

## How to use CASEMR forms

### How to use ADEM's Corrective Action System-Effectiveness Report Forms

This Excel Workbook contains the 16 sections of the System-Effectiveness Monitoring Report (SEMR):

- Section 1 - Summary of Corrective Action
- Section 2 - Site Map/System Layout
- Section 3 - Well Inventory Table
- Section 4 - System Down Time Summary
- Section 5 - Site Visit Summary
- Section 6 - History of Sampling
- Section 7 - History of Major Maintenance/Repair Activities
- Section 8 - Free Product Information
- Section 9 - Groundwater Extraction Information
- Section 10 - Vapor Extraction Information
- Section 11 - Groundwater Influent and Effluent Analytical Data
- Section 12 - Air Effluent Concentration Data
- Section 13 - Infiltration Gallery/Recharge Well Information
- Section 14 - Monitoring/Recovery Well Analytical Data
- Section 15 - Groundwater Elevation Data
- Section 16 - Operation and Maintenance Costs Versus Time

These 16 sections are distributed over 15 forms. Sections requiring graphs are preformatted to generate the graphs.

#### Which Sections To Submit

For sites with remediation systems for pump & treat, soil vapor extraction, dual-phase extraction etc., all 16 sections should be completed and submitted. Section 16 is only required for sites covered by the Alabama Tank Trust Fund. For sites with Remediation by Natural Attenuation, sections 3, 4, 5, 6, 14, 15, and 16 should be completed and submitted.

#### Instructions On Completing the Sections

##### Section 1. Summary of Corrective Action

Indicate the type of remediation system(s) at the site. Complete the information regarding the type of equipment being used. The information in this section should only be changed when modifications are made to the system of the equipment. Simply place an "X" in the box(es) that apply for system type. Complete the "Date System Installed" and "System Startup Date" at the bottom of the page 1 on this section. Page 2 of this section covers the major equipment on the site. Brand name, Serial Number, Type, Capacity, and Warranty Expiration Date should be included for all pieces of equipment on-site. Space for comments is provided on both pages of this section.

##### Section 2 - Site Map/System Layout

Attach an "as-built" site diagram illustrating the layout of the remediation system. New drawings should not be generated unless system modifications have been made. The map should include the system layout, well locations, adjacent properties, north arrow, buildings, scale, etc. Also, a treatment schematic drawing should be provided.

##### Section 3 - Well Inventory Table

Provide a complete listing of all wells at the site including installation date, diameter, and screened interval (e.g., from 15 to 25 feet). The form may be modified to add additional wells. If there are no sparging/vapor extraction wells, then this table can be deleted to allow additional space for documenting additional monitoring or recovery wells. This form may be modified to allow for the addition of additional wells, but it should not be modified for additional columns.

## How to use CASEMR forms

### Section 4 - System Down Time Summary

List all known system down times. Explain the reason(s) for down time along with corrective measures taken to bring the system back into operation. Examples may include high tank shutoff, compressor or pump failures, plugging of discharge lines, wells, infiltration galleries or flow leeters, or other system problems. Note and discuss any system problems that are repeatedly occurring, or that have historically caused other system down time. For Remediation by Natural Attenuation Monitoring Reports, this section should be used to report any delays and the reason(s) for those delays in implementing the scheduled monitoring schedule. Examples may include obstructed or destroyed monitoring well.

### Section 5 - Site Visit Summary

Every site visit should be recorded in this section. Include the reason for the visit, the name, company and title of the person visiting the site. The most efficient method to complete this section is to keep the form at the site as an on-going field log. As long as it is legible, the field log company and title of the person visiting the site. The most efficient method to complete this can then be included in the report.

### Section 6 - History of Sampling

List all sampling events conducted at the site and the sources that were sampled (e.g., monitoring wells, recovery wells, recovery trenches, treatment systems).

### Section 7 - History of Major Maintenance/Repair Activities

Provide a cumulative record of major maintenance and/or repairs activities that have taken place. Examples may include repair or replacement of pumps, compressors, blowers, etc. The dismantling and cleaning of air strippers and oil/water separators should be discussed.

### Section 8 - Free Product Information

Discuss the presence of free product and indicate the method of recovery along with the volumes recovered during the reporting period. Provide the total volume (in gallons) of free product recovered to date and any significant recovery event that may have occurred. Free product thicknesses, elevation data, and a plot of total product recovered versus time should be provided. The form is preformatted to produce the graph. Simply replace the existing sample data with your actual data and the graph will be automatically modified. Use a new form for each free product recovery point. Simply use the "Move or Copy Sheet..." command under "EDIT" to copy the form and place the new copy behind the first form.

### Section 9 - Groundwater Extraction Information

Provide flow rate information for the groundwater extraction system. Include the design flow rates, actual average flow rates for the first month of operation, average flow rates since the startup (total water volume divided by total time since startup), and average flow rates for the reporting period. Also, indicate if the pump(s) is operating on a continual or cycling basis. Data for each extraction point should be provided. The form allows for reporting seven extraction points. If there are more than seven extraction points, select and copy the section and paste it below on the same page. There is room on the form to add an additional section. If Section 10 - Vapor Extraction Information is not going to be used and you need additional space for Section 9 reporting, then "Clear" Section 10 and "Paste" another copy of Section 9 in it's place.

