



Memo

To: Joan Taylor and Cynthia Gianfrancesco, RIDEM

From: Stephen Andrus and Ed Summerly

CC: Mary Morgan, Richmond Town Clerk
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Date: March 30, 2008

Re: Air Sparge and Soil Vapor Extraction System Start-up Report
Charbert Manufacturing Facility, Alton, Rhode Island
RIDEM Case # 99-037

The air sparge and soil vapor extraction remedial system at the Charbert Manufacturing Facility in Alton, Rhode Island was designed and installed by GZA in December of 2007 through January of 2008. The system was issued an Order of Approval from the Rhode Island Department of Environmental Management on December 18, 2007 and began full operation on January 18, 2008.

The air sparge system (AS), is designed to inject air into the groundwater using a grid pattern of 1-inch diameter sparge wells. The purpose of the air injection is to introduce oxygen to enhance bioremediation and expedite the volatilization of the contaminants. The soil vapor extraction system (SVE), uses a blower to apply vacuum to a series of 2-inch wells installed above the groundwater table. The system collects the vapors from the natural breakdown and volatilization of the contaminants generated by the air sparge system and also helps circulate oxygen rich air through unsaturated contaminated soils stimulating bioremediation of contaminants (bioventing). The air collected by the SVE system is then filtered through activated carbon to collect the contaminants. The treated air is then discharged to the atmosphere.

The remedial system consist of an interior AS/SVE located under the concrete floor in the approximate center of the mill building and an exterior AS/SVE system that is located under the rear maintenance area parking lot on the west side of the mill building. The system controls, SVE blowers and carbon filters are located in the west end of the facility, near the boiler room. The air is supplied by a central air compressor located in the eastern side of the mill building.

The interior AS system consists of 16 air injection wells that inject air approximately 25 to 30 feet below the floor of the mill. At this depth the air is injected approximately 19 to 24 feet below the groundwater surface. The interior SVE system consists of 16 soil vapor extraction wells and 7 sub-slab vents. The SVE wells are collecting vapors from 2 to 17 feet below the mill floor. The sub-slab vent wells are located around the perimeter of the interior system and remove any vapors that may collect under the concrete floors. Table 1 lists the interior remedial system specifics:

TABLE 1: Interior Remedial System

Air Supply: Central Rotary Screw Compressor	
Blower: 5 Horse Power	
Total Air Volume Injected:	24 SCFM
Total Air Volume Removed:	157 SCFM
Average AS Well Flow, :	1.5 SCFM
Average SVE Well Flow:	6.8 SCFM
Estimated Contaminant Removal:	55 lbs/year

SCFM = Standard Cubic Feet per Minute

The exterior AS system consists of 14 air injection wells that inject air approximately 25 to 30 feet below the ground surface. At this depth the air is injected approximately 20 to 25 feet below the groundwater surface. To protect the Wood River a line of 5-sparge wells are located along the river bank between the river and the contaminated area. The SVE system consists of 14 soil vapor extraction trenches that are collecting vapors 2 feet below the ground surface. The soil vapor collection trenches are installed similar to septic system leachfield piping. Table 2 lists the exterior remedial system specifics:

TABLE 2: Exterior Remedial System

Air Supply: Central Rotary Screw Compressor	
Blower: 1 Horse Power	
Total Air Volume Injected	24 SCFM
Total Air Volume Removed:	82 SCFM
Average AS Well Flow:	1.7 SCFM
Average SVE Well Flow:	5.8 SCFM
Estimated Contaminant Removal:	55 lbs/year

SCFM = Standard Cubic Feet per Minute

The remedial systems are monitored weekly by Charbert personnel. GZA personnel conduct monthly performance monitoring for the soil vapor extraction/air sparge system. The air flow and vacuum readings are taken at each well and the exhaust air flow rates and contaminant concentrations are evaluated with field equipment. Data collected at each SVE well include: total volatile organic compounds (by volume), carbon dioxide (percent by volume), methane (percent by volume), lower explosive limit and oxygen level (percent by volume).

To monitor the effectiveness of the remedial system an Interim Compliance Monitoring Plan, as approved by RIDEM in December of 2007, is ongoing and was started with a baseline round of groundwater samples collected from 14 groundwater monitoring wells in January of 2008. On a quarterly basis groundwater samples are collected from 12 wells located around the perimeter of the contaminated area and the samples analyzed for volatile organic compounds (VOCs). Quarterly sample analysis consists of six field screening parameters (temperature, pH, oxidation/reduction potential (ORP), specific conductivity, turbidity, and dissolved oxygen) and laboratory analysis for volatile organic compounds (VOCs) via EPA Method 8260B. On a yearly basis groundwater samples are also collected from two additional background wells. Annual sample analysis includes the six field parameters, VOCs and total petroleum hydrocarbon analysis, via EPA 8100M from the 9 shallow overburden wells (15 foot deep +/-).

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