1993 ANNUAL REPORT
TEST PIT 3 AREA TREATMENT TRAILER OPERATIONS VAPOR EXTRACTION/GROUNDWATER WITHDRAWAL AND TREATMENT

THE COLUMBIA MILLS, INCORPORATED
MINETTO, NEW YORK
NYSDEC SITE NO. 7-38-012

FEBRUARY 1994
REVISED MAY 1994

MALCOLM PIRNIE, INC.
7481 Henry Clay Blvd.
Liverpool, New York 13088

1069-079

TABLE OF CONTENTS

LIST OF TABLES

LIST OF TABLES (Cont.)

LIST OF FIGURES

LIST OF APPENDICES

1.0 SUMMARY OF TRAILER OPERATIONS

1.1 GROUNDWATER WITHDRAWAL/TREATMENT SYSTEM

1.1.1 Overall System Operation

Operation of the Test Pit 3 Area groundwater withdrawal/treatment system commenced on February 11, 1993, and continued through December 31, 1993. Over this period, approximately 1.8 million gallons of water were treated. Operation of the system has been continuous; however, temporary shut-downs of the system have occurred throughout the year. Reasons include the inherent start-up problems encountered during initial operation of the system, fouling problems caused by the precipitation of iron and manganese, as well as the growth of iron bacteria, in the liquid phase carbon, and the occurrence of several power failures in the Town. The system was also shut down during the last half of April 1993 due to excessively high water levels and Spring flooding.

Listed below are periods of time during which the groundwater withdrawal/treatment system was shut down for two days or more. The reasons for each shut-down are provided.

Feb 15 - Feb 18	Liquid phase carbon plugged, changed locations of check valves after bag filter housings
Apr 15 - May 3	Excessive amounts of silt flushed into the recovery wells, plugging the prefilters located before the carbon, due to high water levels and Spring flooding

The growth of iron bacteria in the groundwater treatment system, especially in the carbon canisters, negatively affected system operations during 1993. Chlorine addition was implemented on a permanent basis during July, after receiving approval from the New York State Department of Environmental Conservation (NYSDEC), to destroy the biological growth. However, addition of chlorine was discontinued at the end of August, after it was found not to be as effective as bench testing and initial testing indicated.

Inspection logs were kept for the groundwater withdrawal/treatment system. These logs are contained in Appendix A.

1.1.2 Recovery Well Operation and Maintenance

Seasonal variations directly influenced the amount of groundwater recovered by the treatment system. Recovery rates generally decreased between February and August. The lowest flows were recorded during August and September. Flow then increased slightly in October and November, and greatly increased during December. Flow monitoring logs for 1993 are contained in Appendix B.

Two figures which show the relationship between the average daily flow and month of operation are provided in Appendix C. For the first figure, the total gallons of water treated with the system during each month were averaged over the number of days in each month-long period. For the second figure, the total gallons were averaged over the approximate number of days of actual system operation. A table is also included in the appendix which summarizes the data used to plot the figures. The total gallons of groundwater treated are based on the totalizer readings, which were obtained from the three carbon train flow meters.

The five Test Pit 3 Area recovery wells operated effectively during 1993. Only two wells had any down-time associated with them (in addition to the above periods of time when the treatment system and all wells were shut down). These wells were:

1. RW-5	Did not operate Feb 18 - Feb 25, and May 3 - Jun 4	Actuator valve problems, valve removed for repair
2. RW-3	Did not operate Oct 14 - Dec 31	Water level transmitter inoperable - removed for repair, then water froze in line

The pumps in the recovery wells were required to be pulled and cleaned two to three times during 1993 due to the growth of iron bacteria on the pump intake screens. Some of the well lines were also cleaned out. The bacterial growth on some of the pumps actually inhibited the flow of water into the pumps, decreasing the pumping rates and increasing the groundwater levels in the affected wells.

During January 1994, Malcolm Pirnie, Inc. (MPI) added LBA, a chemical for the treatment of iron bacteria, to some of the groundwater recovery wells in an attempt to resolve the bacteria problems. Approval to add LBA to the wells had previously been received from the NYSDEC, and this chemical is certified for use in water wells by the National Sanitation Foundation.

Enough LBA was added to each well to treat the well itself, the surrounding filter pack and the piping leading to the treatment trailer. The well screen was brushed and surged, and the LBA solution was pumped into the piping. The well pump was then shut off. MPI could not keep the treated wells shut off for the recommended full length of time due to the risk of the water freezing in the lines. Although each well treated was not kept off as long as recommended by the LBA manufacturer, it did appear that this chemical could prove to be effective in controlling the iron bacteria problems. MPI plans to test this solution again, when the wells can be shut off for the required amount of time.

Most of the recovery well pumps were pulled, dismantled and cleaned during February 1994. The insides of the pumps had become plugged with iron and silt, and the pumps could no longer maintain the required drawdown.

Well/pump maintenance is expected to be a routine task during 1994. This is expected to consist of pulling the well pumps and cleaning the outside of the pumps and pump screens, as well as treating the wells and piping with LBA and cleaning the insides (impellers) of the pumps.

1.1.3 Metals Removal System

The metals removal system consists of the aeration tank, polymer addition/flash mix tank, flocculation tank, sump tank, and bag filtration system (refer to Figure 1). Operation and maintenance of this part of the treatment system involved preparing polymer for addition to the system and changing the bag filters. Polymer was usually prepared on a weekly basis. Bag filters used for the removal of precipitated metals and sediment were

changed based on a change in pressure between the primary and secondary filter housings. Filters usually lasted between two to three days and three weeks.

Filter log sheets are provided in Appendix D. Although the logs are not totally complete, filters appeared to be changed out less frequently during the second half of the year (August - November), when system flow was less, than during the Spring and early Summer.

1.1.4 Volatile Organic Removal System

The volatile organic compound (VOC) removal system is located after the metals removal system and consists of three parallel trains of liquid phase carbon (refer to Figure 1). Maintenance of the drums of carbon was required during 1993, and consisted of routinely backwashing the drums. This was accomplished by flowing tap water through the drums in the reverse direction at a velocity sufficient enough to dislodge any particles as well as the iron bacteria growing inside the canisters. This process does not remove VOCs adsorbed onto the carbon.

The liquid phase carbon canisters were changed three times during 1993. They were changed because they became plugged, and backwashing was no longer effective. The carbon was not changed due to contaminant breakthrough. Changes occurred as follows:

Apr 14	"A" canister removed from each line, replaced with new canister
Aug 10	"A" canister removed from each line
Sep 14	Other two canisters moved up ("C" to "B", and "B" to "A"), and new canister placed into "C" position
Dec 1 & 2	"A" canister removed from each line
Dec 22	Other two canisters moved up ("C" to "B", and "B" to "A"), and new canister placed into "C" position

1.2 VAPOR EXTRACTION SYSTEM

1.2.1 Initial Start-up Period

A schematic of the vapor extraction system is shown in Figure 1. The start-up period, or first month of system operation, actually lasted from March to October 1993. Several issues required resolution during this time in order for the system to operate effectively. Listed below are the start-up and shut-down dates for the vapor extraction system during this time period. It should be noted that these dates refer to the periods of operation of the vacuum wells, or the actual vapor extraction system. The vapor extraction system vacuum pump does also operate during groundwater treatment, serving to capture vapors from the aeration tank. These vapors are then piped through the vapor carbon treatment system. However, these vapors are much less contaminated than the vapors recovered from the vacuum wells.

Days of System Operation	Notes
Mar 10 - Mar 11 (1 day)	Shut down Mar 11 due to emission of vapors from vent holes in vacuum pump, required implementation of engineering control to capture vapors and route them back into system
Jun 8 - Jun 21 (13 days)	Vacuum wells VW - 1, 2, 3, 4, and 9 turned on Jun 8, Vacuum wells VW - 5, 6, 7, and 8 turned on Jun 16, All VWs turned off Jun 21 - breakthrough of some compounds detected in primary vapor phase carbon adsorber, compounds also detected in secondary effluent
Jun 28	Carbon in primary and secondary adsorbers changed out
Jun 29 - Jul 5 (6 days)	Shut down Jul 5 due to power failure
Jul 8 - Jul 12 (4 days)	Shut down Jul 12 due to possible breakthrough of contaminants, as measured in primary carbon unit effluent with HNU photoionization detector
Sep 30 - Oct 1 (1 day)	Vapor extraction system temporarily turned on for confirmatory sampling

Analytical data obtained during the Test Pit 3 Area vapor extraction system start-up in June/July 1993 indicated that relatively low levels of VOCs, mostly tentatively identified compounds (TICs), were being recovered from the soil. Total hydrocarbon analyses, on the other hand, indicated that relatively high levels of contaminants were present in the vapors. At this time, it was difficult to determine which set of values was more representative or accurate. Total target VOC concentrations detected in the primary vapor carbon influent during June and July 1993 ranged from 0.02 - 0.28 ppm. The target VOC detected most often was xylene.

TIC concentrations ranged from 1.3 - 1.4 ppm for volatiles and 2.0 - 3.6 ppm for semivolatiles. These values were converted from the analytical lab's concentrations (given in ug/m3) to ppm using the molecular weight of methylcyclohexane (volatiles) and dimethylcyclohexane (semivolatiles). Total hydrocarbon concentrations ranged from 149 - 6890 ppm in the primary carbon influent during June and July. All sampling results are summarized in Section 2.2 of this report.

Based on the VOC/TIC data, the carbon being used to treat the vapors experienced breakthrough sooner than expected. However, the contaminant levels detected in the discharge from the carbon at breakthrough were within health-based discharge limits.

Reevaluation of the discharge limits conducted by MPI during July using NYSDEC Air Guide-1 modeling showed that the discharge limits originally established in the air permit application averaged four to five orders of magnitude less than health-based limits (calculated through the modeling). The extremely low levels in the permit were based on the assumption that 99 percent removal of the maximum contaminant concentrations detected during previous soil vapor sampling would be achieved with the carbon. Because the discharge limits were so low, contaminant levels detected at what was previously considered breakthrough were also very low - in fact, several orders of magnitude lower than what could have been discharged.

Because the levels detected were so low compared to health-based limits, MPI proposed to the State that more reasonable discharge limits, which would still meet Air Guide-1 health-based criteria, be established for the primary carbon unit. This would in turn allow for more efficient utilization of the carbon and avoid unnecessary carbon changeouts.

The vapor extraction system was shut down on July 12, 1993, when TIC breakthrough was again detected, and was kept off until three main issues were resolved. The issues requiring resolution prior to restarting the vapor extraction system for full-scale operations were: 1) a monitoring program needed to be devised that would verify TIC discharge limits were met but still be technically and administratively implementable, 2) feasible, health-based limits for the vapor extraction system discharge needed to be established, replacing those included in the November 1992 air permit application, and 3) the discrepancy that existed between the monitoring data and breakthrough frequency of the carbon needed to be resolved. In an effort to resolve these issues, the vapor extraction system was temporarily turned on and split samples were obtained on October 1, 1993 (as noted above). Samples were analyzed by Upstate Laboratories, Inc. (Upstate), East Syracuse, New York and by the New York State Department of Health (NYSDOH).

The discrepancy that existed between the analytical data and carbon breakthrough rate was resolved through the split sampling. Once the NYSDOH and Upstate data were interpreted together, and after discussions with the laboratories, it was evident that the total hydrocarbon data provided a more accurate estimate of the total contaminant concentrations than the TIC Data. Therefore, it was determined that total contaminant concentrations actually were relatively high, but contained relatively low levels of the target VOCs.

Also, site records indicated that three partially buried steel tanks containing "benzine" were formerly located in this area. Benzine, also known as ligroine, is a petroleum based solvent which is a mixture of a variety of volatile hydrocarbons. The presence of ligroine accounted for the difficulty in identifying the specific individual compounds present, which are not the target VOCs typically identifiable with analytic methods.

The other two issues requiring resolution (ie, the need for the establishment of a feasible air monitoring program as well as air discharge limits) were also resolved. The NYSDEC revised the November 1992 air permit discharge criteria, in response to MPI's request, in the NYSDEC's August 17, 1993 letter. This revision set more feasibly monitored health based limits for the target compounds and set efficiency criteria for the 6NYCRR Part 212 A, B and C rated compounds. Also, just prior to the December 1, 1993 full-scale start up of the system, it was established that the TICs would be regarded collectively as ligroine, a C rated (low toxicity) compound, which must be treated to 70% or greater efficiency in the primary carbon unit. A removal efficiency of 60% was required during initial full-scale operations. It was also established that total TICs would be monitored with

real time instrumentation by monitoring for total hydrocarbons with an organic vapor analyzer (OVA). The OVA meter utilizes the same flame ionization detector (FID) method used for total hydrocarbon analysis in the laboratory.

Inspection and monitoring logs were kept for the vapor extraction system. These are contained in Appendix A. Flow data for each of the nine vacuum wells are summarized in Table 1. Included are flow rate and vacuum readings taken during operation of the vacuum wells.

1.2.2 Full-scale Operations

Once the technical issues related to operation of the vapor extraction system were resolved, full-scale operation commenced on December 1, 1993. Listed below are the operating dates during December 1993, and reasons for any shut-downs.

Days of System Operation	Notes
Dec 1 (2.5 hrs)	Vacuum Wells VW - 1, 3, 4, and 9 turned on 1:40 PM, all other vacuum wells turned on 3:30 PM, all vacuum wells shut off 4:20 PM due to elevated water levels
Dec 2 - Dec 9 (7 days)	Vacuum wells VW - 1, 2, 3, 4, 5, and 9 turned on Dec 2, vacuum wells VW - 6, 7, and 8 turned on Dec 6, all VWs turned off Dec 9 - relatively low treatment efficiency achieved by primary carbon unit
Dec 10 (5 hrs)	All VWs turned on, but turned off at 3:30 PM due to decreasing treatment efficiency achieved by primary carbon unit
Dec 13 (6 hrs)	All VWs turned on, but turned off at 4:00 PM due to decreasing treatment efficiency achieved by primary carbon unit
Dec 14 - Dec 17 (3 days)	All VWs turned off Dec 17 due to low treatment efficiency achieved by primary carbon unit
Dec 20 - Dec 23 (3 days)	All VWs turned off Dec 23 - variable primary carbon treatment efficiency, loading calculations showed carbon near maximum adsorption capacity - carbon changeout planned for both adsorbers

TABLE 1
COLUMBIA MILLS TEST PIT 3 AREA IRM
VAPOR EXTRACTION SYSTEM
VACUUM WELL FLOW DATA

Date	VW-1		VW-2		VW-3		VW-4		VW-5		VW-6		VW-7		VW-8		VW-9		Total
	Flowrate (cfm)	Vacuum (in. Hg)	Flowrate (cfm)	Vacuum (in. Hg)	Flowrate (cfm)	Vacuum (in. Hg)	Flowrate (cfm)	Vacuum (in. Hg)	Flowrate (cfm)	Vacuum (in. Hg)	Flowrate (cfm)	Vacuum (in. Hg)	Flowrate (cfm)	Vacuum (in. Hg)	Flowrate (cfm)	Vacuum (in. Hg)	Flowrate (cfm)	Vacuum (in. Hg)	Flowrate* (cfm)
03/10/93	6	0	7	0	6.5	1.5	5.2	2	0	1.5	>0	1.5	6.5	1	6.5	0	4.5	0	235
06/08/93	12.6	2.5	15.6	0.5	10.5	2.7	10	2.6	off	off	off	off	off	off	off	off	–	1.25	220
06/11/93	12.5	3.2	15	1	–	4	9.5	4	off	off	off	off	off	off	off	off	–	2.5	215
06/16/93	10.5	3	15	1	9	3.2	9	3	<3	3	4.5	3	14	2	–	2.5	–	2.5	220
06/18/93	10	2.8	15	1	9	3.2	9	3	<3	3	4.5	3	14	2	–	2.5	–	2.5	220
06/28/93	11.5	1.5	13.5	0.2	8	2	7	2	–	2	–	2	12	0.9	–	1.1	–	1.1	230
06/30/93	14.5	4.5	14.5	1	13	5	14	5	–	4.5	–	5	15.5	2	–	4	–	4	210
07/08/93	9.5	2.3	15.1	1	10	3.1	9.6	3	–	3	4.7	3	16.2	2	5	2.5	–	2.5	220
09/30/93	3.5	2	–	1	10	2	10	2	<3	2	5	2	14	1.5	–	1	–	1.5	230
10/01/93	3.5	2.2	–	1.5	11	2.2	8	2.5	–	2.5	5	2.7	14	2	–	2	–	2	225
12/03/93	2	4.1	25	4.1	9	4.7	14	4.7	–	4.4	off	off	off	off	off	off	–	4.7	215
12/07/93	1	4	19.5	4	8.5 – 10	4.5	9	4.5	–	4	–	4.5	–	4.5	5.5	4	–	4	215
12/10/93	>0	3.5	24	3.5	9	4	7.5	4	–	4	–	4	–	4	–	3.5	–	3.5	215
12/17/93	–	6	–	6	–	5.5	–	6	–	6.5	–	5.5	–	6	–	6	–	5.5	200

NOTES: – indicates reading not taken – flowmeter plug stuck or water in flowmeter
* includes flow from vacuum wells as well as from groundwater aeration tank/sump tank air line

P:\PROJ\1069079\VACFLOW.wk1

Inspection and monitoring logs for the vapor extraction system are contained in Appendix A, and vacuum well flow data are summarized in Table 1.

1.2.3 Vapor Phase Carbon Life

The carbon in both the primary and secondary adsorbers was changed out once during 1993. As noted in Section 1.2.1, this occurred in June, during the start-up period. The carbon in both units was again changed out during January 1994. Listed below are the changeout dates and the approximate number of days of vacuum well operation prior to each changeout.

Changeout #1	June 28, 1993	14 days of operation before changeout
Changeout #2	January 12, 1994	24.5 days of operation before changeout

Changeout #1 occurred after TICs were detected in the effluent from the primary and secondary carbon adsorption units at levels exceeding then-current discharge limits. Limits (for the primary adsorber) had been established for target VOCs, phenol and total TICs in the November 1992 air permit application. Following the first changeout, the vapor extraction system was restarted; however, breakthrough of TICs was again detected earlier than expected in the primary adsorber. The system was shut down on July 12, 1993, and was kept off until issues related to contaminant breakthrough and system monitoring were resolved. These issues were previously discussed in Section 1.2.1.

The vapor extraction system was restarted on December 1, 1993 for full-scale operations, and continued to operate through December. It was shut off for changeout #2 on December 23, 1993.

Changeout #2 was necessary because the treatment efficiency of the primary carbon adsorber was decreasing, and loading calculations indicated the carbon was near its maximum adsorption capacity. MPI determined to also change out the carbon in the secondary unit at the same time since it was economically more feasible to do so than to wait and change it out at a later date.

It is anticipated that the carbon changeout frequency will decrease during 1994, as soil and soil gas contaminant concentrations decrease. An analysis of the contaminant loading on the vapor phase carbon which was changed out is provided in Section 2.2.3.

2.0 SAMPLING AND MONITORING RESULTS

2.1 GROUNDWATER WITHDRAWAL/TREATMENT SYSTEM

2.1.1 Groundwater Levels

During 1993, Test Pit 3 Area groundwater levels were periodically measured to monitor the effectiveness of the groundwater withdrawal system. Levels were obtained from the vacuum wells and groundwater recovery wells on a semi-weekly basis. Monitoring well and piezometer water levels were obtained semi-monthly. Well and piezometer locations are shown in Figure 2.

Groundwater level elevations are provided in Appendix E. The water table configuration in the Test Pit 3 Area on February 11, 1993 is shown in Figure 3, and represents conditions as they existed prior to the commencement of pumping. The configurations of the water table while the recovery well system was operating during both a relatively wet period (March 4, 1993) and a relatively dry period (August 10, 1993) are depicted in Figures 4 and 5, respectively.

Based on the water level data collected, the groundwater withdrawal system is effectively dewatering the Test Pit 3 Area. However, it appeared that during operation of the vapor extraction system, groundwater levels increased within the vacuum wells. This was due to either the removal by the vacuum wells of capillary water held in pore spaces adjacent to the well screens or to vacuum induced mounding of the groundwater in the vicinity of each vacuum well. Limiting the flow of air from the vacuum wells will be necessary to minimize the amount of water accumulating in them.

2.1.2 System Sampling

Sampling of the groundwater withdrawal/treatment system was conducted in accordance with the schedules contained in the Preliminary Operations, Maintenance and Monitoring Plan (Preliminary O, M & M Plan), dated November 1992. All samples were collected by MPI and analyzed by Life Science Laboratories, Inc. (LSL), East Syracuse, New York.

Analytical results are summarized in Tables 2 and 3. Table 2 summarizes the results of sampling conducted during the initial start-up period, or first month of system operation. In Table 3, the results of the routine sampling conducted after this period are summarized. Copies of the 1993 laboratory reports from LSL are provided in Appendix F.

All system discharge limits were consistently met since start-up. In fact, VOC influent concentrations were relatively low, and only xylenes were detected on more than one occasion. Methyl ethyl ketone (MEK) was detected during the first sampling episode in February 1993, but was not detected since then. The source of this compound was most likely the PVC glue used to connect all piping and sample ports, since PVC glue contains MEK.

On December 20 and 21, 1993, the rinse water generated during the remediation of the on-site sewers was pumped from dewatering pits, located in the center of the site, through the Test Pit 3 Area treatment system. The water had previously been sampled, and a portion of the water was run through the system on December 15, when monthly sampling was undertaken, to verify that it would be effectively treated. Toluene and chlorobenzene were detected in the water before the carbon treatment system; however, analytical results indicate that all discharge limits for the system were met during the treatment of the sewer rinse water.

TABLE 2
TEST PIT 3 AREA IRM START-UP
GROUNDWATER SAMPLING
SUMMARY OF ANALYTICAL RESULTS

PARAMETER	RW-1	RW-2	RW-3	RW-4	RW-5
DATE	02/12/93	02/12/93	02/12/93	02/12/93	02/12/93
VOLATILE ORGANICS EPA 8240 (µg/l)					
2-Butanone (MEK)	85	38	91	< 10	< 10
Ethylbenzene	17	< 5	9.7	< 5	< 5
Toluene	< 5	< 5	< 5	< 5	5.8
total Xylenes	110	< 5	33	21	74
TICs (estimated values (µg/l))					
Cyclohexane	50	--	--	--	220
2,2-Dimethylbutane	--	--	20	32	--
1,1-Dimethylcyclohexane	--	--	--	44	34
cis-1,2-Dimethylcyclohexane	--	35	--	--	--
trans-1,2-Dimethylcyclohexane	35	--	--	56	47
cis/trans-1,2-Dimethylcyclohexane	--	--	42	--	--
cis-1,3-Dimethylcyclohexane	--	--	--	--	140
trans-1,3-Dimethylcyclohexane	22	17, 36	26	40	--
1,4-Dimethylcyclohexane	--	--	--	--	27
trans-1,2-Dimethylcyclopentane	--	--	--	860	210
cis-1,3-Dimethylcyclopentane	--	--	--	180	--
3,3-Dimethylpentane	--	--	--	50	--
Ethylcyclohexane	35	--	--	--	36
1-Ethyl-3-methylbenzene	--	9.2	7.6	6.3	--
Heptane	--	--	16	--	42
Hexane	--	--	43	--	130
2-Methylbutane	9.0	--	89	110	--
Methylcyclohexane	610	120	640	1100	620
1-Methylcyclohexene	43	--	--	74	--
Methylcyclopentane	24	--	--	--	130
1-Methylethylbenzene	36	12	--	--	--
2-Methylpentane	14	--	130	230	180
3-Methylpentane	11	--	81	190	130
Pentane	7.2	--	77	74	44
Propylbenzene	24	--	--	--	--
Tetrahydrofuran	--	50	50	--	--
1,2,3-Trimethylbenzene	19	--	--	10	--
1,3,5-Trimethylbenzene	55	--	--	--	--
1,2,4-Trimethylcyclopentane	--	35	--	--	31
Unknown	--	14	--	--	150
Unknown	--	11	--	--	--
Unknown	--	7.8	--	--	--

TABLE 2
TEST PIT 3 AREA IRM START-UP
GROUNDWATER SAMPLING
SUMMARY OF ANALYTICAL RESULTS

PARAMETER	RW-1	RW-2	RW-3	RW-4	RW-5
DATE	02/12/93	02/12/93	02/12/93	02/12/93	02/12/93
INORGANICS (mg/l)					
Aluminum	< 0.1	< 0.1	< 0.1	0.30	2.3
Antimony	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Arsenic	0.017	0.0079	0.019	0.015	0.0097
Barium	0.81	0.16	0.44	0.40	0.11
Cadmium	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chromium total	< 0.01	< 0.01	< 0.01	< 0.01	0.021
Copper	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
Iron	5.1	6.6	4.2	4.8	3.3
Lead	< 0.05	< 0.05	< 0.05	< 0.05	0.10
Magnesium	22	10	11	5.8	4.2
Manganese	4.1	4.2	6.1	3.0	1.2
Zinc	< 0.05	0.052	< 0.05	< 0.05	0.052
Cyanide	< 0.005	< 0.005	0.013	< 0.005	< 0.005
MISCELLANEOUS (mg/l)					
TOC	na	na	na	na	na

TABLE 2
TEST PIT 3 AREA IRM START-UP
GROUNDWATER SAMPLING
SUMMARY OF ANALYTICAL RESULTS

PARAMETER	Aeration Influent		Filter Effluent	
DATE	02/12/93	03/04/93	02/12/93	03/04/93
VOLATILE ORGANICS EPA 8240 (µg/l)				
2-Butanone (MEK)	< 10	< 10	< 10	< 10
Ethylbenzene	7.7	< 5	< 5	< 5
Toluene	5.4	< 5	< 5	< 5
total Xylenes	56	< 5	13	< 5
TICs (estimated values (µg/l))				
Cyclohexane	na	na	na	na
2,2-Dimethylbutane	na	na	na	na
1,1-Dimethylcyclohexane	na	na	na	na
cis-1,2-Dimethylcyclohexane	na	na	na	na
trans-1,2-Dimethylcyclohexane	na	na	na	na
cis/trans-1,2-Dimethylcyclohexane	na	na	na	na
cis-1,3-Dimethylcyclohexane	na	na	na	na
trans-1,3-Dimethylcyclohexane	na	na	na	na
1,4-Dimethylcyclohexane	na	na	na	na
trans-1,2-Dimethylcyclopentane	na	na	na	na
cis-1,3-Dimethylcyclopentane	na	na	na	na
3,3-Dimethylpentane	na	na	na	na
Ethylcyclohexane	na	na	na	na
1-Ethyl-3-methylbenzene	na	na	na	na
Heptane	na	na	na	na
Hexane	na	na	na	na
2-Methylbutane	na	na	na	na
Methylcyclohexane	na	na	na	na
1-Methylcyclohexene	na	na	na	na
Methylcyclopentane	na	na	na	na
1-Methylethylbenzene	na	na	na	na
2-Methylpentane	na	na	na	na
3-Methylpentane	na	na	na	na
Pentane	na	na	na	na
Propylbenzene	na	na	na	na
Tetrahydrofuran	na	na	na	na
1,2,3-Trimethylbenzene	na	na	na	na
1,3,5-Trimethylbenzene	na	na	na	na
1,2,4-Trimethylcyclopentane	na	na	na	na
Unknown	na	na	na	na
Unknown	na	na	na	na
Unknown	na	na	na	na