### Section 10 - Vapor Extraction Information

Provide air flow rate information for the vapor extraction system. Include the air design flow rates, actual average air flow rates for the first month of operation, average air flow rates since the startup (total air volume divided by total time since startup), and average air flow rates for the reporting

## How to use CASEMR forms

period. Also, indicate if the blower(s) is operating on a continual or cycling basis. Data for each extraction point should be provided. The form allows for reporting seven extraction points. If there are more than seven extraction points, select and copy the section and paste it below on the same page. There is room on the form to add an additional section. If Section 9 - Groundwater Extraction Information is not going to be used and you need additional space for Section 10 reporting, then "Clear" Section 9 and "Paste" another copy of Section 10 in it's place.

### Section 11 - Groundwater Influent & Effluent Concentration Data

Data regarding influent and effluent concentrations for the chemicals of concern should be tabulated and graphed. Provide the permitted discharge limits for the chemicals of concern. The form is preformatted to produce the graph. Simply replace the sample data with your actual data and the graph will be automatically modified. Up to 8 chemicals of concern may be included in the table and the graph. If there are more than 8 chemicals of concern, another form should be added. Simply use the "Move or Copy Sheet..." command under "EDIT" to copy the form and place the new copy behind the first form.

### Section 12 - Air Effluent Concentration Data

Present organic vapor readings regarding effluent concentration in both tabular and graphical formats. A graph should be provided for each measuring point. Additionally, in the table and on separate data plots, provide the influent and effluent concentrations and allowable discharge limits for all other constituents regulated by the air discharge permit. If the air discharge permit has limits for the maximum total discharge of a given constituent, a plot showing total discharge over time should be prepared for each regulated contaminant. For each data plot, provide a benchmark line on the effluent concentration graph equivalent to the compliance objectives. The preformatted graph must be modified to add your site-specific benchmark line. For more than one measuring/sampling point, an additional form must be used.

### Section 13 - Infiltration Gallery/Recharge Well Information

Provide depth to water data from the infiltration gallery and/or recharge wells in both tabular and graphical form. Data should be presented for the current period and the previous 11 events. The table and graph are preformatted to list and display 8 monitoring points and the system discharge. If more than 8 points are needed, another form should be used for those points.

### Section 14 - Monitoring/Recovery Well Concentration Data

Provide results from the groundwater sampling events in tabular and graphical form. Results from both monitoring and recovery wells should be presented. Data presented should include the initial concentrations measured just before or after system startup, the concentration in the current sampling event, and the concentrations from the previous 10 events. The form is formatted to present 1 monitoring point at a time, but up to 9 constituents at a time. The form is preformatted to graphically present this data. Simply replace the sample data with your site data and the graph will be automatically modified.

Attach the three most recent isoconcentration maps for benzene and total BTEX. In some cases, it may be more appropriate to present other constituents, contact the ADEM Project Manager to determine what maps are needed.

### Section 15 - Groundwater Elevation Data

Compile a table of groundwater elevation data for each measuring point and indicate the location of the measuring point. Attach the three most recent groundwater elevation maps, each with a groundwater flow direction arrow. Additionally, include surveyed top of casing for each measuring point.

## How to use CASEMR forms

### Section 16 - Operation and Maintenance Costs Versus Time

This section is only required for those systems covered by the Alabama Tank Trust Fund. A table and graph of the O&M costs for the current period and previous 11 periods should be presented. Graphs should have a benchmark line representing the current annual O&M budget (including all approved adjustments, change orders, and reductions) for a twelve month period. The graph will have to be modified to add this benchmark line.

# Corrective Action System

## SYSTEM-EFFECTIVENESS MONITORING REPORT

Facility Name:

Facility I. D. No.

Year:

Quarter:

Reporting Period:

Incident No.

through

Consultant:

Project Manager:

### Section I - Summary of Corrective Action

**Groundwater:**

<input type="checkbox"/>	Pump & Treat	<input type="checkbox"/>	Total Fluid Pumps (elec)	<input type="checkbox"/>	Product Only Skimmer Pumps (elec)
<input type="checkbox"/>		<input type="checkbox"/>	Total Fluid Pumps (pneu)	<input type="checkbox"/>	Product Only Skimmer Pumps (pneu)
<input type="checkbox"/>	Air Sparging	<input type="checkbox"/>		<input type="checkbox"/>	Product Only Skimmer Pumps (other)
<input type="checkbox"/>	Vapor Extraction System	<input type="checkbox"/>	With Off-gas Treatment	<input type="checkbox"/>	Without Off-gas Treatment
Recovery Trenches:		<input type="checkbox"/>	Length (feet)	<input type="checkbox"/>	Width (feet)
		<input type="checkbox"/>		<input type="checkbox"/>	Depth (feet)
Number of Groundwater Recovery Wells:		<input type="checkbox"/>		Number of Air Sparging Wells:	
				Number of Air Injection Wells:	
				Number of Air Extraction Wells:	
Startup Dates:		<input type="checkbox"/>	Groundwater Pump & Treat	<input type="checkbox"/>	Vapor Extraction System
		<input type="checkbox"/>		<input type="checkbox"/>	Bioventing
Type of Water Treatment System:		<input type="checkbox"/>	Packed-Tower Stripper	<input type="checkbox"/>	Tray-Type Stripper
		<input type="checkbox"/>	Carbon	<input type="checkbox"/>	Diffuser
		<input type="checkbox"/>		<input type="checkbox"/>	Other:
Disposition of Treated Water:		<input type="checkbox"/>	Infiltration Gallery/Wells	<input type="checkbox"/>	Sanitary Sewer
		<input type="checkbox"/>	Off-site	<input type="checkbox"/>	NPDES
		<input type="checkbox"/>		<input type="checkbox"/>	Other:

