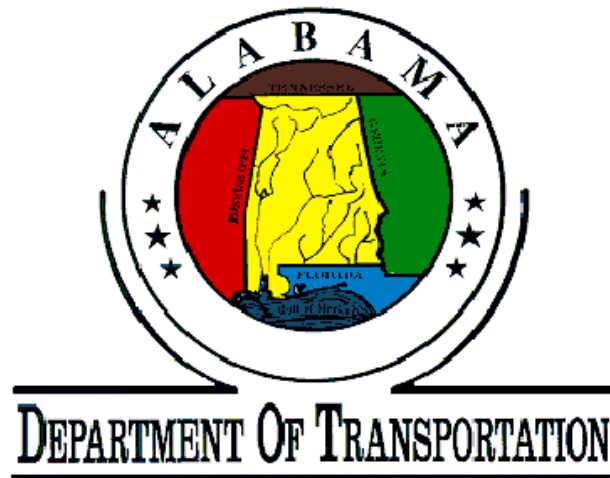


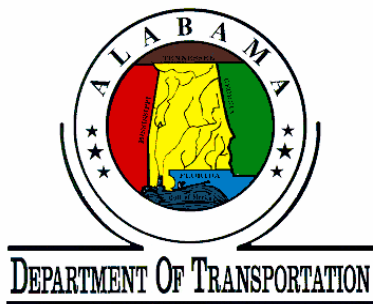
Modification to Addendum 13 Ground-Water Monitoring Plan

Coliseum Boulevard Plume Investigation



March 17, 2005

**Submitted to:
The Alabama Department of Environmental Management
Montgomery, Alabama**



MODIFICATION TO ADDENDUM 13
GROUND-WATER
MONITORING PLAN
MARCH 17, 2005

The following Scope of Work is a modification to Addendum 13, an addendum to the Work Plan for Rapid Response, Interim Corrective Measures and Comprehensive Site Assessment which was approved on June 8, 2001. It is a supplement to Section 4.5.2.2 to establish a long-term ground-water monitoring plan. This Scope of Work provides an alternate sampling frequency for monitoring wells based on evaluation of data from the past seven quarters of monitoring.

Background

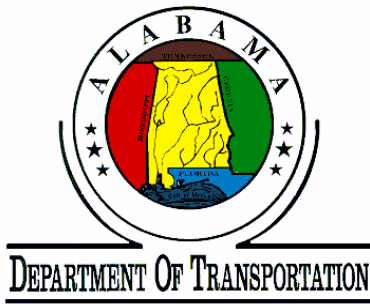
Addendum 13 provided for the wells located in the Probehole 12 and Kilby Ditch areas to be sampled quarterly, the wells located around the perimeter of the plume (designated "Perimeter Wells") to be sampled annually, and the wells outside of the Probehole 12 and Kilby Ditch areas, but interior to the plume (designated "Interior Wells"), to be sampled semi-annually. The annual and semi-annual events were to be staggered to account for variations of the seasons. Addendum 13 provided that the deep zone wells (see Figure 1) were to be sampled annually. This schedule was followed from April 2003 until January 2005.

Concentration data obtained from each of the sampling events was reviewed. Specifically, upward and downward trends and seasonal variations in volatile organic compounds (VOCs) detected in the samples were analyzed. Additionally, special and temporal variation in other parameters such as inorganics (nitrate, nitrite, sulfate, chlorides, alkalinity) and dissolved gasses (methane, ethane, ethane) were evaluated. Based on conclusions drawn during the review, it is recommended that the ground-water monitoring program be modified as described below.

Procedures

Sampling Frequency

- New wells will be sampled quarterly for a minimum of one year. After one year, data collected from new wells will be evaluated as follows to determine sampling frequency.
- If there is a significant (increasing or decreasing) trend in TCE concentrations for samples collected from at least one well in a cluster/nest the sampling frequency will be quarterly.
- If there are detectable levels of TCE but no clear trend, the sampling frequency will be semi-annual.

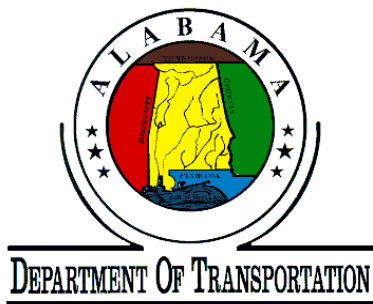


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- If TCE concentrations in ground-water samples from all wells in a cluster are below detectable levels, the sampling frequency is annual. Deep zone wells (300-series) will be sampled annually, with the exception of monitoring well MW-341.
- Natural attenuation parameters (inorganics and dissolved gasses) will be analyzed in new wells for four quarters.
- The parameters of turbidity, dissolved oxygen, conductivity, oxidation-reduction potential, and pH will continue to be monitored at all wells during purging.
- Semi-annual and annual sampling events will be staggered to account for seasonal variability.
- Continuous multi-channel tubing (CMT) wells CMT-5, CMT-6, and CMT-7, and monitoring wells MW-148A, MW-248B, and MW248C were installed as observation wells for aquifer pump tests, and are in close proximity to other monitoring wells. Therefore, these wells will not be sampled.
- The tables below summarize the wells in each sampling category, and when sampling events will occur.