TABLE 2
TEST PIT 3 AREA IRM START-UP
GROUNDWATER SAMPLING
SUMMARY OF ANALYTICAL RESULTS

PARAMETER	Aeration Influent		Filter Effluent	
DATE	02/12/93	03/04/93	02/12/93	03/04/93
INORGANICS (mg/l)				
Aluminum	0.43	< 0.1	0.36	< 0.1
Antimony	< 0.002	< 0.002	< 0.002	< 0.002
Arsenic	0.014	0.014	0.012	0.0091
Barium	0.40	0.72	0.34	0.75
Cadmium	< 0.01	< 0.005	< 0.01	< 0.005
Chromium total	< 0.01	< 0.05	< 0.01	< 0.05
Copper	< 0.04	0.015	< 0.04	0.016
Iron	4.7	1.9	2.3	< 0.06
Lead	< 0.05	< 0.05	< 0.05	< 0.05
Magnesium	10	15	10	16
Manganese	3.6	3.7	3.4	3.5
Zinc	< 0.05	< 0.05	< 0.05	< 0.05
Cyanide	0.055	< 0.005	< 0.005	< 0.005
MISCELLANEOUS (mg/l)				
TOC	na	na	na	na

TABLE 2
TEST PIT 3 AREA IRM START-UP
GROUNDWATER SAMPLING
SUMMARY OF ANALYTICAL RESULTS

PARAMETER	Discharge			Discharge Limits
DATE	02/12/93	02/24/93	03/04/93	
VOLATILE ORGANICS EPA 8240 (µg/l)				
2-Butanone (MEK)	120 *	< 10	< 10	10
Ethylbenzene	< 5	< 5	< 5	10
Toluene	< 5	< 5	< 5	10
total Xylenes	< 5	< 5	< 5	10
TICs (estimated values (µg/l))				
Cyclohexane	--	na	na	na
2,2-Dimethylbutane	--	na	na	na
1,1-Dimethylcyclohexane	--	na	na	na
cis-1,2-Dimethylcyclohexane	--	na	na	na
trans-1,2-Dimethylcyclohexane	--	na	na	na
cis/trans-1,2-Dimethylcyclohexane	--	na	na	na
cis-1,3-Dimethylcyclohexane	--	na	na	na
trans-1,3-Dimethylcyclohexane	--	na	na	na
1,4-Dimethylcyclohexane	--	na	na	na
trans-1,2-Dimethylcyclopentane	--	na	na	na
cis-1,3-Dimethylcyclopentane	--	na	na	na
3,3-Dimethylpentane	--	na	na	na
Ethylcyclohexane	--	na	na	na
1-Ethyl-3-methylbenzene	--	na	na	na
Heptane	--	na	na	na
Hexane	--	na	na	na
2-Methylbutane	--	na	na	na
Methylcyclohexane	--	na	na	na
1-Methylcyclohexene	--	na	na	na
Methylcyclopentane	--	na	na	na
1-Methylethylbenzene	--	na	na	na
2-Methylpentane	--	na	na	na
3-Methylpentane	--	na	na	na
Pentane	--	na	na	na
Propylbenzene	--	na	na	na
Tetrahydrofuran	50 *	na	na	na
1,2,3-Trimethylbenzene	--	na	na	na
1,3,5-Trimethylbenzene	--	na	na	na
1,2,4-Trimethylcyclopentane	--	na	na	na
Unknown	--	na	na	na
Unknown	--	na	na	na
Unknown	--	na	na	na

TABLE 2
TEST PIT 3 AREA IRM START-UP
GROUNDWATER SAMPLING
SUMMARY OF ANALYTICAL RESULTS

PARAMETER	Discharge			Discharge Limits
DATE	02/12/93	02/24/93	03/04/93	
INORGANICS (mg/l)				
Aluminum	0.54	na	< 0.1	4.0
Antimony	< 0.002	na	< 0.002	0.15
Arsenic	0.029	na	0.0074	0.05
Barium	< 0.08	na	0.47	2.5
Cadmium	< 0.01	na	< 0.005	0.02
Chromium total	< 0.01	na	< 0.05	0.1
Copper	< 0.04	na	0.010	0.25
Iron	0.21	na	< 0.06	4.0
Lead	< 0.05	na	< 0.05	0.1
Magnesium	11	na	16	25
Manganese	0.30	na	1.3	6.0
Zinc	< 0.05	na	< 0.05	2.5
Cyanide	< 0.005	na	< 0.005	0.1
MISCELLANEOUS (mg/l)				
TOC	2.7	na	1.0	50

P:\PROJ\1069052\START-UP\STARTUPW.WK1

TABLE 2
TEST PIT 3 AREA IRM START-UP
GROUNDWATER SAMPLING
SUMMARY OF ANALYTICAL RESULTS

PARAMETER	Trip Blank		
DATE	02/12/93	02/24/93	03/04/93
VOLATILE ORGANICS EPA 8240 (µg/l)			
2-Butanone (MEK)	< 10	< 10	< 10
Ethylbenzene	< 5	< 5	< 5
Toluene	< 5	< 5	< 5
total Xylenes	< 5	< 5	< 5
TICs (estimated values (µg/l))			
Cyclohexane	na	na	na
2,2-Dimethylbutane	na	na	na
1,1-Dimethylcyclohexane	na	na	na
cis-1,2-Dimethylcyclohexane	na	na	na
trans-1,2-Dimethylcyclohexane	na	na	na
cis/trans-1,2-Dimethylcyclohexane	na	na	na
cis-1,3-Dimethylcyclohexane	na	na	na
trans-1,3-Dimethylcyclohexane	na	na	na
1,4-Dimethylcyclohexane	na	na	na
trans-1,2-Dimethylcyclopentane	na	na	na
cis-1,3-Dimethylcyclopentane	na	na	na
3,3-Dimethylpentane	na	na	na
Ethylcyclohexane	na	na	na
1-Ethyl-3-methylbenzene	na	na	na
Heptane	na	na	na
Hexane	na	na	na
2-Methylbutane	na	na	na
Methylcyclohexane	na	na	na
1-Methylcyclohexene	na	na	na
Methylcyclopentane	na	na	na
1-Methylethylbenzene	na	na	na
2-Methylpentane	na	na	na
3-Methylpentane	na	na	na
Pentane	na	na	na
Propylbenzene	na	na	na
Tetrahydrofuran	na	na	na
1,2,3-Trimethylbenzene	na	na	na
1,3,5-Trimethylbenzene	na	na	na
1,2,4-Trimethylcyclopentane	na	na	na
Unknown	na	na	na
Unknown	na	na	na
Unknown	na	na	na

TABLE 2
TEST PIT 3 AREA IRM START-UP
GROUNDWATER SAMPLING
SUMMARY OF ANALYTICAL RESULTS

PARAMETER	Trip Blank		
DATE	02/12/93	02/24/93	03/04/93
INORGANICS (mg/l)			
Aluminum	na	na	na
Antimony	na	na	na
Arsenic	na	na	na
Barium	na	na	na
Cadmium	na	na	na
Chromium total	na	na	na
Copper	na	na	na
Iron	na	na	na
Lead	na	na	na
Magnesium	na	na	na
Manganese	na	na	na
Zinc	na	na	na
Cyanide	na	na	na
MISCELLANEOUS (mg/l)			
TOC	na	na	na

NOTES: na – Not Analyzed or Not Applicable
-- – Not Detected
* – The source of the MEK and tetrahydrofuran detected in the 02/12/93 Discharge sample was most likely the glue used to connect the piping and/or sample ports after the carbon . MEK was not detected in the combined flow prior to the carbon treatment (sample ID's – Aeration Influent and Filter Effluent), and the PVC glue used to connect all piping, sample ports, etc. contains MEK and tetrahydrofuran.

TABLE 3
COLUMBIA MILLS – TEST PIT 3 AREA IRM
ROUTINE GROUND WATER SAMPLING
SUMMARY OF ANALYTICAL RESULTS

Sample Location	Date Sampled	VOLATILE ORGANICS (ug/l) 2-Butanone (MEK)	1,2-Dichloroethane	1,1,1-Trichloroethane	Trichloroethene	Benzene	Toluene	Ethylbenzene	Total Xylenes	4-Methyl-2-pentanone (MIBK)	TOC (mg/l)
RW-1											
	07/14/93	<10	<5	<5	<5	<5	<5	<5	5.4	<10	—
	11/15/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
RW-2											
	07/14/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
	11/15/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
RW-3											
	07/14/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
RW-4											
	07/14/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
	11/15/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
RW-5											
	07/14/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
	11/15/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
Aeration Tank Influent											
	03/23/93	<10	<5	<5	<5	<5	<5	<5	8.9	<10	—
	05/12/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
	06/11/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
	07/14/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
	08/12/93	<20	<10	<10	<10	<10	<10	<10	780	<20	1
	09/15/93	<20	<10	<10	<10	<10	<10	<10	11	<20	—
	10/14/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
	11/15/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
	12/15/93	<10	<5	<5	<5	<5	<5	<5	6.5	<10	—
Bag Filter Effluent											
	03/23/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
	05/12/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
	06/11/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
	07/14/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
	08/12/93	<10	<5	<5	<5	<5	<5	12	120	<10	5

TABLE 3
COLUMBIA MILLS – TEST PIT 3 AREA IRM
ROUTINE GROUND WATER SAMPLING
SUMMARY OF ANALYTICAL RESULTS

Sample Location	Date Sampled	VOLATILE ORGANICS (ug/l)									TOC (mg/l)
		2-Butanone (MEK)	1,2-Dichloroethane	1,1,1-Trichloroethane	Trichloroethene	Benzene	Toluene	Ethylbenzene	Total Xylenes	4-Methyl-2-pentanone (MIBK)	
Bag Filter Effluent (cont.)	09/15/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
	10/14/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
	11/15/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
	12/15/93**	<10	<5	<5	<5	<5	380	<5	<5	<10	—
Carbon Tap A											
Train 1	03/23/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
Train 2	05/12/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
Train 3	06/11/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
Train 1	07/14/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
Train 2	08/12/93+	<10	<5	<5	<5	<5	<5	13	130	<10	—
Train 3	09/15/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
Train 1	10/14/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
Train 2	11/15/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
Train 3	12/15/93**	<10	<5	<5	<5	<5	370	<5	<5	<10	—
Carbon Tap B											
Train 1	03/23/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
Train 2	05/12/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
Train 3	06/11/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
Train 1	07/14/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
Train 2	08/12/93+	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
Train 3	09/15/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
Train 1	10/14/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
Train 2	11/15/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
Train 3	12/15/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
Carbon Tap C											
Train 1	03/23/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
Train 2	05/12/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
Train 3	06/11/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
Train 1	07/14/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
Train 2	08/12/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
Train 3	09/15/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
Train 1	10/14/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
Train 2	11/15/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—
Train 3	12/15/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	—

TABLE 3
COLUMBIA MILLS – TEST PIT 3 AREA IRM
ROUTINE GROUND WATER SAMPLING
SUMMARY OF ANALYTICAL RESULTS

Sample Location	Date Sampled	VOLATILE ORGANICS (ug/l)									TOC (mg/l)
		2-Butanone (MEK)	1,2-Dichloroethane	1,1,1-Trichloroethane	Trichloroethene	Benzene	Toluene	Ethylbenzene	Total Xylenes	4-Methyl-2-pentanone (MIBK)	
Discharge											
	03/23/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	30
	04/09/93	—	—	—	—	—	—	—	<5	—	—
	05/12/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	6
	05/26/93	—	—	—	—	—	—	—	<1	—	—
	06/11/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	12
	06/30/93	—	—	—	—	—	—	—	<5	—	—
	07/14/93*	<10	<5	<5	<5	<5	<5	<5	<5	<10	8
	07/28/93	—	—	—	—	—	—	—	<5	—	—
	08/12/93++	<10	<5	<5	<5	<5	<5	<5	<5	<10	<1
	08/30/93	—	—	—	—	—	—	—	<5	—	—
	09/15/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	<1
	09/30/93	—	—	—	—	—	—	—	<5	—	—
	10/14/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	2
	10/29/93	—	—	—	—	—	—	—	<5	—	—
	11/15/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	5
	11/30/93	—	—	—	—	—	—	—	<5	—	—
	12/15/93	<10	<5	<5	<5	<5	<5	<5	<5	<10	1
	12/30/93	—	—	—	—	—	—	—	<5	—	—
Discharge Limits		10	20	10	10	10	10	10	10	10	50

TABLE 3
COLUMBIA MILLS – TEST PIT 3 AREA IRM
ROUTINE GROUND WATER SAMPLING
SUMMARY OF ANALYTICAL RESULTS

Sample Location	Date Sampled	INORGANICS (mg/l)												
		Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Zinc	Cyanide
RW-1	07/14/93	—	—	—	—	—	—	—	1.8	—	27	3.0	—	—
	11/15/93	—	—	—	—	—	—	—	1.2	—	29	3.4	—	—
RW-2	07/14/93	—	—	—	—	—	—	—	1.3	—	21	4.0	—	—
	11/15/93	—	—	—	—	—	—	—	8.7	—	26	5.3	—	—
RW-3	07/14/93	—	—	—	—	—	—	—	1.3	—	26	4.3	—	—
RW-4	07/14/93	—	—	—	—	—	—	—	2.5	—	14	4.6	—	—
	11/15/93	—	—	—	—	—	—	—	3.1	—	18	9.4	—	—
RW-5	07/14/93	—	—	—	—	—	—	—	1.1	—	17	3.9	—	—
	11/15/93	—	—	—	—	—	—	—	1.5	—	14	3.7	—	—
Aeration Tank Influent	03/23/93	—	—	—	—	—	—	—	62	—	—	5.3	—	—
	05/12/93	—	—	—	—	—	—	—	—	—	—	—	—	—
	06/11/93	—	—	—	—	—	—	—	—	—	—	—	—	—
	07/14/93	—	—	—	—	—	—	—	—	—	—	—	—	—
	08/12/93	0.36	<0.002	0.018	1.0	<0.01	<0.01	<0.05	2.3	<0.05	21	5.0	<0.01	<0.005
	09/15/93	—	—	—	—	—	—	—	—	—	—	—	—	—
	10/14/93	—	—	—	—	—	—	—	—	—	—	—	—	—
	11/15/93	—	—	—	—	—	—	—	—	—	—	—	—	—
	12/15/93	—	—	—	—	—	—	—	—	—	—	—	—	—
Bag Filter Effluent	03/23/93	—	—	—	—	—	—	—	1.3	—	—	4.0	—	—
	05/12/93	—	—	—	—	—	—	—	—	—	—	—	—	—
	06/11/93	—	—	—	—	—	—	—	—	—	—	—	—	—
	07/14/93	—	—	—	—	—	—	—	—	—	—	—	—	—
	08/12/93+	0.32	<0.002	<0.01	0.88	<0.01	<0.01	<0.05	0.59	<0.05	21	3.1	<0.01	<0.005

TABLE 3
COLUMBIA MILLS – TEST PIT 3 AREA IRM
ROUTINE GROUND WATER SAMPLING
SUMMARY OF ANALYTICAL RESULTS

Sample Location	Date Sampled	INORGANICS (mg/l)												
		Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Zinc	Cyanide
Bag Filter Effluent (cont.)	09/15/93	—	—	—	—	—	—	—	—	—	—	—	—	—
	10/14/93	—	—	—	—	—	—	—	—	—	—	—	—	—
	11/15/93	—	—	—	—	—	—	—	—	—	—	—	—	—
	12/15/93**	—	—	—	—	—	—	—	—	—	—	—	—	—
Carbon Tap A														
Train 1	03/23/93	—	—	—	—	—	—	—	0.20	—	—	1.3	—	—
Train 2	05/12/93	—	—	—	—	—	—	—	—	—	—	—	—	—
Train 3	06/11/93	—	—	—	—	—	—	—	—	—	—	—	—	—
Train 1	07/14/93	—	—	—	—	—	—	—	—	—	—	—	—	—
Train 2	08/12/93+	—	—	—	—	—	—	—	—	—	—	—	—	—
Train 3	09/15/93	—	—	—	—	—	—	—	—	—	—	—	—	—
Train 1	10/14/93	—	—	—	—	—	—	—	—	—	—	—	—	—
Train 2	11/15/93	—	—	—	—	—	—	—	—	—	—	—	—	—
Train 3	12/15/93**	—	—	—	—	—	—	—	—	—	—	—	—	—
Carbon Tap B														
Train 1	03/23/93	—	—	—	—	—	—	—	0.14	—	—	0.92	—	—
Train 2	05/12/93	—	—	—	—	—	—	—	—	—	—	—	—	—
Train 3	06/11/93	—	—	—	—	—	—	—	—	—	—	—	—	—
Train 1	07/14/93	—	—	—	—	—	—	—	—	—	—	—	—	—
Train 2	08/12/93+	—	—	—	—	—	—	—	—	—	—	—	—	—
Train 3	09/15/93	—	—	—	—	—	—	—	—	—	—	—	—	—
Train 1	10/14/93	—	—	—	—	—	—	—	—	—	—	—	—	—
Train 2	11/15/93	—	—	—	—	—	—	—	—	—	—	—	—	—
Train 3	12/15/93	—	—	—	—	—	—	—	—	—	—	—	—	—
Carbon Tap C														
Train 1	03/23/93	—	—	—	—	—	—	—	0.13	—	—	0.74	—	—
Train 2	05/12/93	—	—	—	—	—	—	—	—	—	—	—	—	—
Train 3	06/11/93	—	—	—	—	—	—	—	—	—	—	—	—	—
Train 1	07/14/93	—	—	—	—	—	—	—	—	—	—	—	—	—
Train 2	08/12/93	—	—	—	—	—	—	—	—	—	—	—	—	—
Train 3	09/15/93	—	—	—	—	—	—	—	—	—	—	—	—	—
Train 1	10/14/93	—	—	—	—	—	—	—	—	—	—	—	—	—
Train 2	11/15/93	—	—	—	—	—	—	—	—	—	—	—	—	—
Train 3	12/15/93	—	—	—	—	—	—	—	—	—	—	—	—	—

TABLE 3
COLUMBIA MILLS – TEST PIT 3 AREA IRM
ROUTINE GROUND WATER SAMPLING
SUMMARY OF ANALYTICAL RESULTS

Sample Location	Date Sampled	INORGANICS (mg/l)												
		Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Zinc	Cyanide
Discharge														
	03/23/93	<0.1	<0.002	0.0083	0.52	<0.005	<0.01	<0.05	0.092	<0.2	16	0.73	0.33	<0.005
	04/09/93	—	—	—	—	—	—	—	—	—	—	—	—	—
	05/12/93	<0.1	<0.001	0.0040	0.42	<0.005	<0.01	<0.05	0.12	<0.001	16	0.080	<0.01	<0.005
	05/28/93	—	—	—	—	—	—	—	—	—	—	—	—	—
	06/11/93	0.15	<0.01	0.0016	0.40	<0.004	<0.01	<0.05	0.052	<0.05	16	0.010	<0.02	<0.005
	06/30/93	—	—	—	—	—	—	—	—	—	—	—	—	—
	07/14/93*	0.32	<0.01	<0.01	0.61	<0.004	<0.005	<0.05	0.066	<0.05	21	0.030	<0.05	0.0062
	07/28/93	—	—	—	—	—	—	—	—	—	—	—	—	—
	08/12/93++	0.54	<0.002	<0.01	0.50	<0.01	<0.01	<0.05	0.13	<0.05	20	2.3	<0.01	0.015
	08/30/93	—	—	—	—	—	—	—	—	—	—	—	—	—
	09/15/93	0.28	0.0010	0.0078	1.0	<0.01	<0.01	<0.05	0.13	<0.05	21	5.5	<0.05	<0.005
	09/30/93	—	—	—	—	—	—	—	—	—	—	—	—	—
	10/14/93	0.23	<0.002	0.0062	0.91	<0.01	<0.01	<0.05	0.12	<0.05	21	3.2	<0.02	0.0064
	10/29/93	—	—	—	—	—	—	—	—	—	—	—	—	—
	11/15/93	0.12	0.0042	<0.01	0.38	<0.01	<0.01	<0.05	<0.06	<0.05	23	0.55	0.013	<0.005
	11/30/93	—	—	—	—	—	—	—	—	—	—	—	—	—
	12/15/93	0.17	0.0032	0.0029	0.46	<0.01	<0.01	<0.05	0.19	<0.05	21	0.35	0.014	<0.01
	12/30/93	—	—	—	—	—	—	—	—	—	—	—	—	—
Discharge Limits		4.0	0.15	0.05	2.5	0.02	0.1	0.25	4.0	0.1	25	6.0	2.5	0.1

NOTES:

— = Not Applicable or Not Analyzed

* = Acetone detected at 76 µg/l – most likely from lab since acetone is a common lab contaminant

+ = Bag Filter Effluent: chloroform-12 ug/l, bromodichloromethane-16 ug/l, dibromochloromethane-16 ug/l

Carbon Tap A: chloroform-14 ug/l, bromodichloromethane-16 ug/l, dibromochloromethane-18 ug/l, first carbon canister removed from service at time of sampling

Carbon Tap B: chloroform-6.1 ug/l

++ = Chlorine analyzed for in field on 08/13/93 – Free Chlorine = <0.1 mg/l, Total Chlorine = <0.1 mg/l, Discharge Limit (total residual) = 0.5 mg/l

** = Bag Filter Effluent: chlorobenzene-6.3 ug/l

Carbon Tap A: chlorobenzene-6.4 ug/l, first carbon canister removed from service at time of sampling, water from site sewer remediation project being passed through system at time of sampling

P:\PROJ\1069052\START-UP\SAMPSUM.WK1

2.2 VAPOR EXTRACTION SYSTEM

2.2.1 Start-Up Sampling

During the month following the start-up of the vapor extraction system (June 8, 1993), start-up sampling was conducted in accordance with the Preliminary O, M & M Plan. Some preliminary air sampling was conducted prior to this to determine the concentrations of contaminants in the air vented from the groundwater treatment system aeration tank. The last sampling conducted during start-up occurred on October 1, 1993. The vapor extraction system had previously been shut down on July 12, 1993 due to contaminant breakthrough in the primary carbon unit. As noted in Section 1.2, the system remained off until the data collected during start-up was reviewed and several issues regarding system operation were resolved. The sampling conducted on October 1, 1993, was conducted as part of the effort to restart the system.

Analytical results of the start-up sampling are summarized in Table 4, and copies of the lab reports are provided in Appendix G. All air samples were obtained by and analyzed by Upstate Labs. Additional split samples were obtained by MPI on October 1, 1993, and analyzed by the NYSDOH.

Sampling of the air originating from the groundwater aeration tank indicated that relatively low levels of VOCs were present following the groundwater system start-up period in February. This would be expected since very little VOC contamination was detected in the groundwater pumped from the recovery wells after the initial period of their operation.

The main contaminants present in the air being removed with the Test Pit 3 Area vacuum wells were TICs. These TICs included alkanes (such as methyl-hexanes), cycloalkanes (such as methyl-cyclohexanes), and unknowns. Ethylbenzene, toluene, xylenes, and phenol were the target compounds detected; however, the concentrations of these compounds were relatively low. Based on these data and review of the former plant's records, the probable source of the contamination found in the Test Pit 3 Area was the petroleum based solvent, benzine (or ligroine), formerly stored in this area.

