< 100	< 100
Acrylonitrile	E3	3/2/99	Primary	< 5.0	< 60	< 100	< 120
Benzene	E3	3/2/99	Primary	< 5.0	60	100	120
Bromoform	E3	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
Bromomethane	E3	3/2/99	Primary	< 10	< 10	< 10	< 10
Carbon tetrachloride	E3	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
Chlorobenzene	E3	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
Chlorodibromomethane	E3	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
Chloroethane	E3	3/2/99	Primary	< 10	< 10	< 10	< 10
2-Chloroethyl Vinyl Ether	E3	3/2/99	Primary	< 10	< 10	< 10	< 10
Chloroform	E3	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
Chloromethane	E3	3/2/99	Primary	< 10	< 10	< 10	< 10
Dichlorobromomethane	E3	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
Dichlorodifluoromethane	E3	3/2/99	Primary	< 10	< 10	< 10	< 10
1,1-Dichloroethane	E3	3/2/99	Primary	7	< 5.0	< 5.0	27
1,2-Dichloroethane	E3	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
1,1-Dichloroethylene	E3	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
trans-1,2-Dichloroethene	E3	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
cis-1,2-Dichloroethene	E3	3/2/99	Primary	22	< 5.0	< 5.0	2000
1,2-Dichloropropane	E3	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
cis-1,3-Dichloropropene	E3	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
trans-1,3-Dichloropropene	E3	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
Ethylbenzene	E3	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
Methylene chloride	E3	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
1,1,2,2-Tetrachloroethane	E3	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
Tetrachloroethene	E3	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0

Analytical Summary Table
 Naptha Recovery Wells
 Quarterly Monitoring Program - 3/99
 AlliedSignal Industrial Complex
 South Bend, Indiana

CONSTITUENT (Units in µg/L)	SITE	DATE	RESULT TYPE	Primary	Primary	Primary	Duplicate
Toluene	E3	3/2/99	Primary	< 5.0	< 5.0	37	1.54
1,1,1-Trichloroethane				< 5.0	< 5.0	20	< 5.0
1,1,2-Trichloroethane				< 5.0	< 5.0	< 5.0	< 5.0
Trichloroethene				< 5.0	< 5.0	230	< 260.0
Trichlorofluoromethane				< 10	< 10	< 10	< 10
Vinyl Chloride				< 10	< 10	580	< 620
Acetone				< 100	< 100	< 100	< 100
Methyl Ethyl Ketone				< 100	< 100	< 100	< 100
Styrene				< 5.0	< 5.0	< 5.0	< 5.0
Xylene (Total)				< 10	< 10	< 10	< 10
Vinyl Acetate				< 50	< 50	< 50	< 50
2-Hexanone				< 50	< 50	< 50	< 50
4-Methyl-2-Pentanone				< 50	< 50	< 50	< 50
Carbon Disulfide				< 5.0	< 5.0	< 5.0	< 5.0
1,2-Dichlorobenzene				< 5.0	< 5.0	< 5.0	< 5.0
1,3-Dichlorobenzene				< 5.0	< 5.0	< 5.0	< 5.0
1,4-Dichlorobenzene				< 5.0	< 5.0	< 5.0	< 5.0

Notes: > = Not detected at indicated reporting limit.
 Values represent total concentrations unless noted.

Analytical Summary Table
 VOC Recovery Wells
 Quarterly Monitoring Program - 3/99
 AlliedSignal Industrial Complex
 South Bend, Indiana

CONSTITUENT (Units in µg/L)	SITE	DATE	RESULT TYPE	Primary	Primary	Primary	Primary
Acrolein	EW-1	3/2/99	Primary	< 100	< 100	< 100	< 100
Acrylonitrile	EW-1	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
Benzene	EW-1	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
Bromofom	EW-1	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
Bromomethane	EW-1	3/2/99	Primary	< 10	< 10	< 10	< 10
Carbon tetrachloride	EW-1	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
Chlorobenzene	EW-1	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
Chlorodibromomethane	EW-1	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
Chloroethane	EW-1	3/2/99	Primary	< 10	< 10	< 10	< 10
2-Chloroethyl Vinyl Ether	EW-1	3/2/99	Primary	< 10	< 10	< 10	< 10
Chloroform	EW-1	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
Chloromethane	EW-1	3/2/99	Primary	< 10	< 10	< 10	< 10
Dichlorobromomethane	EW-1	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
Dichlorodifluoromethane	EW-1	3/2/99	Primary	< 10	< 10	< 10	< 10
1,1-Dichloroethane	EW-1	3/2/99	Primary	32	42	< 5.0	< 5.0
1,2-Dichloroethane	EW-1	3/2/99	Primary	9.0	< 5.0	< 5.0	< 5.0
1,1-Dichloroethylene	EW-1	3/2/99	Primary	6.7	5.6	< 5.0	< 5.0
trans-1,2-Dichloroethene	EW-1	3/2/99	Primary	72	26	100	< 5.0
cis-1,2-Dichloroethene	EW-1	3/2/99	Primary	280	180	57	< 5.0
1,2-Dichloropropane	EW-1	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
cis-1,3-Dichloropropene	EW-1	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
trans-1,3-Dichloropropene	EW-1	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
Ethylbenzene	EW-1	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
Methylene chloride	EW-1	3/2/99	Primary	6.9 J	< 5.0	< 5.0	< 5.0
1,1,2,2-Tetrachloroethane	EW-1	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0
Tetrachloroethene	EW-1	3/2/99	Primary	< 5.0	< 5.0	< 5.0	< 5.0

Volatile Organic Compounds

Analytical Summary Table
 VOC Recovery Wells
 Quarterly Monitoring Program - 3/99
 AlliedSignal Industrial Complex
 South Bend, Indiana

CONSTITUENT (Units in µg/L)	SITE	DATE	RESULT TYPE
	EW-1	3/2/99	Primary
	EW-2	3/2/99	Primary
	EW-3	3/2/99	Primary
	Trip Blank	3/2/99	Primary

Volatile Organic Compounds (cont.)			
Toluene	< 5.0	< 5.0	< 5.0
1,1-Trichloroethane	< 5.0	30	< 5.0
1,1,2-Trichloroethane	< 5.0	< 5.0	< 5.0
Trichloroethene	200	67	35
Trichlorofluoromethane	< 10	< 10	< 10
Vinyl Chloride	39	< 10	< 10
Acetone	< 100	< 100	< 100
Methyl Ethyl Ketone	< 100	< 100	< 100
Styrene	< 5.0	< 5.0	< 5.0
Xylene (Total)	< 10	< 10	< 10
Vinyl Acetate	< 50	< 50	< 50
2-Hexanone	< 50	< 50	< 50
4-Methyl-2-Pentanone	< 50	< 50	< 50
Carbon Disulfide	< 5.0	< 5.0	< 5.0
1,2-Dichlorobenzene	< 5.0	< 5.0	< 5.0
1,3-Dichlorobenzene	< 5.0	< 5.0	< 5.0
1,4-Dichlorobenzene	< 5.0	< 5.0	< 5.0

Notes: > = Not detected at indicated reporting limit.
 Values represent total concentrations unless noted.