Table 1. Monitoring Well Sampling Frequency; Coliseum Boulevard Plume Investigation; Montgomery, Alabama.

Quarterly			
MW-101	MW-124	MW-237C	MW-149A
MW-201	MW-224	MW-138A	MW-249B
MW-103	MW-129	MW-238B	MW-249C
MW-203	MW-229	MW-238C	MW-150A
MW-106	MW-130	MW-341	MW-250B
MW-206	MW-230	MW-143A	MW-250C
MW-107	MW-131	MW-243B	MW-151A
MW-207	MW-231	MW-144A	MW-251B
MW-108	MW-132	MW-244B	MW-152A
MW-208	MW-232	MW-244C	MW-252B
MW-116	MW-133	MW-145A	CMT-1
MW-216	MW-233	MW-146A	CMT-2
MW-117	MW-134	MW-246B	CMT-3
MW-217	MW-234	MW-147A	CMT-4
MW-123	MW-137A	MW-247B	
MW-223	MW-237B		

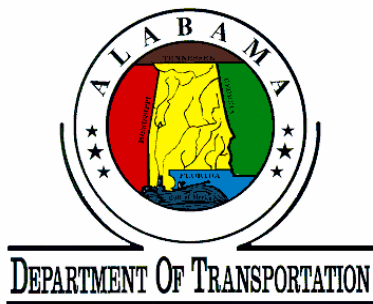


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Semi-Annual			
MW-1A	MW-107	MW-115	MW-135A
MW-2A	MW-210	MW-215	MW-235B
MW-3A	MW-111	MW-125	MW-235C
MW-5A	MW-211	MW-225	MW-136A
MW-105	MW-113	MW-128	MW-236B
MW-205	MW-213	MW-228	MW-236C
Annual			
MW-4A	MW-112	MW-221	MW-311
MW-102	MW-212	MW-122	MW-339
MW-202	MW-214A	MW-222	MW-340
MW-104	MW-118	MW-226	MW-342
MW-204	MW-218	MW-227	
MW-109	MW-219	MW-304	
MW-209	MW-220		

Table 2. Schedule for collection of ground-water samples from monitoring wells; Coliseum Boulevard Plume Investigation; Montgomery, Alabama.

	April 2005	July 2005	Oct 2005	Jan 2006	April 2006	July 2006	Oct 2006	Jan 2007	April 2007	July 2007	Oct 2007	Jan 2008	April 2008
Quarterly Events	X	X		X		X	X		X		X	X	
Semi-Annual Events					X					X			
Annual Events			X					X					X



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Sampling Procedure

Ground-water samples will be collected from each well using standard sampling procedures in accordance with EPA Region 4 *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual*, November 2001, and in accordance with the Work Plan for Rapid Response, Interim Corrective Measures and Comprehensive Site Assessment. Ground-water samples will be collected for the following laboratory analyses:

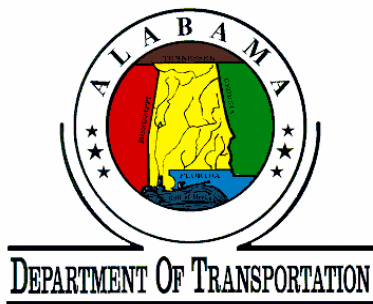
All monitoring wells:	Volatile Organic Compounds (VOCs)
New Monitoring wells:	VOCs Alkalinity Nitrates Nitrites Sulfates Chlorides Methane Ethane Ethene

Ground-water samples will be measured in the field for the following parameters:

Ferrous Iron (new monitoring wells only)
Total Iron (new monitoring wells only)
Dissolved Oxygen
Oxidation-Reduction Potential
Conductivity
pH
Temperature

Analytical

Ground-water samples will be placed on ice, in a cooler, and shipped to the appropriate laboratory. TTL's laboratory in Tuscaloosa, Alabama will perform all analyses except those for methane, ethane, and ethene. Severn Trent Laboratory in Burlington, Vermont, will perform the analyses for methane, ethane, and ethene. The



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backup laboratory for TTL's laboratory will be the Severn Trent Laboratory in Mobile, Alabama.