TABLE 4
TEST PIT 3 AREA IRM START–UP
VAPOR EXTRACTION SYSTEM AIR SAMPLING
SUMMARY OF ANALYTICAL RESULTS

TARGET COMPOUNDS DETECTED

PARAMETER MW / DATE	Ethylbenzene 106.17 µg/m3	ppm	Toluene 92.14 µg/m3	ppm	Xylenes 106.16 µg/m3	ppm	Total Hydrocarbons ppm	Methane ppm	Phenol 94.11 µg/m3	ppm
Vacuum Well 1										
06/11/93	410	0.0944	<25	<0.0066	2200	0.5067	2557	261	<75	<0.0195
Vacuum Well 2										
06/11/93	25	0.0058	<25	<0.0066	370	0.0852	1186	39	<75	<0.0195
Vacuum Well 3										
06/11/93	25	0.0058	<25	<0.0066	170	0.0392	234	21	<75	<0.0195
Vacuum Well 4										
06/11/93	<25	<0.0058	<25	<0.0066	1000	0.2303	1481	111	<75	<0.0195
Vacuum Well 5										
06/18/93	<300	<0.0691	<300	<0.0796	380	0.0875	36642	801	170	0.0442
Vacuum Well 6										
06/18/93	<300	<0.0691	<300	<0.0796	<300	<0.0691	14649	2212	38	0.0099
Vacuum Well 7										
06/18/93 ***	<300	<0.0691	<300	<0.0796	<300	<0.0691	15246	583	380	0.0987
Vacuum Well 8										
06/18/93	<300	<0.0691	<300	<0.0796	730	0.1681	903	37	150	0.0390
Vacuum Well 9										
06/11/93	<25	<0.0058	<25	<0.0066	31	0.0071	681	408	<75	<0.0195
Combined Vacuum Well Air Stream										
06/18/93	<300	<0.0691	<300	<0.0796	630	0.1451	8638	346	230	0.0598
06/30/93	<23	<0.0053	<23	<0.0061	150	0.0345	9380	180	250	0.0650
07/08/93 *	<23	<0.0053	<23	<0.0061	46	0.0106	4940	140	140	0.0364
Aeration Tank/Sump Air Stream										
02/12/93 – front	520	0.1198	280	0.0743	2500	0.5758	300	167	– –	– –
02/12/93 – back	< 3	< 0.0007	4	0.0011	< 3	< 0.0007	– –	– –	– –	– –
06/11/93	<25	<0.0058	<25	<0.0066	39	0.0090	1530	4	– –	– –
06/30/93	<23	<0.0053	<23	<0.0061	<23	<0.0053	14	6	– –	– –
Demister Air Stream Influent										
03/11/93 – front *	< 120	< 0.0276	< 120	< 0.0318	580	0.1336	1822	531	< 80	< 0.0208
06/11/93	69	0.0159	<25	<0.0066	750	0.1727	1360	4	<75	<0.0195
06/30/93	<23	<0.0053	<23	<0.0061	120	0.0276	7610	140	140	0.0364

TABLE 4
TEST PIT 3 AREA IRM START–UP
VAPOR EXTRACTION SYSTEM AIR SAMPLING
SUMMARY OF ANALYTICAL RESULTS

TARGET COMPOUNDS DETECTED

PARAMETER MW	Ethylbenzene	106.17	Toluene	92.14	Xylenes	106.16	Total Hydrocarbons	Methane	Phenol	94.11
DATE	µg/m3	ppm	µg/m3	ppm	µg/m3	ppm	ppm	ppm	µg/m3	ppm
Primary Vapor Carbon Influent										
02/12/93 – front	23	0.0053	52	0.0138	130	0.0299	54	34	– –	– –
02/12/93 – back	< 5	< 0.0012	6	0.0016	< 5	< 0.0012	– –	– –	– –	– –
02/24/93 – front	10	0.0023	19	0.0050	58	0.0134	27	14	– –	– –
02/24/93 – back	< 2	< 0.0005	2	0.0005	< 2	< 0.0005	– –	– –	– –	– –
06/11/93	100	0.0230	<25	<0.0066	1100	0.2533	149	4	<75	<0.0195
06/30/93 *	<23	<0.0053	<23	<0.0061	120	0.0276	4620	90	150	0.0390
07/08/93 *	<23	<0.0053	<23	<0.0061	85	0.0196	6890	150	230	0.0598
10/01/93 – Upstate *	<2300	<0.5297	<2300	<0.6103	<2300	<0.5297	– –	– –	– –	– –
– NYSDOH *	245	0.0564	<3.8	<0.0010	<4.3	<0.0010	1018 (4650 mg/m3)	– –	– –	– –
Primary Vapor Carbon Effluent										
02/24/93 – front	< 3	< 0.0007	3	0.0008	< 3	< 0.0007	14	14	– –	– –
04/09/93 – front	< 3	< 0.0007	< 3	< 0.0008	< 3	< 0.0007	23	23	– –	– –
06/11/93	25	0.0058	<2	<0.0005	230	0.0530	31	2	<75	<0.0195
06/18/93 *	<23	<0.0053	<23	<0.0061	<23	<0.0053	3475	165	138	0.0359
06/30/93 + *	<23	<0.0053	<23	<0.0061	<23	<0.0053	90	84	<80	<0.0208
07/08/93 (2)*	<23	<0.0053	<23	<0.0061	<23	<0.0053	1065	105	120	0.0312
10/01/93 – Upstate *	<2300	<0.5297	<2300	<0.6103	<2300	<0.5297	– –	– –	– –	– –
– NYSDOH *	<4.3	<0.0010	12	0.0032	<4.3	<0.0010	46 (211 mg/m3)	– –	– –	– –
Secondary Vapor Carbon Effluent										
06/23/93 *	<23	<0.0053	<23	<0.0061	<23	<0.0053	1921	146	– –	– –
10/01/93 – Upstate *	<2300	<0.5297	<2300	<0.6103	<2300	<0.5297	– –	– –	– –	– –
– NYSDOH *	5.2	0.0012	<3.8	<0.0010	<4.3	<0.0010	17 (76 mg/m3)	– –	– –	– –
Bag/Pump Equipment Blank										
02/12/93 – front	8	0.0018	12	0.0032	40	0.0092	< 1.0	< 1.0	– –	– –
02/12/93 – back	< 5	< 0.0012	< 5	< 0.0013	< 5	< 0.0012	– –	– –	– –	– –
02/24/93 – front	< 3	< 0.0007	< 3	< 0.0008	< 3	< 0.0007	< 1.0	< 1.0	– –	– –
03/11/93 – front **	8	0.0018	8	0.0021	31	0.0071	< 1.0	< 1.0	< 80	< 0.0208
06/11/93	<2	<0.0005	3	0.0008	<2	<0.0005	< 1.0	< 1.0	<75	<0.0195
06/18/93	<3	<0.0007	<3	<0.0008	<3	<0.0008	<1	<1	<38	<0.0088
06/30/93 *	<2	<0.0005	6	0.0016	3	0.0007	<1	<1	80	0.0208

T/ E 4
TEST PIT 3 AREA IRM START–UP
VAPOR EXTRACTION SYSTEM AIR SAMPLING
SUMMARY OF ANALYTICAL RESULTS

TARGET COMPOUNDS DETECTED

PARAMETER MW DATE	Ethylbenzene 106.17 µg/m3	 ppm	Toluene 92.14 µg/m3	 ppm	Xylenes 106.16 µg/m3	 ppm	Total Hydrocarbons ppm	Methane ppm	Phenol 94.11 µg/m3	 ppm
Control/Media Blank										
02/12/93	< 0.15 µg	--	< 0.15 µg	--	< 0.15 µg	--	--	--	--	--
03/11/93	--	--	--	--	--	--	--	--	< 5 µg	--
06/11/93	< 0.2 µg	--	0.2 µg	--	< 0.2 µg	--	--	--	< 5 µg	--
06/18/93 ***	< 3 µg	--	4 µg	--	< 3 µg	--	--	--	< 3 µg	--
06/23/93 ****	< 3 µg	--	4 µg	--	< 3 µg	--	--	--	--	--
06/30/93 (1)*	< 0.2 µg	--	0.4 µg	--	< 0.2 µg	--	--	--	< 5 µg	--
07/08/93 (2)*	< 0.2 µg	--	0.6 µg	--	< 0.2 µg	--	--	--	< 5 µg	--
10/01/93 (3)* – Upstate	< 0.2 µg	--	0.4 µg	--	< 0.2 µg	--	--	--	--	--
Max Allowable Discharge Limit for the Vapor Carbon Effluent	278098	64.0	278098	73.8	278098	64.0	--	--	278098	72.3

NOTES: -- = not analyzed, or not applicable
* = table of tentatively identified compounds (TICs) attached
** = methyl ethyl ketone (MEK) also detected at 35 µg/m3
*** = methylene chloride also detected at 850 µg/m3 (VW7) and 17 µg (media blank).
**** = acetone also detected at 23 µg and methylene chloride at 11 µg.
\+ = primary and secondary vapor carbon changed out 06/28/93.
(1) = acetone also detected at 1.4 µg and methylene chloride at 0.5 µg.
(2) = acetone also detected in primary vapor carbon effluent at 190 µg/m3 and in media blank at 1.2 µg – methylene chloride detected in media blank at 0.6 µg.
(3) = acetone also detected at 1.5 ug and methylene chloride at 0.6 ug.

A known volume of air was collected for each sample then passed through two carbon adsorbant tubes in series.
The VOCs adsorb onto the carbon; the carbon is then analyzed for VOCs.
The Front and Back designations refer to the first and second carbon tube in series, respectively.
The sample for the TOC analysis is taken as a gaseous direct injection into the GC.

Conversion from µg/m³ to ppm assumes T = 77°F, and V = 24.45.

T = 77°F
V = 24.45

ppm = [(mg/m³)(V)]/(molecular weight)

P:\PROJ\1069052\START-UP\STARTUPA.WK1

TABLE 4
TEST PIT 3 AREA IRM START–UP
VAPOR EXTRACTION SYSTEM AIR SAMPLING
SUMMARY OF ANALYTICAL RESULTS
TENTATIVELY IDENTIFIED COMPOUNDS

PARAMETER / DATE		Demister Air Stream Influent 03/11/93		Pump/Bag Blank 03/11/93	
		µg/m3	ppm	µg/m3	ppm
SEMIVOLATILE ORGANICS					
EPA 8270 – TICs (estimated values)					
cis–1,3–Dimethylcyclohexane		2700	na	– –	– –
1,4–Dimethylcyclohexane		750	na	– –	– –
trans–1,4–Dimethylcyclohexane		1200	na	– –	– –
2,3–Dimethylhexane		230	na	– –	– –
2,5–Dimethyloctane		460	na	– –	– –
Ethylcyclohexane		1200	na	– –	– –
1–Ethyl–4–methylcyclohexane		1700	na	– –	– –
1–Ethyl–4–methylcyclohexane		400	na	– –	– –
2–Methylheptane		980	na	– –	– –
3–Methylnonane		620	na	– –	– –
4–Methylnonane		460	na	– –	– –
Propylcyclohexane		720	na	– –	– –
1,3,5–Trimethylbenzene		200	na	– –	– –
1,3,5–Trimethylcyclohexane		660	na	– –	– –
1,2,3–Trimethylcyclopentane		550	na	– –	– –
Unknown		880	na	– –	– –
Unknown		1100	na	– –	– –
Unknown		3300	na	– –	– –
Unknown		370	na	– –	– –
Unknown		1000	na	– –	– –
Unknown		450	na	– –	– –
Unknown		800	na	– –	– –
Unknown		540	na	– –	– –
Unknown		460	na	– –	– –
Unknown		460	na	– –	– –
Unknown		220	na	– –	– –
Unknown Hydrocarbon		570	na	– –	– –
Unknown Hydrocarbon		1100	na	– –	– –
Unknown Hydrocarbon		1100	na	– –	– –
Unknown Hydrocarbon		740	na	– –	– –
Total TICs (estimated values)++	112.2	25920	5.65	– –	– –

TEST PIT 3 AREA IRM START-UP
VAPOR EXTRACTION SYSTEM AIR SAMPLING
SUMMARY OF ANALYTICAL RESULTS
TENTATIVELY IDENTIFIED COMPOUNDS

PARAMETER / DATE		Demister Air Stream Influent 03/11/93		Pump/Bag Blank 03/11/93	
		µg/m3	ppm	µg/m3	ppm
VOLATILE ORGANICS					
EPA 8240 – TICs (estimated values)					
cis-1,3-Dimethylcyclohexane		3200	na	--	na
2,5-Dimethylhexane		1700	na	--	na
3,5-Dimethylheptane		1200	na	--	na
decahydro-1,6-Dimethylnapthalene		--	na	7	na
trans-1-ethyl-4-methyl-cyclohexane		1200	na	--	na
Methylcyclohexane		2900	na	--	na
2-Methyldecane		960	na	--	na
2-Methylheptane		--	na	--	na
3-Methylheptane		1700	na	--	na
2-Methylpentane		--	na	--	na
Unknown		2100	na	12	na
Unknown		2000	na	70	na
Unknown		1600	na	8	na
Unknown		--	na	10	na
Unknown hydrocarbon		--	na	--	na
Unknown hydrocarbon		--	na	--	na
Unknown hydrocarbon		--	na	--	na
Unknown hydrocarbon		--	na	--	na
Total TICs (estimated values)+	98.19	18560	4.622	107	0.0266

NOTES:

-- = not detected

na = not analyzed, or not applicable

A known volume of air was collected for each sample then passed through two carbon adsorbant tubes in series.
The VOCs adsorb onto the carbon; the carbon is then analyzed for VOCs.
The Front and Back designations refer to the first and second carbon tube in series, respectively.
The sample for the TOC analysis is taken as a gaseous direct injection into the GC.
Conversion from µg/m³ to ppm assumes T=77°F, and V=24.45. 77°F 24.45
ppm = [(mg/m³)(V)]/(molecular weight)
+ = the estimated Total Volatile TIC's concentration in ppm was calculated using the molecular weight of methylcyclohexane.
++ = the estimated Total Semivolatile TIC's concentration in ppm was calculated using the molecular weight of dimethylcyclohexane.

P:\PROJ\1069052\START-UP\CMTCLTIC.WK1

TABLE 4
TEST PIT 3 AREA IRM START-UP
VAPOR EXTRACTION SYSTEM AIR SAMPLING
SUMMARY OF ANALYTICAL RESULTS
TENTATIVELY IDENTIFIED COMPOUNDS

PARAMETER	Combined Vacuum Well Air Stream	Primary Vapor Carbon Influent		Primary Vapor Carbon Effluent			Secondary Carbon Effluent	Bag/Pump Equipment Blank	Control/Media Blank	
DATE	07/08/93	06/30/93	07/08/93	06/18/93	06/30/93	07/08/93	06/23/93	06/30/93	06/30/93	07/08/93
VOLATILE ORGANICS										
EPA 8240 - TICs (estimated values)										
1,1,2-Trimethylcyclopentane	---	---	---	500	---	---	---	---	---	---
1,1,3-Trimethylcyclopentane	---	---	---	2500	150	1100	---	---	---	---
1,1-Dimethylcyclopentane	---	---	---	62	---	---	3000	---	---	---
2,3-Dimethylpentane	---	---	---	---	---	---	300	---	---	---
2,4-Dimethylpentane	---	---	---	96	---	150	2200	---	---	---
2-Methylhexane	---	---	---	390	---	380	---	---	---	---
2-Methylpentane	---	---	---	100	---	---	3000	---	---	---
3-Methylhexane	---	---	---	550	150	---	---	---	---	---
3-Methylpentane	---	---	---	72	---	---	2400	---	---	---
Cycloheptane	---	---	---	250	---	---	---	---	---	---
Cyclohexane	---	---	---	---	---	---	750	---	---	---
Cyclohexane, 1,3-Dimethyl-trans	---	---	---	---	100	---	---	---	---	---
Cyclohexane, 1,4-Dimethyl-trans	320	540	570	---	---	---	---	8	---	---
Cyclohexane, 1-Ethyl-4-Methyl-trans	210	290	370	---	---	---	---	---	---	---
Cyclohexane, Methyl	---	380	380	9300	450	22000	12000	12	---	---
Cyclopentane, 1,2,3-Trimethyl	---	---	---	---	77	---	---	---	---	---
Cyclopentane, 1,2-Dimethyl-trans	---	---	---	2500	---	4600	6400	---	---	---
Cyclopentane, 1,3-Dimethyl-trans	---	---	---	1600	---	3000	3800	---	---	---
Cyclopentane, Ethyl	---	---	---	---	---	1100	---	---	---	---
Heptane, 2,5- Dimethyl	---	240	---	---	---	---	---	---	---	---
Heptane, 2,6- Dimethyl	---	230	---	---	---	---	---	---	---	---
Hexane	---	---	---	110	---	120	4500	---	---	---
Methylcyclopentane	---	---	---	49	---	---	1300	---	---	---
Nonane, 3-Methyl	380	490	460	---	---	---	---	---	---	---
Octane, 2,5-Dimethyl	350	---	290	---	---	---	---	---	---	---
Unknown	---	310	---	---	85	---	---	---	---	---
Unknown	180	230	220	---	150	---	---	---	---	---
Unknown	---	240	230	---	38	200	---	---	---	---
Unknown	---	280	---	---	77	---	---	---	---	---
Unknown Hydrocarbon	320	---	360	---	---	---	---	---	---	---
Unknown Hydrocarbon	260	---	260	---	---	---	---	---	---	---
Unknown Hydrocarbon	460	360	500	39	---	490	1500	---	---	---
Unknown Hydrocarbon	350	270	340	---	---	---	---	---	---	---
Unknown Hydrocarbon	180	350	240	880	110	---	---	---	---	---
Unknown Hydrocarbon	430	270	350	190	---	---	600	---	---	---
Unknown Hydrocarbon	440	---	460	---	---	---	---	---	---	---

TABLE 4
TEST PIT 3 AREA IRM START-UP
VAPOR EXTRACTION SYSTEM AIR SAMPLING
SUMMARY OF ANALYTICAL RESULTS
TENTATIVELY IDENTIFIED COMPOUNDS

PARAMETER	Combined Vacuum Well Air Stream	Primary Vapor Carbon Influent		Primary Vapor Carbon Effluent			Secondary Carbon Effluent	Bag/Pump Equipment Blank	Control/Media Blank	
DATE	07/08/93	06/30/93	07/08/93	06/18/93	06/30/93	07/08/93	06/23/93	06/30/93	06/30/93	07/08/93
Unknown Hydrocarbon	380	380	520	140	---	---	---	6	---	---
Unknown Hydrocarbon	200	490	220	1400	---	---	---	---	---	---
SEMIVOLATILE ORGANICS										
EPA 8270 – TICs (estimated values)										
Benzene, 1,2,3-Trimethyl	---	620	---	NA	---	---	NA	---	---	---
Cyclohexane, 1,3,5-Trimethyl	510	---	550	NA	---	---	NA	---	---	---
Cyclohexane, 1,3-Dimethyl-trans	850	---	830	NA	---	---	NA	---	---	---
Cyclohexane, 1,4-Dimethyl	1600	480	---	NA	---	---	NA	---	---	---
Cyclohexane, 1,4-Dimethyl-trans	---	1000	1600	NA	---	---	NA	---	---	---
Cyclohexane, 1-Ethyl-4-Methyl-trans	630	---	---	NA	---	---	NA	---	---	---
Cyclohexane, Ethyl	800	480	850	NA	---	---	NA	---	---	---
Octane, 2,5-Dimethyl	---	400	650	NA	---	---	NA	---	---	---
Octane, 3,6-Dimethyl	---	---	1100	NA	---	---	NA	---	---	---
Unknown	790	590	650	NA	---	---	NA	---	---	---
Unknown	940	---	920	NA	---	---	NA	---	---	---
Unknown	540	430	590	NA	---	---	NA	---	---	---
Unknown	---	370	---	NA	230	150	NA	92	---	---
Unknown	1900	1200	2100	NA	---	---	NA	---	---	---
Unknown	970	---	970	NA	---	---	NA	---	---	---
Unknown	690	490	740	NA	---	---	NA	---	---	---
Unknown Hydrocarbon	690	680	710	NA	---	---	NA	---	---	---
Unknown Hydrocarbon	620	---	---	NA	---	---	NA	---	---	---
Unknown Hydrocarbon	550	390	570	NA	---	---	NA	---	---	---
Unknown Hydrocarbon	790	390	800	NA	---	---	NA	---	---	---
Unknown Hydrocarbon	890	490	630	NA	---	---	NA	---	---	---
Unknown Hydrocarbon	660	---	610	NA	---	---	NA	---	---	---
Unknown Hydrocarbon	590	630	590	NA	---	---	NA	---	---	---
Unknown Hydrocarbon	1100	460	880	NA	---	---	NA	---	---	---

NOTES:

All concentrations in µg/m3.
--- = not detected
NA = not anlayzed

P:\PROJ\1069052\START-UP\TP3IRMST.WK1

TABLE 4
TEST PIT 3 AREA IRM START–UP
VAPOR EXTRACTION SYSTEM AIR SAMPLING
SUMMARY OF ANALYTICAL RESULTS

TENTATIVELY IDENTIFIED COMPOUNDS
October 1, 1993

PARAMETER	Primary Vapor Carbon Influent mg/m3		Primary Vapor Carbon Effluent mg/m3		Secondary Vapor Carbon Effluent mg/m3		Control/Media Blank µg	
	Upstate	NYSDOH	Upstate	NYSDOH	Upstate	NYSDOH	Upstate	NYSDOH
VOLATILE ORGANICS								
EPA 8240 – TICs (Estimated values)		See Note 1		See Note 1		See Note 1		NA
Benzene, 1,2–diethyl–	---		0.02		---		---	
Benzene, 1,3–diethyl–	---		---		---		0.66	
Benzene, 1,4–diethyl–	---		---		---		0.45	
Benzene, 1–ethenyl–3–ethyl–	---		0.01		---		0.48	
Benzene, 1–ethenyl–4–ethyl–	---		0.01		---		---	
Benzene, ethyl–(1–methylethenyl)–	---		---		---		0.94	
Benzene, 2–methyl–1–butenyl–	---		---		---		0.27	
Bicyclo [3.2.1] octane	---		---		0.005		---	
Cycloheptane	---		---		---		---	
Cycloheptane, methyl–	---		0.03		0.22		---	
Cyclohexane, 1,2–dimethyl–, cis–	---		---		0.08		---	
Cyclohexane, 1,3–dimethyl–, cis–	4.1		0.40		---		---	
Cyclohexane, 1,3–dimethyl–, trans–	0.3		0.82		---		---	
Cyclohexane, 1,4–dimethyl–, cis–	---		---		0.13		---	
Cyclohexane, 1,4–dimethyl–, trans–	---		---		0.17		---	
Cyclohexane, methyl–	2.5		0.03		---		---	
Cyclohexane, 1,2,4–trimethyl–	0.9		---		---		---	
Cyclopentane, 1,3–dimethyl–, trans–	---		---		0.02		---	
Cyclopentane, 1–ethyl–2–methyl–, cis–	---		---		0.006		---	
Cyclohexane, 1,3,5–trimethyl–	0.5		---		---		---	
Cyclopentane, 1,2,3–trimethyl–	---		---		---		---	
Cyclopentane, 1,2,4–trimethyl–	0.9		---		0.11		---	
Ether, heptyl hexyl–	---		0.24		---		---	
Heptane	1.4		---		0.08		---	
Heptane, 2–methyl–	2.3		0.37		---		---	
Hexane, 2,2–dimethyl–	---		0.04		0.04		---	
Hexane, 2–methyl–	0.4		0.04		0.04		---	
Hexane, 3–methyl–	0.4		0.04		0.04		---	
1H–Indene, octahydro–, cis–	---		0.09		---		---	
Naphthalene	---		---		---		0.33	
Nonane, 4–methyl–	0.7		---		---		---	

TABLE 4
TEST PIT 3 AREA IRM START-UP
VAPOR EXTRACTION SYSTEM AIR SAMPLING
SUMMARY OF ANALYTICAL RESULTS

TENTATIVELY IDENTIFIED COMPOUNDS
October 1, 1993

PARAMETER	Primary Vapor Carbon Influent mg/m3		Primary Vapor Carbon Effluent mg/m3		Secondary Vapor Carbon Effluent mg/m3		Control/Media Blank µg	
	Upstate	NYSDOH	Upstate	NYSDOH	Upstate	NYSDOH	Upstate	NYSDOH
Octane, 3,6-dimethyl-	0.3		---		---		---	
Octane, 3-methyl-	0.3		---		---		---	
Pentalene, octahydro-	---		0.05		0.04		---	
Unknown Hydrocarbon (RT = 13.92)	1.6		---		---		---	
Unknown Hydrocarbon (RT = 15.51)	---		---		0.004		---	
Unknown Hydrocarbon (RT = 16.36)	---		---		0.02		---	
Unknown Hydrocarbon (RT = 17.90)	0.4		---		---		---	
Unknown Hydrocarbon (RT = 18.77)	---		1.50		---		---	
Unknown Hydrocarbon (RT = 19.16)	---		0.04		---		---	
Unknown Hydrocarbon (RT = 20.19)	0.4		---		---		---	
Unknown Hydrocarbon (RT = 20.88)	---		0.14		---		---	
Unknown Hydrocarbon (RT = 21.18)	---		0.08		---		---	
Unknown Hydrocarbon (RT = 21.40)	0.2		---		---		---	
Unknown Hydrocarbon (RT = 21.75)	---		0.02		---		---	
Unknown Hydrocarbon (RT = 22.84)	0.4		---		---		---	
Unknown Hydrocarbon (RT = 23.28)	0.4		---		---		---	
Unknown Hydrocarbon (RT = 24.12)	0.2		---		---		---	
Unknown Hydrocarbon (RT = 24.22)	---		0.04		---		---	
Unknown Hydrocarbon (RT = 26.25)	---		---		---		0.67	
Unknown Hydrocarbon (RT = 26.57)	---		---		---		0.35	
Unknown Hydrocarbon (RT = 27.38)	---		---		---		0.33	

Notes:

1. The attached hand written NYSDOH table contains the estimated concentrations of eight TICs for each sample location, as determined through GC/MS analysis. NYSDOH GC/MS analysis indicated the presence of TICs at a total level greater than that detected by their FID total hydrocarbon scan. However, the State considers the results of the total hydrocarbon scan to be more reliable than the GC/MS TIC results.

--- = not detected

NA = not analyzed/not applicable

(RT) = retention time of unknown compound

P:\PROJ\1069079\TP3IRMR2.WK1

TABLE 4
TEST PIT 3 AREA IRM START–UP
VAPOR EXTRACTION SYSTEM AIR SAMPLING
SUMMARY OF ANALYTICAL RESULTS

Dave:

Here are the three samples in diluted form. Our usual sample load on to the M.S is 500 nils. Therefore, a 50 ml sample load is 1/10 our usual load. Dilutions were done in each sample canister or transfered to a clean (FID Tested) canister, diluted with clean air. (The clean air is used as blanks; a cleaned canister filled with clean air is also run as a control). A 50 ml sample load of a 1:8 dilution is equal to a 1/80 final dilution.

	PRIMARY CARBON INFLUENT	PRIMARY CARBON EFFLUENT	SECONDARY CARBON EFFLUENT
File no.	932303D	9323048	932305A
dilution, final	1:80	1:20	1:5
Peak scan / Hexane equiv in mg/m³	394 / 1360	398 / 689	372 / 5.9
	448 / 1452	452 / 395	430 / 36.3
	1158 / 1852	1167 / 52.7	1173 / 71.
	1212 / 2512	1219 / 45.5	1227 / 88.2
	1335 / 3222	1342 / 100.7	1348 / 71.7
	1529 / 3771	1531 / 24.6	1536 / 123
	1766 / 3038	1768 / 73.	1771 / 54.1
	2018 / 3577	2022 / 44	2017 / 8.1

For identification see Library Searches enclosed.

2.2.2 Sampling During Full-Scale Operations

Conditions for restarting the Test Pit 3 Area vacuum wells were finalized during the end of November with the NYSDEC, and the wells were turned back on during early December. As per the NYSDEC, semi-continuous air monitoring was performed by MPI with a Foxboro Century OVA (Model 108) flame ionization detector during December. Upstate Labs also obtained air samples for total hydrocarbon analysis on three different occasions during the month.

Sampling the vapor extraction system air stream for USEPA 8240 VOCs and phenol was undertaken at the beginning of December, when the system was restarted. Consistent with the results of previous analyses, these compounds were detected at very low concentrations (several orders of magnitude lower than their respective discharge limits) or not detected at all.

A summary of OVA meter monitoring results is provided in Table 5, and Upstate Lab's December 1993 analytical results are summarized in Table 6. Copies of the laboratory reports from Upstate are provided in Appendix G.

Graphs showing how the contaminant concentrations (as measured with the OVA meter) in the primary vapor carbon influent stream and the primary vapor carbon treatment efficiency varied over the period of system operation are included in Figures 6 and 7, respectively. As expected, contaminant levels decreased over time, and a treatment efficiency of greater than 60% was maintained by the primary vapor carbon adsorber. It also appears that relatively low levels of light compounds, such as methane, were being recovered by the vacuum wells. Compounds such as methane are not adsorbed by carbon and will pass through the system untreated.

2.2.3 Contaminant Loading on Carbon

The quality of the vapor phase carbon was tested both times it was changed out to confirm that the carbon was exhausted. Samples of the carbon were obtained by MPI and analyzed by Barnebey & Sutcliffe Corp., Columbus, Ohio. In both cases, the apparent density and carbon tetrachloride (CCl4) activity of the carbon were determined. Testing results are summarized in Table 7.