**Soil:**

<input type="checkbox"/>	Vapor Extraction System	<input type="checkbox"/>	With Off-gas Treatment	<input type="checkbox"/>	Without Off-gas Treatment
Number of Vapor Extraction Wells:		<input type="checkbox"/>	Type:	<input type="checkbox"/>	Carbon
		<input type="checkbox"/>		<input type="checkbox"/>	Thermox
		<input type="checkbox"/>		<input type="checkbox"/>	Catox
<input type="checkbox"/>	Bioventing System				
Number of Bioventing Wells:		<input type="checkbox"/>			

**Comments:**


Date System Installed:	<input type="text"/>	System Startup Date:	<input type="text"/>	<input type="text"/>
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Corrective Action System (continued)

**SYSTEM-EFFECTIVENESS MONITORING REPORT**

Facility Name:  
 Facility I. D. No.  
 Year:  
 Consultant:

Quarter:

Reporting Period:

Incident No.  
 through  
 Project Manager:

**Section 1 - Summary of Corrective Action (continued)**

<b>Major Equipment On-site:</b>					
	Brand	Serial Number	Type	Capacity	Warranty Expiration Date
Skimmer Pumps:					
Groundwater Pumps:					
Pretreatment/Filter:					
Air Stripper:					
Transfer Pumps:					
Air Compressor:					
Blower/Vacuum Pump:					
Oil-Water Separator:					
Vacuum Treatment Equip.:					
Vapor Phase Carbon:	Brand	Serial Number	Unit Size		
Water Phase Carbon:					
Enclosure Type:	<input type="checkbox"/> Fence	<input type="checkbox"/> Building	<input type="checkbox"/> Skid	<input type="checkbox"/> Other:	
Telemetry:	Model Number:	<input style="width: 100%;" type="text"/>		Serial Number:	<input style="width: 100%;" type="text"/>
<b>Comments:</b>					

Site Map/Well Inventory Table

**SYSTEM-EFFECTIVENESS MONITORING REPORT**

Facility Name:  
Facility I. D. No.

Incident No.

**Section 2 - Site Map/System Layout**

Attach a map which shows the system layout, well locations, adjacent properties, north arrow, buildings, etc.

Additionally, provide a treatment schematic drawing.

**Section 3 - Well Inventory Table (Onsite and Offsite Wells)**

**Monitoring Wells**

Well Number	Date Installed	Diameter (inches)	Screened Interval (feet)	Well Number	Date Installed	Diameter (inches)	Screened Interval (feet)	Well Number	Date Installed	Diameter (inches)	Screened Interval (feet)

**Recovery Wells**

Well Number	Date Installed	Diameter (inches)	Screened Interval (feet)	Well Number	Date Installed	Diameter (inches)	Screened Interval (feet)	Well Number	Date Installed	Diameter (inches)	Screened Interval (feet)

**Sparging/Vapor Extraction Wells**

Well Number	Date Installed	Diameter (inches)	Screened Interval (feet)	Well Number	Date Installed	Diameter (inches)	Screened Interval (feet)	Well Number	Date Installed	Diameter (inches)	Screened Interval (feet)

**Injection/Recharge Wells**

Well Number	Date Installed	Diameter (inches)	Screened Interval (feet)	Well Number	Date Installed	Diameter (inches)	Screened Interval (feet)	Well Number	Date Installed	Diameter (inches)	Screened Interval (feet)

**Additional Monitoring/Other Wells (attach description of well use)**

Well Number	Date Installed	Diameter (inches)	Screened Interval (feet)	Well Number	Date Installed	Diameter (inches)	Screened Interval (feet)	Well Number	Date Installed	Diameter (inches)	Screened Interval (feet)











## Free Product Information

### SYSTEM-EFFECTIVENESS MONITORING REPORT

Facility Name:

Facility I. D. No.

Incident No.