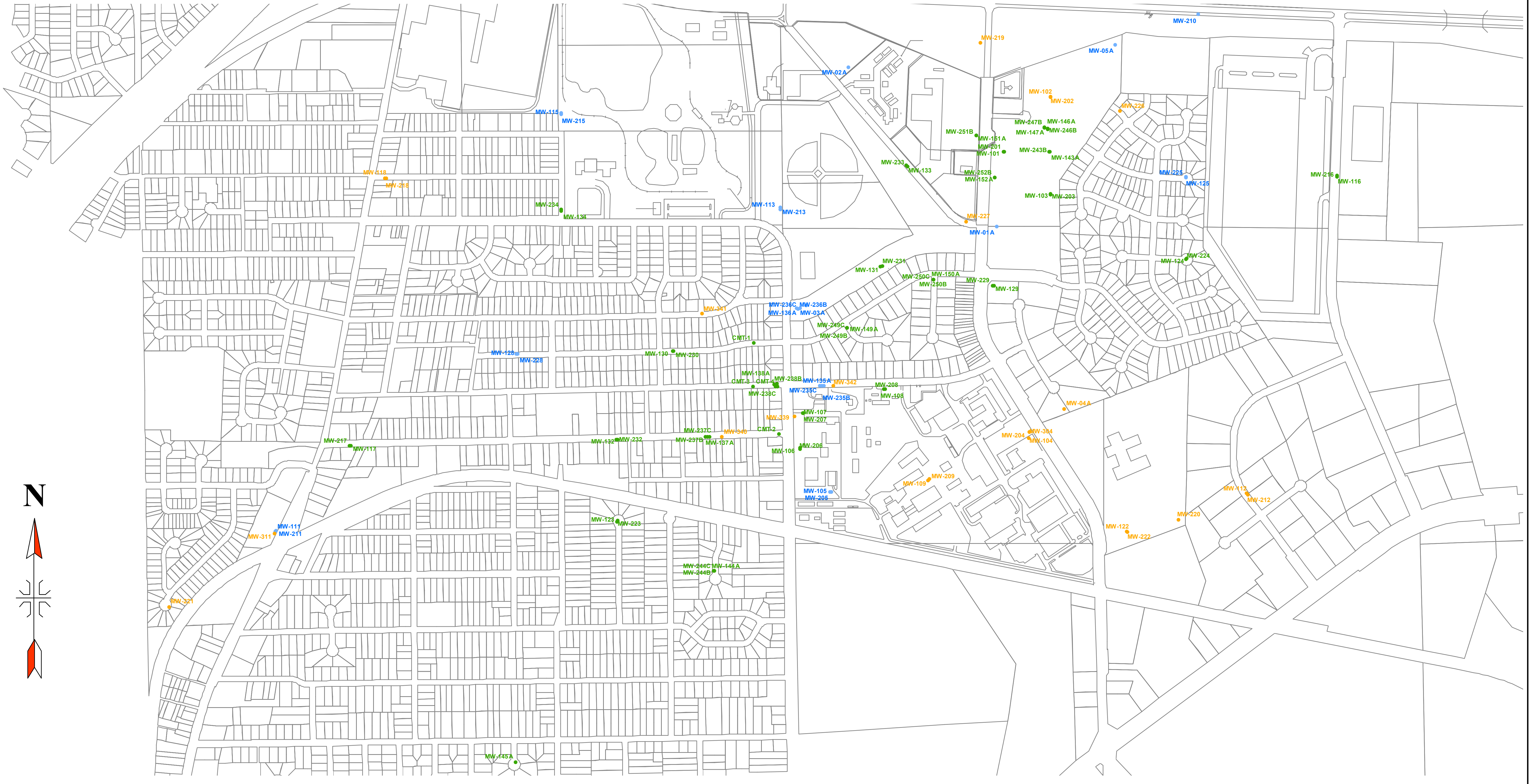
VOC analyses will be in accordance with Method 8260 outlined in Test Methods for Evaluating Solid Waste Physical/ Chemical Methods, EPA, SW-846. Analyses for alkalinity nitrates, nitrites, sulfates, and chlorides will be in accordance with methods outlined in Standard Methods for the Examination of Water and Wastewater, Eighteenth Edition, 1992 and Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020. The analyses for methane, ethane, and ethene will be in accordance with method RSK-175.

Quality Assurance/Quality Control (QA/QC)

Trip blanks of deionized water will accompany all ground-water samples from the field to the laboratory. Trip blanks will be analyzed for VOCs as indicated above. Duplicate samples will be collected for approximately 10 percent of all samples collected. The duplicate samples will be selected randomly, using a computer-generated random number chart. The duplicate samples will be analyzed for each of the constituents listed above.

Reports

The results of the analyses will be provided in the subsequent Monthly Status Report.

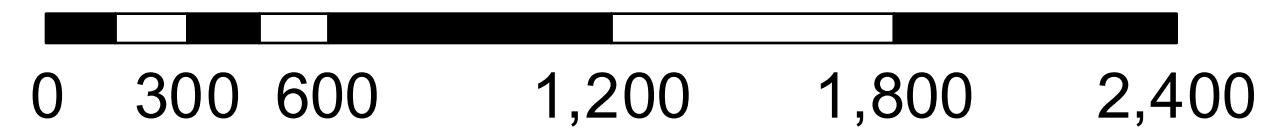


LEGEND

GROUNDWATER MONITORING WELL AND CMT MONITORING FREQUENCY:

- ANNUAL
- SEM-ANNUAL
- QUARTERLY

SCALE IN FEET



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ALABAMA DEPARTMENT OF TRANSPORTATION
COLISEUM BOULEVARD PROJECT

PROPOSED MONITORING FREQUENCY

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