TABLE 5
ROUTINE VAPOR EXTRACTION SYSTEM MONITORING WITH OVA METER
SUMMARY OF RESULTS

Date	Time	Primary Influent (ppm)	Primary Effluent (ppm)	Secondary Effluent (ppm)	Primary % Removal	Active Wells	Dilution Valve
12/1/93	13:35	850	340	280	60	1,3,4,9	Closed
	14:00	680	250	175	63	1,3,4,9	Closed
	14:20	625	230	175	63	1,3,4,9	Closed
	14:50	500	150	110	70	1,3,4,9	Closed
	15:20	375	110	90	71	1,3,4,9	Closed
	15:30	825	310	250	62	All	Closed
	15:45	1025	225	170	78	All	Closed
	16:10	1010	210	150	79	All*	Closed
12/2/93	10:30	800	140	75	83	1,2,3,4,5,9	Open
	11:00	550	110	75	80	1,2,3,4,5,9	Open
	11:30	1200	250	125	79	1,2,3,4,5,9	Closed
	12:00	700	125	85	82	1,2,3,4,5,9	Closed
	12:30	650	100	65	85	1,2,3,4,5,9	Closed
	13:00	600	90	65	85	1,2,3,4,5,9	Closed
	13:30	550	85	60	85	1,2,3,4,5,9	Closed
	14:00	500	75	58	85	1,2,3,4,5,9	Closed
	14:30	500	70	60	86	1,2,3,4,5,9	Closed
	15:00	500	75	50	85	1,2,3,4,5,9	Closed
12/3/93	9:25	550	65	40	88	1,2,3,4,5,9	Closed
	9:44+	600	55	45	91	1,2,3,4,5,9	Closed
	10:05	550	60	40	89	1,2,3,4,5,9	Closed
	11:05	500	60	35	86	1,2,3,4,5,9	Closed
	12:00	500	50	35	90	1,2,3,4,5,9	Closed
	13:00	450	50	35	89	1,2,3,4,5,9	Closed
	14:00	450	55	40	88	1,2,3,4,5,9	Closed
	15:00	400	50	35	88	1,2,3,4,5,9	Closed
12/4/93	10:00	300	40	25	87	1,2,3,4,5,9	Closed
	17:00	250	30	20	88	1,2,3,4,5,9	Closed
12/5/93	15:30	175	25	19	86	1,2,3,4,5,9	Closed
12/6/93	10:45	250	25	20	90	1,2,3,4,5,9	Closed
	11:45	250	30	20	88	1,2,3,4,5,9	Closed
	11:50	400	100	80	75	All	Closed
	12:50	350	95	80	73	All	Closed
	13:50	325	95	75	71	All	Closed
12/7/93	9:00	275	65	40	76	All	Closed
	9:30++	250	65	40	74	All	Closed
	10:00	225	60	35	73	All	Closed
	11:00	225	60	40	73	All	Closed
	12:00	200	50	35	75	All	Closed
12/8/93	12:00	225	55	35	76	All	Closed
	13:00	170	50	30	71	All	Closed
	14:00	150	45	30	70	All	Closed
	15:00	150	45	27	70	All	Closed
12/9/93	9:30	150	40	30	73	All	Closed
	10:30	125	45	30	64	All	Closed
	11:30	100	45	30	55	All	Closed
	12:30	85	40	30	53	All	Closed
	13:35	125	50	25	60	1,2,3,4,5,9*	Closed
	15:15	375	60	35	84	All	Closed
	16:15	210	50	35	76	All*	Closed

TABLE 5
ROUTINE VAPOR EXTRACTION SYSTEM MONITORING WITH OVA METER
SUMMARY OF RESULTS

Date	Time	Primary Influent (ppm)	Primary Effluent (ppm)	Secondary Effluent (ppm)	Primary % Removal	Active Wells	Dilution Valve
12/10/93	10:30	350	45	25	87	All	Closed
	11:30	350	50	30	80	All	Closed
	12:40	200	45	27	78	All	Closed
	13:30	200	50	27	75	All	Closed
	14:30	200	55	27	73	All	Closed
	15:30	200	52	27	74	All*	Closed
12/13/93	10:00	375	85	35	77	All	Closed
	11:00	250	70	30	72	All	Closed
	12:00	225	60	27	73	All	Closed
	13:00	200	60	30	70	All	Closed
	14:00	200	60	25	70	All	Closed
	15:00	175	55	25	69	All	Closed
	16:00	175	55	25	69	All*	Closed
12/14/93	11:00	275	70	32	75	All	Closed
	12:00	250	80	32	68	All	Closed
	13:00	200	70	27	65	All	Closed
	14:00	175	60	50	66	All	Closed
	14:05	200	50 (B)	45 (A)	75	All	Closed
	14:30	200	45 (B)	40 (A)	78	All	Closed
	15:00	200	45 (B)	42 (A)	78	All	Closed
	15:05	225	70	30	69	All	Closed
	15:30	200	65	30	68	All	Closed
	16:00	200	65	30	68	All	Closed
12/15/93	9:35	175	50	25	71	All	Closed
	10:35	175	45	25	74	All	Closed
	11:40	150	47	25	69	All	Closed
	12:45	160	47	22	71	All	Closed
	13:35	170	50	25	69	All	Closed
	14:30	170	50	25	69	All	Closed
	15:20	175	50	25	71	All	Closed
12/16/93	11:00	200	55	27	73	All	Closed
	12:15	175	50	25	71	All	Closed
12/17/93	14:00	90	75	22	17	All*	Closed
12/20/93	9:55	400	90	35	78	All	Closed
	12:50	250	65	32	74	All	Closed
12/21/93	8:00	275	85	32	69	All	Closed
	9:30+++	250	60	30	76	All	Closed
12/22/93	10:45	250	40	20	84	All	Closed
	12:55	125	45	25	64	All	Closed
12/23/93	15:00	250	50	25	80	All*	Closed

Notes: Total air flow rate = 210-215 cfm

* – All wells were turned off after this reading

\+ – Upstate Labs sampling results for 12/3/93 are:

Total Hydrocarbons (ppm) – Primary Influent = 1080, Primary Effluent = 52, Secondary Effluent = 57

Methane (ppm) – Primary Influent = 17, Primary Effluent = 17, Secondary Effluent = 17

++ – Upstate Labs sampling results for 12/7/93 are:

Total Hydrocarbons (ppm) – Primary Influent = 375, Primary Effluent = 80, Secondary Effluent = 80

Methane (ppm) – Primary Influent = 20, Primary Effluent = 20, Secondary Effluent = 20

+++ – Upstate Labs sampling results for 12/21/93 are:

Total Hydrocarbons (ppm) – Primary Influent = 473, Primary Effluent = 146, Secondary Effluent = 54

Methane (ppm) – Primary Influent = 10, Primary Effluent = 10, Secondary Effluent = 10

(B)/(A)–Denotes which adsorber is in the primary position and which is in the secondary position. Noted when adsorbers switched.

TABLE 6
COLUMBIA MILLS TEST PIT 3 AREA IRM
ROUTINE VAPOR EXTRACTION SYSTEM SAMPLING
SUMMARY OF ANALYTICAL RESULTS
TARGET COMPOUNDS DETECTED OR PREVIOUSLY DETECTED

PARAMETER MW	Total Hydrocarbons	Methane	USEPA 8240 Volatile Organics: Ethylbenzene 106.17		Toluene 92.14		Xylenes 106.16		Phenol 94.11	
DATE	ppm	ppm	µg/m3	ppm	µg/m3	ppm	µg/m3	ppm	µg/m3	ppm
Primary Vapor Carbon Influent										
12/03/93	1080	17	<25	<0.0058	<25	<0.0066	180	0.0415	<80	<0.0208
12/07/93	375	20	--	--	--	--	--	--	--	--
12/21/93	473	10	--	--	--	--	--	--	--	--
Primary Vapor Carbon Effluent										
12/03/93	52	17	<25	<0.0058	<25	<0.0066	<25	<0.0058	<80	<0.0208
12/07/93	80	20	--	--	--	--	--	--	--	--
12/21/93	146	10	--	--	--	--	--	--	--	--
Secondary Vapor Carbon Effluent										
12/03/93	57	17	<25	<0.0058	<25	<0.0066	<25	<0.0058	<80	<0.0208
12/07/93	80	20	--	--	--	--	--	--	--	--
12/21/93	54	10	--	--	--	--	--	--	--	--
Max Allowable Discharge Limit for the Primary Vapor Carbon	--	--	278098	64.0	278098	73.8	278098	64.0	278098	72.3

NOTES: -- = not analyzed, or not applicable

A known volume of air was collected for each sample then passed through two carbon adsorbant tubes in series.
The VOCs adsorb onto the carbon; the carbon is then analyzed for VOCs.
The sample for the Total Hydrocarbon/Methane analysis is taken as a gaseous direct injection into the GC.

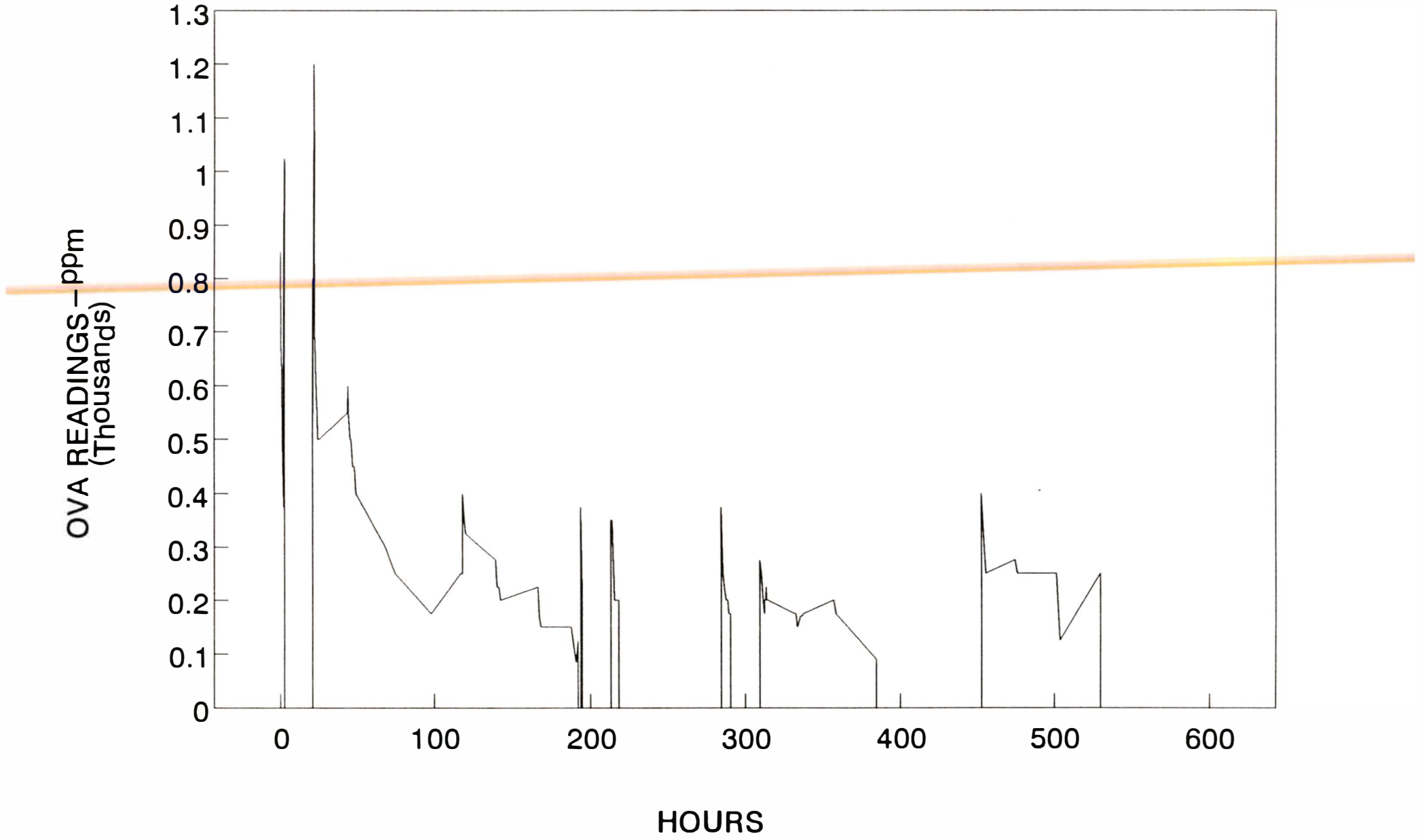
Conversion from µg/m³ to ppm assumes T=77°F, and V=24.45.

T = 77°F
V = 24.45

ppm = [(mg/m³)(V)]/(molecular weight)

P:\PROJ\1069052\START-UP\VEAIR.WK1

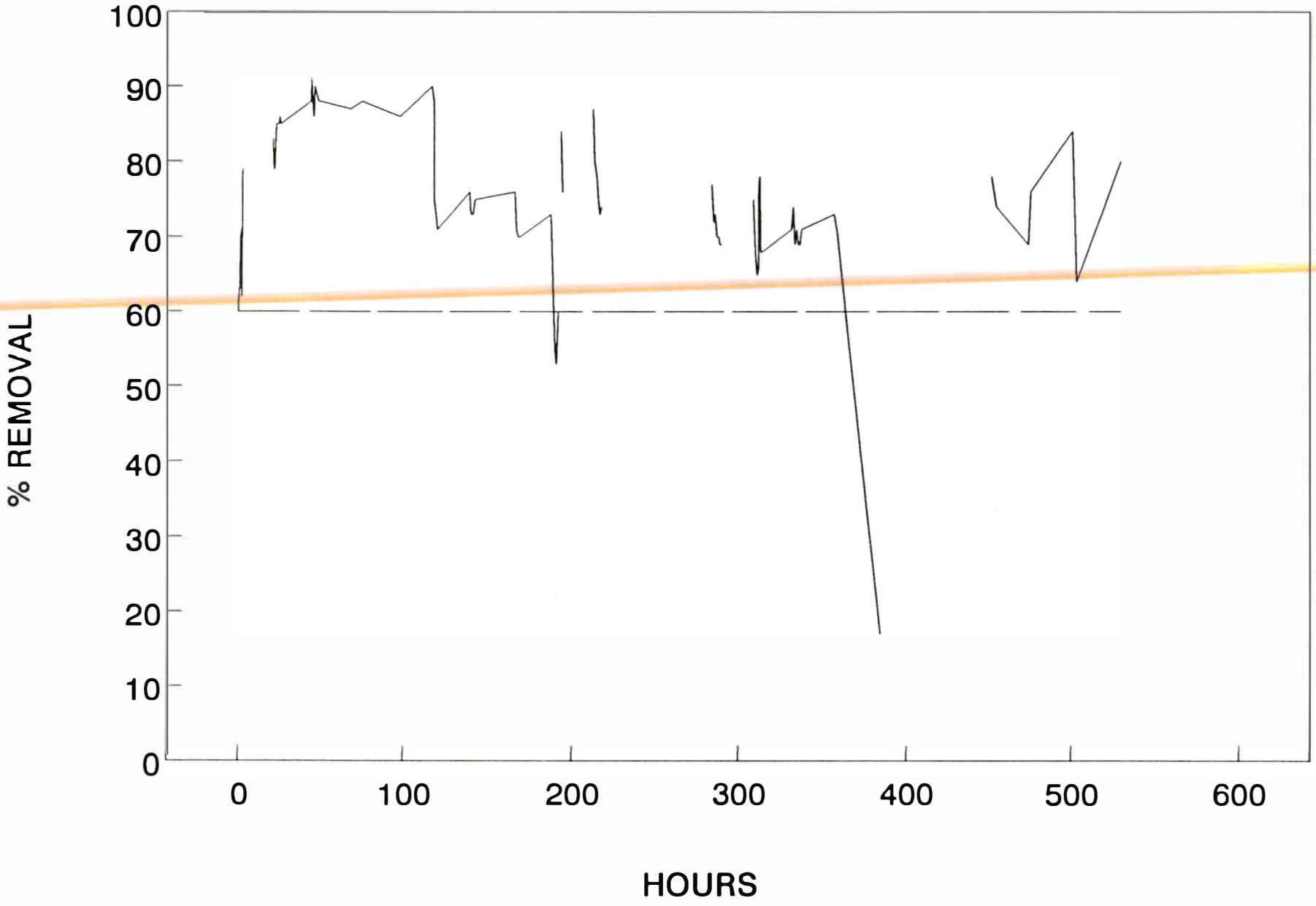
Figure 6
Columbia Mills Vapor Extraction System
OVA Readings vs Time – Prim. Influent



09-Feb-94

/1069079/OVAGRAF2.wk1

Figure 7
Columbia Mills Vapor Extraction System
% Efficiency – Primary Carbon



09-Feb-94

/1069079/OVAGRAF3.wk1

TABLE 7
COLUMBIA MILLS VAPOR EXTRACTION SYSTEM
SPENT VAPOR CARBON QUALITY DATA

CARBON CHANGEOUT DATE	TOTAL POUNDS CARBON REMOVED FROM ADSORBERS	APPARENT DENSITY (g/ml)			CCl_4 ACTIVITY (wt.%)	
		ORIGINAL	SPENT CARBON	DIFFERENCE	ORIGINAL	SPENT CARBON
June 28, 1993	4000	0.43-0.45	0.572	0.13	65-68	37.5
January 12, 1994						
Primary Adsorber	1628	0.383	0.471	0.088	71.2	27.6
Secondary Adsorber	1628	0.387	0.414	0.027	71.0	40.6

CONTAMINANT REMOVAL CALCULATIONS:
– calculations based on difference in apparent density of carbon
Carbon removed June 28, 1993 –
(4000 lb) X (453.593 g/lb) X (ml/0.44 g) X (0.13 g/ml) X (lb/453.593 g) = 1182 lbs – both adsorbers

Carbon removed January 12, 1994 –
primary adsorber: (1628 lb) X (453.593 g/lb) X (ml/0.383 g) X (0.088 g/ml) X (lb/453.593 g) = 374 lbs
secondary adsorber: (1628 lb) X (453.593 g/lb) X (ml/0.387 g) X (0.027 g/ml) X (lb/453.593 g) = 114 lbs
TOTAL 488 lbs – both adsorbers

P:\PROJ\1069079\CARBCCL4.wk1

The apparent density and CCl4 activity tests are meant to be quick tests performed on an "as received" carbon sample to determine the ultimate capacity of the carbon. The apparent density is simply the mass of a certain volume of the VOC contaminated carbon. If the original density of the carbon is known, the change in density can be used to calculate the approximate pounds of contaminants adsorbed onto the carbon. The presence of water vapor, however, can affect the apparent density by increasing it from what it would be if only VOCs were adsorbed.

The CCl4 activity test involves passing a saturated airstream of CCl4 through a weighed carbon sample until it will no longer adsorb the CCl4. This weight gain is the CCl4 activity in weight percent. According to Carbon Service Company, if a carbon is loaded with contaminants, in most cases it will show a residual activity of 10 - 60 % of its original specification. In some instances, the CCl4 activity might actually be lower than results indicate since CCl4 vapor is much more adsorbable than most compounds, and could actually "kick out" weaker adsorbing VOCs. In such instances, the carbon would have adsorbed more contaminants than the test indicated.

The apparent densities of the changed-out carbon were used to calculate the pounds of VOCs removed from the Test Pit 3 Area through the vapor extraction system during 1993. Calculations are shown in Table 7, and indicate that a total of 1670 pounds were adsorbed by the carbon. CCl4 activity results confirm that there was a significant quantity of organic loading on the carbon at the times of changeout.

The estimated total pounds of organic contaminants removed by each adsorber are also summarized in Table 8, along with the corresponding weight percent removal achieved. Loading and weight percent removals were also estimated based on contaminant concentrations in the inlet vapor, carbon removal efficiencies, and vapor extraction system operating time. These estimates are included in Table 8 as well, and the calculations are contained in Appendix H. The vendor's prediction for carbon performance is included in the last column of Table 8.

Based on the vapor phase carbon adsorption isotherm for cyclohexane, the vendor predicted a weight percent pick-up of roughly 10% to 12% for the types of hydrocarbons present in the Test Pit 3 Area. The contaminant loadings which were calculated based on the difference in apparent density of the new and spent carbon used at the site were generally higher than predicted. The loadings calculated from the contaminant concentrations in the vapor stream were higher than those based on apparent density

TABLE 8
COLUMBIA MILLS VAPOR EXTRACTION SYSTEM
VAPOR CARBON CONTAMINANT LOADING & WEIGHT % REMOVAL

CARBON CHANGEOUT DATE	TOTAL POUNDS CARBON REMOVED FROM ADSORBERS		DATA SOURCE FOR LOADING/% REMOVAL		VENDOR PREDICTION*
			CARBON APPARENT DENSITY	CONTAMINANT CONCS IN VAPOR	
June 28, 1993					
Primary Adsorber	2000	contaminant loading (lbs)	591	928	200 – 240
		weight % removal	30	46	10 – 12
Secondary Adsorber	2000	contaminant loading (lbs)	591	651	200 – 240
		weight % removal	30	33	10 – 12
January 12, 1994					
Primary Adsorber	1628	contaminant loading (lbs)	374	4320	163 – 195
		weight % removal	23	270	10 – 12
Secondary Adsorber	1628	contaminant loading (lbs)	114	417	163 – 195
		weight % removal	7.0	26	10 – 12

Note: * Vendor's prediction for expected percent contaminant removal based on vapor phase carbon adsorption isotherm for cyclohexane. These numbers represent the predicted weight pick-up for carbon in general.

p:\proj\1069079\carbload

differences. However, many of the concentrations used in the calculations were estimated, and some error may have been introduced in converting hydrocarbon concentrations in ppm to mg/m^3. A total molecular weight of 100 was assumed for the conversion.

In general, the contaminant loading and weight percent removal values calculated using the difference in carbon apparent density appeared to be closest to the predicted performance values. Part of the gain shown by the apparent density results over the predicted values could have been due to the presence of some water vapor.

2.2.4 Summary and Conclusions

Based on the evaluation of the vapor extraction system operation and data collected through March 1994, the following conclusions and observations have been made:

a. TICs make up the majority of the vapor phase contaminants. These compounds are generally considered to be compounds related to ligroine.

b. Analysis for total hydrocarbons appears to provide the best measurement of total VOCs and TICs in the vapor phase, and is the best indicator of the operating efficiency of the carbon. Total hydrocarbons can be analyzed either in the lab or in the field with an OVA meter. But, the field meter provides real time data and, therefore, is considered to be the best method of total VOC analysis.

c. Light hydrocarbons make up a portion of the vapor stream contamination, which are not adsorbed by the carbon, e.g. methane. This was determined based on the fact that a portion of the vapor contamination always passes through the carbon even if carbon is fresh. Methane was also detected in the vapor extraction air stream as part of the total hydrocarbon analyses performed by the lab. The inability to adsorb lighter compounds is a known characteristic of carbon. In addition, the light hydrocarbons appear to be generally proportional to the inlet concentrations.

d. The removal efficiency of the vapor phase carbon depends on the inlet contaminant concentrations. The carbon efficiency appears to be better at high inlet concentrations and decreases at low inlet concentrations. This may be due to the fact that at low concentrations there are less driving forces to cause the compounds to adsorb onto the carbon. Another explanation is that light hydrocarbons may dominate the vapor stream at low concentrations and, therefore, greatly reduce the calculated efficiency of the carbon, if not compensated for.

e. Consistent with literature, a reduction in VOC concentrations in the vacuum well air stream has occurred over time. In general, at system start-up, the saturated vapors present in the soil are quickly removed. After the initial period of operation, contaminant removal tends to become diffusion-limited, and removal rates drop with time. The vacuum wells at Columbia Mills have been temporarily turned off several times recently to allow the soil vapor to re-equilibrate and contaminant concentrations to build back up. This increases removal efficiency.

3.0 SYSTEM OPERATIONS AND MONITORING IN 1994

3.1 OPERATIONS IN 1994

Based on the operation of the vapor extraction/ground water withdrawal and treatment system during the past year, several actions will be taken in 1994 to improve its efficiency. Although the system as a whole is effectively removing and treating volatile contamination from the Test Pit 3 Area groundwater and soil, there are some steps which can be taken to improve the overall operating efficiency. These are described below.

1. During 1993, iron/iron bacteria fouling of the groundwater withdrawal and treatment system negatively affected operations. Maintenance of the recovery well pumps and carbon units was required. Groundwater levels began to rise in the recovery wells when the pumps became plugged and could no longer pump at the rates required to maintain the necessary drawdown. Operating pressures also began to rise when the carbon units became plugged. In fact, the carbon was plugging and required replacement before its VOC treatment capacity was fully utilized.
During 1994, MPI will implement a structured maintenance program for the recovery wells. The pumps will be pulled, disassembled, and cleaned once every three to four months. MPI is also looking into the feasibility of replacing the current liquid phase carbon adsorbers with adsorbers which are much more resistant to fouling from inorganics and biological growth. If this proves not to be feasible, a permanent carbon backwash system will be installed.

2. Although it appeared that the groundwater withdrawal system effectively dewatered the Test Pit 3 Area, groundwater levels rose in the vacuum wells when they were operating. The vacuums applied to the vacuum wells will be optimized so as to limit the amount of water accumulating in the wells and, at the same time, maintain a maximum air flowrate.

3. Operation of the vapor extraction system during 1993 indicated that vapor contaminant levels were relatively high at the time of system start-up, and dropped off quickly over time. MPI anticipates that during 1994, the vapor extraction system will have to operate on an on-and-off basis. In this way, contaminant levels will be able to build back up in the soil/soil gas when the system is shut off, allowing for more efficient contaminant recovery and treatment. Further testing and evaluation of current data will be required to determine the most effective on/off operating schedule.

3.2 MONITORING/SAMPLING

3.2.1 Monitoring and Recording

As approved by the NYSDEC (March 28, 1994 letter), monitoring and recording vapor and groundwater extraction system operating parameters will take place as outlined below. During preparation of this Annual Report, MPI determined that monitoring the system as frequently as originally proposed in the Preliminary OM & M Plan was not necessary to ensure effective operation.

a. Vapor Extraction System

Monitoring and recording the vapor extraction system operating characteristics is to take place according to the schedule shown in Table 9. Parameters will be recorded twice a month.

b. Groundwater Extraction System

Monitoring and recording flow into and through the treatment system is to take place according to the schedule shown in Table 10. Groundwater levels in the Test Pit 3 Area recovery and monitoring wells and piezometers are also to be measured as shown in Table 10. Flow monitoring will be conducted twice per month, and vacuum well and recovery well water levels will be obtained twice a month to ensure proper operation. All Test Pit 3 Area groundwater levels will be measured on a quarterly basis.

In order to monitor groundwater filtration system performance, the date will be noted when one set of bag filters becomes plugged, and the flow is diverted to the other set.

TABLE 9
COLUMBIA MILLS – TEST PIT 3 AREA
VAPOR EXTRACTION SYSTEM
MONITORING SCHEDULE

PARAMETER/LOCATION	FREQUENCY
Air Flow Rate*	
Nine Individual Vacuum Well Lines at entrance to trailer	2/month
Combined Influent Line to Primary Vapor Carbon Adsorber	2/month
Vacuum/Pressure*	
Nine Individual Vacuum Well Lines at entrance to trailer	2/month
Manifolded Line near entrance to Demister	2/month
Before and after Filter in Vapor Extraction Vacuum Pump Unit	2/month
Line exiting Vapor Extraction Vacuum Pump Unit	2/month
Lines entering Carbon Adsorber Units	2/month
Water Level	
Nine Vacuum Wells (ground water)	2/month
Demister Effluent Holding Tank (water removed from air stream)	2/month
Miscellaneous*	
Status of Manual Air Dilution Valve (open/closed)	2/month
LEL Monitor – Manifolded Line near entrance to Demister **	2/month
Temperature – Line exiting Vapor Extraction Vacuum Pump Unit	2/month

P:\PROJ\1069079\TABLES\VEMONSCH.WK1

NOTES: * These parameters should be recorded when air monitoring/sampling is conducted (at the middle and end of each month).