#### Section 8 - Free Product Information

Is free product currently present at the site?		If yes, when was it discovered?		
If no, was free product ever present?		If yes, when was it last observed?		
List wells containing free product and provide thicknesses (inches):				

Recovery Method	This Period		Year to Date		Startup to Date		
Passive		gals.			gals.		
Bailing		gals.			gals.		
Automated		gals.			gals.		
Vacuum Truck		gals.			gals.		
Other (dewatering etc)		gals.			gals.		
<b>Total FP Recovered:</b>		<b>gals.</b>			<b>gals.</b>		

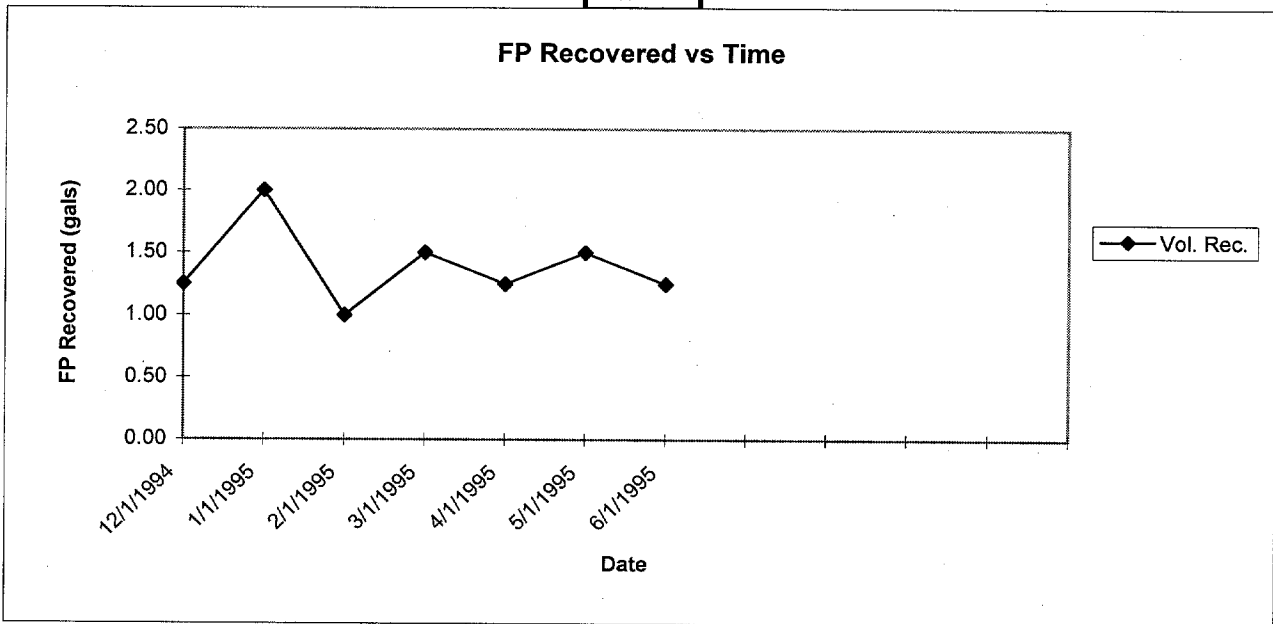
#### Free Product Recovery (gals) [Current Event Plus Previous 10 Events and Initial Event]

Well No:	MW-1												
Date	12/1/1994	1/1/1995	2/1/1995	3/1/1995	4/1/1995	5/1/1995	6/1/1995						
Vol. Rec.	1.25	2.00	1.00	1.50	1.25	1.50	1.25						
FP Thk.													
GW Elev.													
Method													
Date FP Discovered:		Provide similar Table for Each Well Containing Free Product											

#### Summary of Free Product Recovered (gals) - Cumulative Totals by Year

Year											Current	Total
Vol. Rec.												

MW-1



# Groundwater/Vapor Extraction

## SYSTEM-EFFECTIVENESS MONITORING REPORT

Facility Name:

Facility I. D. No.

Year:

Quarter:

Reporting Period:

Incident No.

through

Consultant:

Project Manager:

Section 9 - Groundwater Extraction Information							
	Flow Rate (gpm)						
Well No.							Total
Design Flow Rate for Groundwater Extraction:							
Actual Average Flow Rate During First Month:							
Actual Average Flow Rate Since Startup:							
Total Gallons Pumped:							
Number of Days Pumping Occurred:							
Reporting Period Average Flow Rate:							
Pump Operation:		Continual			Cycling		

Section 10 - Vapor Extraction Information							
	Air Flow Rate (cfm)						
Well No.							Total
Design Flow Rate for Vapor Extraction System:							
Actual Average Flow Rate During First Month:							
Actual Average Flow Rate Since Startup:							
Reporting Period Average Flow Rate:							
Blower Operation:		Continual			Cycling		

Groundwater Influent Effluent Concentration Data

**SYSTEM-EFFECTIVENESS MONITORING REPORT**

Facility Name:

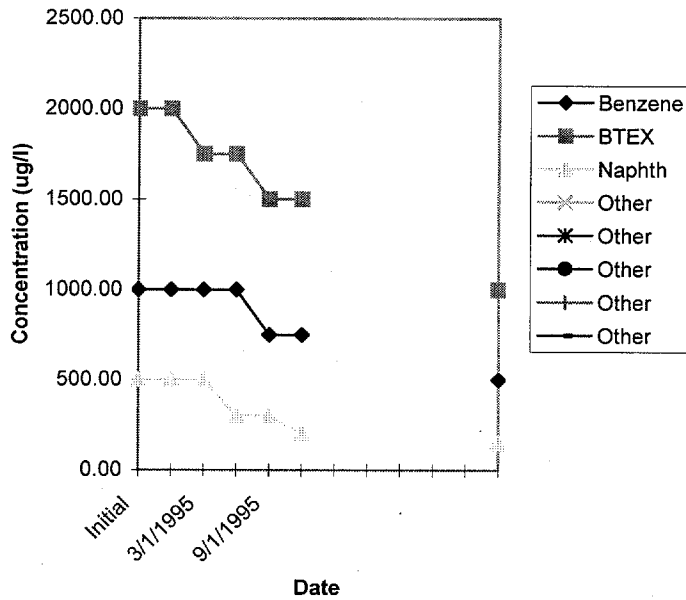
Facility I. D. No.

Incident No.

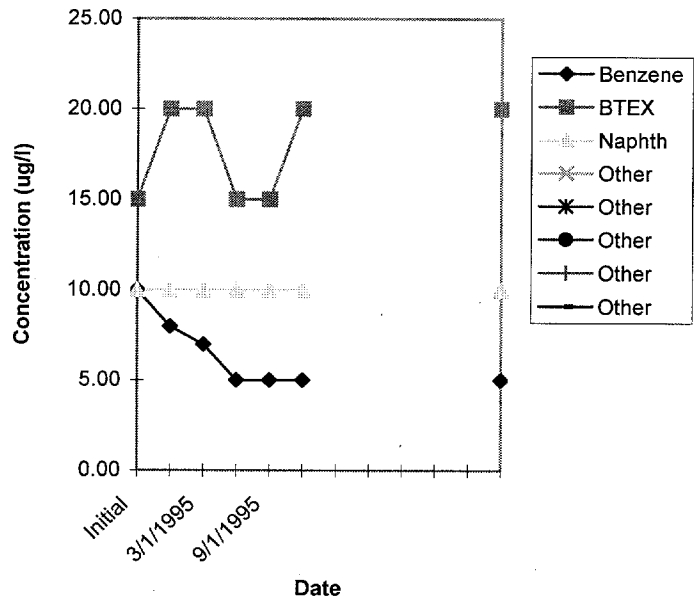
**Section 11 - Groundwater Influent & Effluent Concentration Data (ug/l)  
[Current Month Plus Previous 10 Months and Initial Month]**

Date	Influent							Current
	Initial	12/1/1994	3/1/1995	6/1/1995	9/1/1995	12/1/1995		
Benzene	1000.00	1000.00	1000.00	1000.00	750.00	750.00		500.00
BTEX	2000.00	2000.00	1750.00	1750.00	1500.00	1500.00		1000.00
Naphth	500.00	500.00	500.00	300.00	300.00	200.00		150.00
Other								
Other								
Other								
Other								
Other								

**Influent Concentration vs Time**



**Effluent Concentration vs Time**



Date	Effluent						Current
	Initial	12/1/1994	3/1/1995	6/1/1995	9/1/1995	12/1/1995	
Benzene	10.00	8.00	7.00	5.00	5.00	5.00	5.00
BTEX	15.00	20.00	20.00	15.00	15.00	20.00	20.00
Naphth	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Other							
Other							
Other							
Other							
Other							

Have any discharge limits been exceeded?

# Air Effluent Concentration Data

## SYSTEM-EFFECTIVENESS MONITORING REPORT

Facility Name:

Facility I. D. No.

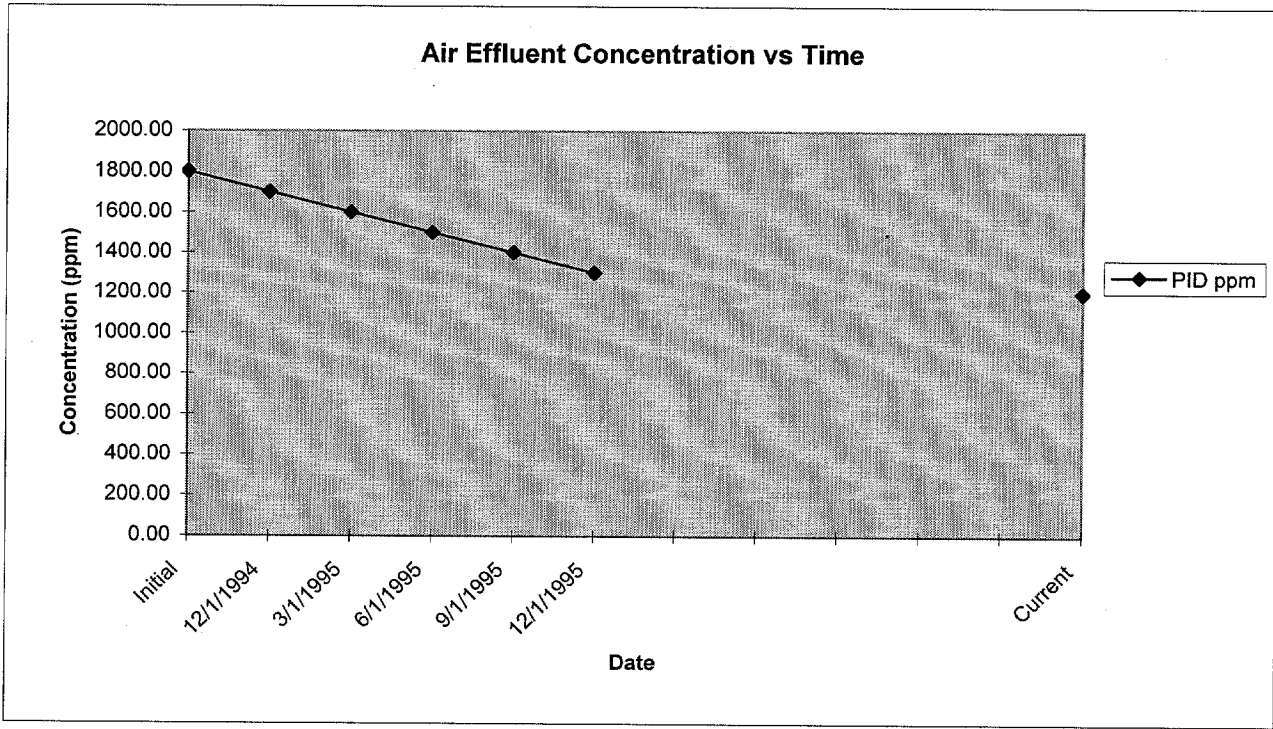
Incident No.