** The LEL Monitor continually monitors the gross contaminant levels in the manifolded vacuum well line and regulates an air dilution valve. This ensures explosive conditions will not exist in the line. The LEL Monitor reading will also be obtained during inspection of the system as noted above.

TABLE 10
GROUND WATER EXTRACTION SYSTEM
MONITORING SCHEDULE

PARAMETER/LOCATION	FREQUENCY
Flow*	
Individual Recovery Well Flow Rates	2/month
Individual Recovery Well Totalizer Readings	2/month
Flow Rate through each Carbon Canister Train	2/month
Carbon Canister Train Totalizer Readings	2/month
Total Flow Rate exiting Treatment System **	2/month
Total Flow exiting Treatment System – Totalizer Reading **	2/month
Water Level	
Five Recovery Wells	2/month
Monitoring Wells/Piezometers	Quarterly+

Notes:

* These parameters should be recorded at the beginning and middle of each month.

** The flow rate of the treatment system effluent stream and the total gallons exiting the system are continually recorded by an inline recorder. Readings will also be visually obtained as noted above.

+ Monitoring well and piezometer water levels should be obtained during March, June, September, and December of each year.

P:\PROJ\1069079\TABLES\GWSCH.WK1

3.2.2 Sampling/Analytical Testing

Based on analytical results of sampling last year, MPI has revised the sampling program, and, as approved by the NYSDEC (March 28, 1994 letter), plans to conduct sampling as outlined in Table 11. Sample port locations are shown in Figure 8.

a. Vapor Extraction System

Samples of the extracted vapor will be routinely obtained at several system locations during operation to determine when carbon within the primary treatment vessel has become exhausted, to verify that the effluent air from the carbon meets NYSDEC air discharge criteria and to aid in determining the amount of VOCs removed from the Test Pit 3 Area soils. Analytical results will also be used to predict carbon breakthrough. Monitoring with an OVA meter will take place two times per month, and samples of the primary carbon influent and effluent will be obtained for USEPA 8240 analysis after each month of operation. This will occur monthly if the system continually operates, with no shut downs.

Table 12 lists the revised air discharge criteria established by the NYSDEC for the vapor extraction system.

b. Groundwater Extraction System

Samples of the withdrawn groundwater will be routinely obtained at several locations during operation to monitor system performance, determine when carbon within the canisters has become exhausted and verify the discharge limits established by the NYSDEC are met.

Table 13 lists the groundwater effluent discharge limitations required at this facility as established by the NYSDEC. These levels have been set for the treatment of groundwater piped from both the Test Pit 3 Area and UST Area 1. Construction of the UST Area 1 pumping system and its connection to the treatment trailer is planned to be completed by May 1994.

TABLE 11
COLUMBIA MILLS – TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION OPERATIONS
SAMPLING SCHEDULE

SAMPLE PORT ID/LOCATION	NO. OF SAMPLES	FREQUENCY	ANALYSES
Vapor Extraction System			
1 Primary carbon unit influent	1	monthly	USEPA 8240
		2/month (middle & end)	Total hydrocarbons w/OVA meter
2 Primary carbon unit effluent	1	monthly	USEPA 8240
		2/month (middle & end)	Total hydrocarbons w/OVA meter
3 Secondary carbon unit effluent (system discharge)	1	2/month (middle & end)	Total hydrocarbons w/OVA meter
4 Individual well streams (VW1–VW9) – untreated	9	to be determined	USEPA 8240
			Total hydrocarbons w/OVA meter
Ground Water Withdrawal System			
5 Combined stream before metals treatment	1	monthly	USEPA 8240
6 Influent to carbon (bag filter effluent)	1	monthly	USEPA 8240
7 Carbon canister #2 effluent (Tap B)	1	monthly	USEPA 8240, TOC
8 Carbon system effluent	1	monthly	USEPA 8240, Inorganics, TOC
	1	2/month	Xylenes
9 Individual well streams (RW1–RW5) – untreated	5	2/year**	USEPA 8240, 3 select metals*

NOTES:

USEPA 8240 – VOC analysis
Inorganics = Aluminum, Antimony, Arsenic, Barium, Cadmium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Zinc, Cyanide
TOC – Total Organic Carbon
* = 3 select metals = Iron, Magnesium and Manganese
** = Individual well streams tentatively scheduled to be sampled during March and September of each year

P:\PROJ\1069079\TABLES\SAMPSC1.WK1

TABLE 12

COLUMBIA MILLS SITE – TEST PIT 3 AREA IRM
AIR DISCHARGE CRITERIA FOR VAPOR EXTRACTION SYSTEM (PRIMARY CARBON EFFLUENT)

RATING	REQUIRED TREATMENT EFFICIENCY	PARAMETER	MAXIMUM ALLOWABLE DISCHARGE LIMIT (LB/HR)
A	99%	Benzene	0.02
B	90%	Xylene	0.25
		Methyl ethyl ketone	0.25
		Methyl isobutyl ketone	0.25
		Ethylbenzene	0.25
		Trichloroethylene	0.21
		1,1,2,2-Tetrachloroethane	0.01
		Methylene chloride	0.25
		1,1,2-Trichloroethane	0.03
C	70%	Toluene	0.25
		1,1-Dichloroethene	0.25
		Acetone	0.25
	70%*	Total Hydrocarbons	NA

Notes: * Indicates normalized to account for lighter untreatable hydrocarbons

NA Not Applicable

P:\PROJ\1069079\TABLES\ADCVES3.WK1

TABLE 13
COLUMBIA MILLS – TEST PIT 3 AREA AND UST AREA 1 IRM
GROUND WATER EFFLUENT DISCHARGE LIMITS

PARAMETER	LIMITS	
	CONCENTRATION (mg/l)	LOADING (lb/day)
VOLATILES		
Xylenes, total	0.01	0.0029
Benzene	0.01	0.0029
1,2-Dichloroethane	0.02	0.0058
1,1,1-Trichloroethane	0.01	0.0029
1,2-(trans)-Dichloroethene	0.01	0.0029
1,2-(cis)-Dichloroethene	0.01	0.0029
Vinyl Chloride	0.01	0.0029
Methyl ethyl ketone	0.01	0.0029
Methyl isobutyl ketone	0.01	0.0029
Toluene	0.01	0.0029
Ethylbenzene	0.01	0.0029
Trichloroethylene	0.01	0.0029
Acetone	0.01	0.0029
INORGANICS		
Aluminum	4.0	1.15
Antimony	0.15	0.043
Arsenic	0.05	0.014
Barium	2.5	0.72
Cadmium	0.02	0.0058
Chromium	0.1	0.029
Copper	0.25	0.072
Iron	4.0	1.15
Lead	0.1	0.029
Magnesium	25	7.2
Manganese	6.0	1.7
Zinc	2.5	0.72
Cyanide	0.1	0.029
TOTAL ORGANIC CARBON	50	—
CHLORINE, TOTAL RESIDUAL	0.5	—

P:\PROJ\1069079\TABLES\CMGWLIMS.WK1

NOTE:
Loading (lb/day) calculated utilizing a 24 gpm flow rate.

APPENDIX A

Vapor Extraction/Groundwater Withdrawal System Logs

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

(1)

DATE: 2/24/93 TIME: 10:00 AM DWK
INITIALS

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1	0	0
VW2	↓	↓
VW3	↓	↓
VW4	↓	↓
VW5	↓	↓
VW6	↓	↓
VW7	↓	↓
VW8	↓	↓
VW9	↓	↓

COMBINED FLOW

needs to be zeroed

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister	3.8			2	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	2.6				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	3.4				
Line Exiting Vacuum Pump Unit		0	240		< 130
Line Entering Primary Carbon (A) ~~or B~~ (circle one)		2			
Line Entering Secondary Carbon ~~A~~ or (B) (circle one)		0.5			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = _____
Status of Manual Air Dilution Valve: (open) ~~closed~~ (circle one)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

DATE: 3/1/93
Individuals On Site: DWK

Items to check:

Vapor Extraction System

1. Adjust Individual Air Line Inflows — No Flow

VW1	Adjustment ☐	No Adjustment Necessary ☐
VW2	Adjustment ☐	No Adjustment Necessary ☐
VW3	Adjustment ☐	No Adjustment Necessary ☐
VW4	Adjustment ☐	No Adjustment Necessary ☐
VW5	Adjustment ☐	No Adjustment Necessary ☐
VW6	Adjustment ☐	No Adjustment Necessary ☐
VW7	Adjustment ☐	No Adjustment Necessary ☐
VW8	Adjustment ☐	No Adjustment Necessary ☐
VW9	Adjustment ☐	No Adjustment Necessary ☐

2. Verify Operation of Vacuum Pump Unit ☑
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☐ No Adjustment Necessary ☑
4. Check Vacuum Pump Unit Filter:
   Vacuum Before Filter 1.8 in. Hg
   Vacuum After Filter 3 in. Hg
5. Verify Operation of Demister Liquid Drain Pump ☐
6. Check Carbon Adsorbers ☑

Ground Water Extraction System

1. Check Submersible Well Pumps ☑
2. Verify Operation of Aeration Tank Blower ☑
3. Verify Operation of Polymer and Chemical Feed Pumps ☑
4. Check Polymer/Chemical Supplies ☑
5. Verify Operation of Waste Water Feed Pump ☑
6. Check Primary and Secondary Filters: Set B
   Pressure at Primary Filter Inlet 19 psi
   Pressure at Primary Filter Outlet/Secondary Inlet 9 psi
   ~~Pressure at Secondary Filter Outlet~~ N/A psi
   Overall Differential Pressure 10 psi
7. Check Carbon Canisters
   Pressure - Train 1 4.5 psi
   Pressure - Train 2 4.5 psi
   Pressure - Train 3 3.2 psi ← less flow than this train

(2)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 3/1/93 TIME: 1:00 pm DWK (INITIALS)

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1	0	0
VW2	↓	↓
VW3	↓	↓
VW4	↓	↓
VW5	↓	↓
VW6	↓	↓
VW7	↓	↓
VW8	↓	↓
VW9	↓	↓

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister	3.4			1	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	1.5				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	2.8				
Line Exiting Vacuum Pump Unit		0	240		< 130
Line Entering Primary Carbon (A) ~~or B~~ (circle one)		2			
Line Entering Secondary Carbon ~~A or~~ (B) (circle one)		0.5			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = _____

Status of Manual Air Dilution Valve: (open) ~~closed~~ (circle one)

(2)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

DATE: 3/3/93
Individuals On Site: DWK, Dave (B&W)

Items to check:

Vapor Extraction System

1. Adjust Individual Air Line Inflows - No flow
   - VW1 Adjustment ☐ No Adjustment Necessary ☐
   - VW2 Adjustment ☐ No Adjustment Necessary ☐
   - VW3 Adjustment ☐ No Adjustment Necessary ☐
   - VW4 Adjustment ☐ No Adjustment Necessary ☐
   - VW5 Adjustment ☐ No Adjustment Necessary ☐
   - VW6 Adjustment ☐ No Adjustment Necessary ☐
   - VW7 Adjustment ☐ No Adjustment Necessary ☐
   - VW8 Adjustment ☐ No Adjustment Necessary ☐
   - VW9 Adjustment ☐ No Adjustment Necessary ☐
2. Verify Operation of Vacuum Pump Unit ☑
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☐ No Adjustment Necessary ☑
4. Check Vacuum Pump Unit Filter:
   - Vacuum Before Filter 2.5 in. Hg
   - Vacuum After Filter 4 in. Hg
5. Verify Operation of Demister Liquid Drain Pump ☐
6. Check Carbon Adsorbers ☑

Ground Water Extraction System

1. Check Submersible Well Pumps ☑
2. Verify Operation of Aeration Tank Blower ☑
3. Verify Operation of Polymer and Chemical Feed Pumps ☑
4. Check Polymer/Chemical Supplies ☑
5. Verify Operation of Waste Water Feed Pump ☑
6. Check Primary and Secondary Filters: Set B
   - Pressure at Primary Filter Inlet 17.5 psi
   - Pressure at Primary Filter Outlet/Secondary Inlet 10.5 psi
   - ~~Pressure at Secondary Filter Outlet~~ N/A psi
   - Overall Differential Pressure 8 psi
7. Check Carbon Canisters
   - Pressure - Train 1 5.6 psi
   - Pressure - Train 2 5.6 psi
   - Pressure - Train 3 4.2 psi

(3)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 3/3/98 TIME: 12:45 PM DWK
INITIALS

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1	0	0
VW2	↓	↓
VW3	↓	↓
VW4	↓	↓
VW5	↓	↓
VW6	↓	↓
VW7	↓	↓
VW8	↓	↓
VW9	↓	↓

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister	4.2			1	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	2.5				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	4				
Line Exiting Vacuum Pump Unit		0	240		< 130
Line Entering Primary Carbon (A) ~~or B~~ (circle one)		2			
Line Entering Secondary Carbon ~~A or~~ (B) (circle one)		0.5			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = _____
Status of Manual Air Dilution Valve: (open) ~~closed~~ (circle one)

(3)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

DATE: 3/8/93
Individuals On Site: Dwk

Items to check:

Vapor Extraction System

1. Adjust Individual Air Line Inflows - No flow
   - VW1 Adjustment ☐ No Adjustment Necessary ☐
   - VW2 Adjustment ☐ No Adjustment Necessary ☐
   - VW3 Adjustment ☐ No Adjustment Necessary ☐
   - VW4 Adjustment ☐ No Adjustment Necessary ☐
   - VW5 Adjustment ☐ No Adjustment Necessary ☐
   - VW6 Adjustment ☐ No Adjustment Necessary ☐
   - VW7 Adjustment ☐ No Adjustment Necessary ☐
   - VW8 Adjustment ☐ No Adjustment Necessary ☐
   - VW9 Adjustment ☐ No Adjustment Necessary ☐
2. Verify Operation of Vacuum Pump Unit ☑
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☐ No Adjustment Necessary ☑
4. Check Vacuum Pump Unit Filter:
   Vacuum Before Filter 0 in. Hg
   Vacuum After Filter 1.5 in. Hg
5. ~~5.~~ Verify Operation of Demister Liquid Drain Pump ☐
6. Check Carbon Adsorbers ☑

Ground Water Extraction System

1. Check Submersible Well Pumps ☐
2. Verify Operation of Aeration Tank Blower ☐
3. Verify Operation of Polymer and Chemical Feed Pumps ☐
4. Check Polymer/Chemical Supplies ☐
5. Verify Operation of Waste Water Feed Pump ☐
6. Check Primary and Secondary Filters: ☐ 3
   Pressure at Primary Filter Inlet 9 psi
   Pressure at Primary Filter Outlet/Secondary Inlet 10.5 psi
   ~~Pressure at Secondary Filter Outlet~~ N/A psi
   Overall Differential Pressure 0 psi
7. Check Carbon Canisters
   Pressure - Train 1 6 psi
   Pressure - Train 2 6 psi
   Pressure - Train 3 5 psi

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 3/8/93 TIME: 1:00 pm DWK (INITIALS)

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1	0	0
VW2	↓	↓
VW3	↓	↓
VW4	↓	↓
VW5	↓	↓
VW6	↓	↓
VW7	↓	↓
VW8	↓	↓
VW9	↓	↓

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister	1.5			1	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	0				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	1.5				
Line Exiting Vacuum Pump Unit		1.5	240		< 130
Line Entering Primary Carbon (A) or B (circle one)		2			
Line Entering Secondary Carbon A or (B) (circle one)		0.7			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = _____
Status of Manual Air Dilution Valve: (open) ~~closed~~ (circle one)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

5

DATE: 3/10/93 TIME: 2:30 pm DWK
INITIALS

INDIVIDUAL VACUUM WELL LINES - start-up arm.) 12:30 PM

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1	6	0
VW2	7	0
VW3	6.5	1.5
VW4	5.2	2
VW5	0	1.5
VW6	>0	1.5
VW7	6.5	1
VW8	6.5	0
VW9	4.5	0

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister	4.7			41	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	2.5				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	3.2				
Line Exiting Vacuum Pump Unit		0	235		130
Line Entering Primary Carbon (A) ~~or B~~ (circle one)		2			
Line Entering Secondary Carbon ~~A or~~ (B) (circle one)		0.5			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = _____
Status of Manual Air Dilution Valve: (open) ~~closed~~ (circle one)

4

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

DATE: 3/11/93
Individuals On Site: DWK
also Garrett Mall, Upstate
Kelley Roe - VST Area 1

Items to check:

Vapor Extraction System

All VW's shut down at 2 PM (started yesterday)

1. Adjust Individual Air Line Inflows
   - VW1 Adjustment ☐ No Adjustment Necessary ☐
   - VW2 Adjustment ☐ No Adjustment Necessary ☐
   - VW3 Adjustment ☐ No Adjustment Necessary ☐
   - VW4 Adjustment ☐ No Adjustment Necessary ☐
   - VW5 Adjustment ☐ No Adjustment Necessary ☐
   - VW6 Adjustment ☐ No Adjustment Necessary ☐
   - VW7 Adjustment ☐ No Adjustment Necessary ☐
   - VW8 Adjustment ☐ No Adjustment Necessary ☐
   - VW9 Adjustment ☐ No Adjustment Necessary ☐
2. Verify Operation of Vacuum Pump Unit ☒
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☒ No Adjustment Necessary ☐
4. Check Vacuum Pump Unit Filter:
   Vacuum Before Filter 0 in. Hg
   Vacuum After Filter 0 in. Hg
5. Verify Operation of Demister Liquid Drain Pump ☐
6. Check Carbon Adsorbers ☒

Ground Water Extraction System

1. Check Submersible Well Pumps ☐
2. Verify Operation of Aeration Tank Blower ☐
3. Verify Operation of Polymer and Chemical Feed Pumps ☐
4. Check Polymer/Chemical Supplies ☐
5. Verify Operation of Waste Water Feed Pump ☐
6. Check Primary and Secondary Filters: not A
   Pressure at Primary Filter Inlet 11 psi
   Pressure at Primary Filter Outlet/Secondary Inlet 8.5 psi
   ~~Pressure at Secondary Filter Outlet _____ psi~~
   Overall Differential Pressure _____ psi
7. Check Carbon Canisters
   Pressure - Train 1 6.2 psi
   Pressure - Train 2 6.2 psi
   Pressure - Train 3 5.5 psi

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

DATE: 3/16/93
Individuals On Site: Wes S., GWM

Items to check:

Vapor Extraction System

1. Adjust Individual Air Line Inflows

VW1	Adjustment ☐	No Adjustment Necessary ☐
VW2	Adjustment ☐	No Adjustment Necessary ☐
VW3	Adjustment ☐	No Adjustment Necessary ☐
VW4	Adjustment ☐	No Adjustment Necessary ☐
VW5	Adjustment ☐	No Adjustment Necessary ☐
VW6	Adjustment ☐	No Adjustment Necessary ☐
VW7	Adjustment ☐	No Adjustment Necessary ☐
VW8	Adjustment ☐	No Adjustment Necessary ☐
VW9	Adjustment ☐	No Adjustment Necessary ☐

Shut Down

2. Verify Operation of Vacuum Pump Unit ☑
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☐ No Adjustment Necessary ☒
4. Check Vacuum Pump Unit Filter:
   Vacuum Before Filter 0 in. Hg
   Vacuum After Filter 0 in. Hg
5. Verify Operation of Demister Liquid Drain Pump ☑
6. Check Carbon Adsorbers ☑

Ground Water Extraction System

1. Check Submersible Well Pumps ☑
2. Verify Operation of Aeration Tank Blower ☑
3. Verify Operation of Polymer and Chemical Feed Pumps ☑
4. Check Polymer/Chemical Supplies ☑
5. Verify Operation of Waste Water Feed Pump ☑
6. Check Primary and Secondary Filters:
   Pressure at Primary Filter Inlet 10 psi
   Pressure at Primary Filter Outlet/Secondary Inlet 7 psi
   ~~Pressure at Secondary Filter Outlet~~ _____ psi
   Overall Differential Pressure 3 psi
7. Check Carbon Canisters
   Pressure - Train 1 5 psi
   Pressure - Train 2 5 psi
   Pressure - Train 3 5 psi

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 3/16/93 TIME: 11[3?] INITIALS

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1		
VW2		
VW3		
VW4		
VW5		
VW6		
VW7		
VW8		
VW9		

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister	0			2	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	0				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	0				
Line Exiting Vacuum Pump Unit		4	250		<130
Line Entering Primary Carbon A or B (circle one)		2 3			
Line Entering Secondary Carbon A or B (circle one)		.8			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = 0
Status of Manual Air Dilution Valve: open closed (circle one)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 3/26/93 TIME: 2:30 pm DWK
INITIALS

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1		
VW2		
VW3		
VW4		
VW5		
VW6		
VW7		
VW8		
VW9		

shut down

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister	2.5			3	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	0				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	1.6				
Line Exiting Vacuum Pump Unit		1.5	245		< 130
Line Entering Primary Carbon A ~~or B~~ (circle one)		2.1			
Line Entering Secondary Carbon A ~~or~~ B (circle one)		0.7			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = N/A
Status of Manual Air Dilution Valve: open ~~closed~~ (circle one)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

DATE: 3/29/93
Individuals On Site: DWK, GWM

Items to check:

Vapor Extraction System

1. Adjust Individual Air Line Inflows

VW1	Adjustment ☐	No Adjustment Necessary ☐
VW2	Adjustment ☐	No Adjustment Necessary ☐
VW3	Adjustment ☐	No Adjustment Necessary ☐
VW4	Adjustment ☐	No Adjustment Necessary ☐
VW5	Adjustment ☐	No Adjustment Necessary ☐
VW6	Adjustment ☐	No Adjustment Necessary ☐
VW7	Adjustment ☐	No Adjustment Necessary ☐
VW8	Adjustment ☐	No Adjustment Necessary ☐
VW9	Adjustment ☐	No Adjustment Necessary ☐

2. Verify Operation of Vacuum Pump Unit ☐
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☐ No Adjustment Necessary ☐
4. Check Vacuum Pump Unit Filter:
   Vacuum Before Filter 0 in. Hg
   Vacuum After Filter 0 in. Hg
5. Verify Operation of Demister Liquid Drain Pump ☐
6. Check Carbon Adsorbers ☐

Ground Water Extraction System

1. Check Submersible Well Pumps ☐
2. Verify Operation of Aeration Tank Blower ☐
3. Verify Operation of Polymer and Chemical Feed Pumps ☐
4. Check Polymer/Chemical Supplies ☐
5. Verify Operation of Waste Water Feed Pump ☐
6. Check Primary and Secondary Filters: set A
   Pressure at Primary Filter Inlet 12 psi
   Pressure at Primary Filter Outlet/Secondary Inlet 7 psi
   Pressure at Secondary Filter Outlet ____ psi
   Overall Differential Pressure 2 psi
7. Check Carbon Canisters
   Pressure - Train 1 5.8 psi
   Pressure - Train 2 3.9 psi
   Pressure - Train 3 5.6 psi

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 3/29/23 TIME: 12:45 PM DJK
INITIALS

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1		
VW2	Shut Down	
VW3		
VW4		
VW5		
VW6		
VW7		
VW8		
VW9		

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister	0			4	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	0				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	0				
Line Exiting Vacuum Pump Unit		4.7	245		< 130
Line Entering Primary Carbon A ~~or B~~ (circle one)		2.1			
Line Entering Secondary Carbon A ~~or~~ B (circle one)		0.7			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank: ———
Status of Manual Air Dilution Valve: open ~~closed~~ (circle one)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

DATE: 4/2
Individuals On Site: WLJ, GWM, KR

Items to check:

Vapor Extraction System

1. Adjust Individual Air Line Inflows

VW1	Adjustment ☐	No Adjustment Necessary ☐
VW2	Adjustment ☐	No Adjustment Necessary ☐
VW3	Adjustment ☐	No Adjustment Necessary ☐
VW4	Adjustment ☐	No Adjustment Necessary ☐
VW5	Adjustment ☐	No Adjustment Necessary ☐
VW6	Adjustment ☐	No Adjustment Necessary ☐
VW7	Adjustment ☐	No Adjustment Necessary ☐
VW8	Adjustment ☐	No Adjustment Necessary ☐
VW9	Adjustment ☐	No Adjustment Necessary ☐

2. Verify Operation of Vacuum Pump Unit ☐
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☐ No Adjustment Necessary ☐
4. Check Vacuum Pump Unit Filter:
   Vacuum Before Filter 0 in. Hg
   Vacuum After Filter 0 in. Hg
5. Verify Operation of Demister Liquid Drain Pump ☐
6. Check Carbon Adsorbers ☐

Ground Water Extraction System

1. Check Submersible Well Pumps ☑
2. Verify Operation of Aeration Tank Blower ☐
3. Verify Operation of Polymer and Chemical Feed Pumps ☑
4. Check Polymer/Chemical Supplies ☐
5. Verify Operation of Waste Water Feed Pump ☑
6. Check Primary and Secondary Filters:
   Pressure at Primary Filter Inlet _____ psi
   Pressure at Primary Filter Outlet/Secondary Inlet _____ psi
   Pressure at Secondary Filter Outlet _____ psi
   Overall Differential Pressure _____ psi
7. Check Carbon Canisters
   Pressure - Train 1 3 psi
   Pressure - Train 2 3 psi
   Pressure - Train 3 3 psi

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 4/2/93 TIME: 3 pm LWS
INITIALS

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1		
VW2		
VW3		
VW4		
VW5		
VW6		
VW7		
VW8		
VW9		

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister	0			4	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	0				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	0				
Line Exiting Vacuum Pump Unit		4.7	<47		<130
Line Entering Primary Carbon A or (B) (circle one)					
Line Entering Secondary Carbon A or B (circle one)					

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = _____
Status of Manual Air Dilution Valve: open closed (circle one)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

DATE: 4/5/93
Individuals On Site: WJ, GWM

Items to check:

Vapor Extraction System

1. Adjust Individual Air Line Inflows
   - VW1 Adjustment ☐ No Adjustment Necessary ☐
   - VW2 Adjustment ☐ No Adjustment Necessary ☐
   - VW3 Adjustment ☐ No Adjustment Necessary ☐
   - VW4 Adjustment ☐ No Adjustment Necessary ☐
   - VW5 Adjustment ☐ No Adjustment Necessary ☐
   - VW6 Adjustment ☐ No Adjustment Necessary ☐
   - VW7 Adjustment ☐ No Adjustment Necessary ☐
   - VW8 Adjustment ☐ No Adjustment Necessary ☐
   - VW9 Adjustment ☐ No Adjustment Necessary ☐
2. Verify Operation of Vacuum Pump Unit ☐
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☐ No Adjustment Necessary ☐
4. Check Vacuum Pump Unit Filter:
   Vacuum Before Filter 0 in. Hg
   Vacuum After Filter 0 in. Hg
5. Verify Operation of Demister Liquid Drain Pump ☐
6. Check Carbon Adsorbers ☐

Ground Water Extraction System

1. Check Submersible Well Pumps ☐
2. Verify Operation of Aeration Tank Blower ☐
3. Verify Operation of Polymer and Chemical Feed Pumps ☐
4. Check Polymer/Chemical Supplies ☐
5. Verify Operation of Waste Water Feed Pump ☐
6. Check Primary and Secondary Filters:
   Pressure at Primary Filter Inlet _____ psi
   Pressure at Primary Filter Outlet/Secondary Inlet _____ psi
   Pressure at Secondary Filter Outlet _____ psi
   Overall Differential Pressure _____ psi
7. Check Carbon Canisters
   Pressure - Train 1 3 psi
   Pressure - Train 2 3 psi
   Pressure - Train 3 3 psi

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 4/5/93 TIME: 1 PM WRS

INITIALS

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1	SHUT DOWN	
VW2		
VW3		
VW4		
VW5		
VW6		
VW7		
VW8		
VW9		

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister				4	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	2				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	0				
Line Exiting Vacuum Pump Unit		2	250		
Line Entering Primary Carbon A or B (circle one)		2			
Line Entering Secondary Carbon A or B (circle one)		0.5			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = _____

Status of Manual Air Dilution Valve: open closed (circle one)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

DATE: 4/14/93
Individuals On Site: WS, D. Camp

Items to check:

Vapor Extraction System

1. Adjust Individual Air Line Inflows

VW1	Adjustment ☐	No Adjustment Necessary ☐
VW2	Adjustment ☐	No Adjustment Necessary ☐
VW3	Adjustment ☐	No Adjustment Necessary ☐
VW4	Adjustment ☐	No Adjustment Necessary ☐
VW5	Adjustment ☐	No Adjustment Necessary ☐
VW6	Adjustment ☐	No Adjustment Necessary ☐
VW7	Adjustment ☐	No Adjustment Necessary ☐
VW8	Adjustment ☐	No Adjustment Necessary ☐
VW9	Adjustment ☐	No Adjustment Necessary ☐

2. Verify Operation of Vacuum Pump Unit ☑
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☐ No Adjustment Necessary ☑
4. Check Vacuum Pump Unit Filter:
   Vacuum Before Filter 5 in. Hg
   Vacuum After Filter 0 in. Hg
5. Verify Operation of Demister Liquid Drain Pump ☑
6. Check Carbon Adsorbers ☑

Ground Water Extraction System

1. Check Submersible Well Pumps ☑
2. Verify Operation of Aeration Tank Blower ☑
3. Verify Operation of Polymer and Chemical Feed Pumps ☑
4. Check Polymer/Chemical Supplies ☑
5. Verify Operation of Waste Water Feed Pump ☑
6. Check Primary and Secondary Filters:
   Pressure at Primary Filter Inlet 20 psi
   Pressure at Primary Filter Outlet/Secondary Inlet 20 psi
   Pressure at Secondary Filter Outlet _____ psi
   Overall Differential Pressure 0 psi
7. Check Carbon Canisters
   Pressure - Train 1 7.5 psi
   Pressure - Train 2 7.5 psi
   Pressure - Train 3 7.5 psi

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 4/14/93 TIME: 10[illegible] WCJ
INITIALS

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1		
VW2		
VW3		
VW4		
VW5		
VW6		
VW7		
VW8		
VW9		

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister				4	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	2				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	0				
Line Exiting Vacuum Pump Unit		2	250		
Line Entering Primary Carbon A or B (circle one)		2			
Line Entering Secondary Carbon A or B (circle one)		0.5			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = 0
Status of Manual Air Dilution Valve: open closed (circle one)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

DATE: 5/3/93
Individuals On Site: WLJ, CWM

Items to check:

Vapor Extraction System

1. Adjust Individual Air Line Inflows

VW1	Adjustment ☐	No Adjustment Necessary ☑
VW2	Adjustment ☐	No Adjustment Necessary ☑
VW3	Adjustment ☐	No Adjustment Necessary ☑
VW4	Adjustment ☐	No Adjustment Necessary ☑
VW5	Adjustment ☐	No Adjustment Necessary ☑
VW6	Adjustment ☐	No Adjustment Necessary ☑
VW7	Adjustment ☐	No Adjustment Necessary ☑
VW8	Adjustment ☐	No Adjustment Necessary ☑
VW9	Adjustment ☐	No Adjustment Necessary ☑

2. Verify Operation of Vacuum Pump Unit ☑
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☐ No Adjustment Necessary ☑
4. Check Vacuum Pump Unit Filter:
   Vacuum Before Filter 0 in. Hg
   Vacuum After Filter 0 in. Hg
5. Verify Operation of Demister Liquid Drain Pump ☑
6. Check Carbon Adsorbers ☑

Ground Water Extraction System

1. Check Submersible Well Pumps ☑
2. Verify Operation of Aeration Tank Blower ☑
3. Verify Operation of Polymer and Chemical Feed Pumps ☑
4. Check Polymer/Chemical Supplies ☑
5. Verify Operation of Waste Water Feed Pump ☑
6. Check Primary and Secondary Filters:
   Pressure at Primary Filter Inlet 7 psi
   Pressure at Primary Filter Outlet/Secondary Inlet 6 psi
   Pressure at Secondary Filter Outlet _____ psi
   Overall Differential Pressure 1 psi
7. Check Carbon Canisters
   Pressure - Train 1 3 psi
   Pressure - Train 2 3 psi
   Pressure - Train 3 2 psi

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 5/3/93 TIME: 9^30 Am WLW
INITIALS

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1		
VW2		
VW3		
VW4		
VW5		
VW6		
VW7		
VW8		
VW9		

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister				5	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	2				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	0				
Line Exiting Vacuum Pump Unit		2	250		
Line Entering Primary Carbon A or B (circle one)		2			
Line Entering Secondary Carbon A or B (circle one)		0.5			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = 0
Status of Manual Air Dilution Valve: open closed (circle one)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

DATE: 5/9/97
Individuals On Site: DLJK

Items to check:

Vapor Extraction System

1. Adjust Individual Air Line Inflows

VW1	Adjustment ☐	No Adjustment Necessary ☐
VW2	Adjustment ☐	No Adjustment Necessary ☐
VW3	Adjustment ☐	No Adjustment Necessary ☐
VW4	Adjustment ☐	No Adjustment Necessary ☐
VW5	Adjustment ☐	No Adjustment Necessary ☐
VW6	Adjustment ☐	No Adjustment Necessary ☐
VW7	Adjustment ☐	No Adjustment Necessary ☐
VW8	Adjustment ☐	No Adjustment Necessary ☐
VW9	Adjustment ☐	No Adjustment Necessary ☐

2. Verify Operation of Vacuum Pump Unit ☑
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☐ No Adjustment Necessary ☑
4. Check Vacuum Pump Unit Filter:
   Vacuum Before Filter 2 in. Hg
   Vacuum After Filter 2 in. Hg
5. Verify Operation of Demister Liquid Drain Pump ☑
6. Check Carbon Adsorbers ☑

Ground Water Extraction System

1. Check Submersible Well Pumps ☐
2. Verify Operation of Aeration Tank Blower ☐
3. Verify Operation of Polymer and Chemical Feed Pumps ☐
4. Check Polymer/Chemical Supplies ☐
5. Verify Operation of Waste Water Feed Pump ☐
6. Check Primary and Secondary Filters: (sdA)
   Pressure at Primary Filter Inlet ~14 psi
   Pressure at Primary Filter Outlet/Secondary Inlet 16 psi
   Pressure at Secondary Filter Outlet N/A psi
   Overall Differential Pressure 0 psi
7. Check Carbon Canisters
   Pressure - Train 1 8.5 psi
   Pressure - Train 2 2.4 psi
   Pressure - Train 3 2.2 psi

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 5/19/98 TIME: 1:30 pm BLK

INITIALS

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1		
VW2		
VW3	Shut	
VW4		
VW5	Down	
VW6		
VW7		
VW8		
VW9		

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister	6				
Between Vacuum Pump Unit Filter and Demister (Before Filter)	8				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	8				
Line Exiting Vacuum Pump Unit		0	230		130
Line Entering Primary Carbon (A) or ~~B~~ (circle one)		2			
Line Entering Secondary Carbon ~~A~~ or (B) (circle one)		0.5			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = 0

Status of Manual Air Dilution Valve: (open) closed (circle one)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

DATE: 5/14/93
Individuals On Site: DLK

Items to check:

Vapor Extraction System

1. Adjust Individual Air Line Inflows
   - VW1 Adjustment ☐ No Adjustment Necessary ☐
   - VW2 Adjustment ☐ No Adjustment Necessary ☐
   - VW3 Adjustment ☐ No Adjustment Necessary ☐
   - VW4 Adjustment ☐ No Adjustment Necessary ☐
   - VW5 Adjustment ☐ No Adjustment Necessary ☐
   - VW6 Adjustment ☐ No Adjustment Necessary ☐
   - VW7 Adjustment ☐ No Adjustment Necessary ☐
   - VW8 Adjustment ☐ No Adjustment Necessary ☐
   - VW9 Adjustment ☐ No Adjustment Necessary ☐
2. Verify Operation of Vacuum Pump Unit ☑
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☐ No Adjustment Necessary ☑
4. Check Vacuum Pump Unit Filter:
   Vacuum Before Filter 5.5 in. Hg
   Vacuum After Filter 5.5 in. Hg
5. Verify Operation of Demister Liquid Drain Pump ☑
6. Check Carbon Adsorbers ☑

Ground Water Extraction System

1. Check Submersible Well Pumps
2. Verify Operation of Aeration Tank Blower
3. Verify Operation of Polymer and Chemical Feed Pumps
4. Check Polymer/Chemical Supplies
5. Verify Operation of Waste Water Feed Pump
6. Check Primary and Secondary Filters: (set 2)
   Pressure at Primary Filter Inlet 26 > 22 psi
   Pressure at Primary Filter Outlet/Secondary Inlet 24 -> 26 psi
   Pressure at Secondary Filter Outlet N/A psi
   Overall Differential Pressure 1.5 psi
7. Check Carbon Canisters
   Pressure - Train 1 4.4 -> 5 psi
   Pressure - Train 2 5.5 -> 4.5 psi
   Pressure - Train 3 4.4 -> 5 psi

turned up water level flow rate

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 5/14/93 TIME: 2:30 pm DWK (INITIALS)

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1		
VW2		
VW3	Shut	
VW4		
VW5	Down	
VW6		
VW7		
VW8		
VW9		

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister	6.4			6	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	5.5				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	5.5				
Line Exiting Vacuum Pump Unit		0	220		130
Line Entering Primary Carbon (A) or B (circle one)		1.3			
Line Entering Secondary Carbon A or (B) (circle one)		0.5			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = 0

Status of Manual Air Dilution Valve: (open) ~~closed~~ (circle one)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

DATE: 5/20/93
Individuals On Site: DWK / WLJ

Items to check:

Vapor Extraction System

1. Adjust Individual Air Line Inflows

VW1	Adjustment ☐	No Adjustment Necessary ☐
VW2	Adjustment ☐	No Adjustment Necessary ☐
VW3	Adjustment ☐	No Adjustment Necessary ☐
VW4	Adjustment ☐	No Adjustment Necessary ☐
VW5	Adjustment ☐	No Adjustment Necessary ☐
VW6	Adjustment ☐	No Adjustment Necessary ☐
VW7	Adjustment ☐	No Adjustment Necessary ☐
VW8	Adjustment ☐	No Adjustment Necessary ☐
VW9	Adjustment ☐	No Adjustment Necessary ☐

2. Verify Operation of Vacuum Pump Unit ☑
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☐ No Adjustment Necessary ☑
4. Check Vacuum Pump Unit Filter:
   Vacuum Before Filter 0 in. Hg
   Vacuum After Filter 0 in. Hg
5. Verify Operation of Demister Liquid Drain Pump ☑
6. Check Carbon Adsorbers ☑
   Distance Thermometer removed for repair

Ground Water Extraction System

1. Check Submersible Well Pumps ☐
2. Verify Operation of Aeration Tank Blower ☐
3. Verify Operation of Polymer and Chemical Feed Pumps ☐
4. Check Polymer/Chemical Supplies ☐
5. Verify Operation of Waste Water Feed Pump ☐
6. Check Primary and Secondary Filters: Set B)
   Pressure at Primary Filter Inlet 34 psi
   Pressure at Primary Filter Outlet/Secondary Inlet 29 psi
   Pressure at Secondary Filter Outlet N/A psi
   Overall Differential Pressure 3.8 psi
7. Check Carbon Canisters
   Pressure - Train 1 6.5 psi
   Pressure - Train 2 7 psi
   Pressure - Train 3 5.5 psi

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 5/26/92 TIME: 10 Am DWK
INITIALS

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1		
VW2		
VW3		
VW4		
VW5		
VW6		
VW7		
VW8		
VW9		

Shut Down

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister	1.8			6	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	0				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	0				
Line Exiting Vacuum Pump Unit		3.5	Flowmeter removed for repair		130
Line Entering Primary Carbon A or ~~B~~ (circle one)		1.8			
Line Entering Secondary Carbon ~~A~~ or B (circle one)		0.5			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = 0
Status of Manual Air Dilution Valve: open ~~closed~~ (circle one)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

DATE: 5/27
Individuals On/Site: WLJ

Items to check:

Vapor Extraction System

1. Adjust Individual Air Line Inflows

VW1	Adjustment ☐	No Adjustment Necessary ☐
VW2	Adjustment ☐	No Adjustment Necessary ☐
VW3	Adjustment ☐	No Adjustment Necessary ☐
VW4	Adjustment ☐	No Adjustment Necessary ☐
VW5	Adjustment ☐	No Adjustment Necessary ☐
VW6	Adjustment ☐	No Adjustment Necessary ☐
VW7	Adjustment ☐	No Adjustment Necessary ☐
VW8	Adjustment ☐	No Adjustment Necessary ☐
VW9	Adjustment ☐	No Adjustment Necessary ☐

2. Verify Operation of Vacuum Pump Unit ☐
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☐ No Adjustment Necessary ☐
4. Check Vacuum Pump Unit Filter:
   Vacuum Before Filter 0 in. Hg
   Vacuum After Filter 0 in. Hg
5. Verify Operation of Demister Liquid Drain Pump ☐
6. Check Carbon Adsorbers ☐

Ground Water Extraction System

1. Check Submersible Well Pumps ☐
2. Verify Operation of Aeration Tank Blower ☐
3. Verify Operation of Polymer and Chemical Feed Pumps ☐
4. Check Polymer/Chemical Supplies ☐
5. Verify Operation of Waste Water Feed Pump ☐
6. Check Primary and Secondary Filters:
   Pressure at Primary Filter Inlet _____ psi
   Pressure at Primary Filter Outlet/Secondary Inlet 2 psi
   Pressure at Secondary Filter Outlet _____ psi
   Overall Differential Pressure 2 psi
7. Check Carbon Canisters
   Pressure - Train 1 _____ psi
   Pressure - Train 2 _____ psi
   Pressure - Train 3 _____ psi

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 5/27 TIME: 7:2 WKS
INITIALS

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1		
VW2	SHUT	
VW3		
VW4		
VW5		
VW6		
VW7		
VW8		
VW9		

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister	1.8			7	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	↓				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	↓				
Line Exiting Vacuum Pump Unit		3.5			13
Line Entering Primary Carbon A or B (circle one)		1.3			
Line Entering Secondary Carbon A or B (circle one)		0.5			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = ↓

Status of Manual Air Dilution Valve: open closed (circle one)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

DATE: 6/1/93
Individuals On Site: Dusk, Jms

Items to check:

Vapor Extraction System

1. Adjust Individual Air Line Inflows

VW1	Adjustment ☐	No Adjustment Necessary ☐
VW2	Adjustment ☐	No Adjustment Necessary ☐
VW3	Adjustment ☐	No Adjustment Necessary ☐
VW4	Adjustment ☐	No Adjustment Necessary ☐
VW5	Adjustment ☐	No Adjustment Necessary ☐
VW6	Adjustment ☐	No Adjustment Necessary ☐
VW7	Adjustment ☐	No Adjustment Necessary ☐
VW8	Adjustment ☐	No Adjustment Necessary ☐
VW9	Adjustment ☐	No Adjustment Necessary ☐

2. Verify Operation of Vacuum Pump Unit ☐
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☐ No Adjustment Necessary ☐
4. Check Vacuum Pump Unit Filter:
   Vacuum Before Filter 3.5 in. Hg
   Vacuum After Filter 5 in. Hg
5. Verify Operation of Demister Liquid Drain Pump ☐
6. Check Carbon Adsorbers ☐

Ground Water Extraction System

1. Check Submersible Well Pumps ☐
2. Verify Operation of Aeration Tank Blower ☐
3. Verify Operation of Polymer and Chemical Feed Pumps ☐ (made up polymer)
4. Check Polymer/Chemical Supplies ☐
5. Verify Operation of Waste Water Feed Pump ☐
6. Check Primary and Secondary Filters: set A
   Pressure at Primary Filter Inlet 19 psi
   Pressure at Primary Filter Outlet/Secondary Inlet 17.5 psi
   Pressure at Secondary Filter Outlet N/A psi
   Overall Differential Pressure 0 psi
7. Check Carbon Canisters
   Pressure - Train 1 6.8 psi
   Pressure - Train 2 6.8 psi
   Pressure - Train 3 7.2 psi

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 6/1/93 TIME: 4:10 pm DWK
INITIALS

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1		
VW2		
VW3		
VW4		
VW5		
VW6		
VW7		
VW8		
VW9		

Shut Down

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister	4			7	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	3.5				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	5				
Line Exiting Vacuum Pump Unit		2	225		130
Line Entering Primary Carbon A ~~or B~~ (circle one)		1.8			
Line Entering Secondary Carbon ~~A~~ or B (circle one)		0.5			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = 0
Status of Manual Air Dilution Valve: (open) ~~closed~~ (circle one)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

DATE: 6/3/93
Individuals On Site: GARY W MULLEN

Items to check:

Vapor Extraction System

1. Adjust Individual Air Line Inflows

VW1	Adjustment ☐	No Adjustment Necessary ☐
VW2	Adjustment ☐	No Adjustment Necessary ☐
VW3	Adjustment ☐	No Adjustment Necessary ☐
VW4	Adjustment ☐	No Adjustment Necessary ☐
VW5	Adjustment ☐	No Adjustment Necessary ☐
VW6	Adjustment ☐	No Adjustment Necessary ☐
VW7	Adjustment ☐	No Adjustment Necessary ☐
VW8	Adjustment ☐	No Adjustment Necessary ☐
VW9	Adjustment ☐	No Adjustment Necessary ☐

2. Verify Operation of Vacuum Pump Unit ☑
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☐ No Adjustment Necessary ☑
4. Check Vacuum Pump Unit Filter:
   Vacuum Before Filter 6.5 in. Hg
   Vacuum After Filter ~~6.5~~ 24 in. Hg
5. Verify Operation of Demister Liquid Drain Pump ☑
6. Check Carbon Adsorbers ☑

Ground Water Extraction System

1. Check Submersible Well Pumps ☑
2. Verify Operation of Aeration Tank Blower ☑
3. Verify Operation of Polymer and Chemical Feed Pumps ☑
4. Check Polymer/Chemical Supplies ☑
5. Verify Operation of Waste Water Feed Pump ☑
6. Check Primary and Secondary Filters:
   Pressure at Primary Filter Inlet _____ psi
   Pressure at Primary Filter Outlet/Secondary Inlet 20 psi
   Pressure at Secondary Filter Outlet N/A ~~82~~ psi
   Overall Differential Pressure _____ psi
7. Check Carbon Canisters
   Pressure - Train 1 8 psi
   Pressure - Train 2 6 psi
   Pressure - Train 3 4 psi

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 6/3/93 TIME: 2:26 GCM
INITIALS

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1		
VW2		
VW3		
VW4		
VW5		
VW6		
VW7		
VW8		
VW9		

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister	6				
Between Vacuum Pump Unit Filter and Demister (Before Filter)	6				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	6.5				
Line Exiting Vacuum Pump Unit		1.8	220		130
Line Entering Primary Carbon A or B (circle one)		~~1.6~~ 1.6			
Line Entering Secondary Carbon A or B (circle one)		0.4			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = 0
Status of Manual Air Dilution Valve: (open) closed (circle one)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 6/3/93 TIME: 932 INITIALS

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1	12.6	2.5
VW2	15.6	0.5
VW3	10.5	2.7
VW4	10	2.6
VW5	OFF	—
VW6	OFF	—
VW7	OFF	—
VW8	OFF	—
VW9	?	1.25

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister	8.5			28	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	3.0				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	7.0				
Line Exiting Vacuum Pump Unit		0	220		140
Line Entering Primary Carbon A or B (circle one)		1.6			
Line Entering Secondary Carbon A or B (circle one)		0			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = 0

Status of Manual Air Dilution Valve: open closed (circle one)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

DATE: 6/11/93
Individuals On Site: DWK
Paula, Tim - Upstate

Items to check:

Vapor Extraction System

1. Adjust Individual Air Line Inflows

VW1	Adjustment ☐	No Adjustment Necessary ☐
VW2	Adjustment ☐	No Adjustment Necessary ☐
VW3	Adjustment ☐	No Adjustment Necessary ☐
VW4	Adjustment ☐	No Adjustment Necessary ☐
VW5	Adjustment ☐	No Adjustment Necessary ☐
VW6	Adjustment ☐	No Adjustment Necessary ☐
VW7	Adjustment ☐	No Adjustment Necessary ☐
VW8	Adjustment ☐	No Adjustment Necessary ☐
VW9	Adjustment ☐	No Adjustment Necessary ☐

2. Verify Operation of Vacuum Pump Unit ☒
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☐ No Adjustment Necessary ☒
4. Check Vacuum Pump Unit Filter:
   Vacuum Before Filter 5 in. Hg
   Vacuum After Filter 4.5 in. Hg
5. Verify Operation of Demister Liquid Drain Pump ☐
6. Check Carbon Adsorbers ☒

Ground Water Extraction System

1. Check Submersible Well Pumps ☒
2. Verify Operation of Aeration Tank Blower ☒
3. Verify Operation of Polymer and Chemical Feed Pumps ☒
4. Check Polymer/Chemical Supplies ☒
5. Verify Operation of Waste Water Feed Pump ☒
6. Check Primary and Secondary Filters: set B
   Pressure at Primary Filter Inlet 26 psi
   Pressure at Primary Filter Outlet/Secondary Inlet 22 psi
   Pressure at Secondary Filter Outlet N/A psi
   Overall Differential Pressure 4 psi
7. Check Carbon Canisters
   Pressure - Train 1 8.7 psi
   Pressure - Train 2 4.7 psi
   Pressure - Train 3 4.5 psi

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 6/11/93 TIME: 11:30 Am DWK
INITIALS

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1	12.5	3.2
VW2	15	/
VW3	? - plug stuck	4/
VW4	9.5	4/
VW5	OFF	—
VW6	OFF	—
VW7	OFF	—
VW8	OFF	—
VW9	? plug stuck	2.5

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister	6			18	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	5				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	4.5				
Line Exiting Vacuum Pump Unit		0	215		140
Line Entering Primary Carbon A or B (circle one)		1.7			
Line Entering Secondary Carbon A or B (circle one)		0.5			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = 0
Status of Manual Air Dilution Valve: open closed (circle one)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

DATE: 6/16/93
Individuals On Site: DWK
DMS, KJR

Items to check:

Vapor Extraction System

1. Adjust Individual Air Line Inflows

VW1	Adjustment ☐	No Adjustment Necessary ☐
VW2	Adjustment ☐	No Adjustment Necessary ☐
VW3	Adjustment ☐	No Adjustment Necessary ☐
VW4	Adjustment ☐	No Adjustment Necessary ☐
VW5	Adjustment ☐	No Adjustment Necessary ☐
VW6	Adjustment ☐	No Adjustment Necessary ☐
VW7	Adjustment ☐	No Adjustment Necessary ☐
VW8	Adjustment ☐	No Adjustment Necessary ☐
VW9	Adjustment ☐	No Adjustment Necessary ☐

2. Verify Operation of Vacuum Pump Unit ☒
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☐ No Adjustment Necessary ☒
4. Check Vacuum Pump Unit Filter:
   Vacuum Before Filter 8.5 in. Hg
   Vacuum After Filter 8.5 in. Hg
5. Verify Operation of Demister Liquid Drain Pump ☐
6. Check Carbon Adsorbers ☒

Ground Water Extraction System

1. Check Submersible Well Pumps ☒
2. Verify Operation of Aeration Tank Blower ☒
3. Verify Operation of Polymer and Chemical Feed Pumps ☒
4. Check Polymer/Chemical Supplies ☒
5. Verify Operation of Waste Water Feed Pump ☒
6. Check Primary and Secondary Filters: set A
   Pressure at Primary Filter Inlet 12 psi
   Pressure at Primary Filter Outlet/Secondary Inlet 12 psi
   Pressure at Secondary Filter Outlet N/A psi
   Overall Differential Pressure 0 psi
7. Check Carbon Canisters
   Pressure - Train 1 5.5 psi
   Pressure - Train 2 5.5 psi
   Pressure - Train 3 6 psi

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 6/16/93 TIME: 2:30 pm DWK
INITIALS

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1	10.5	3
VW2	15	1
VW3	9	3.2
VW4	9	3
VW5	<3	3
VW6	4.5	3
VW7	14	2
VW8	— plug stuck —	2.5
VW9	- plug stuck -	2.5

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister	8.5			25	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	8.5				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	8.5				
Line Exiting Vacuum Pump Unit		0	220		145
Line Entering Primary Carbon ~~A or B~~ (circle one)		1.8			
Line Entering Secondary Carbon ~~A or B~~ (circle one)		0.5			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = 0
Status of Manual Air Dilution Valve: ~~open~~ closed (circle one)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

DATE: 6/18/93
Individuals On Site: DWK
Paula - Upstate

Items to check:

Vapor Extraction System

1. Adjust Individual Air Line Inflows

VW1	Adjustment ☐	No Adjustment Necessary ☐
VW2	Adjustment ☐	No Adjustment Necessary ☐
VW3	Adjustment ☐	No Adjustment Necessary ☐
VW4	Adjustment ☐	No Adjustment Necessary ☐
VW5	Adjustment ☐	No Adjustment Necessary ☒
VW6	Adjustment ☐	No Adjustment Necessary ☐
VW7	Adjustment ☐	No Adjustment Necessary ☐
VW8	Adjustment ☐	No Adjustment Necessary ☐
VW9	Adjustment ☐	No Adjustment Necessary ☐