**Section 12 - Air Effluent Concentration Data (per permit requirements)**  
*Provide similar table and graph for each vapor extraction point monitored*

### Effluent Readings by Event [Current Event Plus 10 Previous Events & Initial Event]

Point of Measurement:		Blower stack					Indicate Blower stack, wells or other					
Date	Initial	12/1/1994	3/1/1995	6/1/1995	9/1/1995	12/1/1995						Current
PID ppm	1800.00	1700.00	1600.00	1500.00	1400.00	1300.00						1200.00

Laboratory Analysis:												
TPH ppm												
BTEXppm												
Other												
Other												



## Infiltration Gallery/Recharge Well Information

### SYSTEM-EFFECTIVENESS MONITORING REPORT

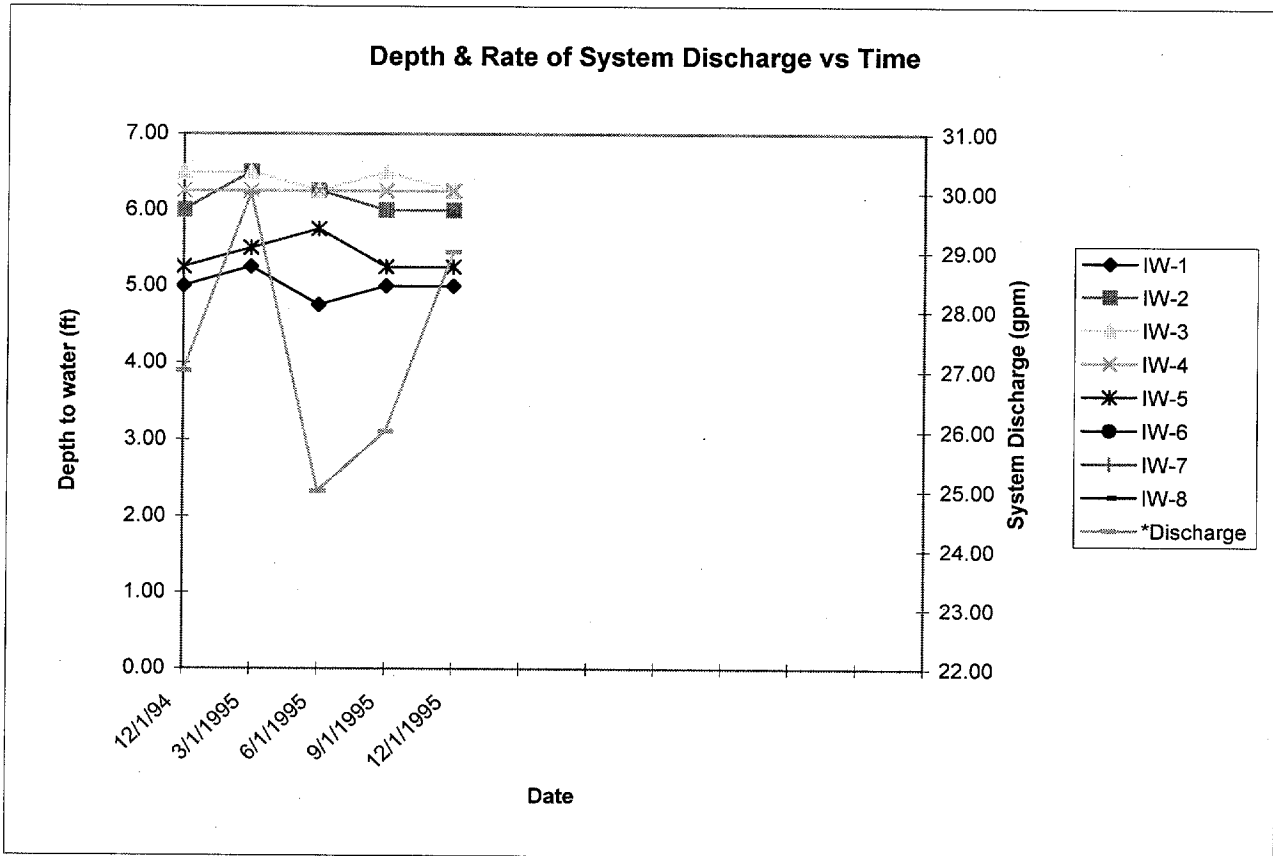
Facility Name:

Facility I. D. No.

Incident No.

Section 13 - Infiltration Gallery/Recharge Well Information [Current Event Plus Previous 11 Events]											
Depth to water level (ft) in infiltration gallery/injection well:											
Date	12/1/94	3/1/1995	6/1/1995	9/1/1995	12/1/1995						
IW-1	5.00	5.25	4.75	5.00	5.00						
IW-2	6.00	6.50	6.25	6.00	6.00						
IW-3	6.50	6.50	6.25	6.50	6.25						
IW-4	6.25	6.25	6.25	6.25	6.25						
IW-5	5.25	5.50	5.75	5.25	5.25						
IW-6											
IW-7											
IW-8											
*Discharge	27.00	30.00	25.00	26.00	29.00						

\*System Discharge (gpm)





Concentration Data

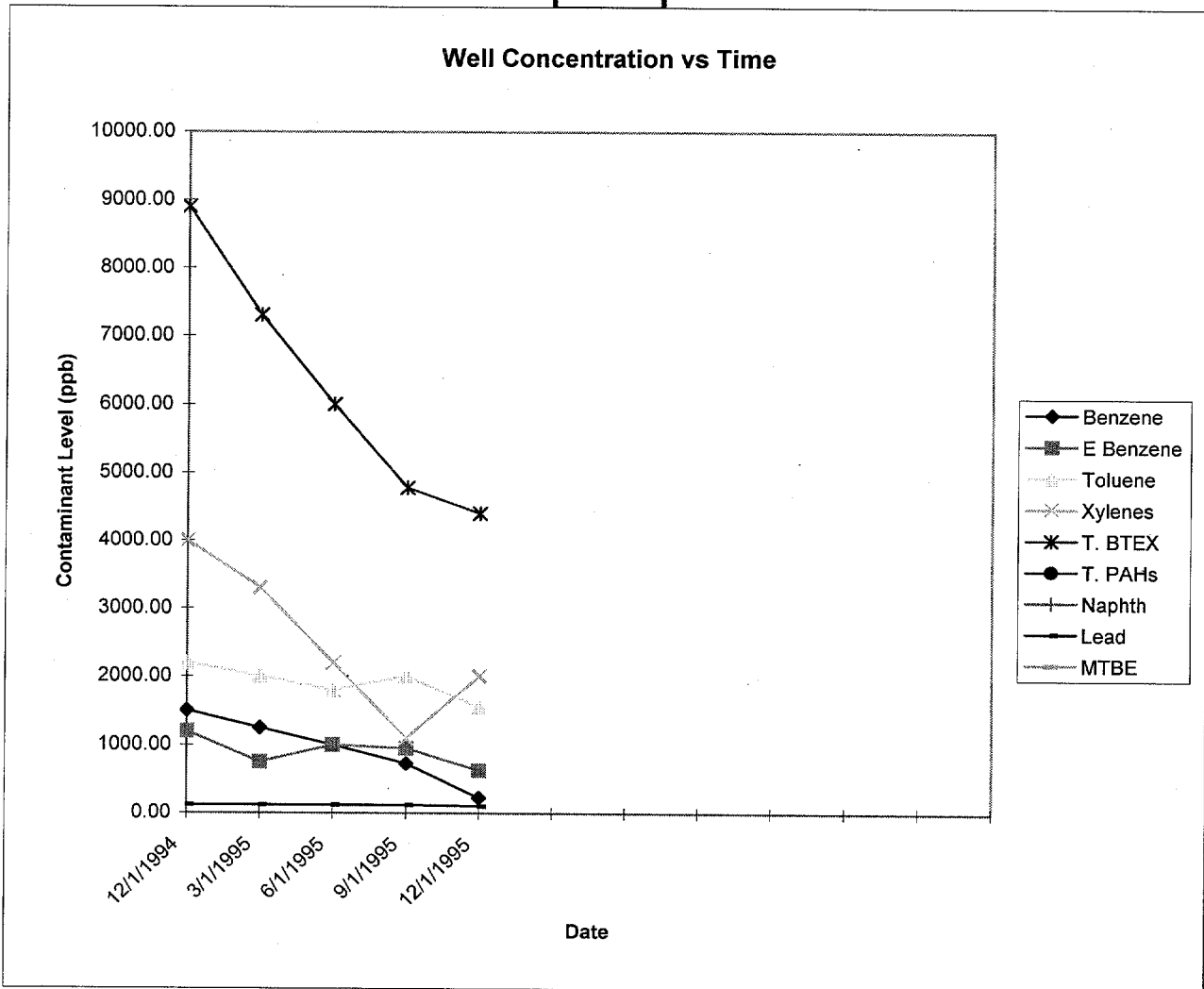
**SYSTEM-EFFECTIVENESS MONITORING REPORT**

Facility Name:  
Facility I. D. No.