2. Verify Operation of Vacuum Pump Unit ☒
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☐ No Adjustment Necessary ☒
4. Check Vacuum Pump Unit Filter:
   Vacuum Before Filter 12.2 in. Hg
   Vacuum After Filter 10.9 in. Hg
5. Verify Operation of Demister Liquid Drain Pump ☐
6. Check Carbon Adsorbers ☒

Ground Water Extraction System

1. Check Submersible Well Pumps ☒
2. Verify Operation of Aeration Tank Blower ☒
3. Verify Operation of Polymer and Chemical Feed Pumps ☒
4. Check Polymer/Chemical Supplies ☒
5. Verify Operation of Waste Water Feed Pump ☒
6. Check Primary and Secondary Filters: Set B
   Pressure at Primary Filter Inlet 9-10 psi
   Pressure at Primary Filter Outlet/Secondary Inlet 8 psi
   Pressure at Secondary Filter Outlet N/A psi
   Overall Differential Pressure 0 psi
7. Check Carbon Canisters
   Pressure - Train 1 5.6 psi
   Pressure - Train 2 5.6 psi
   Pressure - Train 3 6.0 psi

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 6/18/93 TIME: 11:15 Am DWK
INITIALS

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1	10	2.8
VW2	15	1
VW3	9	3.2
VW4	9	3
VW5	<3	3
VW6	4.5	3
VW7	14	2
VW8	-plug stuck-	2.5
VW9	-plug stuck-	2.5

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister	13			21	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	12.2				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	10.4				
Line Exiting Vacuum Pump Unit		0	220		145
Line Entering Primary Carbon (A) ~~or B~~ (circle one)		1.8			
Line Entering Secondary Carbon ~~A or~~ (B) (circle one)		0.5			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = 0
Status of Manual Air Dilution Valve: ~~open~~ (closed) (circle one)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

DATE: 6/24/93
Individuals On Site: WLJ, DWK

Items to check:

— SHUT SYSTEM DOWN —

Vapor Extraction System

1. Adjust Individual Air Line Inflows

VW1	Adjustment ☐	No Adjustment Necessary ☐
VW2	Adjustment ☐	No Adjustment Necessary ☐
VW3	Adjustment ☐	No Adjustment Necessary ☐
VW4	Adjustment ☐	No Adjustment Necessary ☐
VW5	Adjustment ☐	No Adjustment Necessary ☐
VW6	Adjustment ☐	No Adjustment Necessary ☐
VW7	Adjustment ☐	No Adjustment Necessary ☐
VW8	Adjustment ☐	No Adjustment Necessary ☐
VW9	Adjustment ☐	No Adjustment Necessary ☐

2. Verify Operation of Vacuum Pump Unit ☑
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☑ No Adjustment Necessary ☐
4. Check Vacuum Pump Unit Filter:
   Vacuum Before Filter _____ in. Hg
   Vacuum After Filter _____ in. Hg
5. Verify Operation of Demister Liquid Drain Pump ☐
6. Check Carbon Adsorbers ☐

Ground Water Extraction System

1. Check Submersible Well Pumps ☑
2. Verify Operation of Aeration Tank Blower ☑
3. Verify Operation of Polymer and Chemical Feed Pumps ☑
4. Check Polymer/Chemical Supplies ☑
5. Verify Operation of Waste Water Feed Pump ☑
6. Check Primary and Secondary Filters:
   Pressure at Primary Filter Inlet _____ psi
   Pressure at Primary Filter Outlet/Secondary Inlet _____ psi
   Pressure at Secondary Filter Outlet _____ psi
   Overall Differential Pressure _____ psi
7. Check Carbon Canisters
   Pressure - Train 1 8 psi
   Pressure - Train 2 8 psi
   Pressure - Train 3 8 psi

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 6/24/93 TIME: 8:30 AM LWS
INITIALS

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1		
VW2		
VW3		
VW4		
VW5		
VW6		
VW7		
VW8		
VW9		

SHUT DOWN

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister					
Between Vacuum Pump Unit Filter and Demister (Before Filter)					
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)					
Line Exiting Vacuum Pump Unit					
Line Entering Primary Carbon A or B (circle one)					
Line Entering Secondary Carbon A or B (circle one)					

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = _____
Status of Manual Air Dilution Valve: open closed (circle one)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

Carbon Changeout (Vapor Phase) Monday before

DATE: 6/28
Individuals On Site: WCS, Enviroteck

Items to check:

Vapor Extraction System

1. Adjust Individual Air Line Inflows

VW1	Adjustment ☐	No Adjustment Necessary ☐
VW2	Adjustment ☐	No Adjustment Necessary ☐
VW3	Adjustment ☐	No Adjustment Necessary ☐
VW4	Adjustment ☐	No Adjustment Necessary ☐
VW5	Adjustment ☐	No Adjustment Necessary ☐
VW6	Adjustment ☐	No Adjustment Necessary ☐
VW7	Adjustment ☐	No Adjustment Necessary ☐
VW8	Adjustment ☐	No Adjustment Necessary ☐
VW9	Adjustment ☐	No Adjustment Necessary ☐

2. Verify Operation of Vacuum Pump Unit ☑
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☐ No Adjustment Necessary ☐
4. Check Vacuum Pump Unit Filter:
   Vacuum Before Filter 0 in. Hg
   Vacuum After Filter 0 in. Hg
5. Verify Operation of Demister Liquid Drain Pump ☐
6. Check Carbon Adsorbers ☐

Ground Water Extraction System

1. Check Submersible Well Pumps ☑
2. Verify Operation of Aeration Tank Blower ☑
3. Verify Operation of Polymer and Chemical Feed Pumps ☑
4. Check Polymer/Chemical Supplies ☑
5. Verify Operation of Waste Water Feed Pump ☐
6. Check Primary and Secondary Filters:
   Pressure at Primary Filter Inlet 1.7 psi
   Pressure at Primary Filter Outlet/Secondary Inlet 0 psi
   Pressure at Secondary Filter Outlet — psi
   Overall Differential Pressure _____ psi
7. Check Carbon Canisters
   Pressure - Train 1 6 psi
   Pressure - Train 2 6 psi
   Pressure - Train 3 6 psi

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 6/28/93 TIME: 9:30 am LCS INITIALS

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1	11.5	1.5
VW2	13.5	0.2
VW3	8	2
VW4	7	2
VW5	STUCK	2
VW6	STUCK	2
VW7	12	0.9
VW8	STUCK	1.1
VW9	11	1.1

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister	2			22	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	0				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	0				
Line Exiting Vacuum Pump Unit		5	230		130
Line Entering Primary Carbon (A) or B (circle one)		1.7			
Line Entering Secondary Carbon A or (B) (circle one)		0			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = 0
Status of Manual Air Dilution Valve: open (closed) (circle one)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 6/30/93 TIME: 3:32 pm WLS INITIALS

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1	14.5	4.5
VW2	14.5	1
VW3	13	5
VW4	14	5
VW5	5 Tack	
VW6	~	5
VW7	15.5	2
VW8	5 Tack	4
VW9	~	4

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister	-9			25	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	8.5				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	6.5				
Line Exiting Vacuum Pump Unit		1.5	210		155
Line Entering Primary Carbon (A) or B (circle one)		2.5			
Line Entering Secondary Carbon A or (B) (circle one)		0			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = 0

Status of Manual Air Dilution Valve: open (closed) (circle one)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

DATE: 7/2
Individuals On Site: DMS
Change filters 525A + 529A

Items to check:

Vapor Extraction System

1. Adjust Individual Air Line Inflows
   - VW1 Adjustment ☐ No Adjustment Necessary ☐
   - VW2 Adjustment ☐ No Adjustment Necessary ☐
   - VW3 Adjustment ☐ No Adjustment Necessary ☐
   - VW4 Adjustment ☐ No Adjustment Necessary ☐
   - VW5 Adjustment ☐ No Adjustment Necessary ☐
   - VW6 Adjustment ☐ No Adjustment Necessary ☐
   - VW7 Adjustment ☐ No Adjustment Necessary ☐
   - VW8 Adjustment ☐ No Adjustment Necessary ☐
   - VW9 Adjustment ☐ No Adjustment Necessary ☐
2. Verify Operation of Vacuum Pump Unit ☑
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☐ No Adjustment Necessary ☑
4. Check Vacuum Pump Unit Filter:
   Vacuum Before Filter 6.5 in. Hg
   Vacuum After Filter 5.0 in. Hg
5. Verify Operation of Demister Liquid Drain Pump ☑
6. Check Carbon Adsorbers ☑

Ground Water Extraction System

1. Check Submersible Well Pumps ☑
2. Verify Operation of Aeration Tank Blower ☑
3. Verify Operation of Polymer and Chemical Feed Pumps ☑
4. Check Polymer/Chemical Supplies ☑
5. Verify Operation of Waste Water Feed Pump ☑
6. Check Primary and Secondary Filters:
   Pressure at Primary Filter Inlet 10 psi
   Pressure at Primary Filter Outlet/Secondary Inlet ~~8~~ psi
   Pressure at Secondary Filter Outlet 15 psi
   Overall Differential Pressure 5 psi
7. Check Carbon Canisters
   Pressure - Train 1 7.6 psi
   Pressure - Train 2 7.6 psi
   Pressure - Train 3 7.6 psi

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 7/8/93 TIME: 11:00a JMS INITIALS

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1	9.5	2.3
VW2	15.1	1
VW3	10	3.1
VW4	9.6	3
VW5	stuck	3
VW6	4.7	3
VW7	16.2	2
VW8	5	2.5
VW9	stuck	2.5

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister	11.4			23	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	7.1				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	10.4				
Line Exiting Vacuum Pump Unit		0	220		150
Line Entering Primary Carbon (A) or B (circle one)		12			
Line Entering Secondary Carbon A or (B) (circle one)		0			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = _____
Status of Manual Air Dilution Valve: open (closed) (circle one)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

DATE: 7/9/93
Individuals On Site: DMS

Items to check:

Vapor Extraction System

1. Adjust Individual Air Line Inflows

VW1	Adjustment ☐	No Adjustment Necessary ☐
VW2	Adjustment ☐	No Adjustment Necessary ☐
VW3	Adjustment ☐	No Adjustment Necessary ☐
VW4	Adjustment ☐	No Adjustment Necessary ☐
VW5	Adjustment ☐	No Adjustment Necessary ☐
VW6	Adjustment ☐	No Adjustment Necessary ☐
VW7	Adjustment ☐	No Adjustment Necessary ☐
VW8	Adjustment ☐	No Adjustment Necessary ☐
VW9	Adjustment ☐	No Adjustment Necessary ☐

2. Verify Operation of Vacuum Pump Unit ☑
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☐ No Adjustment Necessary ☑
4. Check Vacuum Pump Unit Filter:
   Vacuum Before Filter 15 in. Hg
   Vacuum After Filter 16 in. Hg
5. Verify Operation of Demister Liquid Drain Pump ☐
6. Check Carbon Adsorbers ☐

Ground Water Extraction System

1. Check Submersible Well Pumps ☑
2. Verify Operation of Aeration Tank Blower ☑
3. Verify Operation of Polymer and Chemical Feed Pumps ☑
4. Check Polymer/Chemical Supplies ☑
5. Verify Operation of Waste Water Feed Pump ☑
6. Check Primary and Secondary Filters: Set B
   Pressure at Primary Filter Inlet 5 psi
   Pressure at Primary Filter Outlet/Secondary Inlet 6 psi
   Pressure at Secondary Filter Outlet _____ psi
   Overall Differential Pressure 0 psi
7. Check Carbon Canisters
   Pressure - Train 1 3.5 psi
   Pressure - Train 2 3.5 psi
   Pressure - Train 3 3.6 psi

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

DATE: 7/19/93
Individuals on Site: DMS

Items to check:

Vapor Extraction System system off (wells only)

1. Adjust Individual Air Line Inflows

VW1	Adjustment ☐	No Adjustment Necessary ☐
VW2	Adjustment ☐	No Adjustment Necessary ☐
VW3	Adjustment ☐	No Adjustment Necessary ☐
~~VW4~~	Adjustment ☐	No Adjustment Necessary ☐
VW5	Adjustment ☐	No Adjustment Necessary ☐
VW6	Adjustment ☐	No Adjustment Necessary ☐
VW7	Adjustment ☐	No Adjustment Necessary ☐
VW8	Adjustment ☐	No Adjustment Necessary ☐
VW9	Adjustment ☐	No Adjustment Necessary ☐

2. Verify Operation of Vacuum Pump Unit ☒
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☐ No Adjustment Necessary ☒
4. Check Vacuum Pump Unit Filter:
   Vacuum Before Filter 8 in. Hg
   Vacuum After Filter 8 in. Hg
5. Verify Operation of Demister Liquid Drain Pump ☐
6. Check Carbon Adsorbers ☒

Ground Water Extraction System

1. Check Submersible Well Pumps ☒
2. Verify Operation of Aeration Tank Blower ☒
3. Verify Operation of Polymer and Chemical Feed Pumps ☒ make poly
4. Check Polymer/Chemical Supplies ☒
5. Verify Operation of Waste Water Feed Pump ☐
6. Check Primary and Secondary Filters:
   Pressure at Primary Filter Inlet 16 psi
   Pressure at Primary Filter Outlet/Secondary Inlet 14 psi
   Pressure at Secondary Filter Outlet _____ psi
   Overall Differential Pressure 2 psi
7. Check Carbon Canisters
   Pressure - Train 1 5 psi
   Pressure - Train 2 5 psi
   Pressure - Train 3 5 psi

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 7/19/93 TIME: 12:30 DMS (INITIALS)

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1	0	0
VW2		
VW3		
VW4		
VW5		
VW6		
VW7		
VW8		
VW9		

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister	0			11	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	0				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	0				
Line Exiting Vacuum Pump Unit		7	235		130
Line Entering Primary Carbon (A) or B (circle one)		14			
Line Entering Secondary Carbon A or (B) (circle one)		4			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = _____
Status of Manual Air Dilution Valve: open closed (circle one)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

DATE: 7/29/93
Individuals On Site: DMS

Items to check:

Vapor Extraction System wells off

1. Adjust Individual Air Line Inflows

VW1	Adjustment ☐	No Adjustment Necessary ☐
VW2	Adjustment ☐	No Adjustment Necessary ☐
VW3	Adjustment ☐	No Adjustment Necessary ☐
VW4	Adjustment ☐	No Adjustment Necessary ☐
VW5	Adjustment ☐	No Adjustment Necessary ☐
VW6	Adjustment ☐	No Adjustment Necessary ☐
VW7	Adjustment ☐	No Adjustment Necessary ☐
VW8	Adjustment ☐	No Adjustment Necessary ☐
VW9	Adjustment ☐	No Adjustment Necessary ☐

2. Verify Operation of Vacuum Pump Unit ☒
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☐ No Adjustment Necessary ☒
4. Check Vacuum Pump Unit Filter:
   Vacuum Before Filter 0 in. Hg
   Vacuum After Filter 2 in. Hg
5. Verify Operation of Demister Liquid Drain Pump ☐
6. Check Carbon Adsorbers ☒

Ground Water Extraction System

1. Check Submersible Well Pumps ☒ pull Rw2 pump
2. Verify Operation of Aeration Tank Blower ☒
3. Verify Operation of Polymer and Chemical Feed Pumps ☒ poly 7/28
4. Check Polymer/Chemical Supplies ☒
5. Verify Operation of Waste Water Feed Pump ☒
6. Check Primary and Secondary Filters:
   Pressure at Primary Filter Inlet 26 psi
   Pressure at Primary Filter Outlet/Secondary Inlet 24 psi
   Pressure at Secondary Filter Outlet — psi
   Overall Differential Pressure 2 psi
7. Check Carbon Canisters
   Pressure - Train 1 7 psi
   Pressure - Train 2 7 psi
   Pressure - Train 3 7 psi

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 7/29/93 TIME: 9:00 DMS
INITIALS

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1	0	0
VW2		
VW3		
VW4		
VW5		
VW6		
VW7		
VW8		
VW9		

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL (needs calib.)	Temp. (°F)
Near Entrance to Demister	2.5			11	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	0				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	2				
Line Exiting Vacuum Pump Unit		5	235		135
Line Entering Primary Carbon A or B (circle one)		14			
Line Entering Secondary Carbon A or B (circle one)		5			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = _____
Status of Manual Air Dilution Valve: open closed (circle one)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

DATE: 8/3/93
Individuals On Site: DMS

Items to check:

Vapor Extraction System VW wells off

1. Adjust Individual Air Line Inflows

VW1	Adjustment ☐	No Adjustment Necessary ☐
VW2	Adjustment ☐	No Adjustment Necessary ☐
VW3	Adjustment ☐	No Adjustment Necessary ☐
VW4	Adjustment ☐	No Adjustment Necessary ☐
VW5	Adjustment ☐	No Adjustment Necessary ☐
VW6	Adjustment ☐	No Adjustment Necessary ☐
VW7	Adjustment ☐	No Adjustment Necessary ☐
VW8	Adjustment ☐	No Adjustment Necessary ☐
VW9	Adjustment ☐	No Adjustment Necessary ☐

2. Verify Operation of Vacuum Pump Unit ☒
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☐ No Adjustment Necessary ☒
4. Check Vacuum Pump Unit Filter:
   Vacuum Before Filter _____ in. Hg
   Vacuum After Filter _____ in. Hg
5. Verify Operation of Demister Liquid Drain Pump ☒
6. Check Carbon Adsorbers ☒

Ground Water Extraction System

1. Check Submersible Well Pumps ☒
2. Verify Operation of Aeration Tank Blower ☒
3. Verify Operation of Polymer and Chemical Feed Pumps ☒
4. Check Polymer/Chemical Supplies ☒ poly 8/2/93
5. Verify Operation of Waste Water Feed Pump ☒
6. Check Primary and Secondary Filters:
   Pressure at Primary Filter Inlet 24 psi
   Pressure at Primary Filter Outlet/Secondary Inlet 21 psi
   Pressure at Secondary Filter Outlet _____ psi
   Overall Differential Pressure 2 psi
7. Check Carbon Canisters
   Pressure - Train 1 7 psi
   Pressure - Train 2 6.8 psi
   Pressure - Train 3 7 psi

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 8/3/93 TIME: 2:00p DMS
INITIALS

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1		
VW2		
VW3		
VW4	wells off	
VW5		
VW6		
VW7		
VW8		
VW9		

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister	6			12	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	4				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	5				
Line Exiting Vacuum Pump Unit		2	235		145
Line Entering Primary Carbon (A) or B (circle one)		14			
Line Entering Secondary Carbon A or (B) (circle one)		4			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = _____
Status of Manual Air Dilution Valve: (open) closed (circle one)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

INSPECTION LOG SHEET

DATE: 8/13/93
Individuals On Site: DWK

Items to check:

Vapor Extraction System VWs off

1. Adjust Individual Air Line Inflows

VW1	Adjustment ☐	No Adjustment Necessary ☐
VW2	Adjustment ☐	No Adjustment Necessary ☐
VW3	Adjustment ☐	No Adjustment Necessary ☐
VW4	Adjustment ☐	No Adjustment Necessary ☐
VW5	Adjustment ☐	No Adjustment Necessary ☐
VW6	Adjustment ☐	No Adjustment Necessary ☐
VW7	Adjustment ☐	No Adjustment Necessary ☐
VW8	Adjustment ☐	No Adjustment Necessary ☐
VW9	Adjustment ☐	No Adjustment Necessary ☐

2. Verify Operation of Vacuum Pump Unit ☑
3. Adjust Total System Inflow Rate at Vacuum Pump Unit
   Adjustment ☐ No Adjustment Necessary ☑
4. Check Vacuum Pump Unit Filter:
   Vacuum Before Filter 2.8 in. Hg
   Vacuum After Filter 4.2 in. Hg
5. Verify Operation of Demister Liquid Drain Pump ☑
6. Check Carbon Adsorbers ☑

Ground Water Extraction System

1. Check Submersible Well Pumps ☑
2. Verify Operation of Aeration Tank Blower ☑
3. Verify Operation of Polymer and Chemical Feed Pumps ☑
4. Check Polymer/Chemical Supplies ☑
5. Verify Operation of Waste Water Feed Pump ☑
6. Check Primary and Secondary Filters: set B
   Pressure at Primary Filter Inlet 13 psi
   Pressure at Primary Filter Outlet/Secondary Inlet 12 psi
   Pressure at Secondary Filter Outlet N/A psi
   Overall Differential Pressure 1.1 psi
7. Check Carbon Canisters
   Pressure - Train 1 5.5 psi
   Pressure - Train 2 5.5 psi
   Pressure - Train 3 5.5 psi

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

VAPOR EXTRACTION SYSTEM - MONITORING LOG SHEET

DATE: 8/13/93 TIME: 11:25 AM DWK
INITIALS

INDIVIDUAL VACUUM WELL LINES

Well Line	Air Flowrate (cfm)	Vacuum (in.Hg)
VW1		
VW2		
VW3		
VW4		
VW5		
VW6		
VW7		
VW8		
VW9		

W2 H5 OFF

COMBINED FLOW

System Location	Vacuum (in.Hg)	Pressure (psi)	Air Flowrate (cfm)	% LEL	Temp. (°F)
Near Entrance to Demister	4			10	
Between Vacuum Pump Unit Filter and Demister (Before Filter)	2.2				
Between Vacuum Pump Unit Filter and Vacuum Pump (After Filter)	3.6				
Line Exiting Vacuum Pump Unit		2.4	240		130
Line Entering Primary Carbon A or B (circle one)		2			
Line Entering Secondary Carbon A or B (circle one)		0.5			

MISCELLANEOUS:

Depth of Water in Demister Effluent Holding Tank = —
Status of Manual Air Dilution Valve: (open) closed (circle one)

Columbia Mills
Test Pit 3 Area IRM
Groundwater and Vapor Treatment System

Operations, Maintenance and Monitoring Manual
Inspection Log Sheet

Date: 8/19/93 Initials DMS

VAPOR EXTRACTION SYSTEM

1. Individual Air Flow Lines

Well ID	Adjustment Necessary	Air Flow (cfm)	Vacuum (in. Hg)
VW-1			
VW-2	SYSTEM		
VW-3			
VW-4			
VW-5			
VW-6	OFF		
VW-7			
VW-8			
VW-9			

2. Vacuum Pump Unit (On) Off
Temp (F) 130 Air Flow (cfm) 240 Pressure (psi) 6.5

3. Vacuum Pump Unit Filter
Before Filter 0 in. Hg After Filter 0 in. Hg

4. Verify Operation of Demister Pump ✓
Vacuum Near Entrance To Demister 0 in. Hg

5. Check Air Dilution Valve (Open) Closed

6. Inspect Carbon Adsorbers ✓
Line Entering Primary Carbon (A or B) 14.5 psi Line Entering Secondary Carbon (A or (B) 5 psi

7. % LEL 9

GROUNDWATER EXTRACTION SYSTEM

1. Check Levels of Submersible Well Pumps

	Set	Act		Set	Act		Set	Act		Set	Act		Set	Act
RW-1	4.0	4.2	RW-2	5.7	5.5	RW-3	5.9	5.9	RW-4	6.0	6.0	RW-5	5.8	5.8

2. Verify Operation of Aeration Tank Blower (On) Off

3. Verify Operation of Chlorine Feed Pump On (Off)
Amount of Chlorine In Tank 5 gal. Make Chlorine Yes (No)

4. Verify Operation of Polymer Feed Pump (On) Off
Amount of Polymer In Tank 45 gal. Make Polymer (Yes) No
8/18/93

5. Verify Operation of Wastewater Feed Pump ✓

6. Check Bag Filter System
Filter Set In Use A or (B) Filter Type: Set A 3M Set B 3M
Primary Filter Pressure 19 psi Secondary Filter Pressure 20 psi Differential Pressure 5 psi

7. Check Pressure in Carbon Canisters

	1st	2nd	3rd
Train 1	6.2	7	3
Train 2	6	7	[illegible]
Train 3	6.2	~~6.5~~	[illegible]

Columbia Mills
Test Pit 3 Area IRM
Groundwater and Vapor Treatment System

Operations, Maintenance and Monitoring Manual
Inspection Log Sheet

Date: 8/24/93 Initials: JWS

VAPOR EXTRACTION SYSTEM

1. Individual Air Flow Lines

Well ID	Adjustment Necessary	Air Flow (cfm)	Vacuum (in. Hg)
VW-1			
VW-2	System		
VW-3			
VW-4			
VW-5			
VW-6	Off		
VW-7			
VW-8			
VW-9			

2. Vacuum Pump Unit (On) Off
Temp (F) 140 Air Flow (cfm) 240 Pressure (psi) 0

3. Vacuum Pump Unit Filter
Before Filter 6.5 in. Hg After Filter 7.5 in. Hg

4. Verify Operation of Demister Pump ✓
Vacuum Near Entrance To Demister 7 in. Hg

5. Check Air Dilution Valve (Open) Closed

6. Inspect Carbon Adsorbers ✓
Line Entering Primary Carbon (A or B) 14 psi Line Entering Secondary Carbon (A or (B)) 5 psi

7. % LEL 10

GROUNDWATER EXTRACTION SYSTEM

1. Check Levels of Submersible Well Pumps

	Set	Act		Set	Act		Set	Act		Set	Act		Set	Act
RW-1	4.0	4.1	RW-2	5.7	5.5	RW-3	5.9	6.1	RW-4	6.0	6.2	RW-5	5.8	6.0

2. Verify Operation of Aeration Tank Blower (On) Off

3. Verify Operation of Chlorine Feed Pump On (Off)
Amount of Chlorine In Tank 5 gal. Make Chlorine Yes (No)

4. Verify Operation of Polymer Feed Pump (On) Off
Amount of Polymer In Tank 30 gal. Make Polymer Yes (No)

5. Verify Operation of Wastewater Feed Pump ✓

6. Check Bag Filter System
Filter Set In Use (A) or B Filter Type: Set A 3M Set B 3M
Primary Filter Pressure 2 psi Secondary Filter Pressure 4 psi Differential Pressure 8 psi

7. Check Pressure in Carbon Canisters

	1st	2nd	3rd
Train 1	0	0	0
Train 2	0	0	—
Train 3	0	0.5	—

Columbia Mills
Test Pit 3 Area IRM
Groundwater and Vapor Treatment System

Operations, Maintenance and Monitoring Manual
Inspection Log Sheet

Date: 9/2/93 Initials DMS

VAPOR EXTRACTION SYSTEM

1. Individual Air Flow Lines

Well ID	Adjustment Necessary	Air Flow (cfm)	Vacuum (in. Hg)
VW-1			
VW-2			
VW-3	SYSTEM		
VW-4			
VW-5			
VW-6	OFF		
VW-7			
VW-8			
VW-9			