Incident No.

Section 14 - Monitoring/Recovery Well Concentration Data (ug/l) [Current Event Plus Previous 10 Events & Initial Event]										
Well No:	MW-1									
Date	#####	3/1/1995	6/1/1995	9/1/1995	#####					
Benzene	1500.00	1250.00	1000.00	725.00	225.00					
E Benzene	1200.00	750.00	1000.00	950.00	625.00					
Toluene	2200.00	2000.00	1800.00	2000.00	1550.00					
Xylenes	4000.00	3300.00	2200.00	1100.00	2000.00					
T. BTEX	8900.00	7300.00	6000.00	4775.00	4400.00					
T. PAHs										
Naphth										
Lead	120.00	120.00	120.00	120.00	100.00					
MTBE										

MW-1



# Groundwater Elevations

## SYSTEM-EFFECTIVENESS MONITORING REPORT

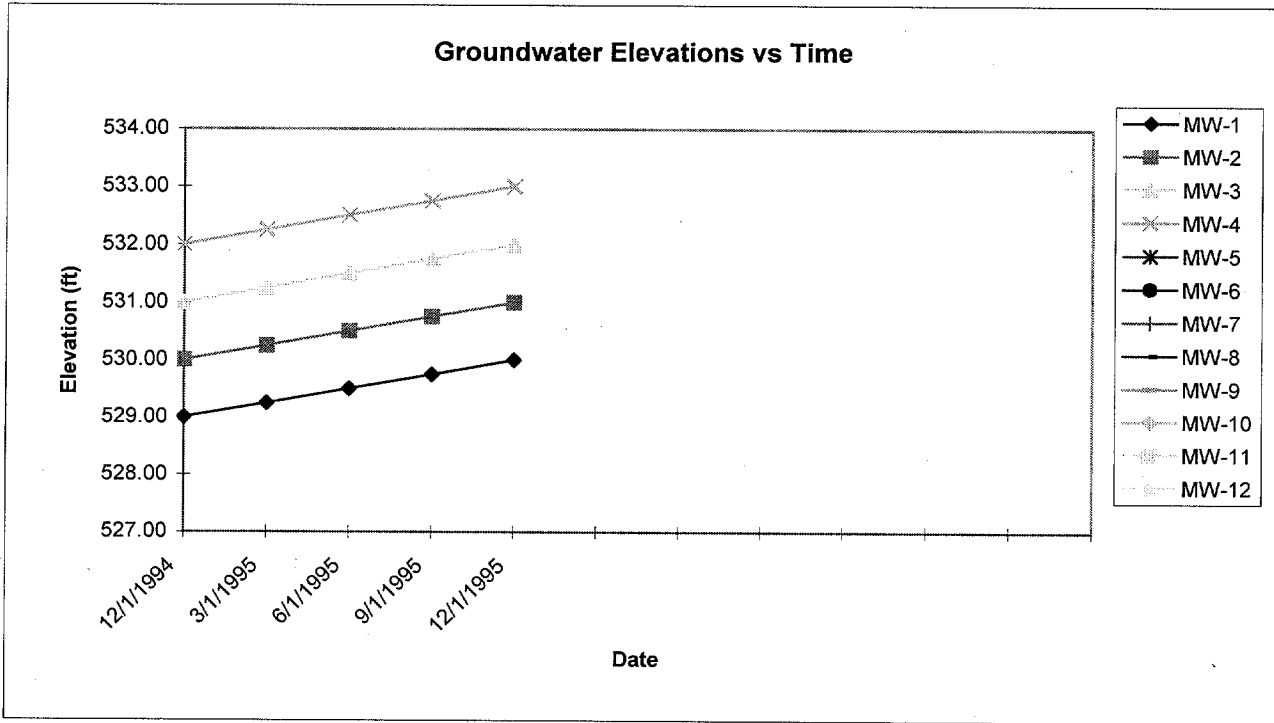
Facility Name:

Facility I. D. No.

Incident No.

**Section 15 - Groundwater Elevation Map**

Date	#####	3/1/1995	6/1/1995	9/1/1995	#####								
MW-1	529.00	529.25	529.50	529.75	530.00								
MW-2	530.00	530.25	530.50	530.75	531.00								
MW-3	531.00	531.25	531.50	531.75	532.00								
MW-4	532.00	532.25	532.50	532.75	533.00								
MW-5													
MW-6													
MW-7													
MW-8													
MW-9													
MW-10													
MW-11													
MW-12													



Attach the three (3) most recent groundwater elevation maps with groundwater flow direction clearly marked. The data must also be presented in tabular form and corrected for Free Product, if present.

# Operation and Maintenance Costs

## SYSTEM-EFFECTIVENESS MONITORING REPORT

Facility Name:  
Facility I. D. No.

Incident No.

Section 16 - Operation & Maintenance Costs vs Time [Current Event Plus Previous 11 Events]											
Date	12/1/1994	3/1/1995	6/1/1995	9/1/1995	12/1/1995						
O & M	5200.00	5380.00	5500.00	6345.00	2230.00						
Cumulative	5200.00	10580.00	16080.00	22,425.00	24,655.00						