2. Vacuum Pump Unit (On) Off
Temp (F) 130 Air Flow (cfm) 240 Pressure (psi) 6

3. Vacuum Pump Unit Filter
Before Filter 0 in. Hg After Filter 0 in. Hg

4. Verify Operation of Demister Pump ✓
Vacuum Near Entrance To Demister 0 in. Hg

5. Check Air Dilution Valve (Open) Closed

6. Inspect Carbon Adsorbers ✓
Line Entering Primary Carbon (A or B) 15 psi Line Entering Secondary Carbon (A or B) 5 psi

7. % LEL 0

GROUNDWATER EXTRACTION SYSTEM

1. Check Levels of Submersible Well Pumps

	Set	Act		Set	Act		Set	Act		Set	Act		Set	Act
RW-1	4.0	3.8	RW-2	5.7	5.6	RW-3	5.9	5.8	RW-4	6.0	5.8	RW-5	5.8	5.9

2. Verify Operation of Aeration Tank Blower (On) Off

3. Verify Operation of Chlorine Feed Pump On (Off)
Amount of Chlorine In Tank 5 gal. Make Chlorine Yes (No)

4. Verify Operation of Polymer Feed Pump (On) Off
Amount of Polymer In Tank 18 gal. Make Polymer (Yes) No

5. Verify Operation of Wastewater Feed Pump ✓

6. Check Bag Filter System
Filter Set In Use A or (B) Filter Type: Set A 3M Set B Accusit
Primary Filter Pressure 22 psi Secondary Filter Pressure 19 psi Differential Pressure 3 psi

7. Check Pressure in Carbon Canisters

	1st	2nd	3rd
Train 1	3.7	0	0
Train 2	3.2	0.5	—
Train 3	4.5	—	—

Columbia Mills
Test Pit 3 Area IRM
Groundwater and Vapor Treatment System

Operations, Maintenance and Monitoring Manual
Inspection Log Sheet

Date: 9/8/93 Initials DMS

VAPOR EXTRACTION SYSTEM

1. Individual Air Flow Lines

Well ID	Adjustment Necessary	Air Flow (cfm)	Vacuum (in. Hg)
VW-1			
VW-2			
VW-3	SYSTEM		
VW-4			
VW-5			
VW-6	OFF		
VW-7			
VW-8			
VW-9			

2. Vacuum Pump Unit On Off
Temp (F) 130 Air Flow (cfm) 240 Pressure (psi) 5

3. Vacuum Pump Unit Filter
Before Filter 0 in. Hg After Filter 0 in. Hg

4. Verify Operation of Demister Pump ✓
Vacuum Near Entrance To Demister 0 in. Hg

5. Check Air Dilution Valve (Open) Closed

6. Inspect Carbon Adsorbers ✓
Line Entering Primary Carbon (A or B) 15 psi Line Entering Secondary Carbon (A or (B) 5 psi

7. % LEL 8

GROUNDWATER EXTRACTION SYSTEM

1. Check Levels of Submersible Well Pumps

	Set	Act		Set	Act		Set	Act		Set	Act		Set	Act
RW-1	4.0	4.1	RW-2	5.7	5.9	RW-3	5.9	6.1	RW-4	6.0	6.2	RW-5	5.8	6.0

2. Verify Operation of Aeration Tank Blower (On) Off

3. Verify Operation of Chlorine Feed Pump On (Off)
Amount of Chlorine In Tank 16 gal. Make Chlorine Yes (No)

4. Verify Operation of Polymer Feed Pump (On) Off
Amount of Polymer In Tank 40 gal. Make Polymer Yes (No)

5. Verify Operation of Wastewater Feed Pump ✓

6. Check Bag Filter System
Filter Set In Use A or (B) Filter Type: Set A 327 Set B 325
Primary Filter Pressure 11 psi Secondary Filter Pressure 6 psi Differential Pressure 4 psi

7. Check Pressure in Carbon Canisters

	1st	2nd	3rd
Train 1	2	2.0	0.5
Train 2	2	2.6	1.5
Train 3	2.5	–	–

Columbia Mills
Test Pit 3 Area IRM
Groundwater and Vapor Treatment System

Operations, Maintenance and Monitoring Manual
Inspection Log Sheet

Date: 9/14/93 Initials DMS

VAPOR EXTRACTION SYSTEM

1. Individual Air Flow Lines

Well ID	Adjustment Necessary	Air Flow (cfm)	Vacuum (in. Hg)
VW-1			
VW-2			
VW-3	SYSTEM		
VW-4			
VW-5			
VW-6			
VW-7	OFF		
VW-8			
VW-9			

2. Vacuum Pump Unit (On) Off
Temp (F) 140 Air Flow (cfm) 240 Pressure (psi) 3

3. Vacuum Pump Unit Filter
Before Filter 8.6 in. Hg After Filter 8 in. Hg

4. Verify Operation of Demister Pump ✓
Vacuum Near Entrance To Demister 8.4 in. Hg

5. Check Air Dilution Valve (Open) Closed

6. Inspect Carbon Adsorbers ✓
Line Entering Primary Carbon ((A) or B) 15 psi Line Entering Secondary Carbon (A or B) 5 psi

7. % LEL 9

GROUNDWATER EXTRACTION SYSTEM

1. Check Levels of Submersible Well Pumps

	Set	Act		Set	Act		Set	Act		Set	Act		Set	Act
RW-1	4.0	3.8	RW-2	5.7	5.8	RW-3	5.9	6.0	RW-4	6.0	6.1	RW-5	5.8	5.9

2. Verify Operation of Aeration Tank Blower (On) Off

3. Verify Operation of Chlorine Feed Pump On (Off)
Amount of Chlorine In Tank 10 gal. Make Chlorine Yes (No)

4. Verify Operation of Polymer Feed Pump (On) Off
Amount of Polymer In Tank 50 gal. Make Polymer (Yes) No
↳ 9/12/93

5. Verify Operation of Wastewater Feed Pump ✓

6. Check Bag Filter System
Filter Set In Use A or (B) Filter Type: Set A 3M Set B 3M
Primary Filter Pressure 12 psi Secondary Filter Pressure 10 psi Differential Pressure 1 psi

7. Check Pressure in Carbon Canisters

	1st	2nd	3rd
Train 1	0	1	0.6
Train 2	0	1.3	0.5
Train 3	2	—	—

Columbia Mills
Test Pit 3 Area IRM
Groundwater and Vapor Treatment System

Operations, Maintenance and Monitoring Manual
Inspection Log Sheet

Date: 9/24/93 Initials DMS

VAPOR EXTRACTION SYSTEM

1. Individual Air Flow Lines

Well ID	Adjustment Necessary	Air Flow (cfm)	Vacuum (in. Hg)
~~VW-1~~			
~~VW-2~~			
~~VW-3~~	SYSTEM		
~~VW-4~~			
~~VW-5~~			
~~VW-6~~	OFF		
~~VW-7~~			
~~VW-8~~			
~~VW-9~~			

2. Vacuum Pump Unit On Off
Temp (F) 130 Air Flow (cfm) 240 Pressure (psi) 5

3. Vacuum Pump Unit Filter
Before Filter 0 in. Hg After Filter 0 in. Hg

4. Verify Operation of Demister Pump ✓
Vacuum Near Entrance To Demister 0 in. Hg

5. Check Air Dilution Valve (Open) Closed

6. Inspect Carbon Adsorbers ✓
Line Entering Primary Carbon (A or B) 15 psi Line Entering Secondary Carbon (A or B) 5 psi

7. % LEL 9

GROUNDWATER EXTRACTION SYSTEM

1. Check Levels of Submersible Well Pumps

	Set	Act		Set	Act		Set	Act		Set	Act		Set	Act
RW-1	4.0	3.8	RW-2	5.7	5.7	RW-3	5.9	5.9	RW-4	6.0	6.1	RW-5	5.8	5.8

2. Verify Operation of Aeration Tank Blower (On) Off

3. Verify Operation of Chlorine Feed Pump On (Off)
Amount of Chlorine In Tank ____ gal. Make Chlorine Yes (No)

4. Verify Operation of Polymer Feed Pump (On) Off
Amount of Polymer In Tank ____ gal. Make Polymer Yes (No)

5. Verify Operation of Wastewater Feed Pump ✓

6. Check Bag Filter System
Filter Set In Use (A) or B Filter Type: Set A 3M Set B 3M
Primary Filter Pressure 12 psi Secondary Filter Pressure 12 psi Differential Pressure 0 psi

7. Check Pressure in Carbon Canisters

	1st	2nd	3rd
Train 1	1.0	0	0
Train 2	2.0	0.5	0
Train 3	1.5	—	—

Columbia Mills
Test Pit 3 Area IRM
Groundwater and Vapor Treatment System

Operations, Maintenance and Monitoring Manual
Inspection Log Sheet

Date: 9/30/93 Initials DWK

VAPOR EXTRACTION SYSTEM

1. Individual Air Flow Lines

Well ID	Adjustment Necessary	Air Flow (cfm)	Vacuum (in. Hg)
VW-1	turned on 3 PM	3.5	2
VW-2		plug stuck	1
VW-3		10	2
VW-4		10	2
VW-5		< 3.5	2
VW-6		5	2
VW-7		14	1.5
VW-8		plug stuck	1
VW-9		plug stuck	1.5

2. Vacuum Pump Unit (On) Off
Temp (F) 130 Air Flow (cfm) 230 Pressure (psi) 3.8

3. Vacuum Pump Unit Filter
Before Filter 0 in. Hg After Filter 0 in. Hg

4. Verify Operation of Demister Pump ✓
Vacuum Near Entrance To Demister 0 in. Hg

5. Check Air Dilution Valve Open (Closed)

6. Inspect Carbon Adsorbers ✓
Line Entering Primary Carbon (A or B) 2 psi Line Entering Secondary Carbon (A or B) 0.5 psi

7. % LEL 41

GROUNDWATER EXTRACTION SYSTEM

1. Check Levels of Submersible Well Pumps

	Set	Act		Set	Act		Set	Act		Set	Act		Set	Act
RW-1	4.0	3.9	RW-2	6.3	6.3	RW-3	5.9	6.0	RW-4	6.0	6.1	RW-5	5.8	5.8

2. Verify Operation of Aeration Tank Blower (On) Off

3. Verify Operation of Chlorine Feed Pump On (Off)
Amount of Chlorine In Tank ____ gal. Make Chlorine Yes (No)

4. Verify Operation of Polymer Feed Pump (On) Off
Amount of Polymer In Tank 30 gal. Make Polymer (Yes) No → 10/1/93

5. Verify Operation of Wastewater Feed Pump ✓

6. Check Bag Filter System
Filter Set In Use A or (B) Filter Type: Set A ____ Set B ____
Primary Filter Pressure 14 psi Secondary Filter Pressure 11 psi Differential Pressure 2.5 psi

7. Check Pressure in Carbon Canisters

	1st	2nd	3rd
Train 1	5	0	0
Train 2	5	1.5	0
Train 3	5		

Columbia Mills
Test Pit 3 Area IRM
Groundwater and Vapor Treatment System

Operations, Maintenance and Monitoring Manual
Inspection Log Sheet

Date: 10/1/93 Initials DWK

VAPOR EXTRACTION SYSTEM

1. Individual Air Flow Lines – at time of sampling

Well ID	Adjustment Necessary	Air Flow (cfm)	Vacuum (in. Hg)
VW-1		3.5	2.2
VW-2		plug stuck	1.5
VW-3		11	2.2
VW-4		8	2.5
VW-5		plug stuck	2.5
VW-6		5	2.7
VW-7		14	2
VW-8		plug stuck	~~5~~ 2
VW-9		plug stuck	2

some water in flowmeter

turned off VWs at 10:40 AM

2. Vacuum Pump Unit On Off
Temp (F) 130 Air Flow (cfm) 225 Pressure (psi) 9

3. Vacuum Pump Unit Filter
Before Filter 0 in. Hg After Filter 0 in. Hg

4. Verify Operation of Demister Pump ✓
Vacuum Near Entrance To Demister 0 in. Hg

5. Check Air Dilution Valve Open (Closed)

6. Inspect Carbon Adsorbers ✓
Line Entering Primary Carbon (A ~~or B~~) 2 psi Line Entering Secondary Carbon (~~A or~~ B) 0.5 psi

7. % LEL 22

GROUNDWATER EXTRACTION SYSTEM

1. Check Levels of Submersible Well Pumps

	Set	Act		Set	Act		Set	Act		Set	Act		Set	Act
RW-1			RW-2			RW-3			RW-4			RW-5		

2. Verify Operation of Aeration Tank Blower On Off

3. Verify Operation of Chlorine Feed Pump On Off
Amount of Chlorine In Tank ____ gal. Make Chlorine Yes No

4. Verify Operation of Polymer Feed Pump On Off
Amount of Polymer In Tank ____ gal. Make Polymer Yes No

5. Verify Operation of Wastewater Feed Pump ____

6. Check Bag Filter System
Filter Set In Use A or B Filter Type: Set A ____ Set B ____
Primary Filter Pressure ____psi Secondary Filter Pressure ____psi Differential Pressure ____psi

7. Check Pressure in Carbon Canisters

	1st	2nd	3rd
Train 1			
Train 2			
Train 3			

Columbia Mills
Test Pit 3 Area IRM
Groundwater and Vapor Treatment System

Operations, Maintenance and Monitoring Manual
Inspection Log Sheet

Date: 10/1/12 Initials DL

VAPOR EXTRACTION SYSTEM

1. Individual Air Flow Lines

Well ID	Adjustment Necessary	Air Flow (cfm)	Vacuum (in. Hg)
VW-1			
VW-2			
VW-3	SYSTEM		
VW-4			
VW-5			
VW-6	OFF		
VW-7			
VW-8			
VW-9			

2. Vacuum Pump Unit (On) Off
Temp (F) 140 Air Flow (cfm) 230 Pressure (psi) 0

3. Vacuum Pump Unit Filter
Before Filter 10 in. Hg After Filter 11 in. Hg

4. Verify Operation of Demister Pump ✓
Vacuum Near Entrance To Demister 10 in. Hg

5. Check Air Dilution Valve (Open) Closed

6. Inspect Carbon Adsorbers ✓
Line Entering Primary Carbon (A) ~~or B~~ 2 psi Line Entering Secondary Carbon ~~A or~~ (B) 0.5 psi

7. % LEL 9

GROUNDWATER EXTRACTION SYSTEM

1. Check Levels of Submersible Well Pumps

	Set	Act		Set	Act		Set	Act		Set	Act		Set	Act
RW-1	4.0	4.1	RW-2	6.0	6.0	RW-3	5.9	6.1	RW-4	6.0	6.2	RW-5	5.8	5.9

2. Verify Operation of Aeration Tank Blower (On) Off

3. Verify Operation of Chlorine Feed Pump On (Off)
Amount of Chlorine In Tank ____ gal. Make Chlorine Yes No

4. Verify Operation of Polymer Feed Pump (On) Off
Amount of Polymer In Tank 25 gal. Make Polymer Yes No

5. Verify Operation of Wastewater Feed Pump ✓

6. Check Bag Filter System
Filter Set In Use A or (B) Filter Type: Set A ____ Set B ____
Primary Filter Pressure 18 psi Secondary Filter Pressure 14 psi Differential Pressure 3.75 psi

7. Check Pressure in Carbon Canisters

	1st	2nd	3rd
Train 1	2.3	0.25	0
Train 2	1.5	1	0
Train 3	2.6	—	—

Columbia Mills
Test Pit 3 Area IRM
Groundwater and Vapor Treatment System

Operations, Maintenance and Monitoring Manual
Inspection Log Sheet

Date: 10/14/93 Initials DWK

VAPOR EXTRACTION SYSTEM

1. Individual Air Flow Lines

Well ID	Adjustment Necessary	Air Flow (cfm)	Vacuum (in. Hg)
VW-1			
VW-2			
VW-3	SYSTEM		
VW-4			
VW-5			
VW-6		OFF	
VW-7			
VW-8			
VW-9			

2. Vacuum Pump Unit (On) Off
Temp (F) 130 Air Flow (cfm) 235 Pressure (psi) 6.5

3. Vacuum Pump Unit Filter
Before Filter 0 in. Hg After Filter 0 in. Hg

4. Verify Operation of Demister Pump ✓
Vacuum Near Entrance To Demister 0 in. Hg

5. Check Air Dilution Valve (Open) Closed

6. Inspect Carbon Adsorbers ✓
Line Entering Primary Carbon ((A) or B) 2 psi Line Entering Secondary Carbon (A or (B)) 0.5 psi

7. % LEL 9-10

GROUNDWATER EXTRACTION SYSTEM

1. Check Levels of Submersible Well Pumps

level controls not working

	Set	Act		Set	Act		Set	Act		Set	Act		Set	Act
RW-1	4.0	3.8	RW-2	6.0	6.0	RW-3	OFF	✓	RW-4	6.0	6.0	RW-5	5.8	6.0

2. Verify Operation of Aeration Tank Blower (On) Off

3. Verify Operation of Chlorine Feed Pump On (Off)
Amount of Chlorine In Tank ____ gal. Make Chlorine Yes No

4. Verify Operation of Polymer Feed Pump (On) Off
Amount of Polymer In Tank 25 gal. Make Polymer Yes (No)

5. Verify Operation of Wastewater Feed Pump ✓

6. Check Bag Filter System
Filter Set In Use A or (B) Filter Type: Set A ____ Set B ____
Primary Filter Pressure 25 psi Secondary Filter Pressure 19 psi Differential Pressure 4.9 psi

7. Check Pressure in Carbon Canisters

	1st	2nd	3rd
Train 1	6.8	0.3	0
Train 2	6	1.5	0
Train 3	7.2	—	—

Columbia Mills
Test Pit 3 Area IRM
Groundwater and Vapor Treatment System

Operations, Maintenance and Monitoring Manual
Inspection Log Sheet

Date: 10/18/93 Initials NW

VAPOR EXTRACTION SYSTEM

1. Individual Air Flow Lines

Well ID	Adjustment Necessary	Air Flow (cfm)	Vacuum (in. Hg)
~~VW-1~~			
~~VW-2~~			
~~VW-3~~			
~~VW-4~~			
~~VW-5~~			
~~VW-6~~			
~~VW-7~~			
~~VW-8~~			
~~VW-9~~			

System Off

2. Vacuum Pump Unit (On) Off
Temp (F) 130 Air Flow (cfm) 230 Pressure (psi) 12

3. Vacuum Pump Unit Filter
Before Filter 0 in. Hg After Filter 0 in. Hg

4. Verify Operation of Demister Pump ✓
Vacuum Near Entrance To Demister 0 in. Hg

5. Check Air Dilution Valve Open (Closed)

6. Inspect Carbon Adsorbers ✓
Line Entering Primary Carbon (A or B) [illegible] psi Line Entering Secondary Carbon (A or B) [illegible] psi

7. % LEL 10

GROUNDWATER EXTRACTION SYSTEM

1. Check Levels of Submersible Well Pumps

	Set	Act		Set	Act		Set	Act		Set	Act		Set	Act
RW-1			RW-2			RW-3			RW-4			RW-5		

2. Verify Operation of Aeration Tank Blower (On) Off

3. Verify Operation of Chlorine Feed Pump On Off
Amount of Chlorine In Tank N/A gal. Make Chlorine Yes (No)

4. Verify Operation of Polymer Feed Pump (On) Off
Amount of Polymer In Tank 45 gal. Make Polymer Yes (No)

5. Verify Operation of Wastewater Feed Pump ✓

6. Check Bag Filter System
Filter Set In Use A or B Filter Type: Set A ____ Set B ✓
Primary Filter Pressure 28 psi Secondary Filter Pressure 23 psi Differential Pressure 5 psi

7. Check Pressure in Carbon Canisters

	1st	2nd	3rd
Train 1	6	1	0
Train 2	6	1	0
Train 3	6	1	0

Columbia Mills
Test Pit 3 Area IRM
Groundwater and Vapor Treatment System

Operations, Maintenance and Monitoring Manual
Inspection Log Sheet

Date: 10/29/93 Initials JLM

VAPOR EXTRACTION SYSTEM

1. Individual Air Flow Lines

Well ID	Adjustment Necessary	Air Flow (cfm)	Vacuum (in. Hg)
~~VW-1~~			
~~VW-2~~			
~~VW-3~~			
~~VW-4~~			
~~VW-5~~			
~~VW-6~~			
~~VW-7~~			
~~VW-8~~			
~~VW-9~~			

SYSTEM OFF

2. Vacuum Pump Unit (On) Off
Temp (F) 130 Air Flow (cfm) 230 Pressure (psi) 3

3. Vacuum Pump Unit Filter
Before Filter 0 in. Hg After Filter 0 in. Hg

4. Verify Operation of Demister Pump ✓
Vacuum Near Entrance To Demister 0 in. Hg

5. Check Air Dilution Valve Open (Closed)

6. Inspect Carbon Adsorbers
Line Entering Primary Carbon ((A) or B) 2 psi Line Entering Secondary Carbon (A or (B)) 15 psi

7. % LEL 10

GROUNDWATER EXTRACTION SYSTEM

1. Check Levels of Submersible Well Pumps

	Set	Act		Set	Act		Set	Act		Set	Act		Set	Act
RW-1	4	3.8	RW-2	6	6.5	RW-3	OFF		RW-4	6.0	6.4	RW-5	6	5.9

2. Verify Operation of Aeration Tank Blower (On) Off

3. Verify Operation of Chlorine Feed Pump On (Off)
Amount of Chlorine In Tank ___ gal. Make Chlorine Yes (No)

4. Verify Operation of Polymer Feed Pump (On) Off
Amount of Polymer In Tank 45 gal. Make Polymer Yes (No)

5. Verify Operation of Wastewater Feed Pump ✓

6. Check Bag Filter System
Filter Set In Use (A) or B Filter Type: Set A ___ Set B ___
Primary Filter Pressure 19 psi Secondary Filter Pressure 13 psi Differential Pressure 0 psi

7. Check Pressure in Carbon Canisters

	1st	2nd	3rd
Train 1			
Train 2			
Train 3			

Columbia Mills
Test Pit 3 Area IRM
Groundwater and Vapor Treatment System

Operations, Maintenance and Monitoring Manual
Inspection Log Sheet

Date: 11/4/94 Initials DWK

VAPOR EXTRACTION SYSTEM

1. Individual Air Flow Lines

Well ID	Adjustment Necessary	Air Flow (cfm)	Vacuum (in. Hg)
VW-1			
VW-2			
VW-3	SYSTEM		
VW-4			
VW-5		OFF	
VW-6			
VW-7			
VW-8			
VW-9			

2. Vacuum Pump Unit (On) Off
Temp (F) 130 Air Flow (cfm) 230 Pressure (psi) 3.5

3. Vacuum Pump Unit Filter
Before Filter 0 in. Hg After Filter 1 in. Hg

4. Verify Operation of Demister Pump ✓
Vacuum Near Entrance To Demister 1.5 in. Hg

5. Check Air Dilution Valve (Open) Closed

6. Inspect Carbon Adsorbers ✓
Line Entering Primary Carbon ((A) or B) 2 psi Line Entering Secondary Carbon (A or (B)) 0.75 psi

7. % LEL 10

GROUNDWATER EXTRACTION SYSTEM

1. Check Levels of Submersible Well Pumps

	Set	Act		Set	Act		Set	Act		Set	Act		Set	Act
RW-1	4.1	3.8	RW-2	5.8	6.0	RW-3	OFF		RW-4	6.2	6.3	RW-5	6.0	6.0

2. Verify Operation of Aeration Tank Blower (On) Off

3. Verify Operation of Chlorine Feed Pump On (Off)
Amount of Chlorine In Tank ____ gal. Make Chlorine Yes No

4. Verify Operation of Polymer Feed Pump (On) Off
Amount of Polymer In Tank 45 gal. Make Polymer Yes No

5. Verify Operation of Wastewater Feed Pump ✓

6. Check Bag Filter System
Filter Set In Use (A) or B Filter Type: Set A ____ Set B ____
Primary Filter Pressure 20 psi Secondary Filter Pressure 22 psi Differential Pressure 0 psi

7. Check Pressure in Carbon Canisters

	1st	2nd	3rd
Train 1	3.5	0.75	0.5
Train 2	3.5	1.5	0.5
Train 3	4.5	—	—

Columbia Mills
Test Pit 3 Area IRM
Groundwater and Vapor Treatment System

Operations, Maintenance and Monitoring Manual
Inspection Log Sheet

Date: 11/10/93 Initials DMS

VAPOR EXTRACTION SYSTEM

1. Individual Air Flow Lines

Well ID	Adjustment Necessary	Air Flow (cfm)	Vacuum (in. Hg)
VW-1			
VW-2	SYSTEM		
VW-3			
VW-4			
VW-5			
VW-6	OFF		
VW-7			
VW-8			
VW-9			

2. Vacuum Pump Unit (On) Off
Temp (F) 130 Air Flow (cfm) 235 Pressure (psi) 3.5

3. Vacuum Pump Unit Filter
Before Filter 0 in. Hg After Filter 0 in. Hg

4. Verify Operation of Demister Pump ✓
Vacuum Near Entrance To Demister 0 in. Hg

5. Check Air Dilution Valve (Open) Closed

6. Inspect Carbon Adsorbers ✓
Line Entering Primary Carbon (A or B) 14 psi Line Entering Secondary Carbon (A or (B)) 5 psi

7. % LEL 11

GROUNDWATER EXTRACTION SYSTEM

1. Check Levels of Submersible Well Pumps

	Set	Act		Set	Act		Set	Act		Set	Act		Set	Act
RW-1	4.0	3.8	RW-2	5.8	6.0	RW-3	OFF		RW-4	6.0	6.1	RW-5	5.9	6.1

2. Verify Operation of Aeration Tank Blower (On) Off

3. Verify Operation of Chlorine Feed Pump On (Off)
Amount of Chlorine In Tank 0 gal. Make Chlorine Yes No

4. Verify Operation of Polymer Feed Pump (On) Off
Amount of Polymer In Tank 40 gal. Make Polymer (Yes) No
↳ 11/8/93

5. Verify Operation of Wastewater Feed Pump ✓

6. Check Bag Filter System
Filter Set In Use (A) or B Filter Type: Set A Strainrite SP23 Set B 3M
Primary Filter Pressure 14 psi Secondary Filter Pressure 16 psi Differential Pressure 0 psi

7. Check Pressure in Carbon Canisters

	1st	2nd	3rd
Train 1	3.0	0.5	0.4
Train 2	0.5	0.7	0.5
Train 3	2.8	—	—

Columbia Mills
Test Pit 3 Area IRM
Groundwater and Vapor Treatment System

Operations, Maintenance and Monitoring Manual
Inspection Log Sheet

Date: 11/17/93 Initials DMS

VAPOR EXTRACTION SYSTEM

1. Individual Air Flow Lines

Well ID	Adjustment Necessary	Air Flow (cfm)	Vacuum (in. Hg)
VW-1			
VW-2			
VW-3	5 4 5		
VW-4			
VW-5			
VW-6	OFF		
VW-7			
VW-8			
VW-9			

2. Vacuum Pump Unit (On) Off
Temp (F) 130 Air Flow (cfm) 235 Pressure (psi) 4

3. Vacuum Pump Unit Filter
Before Filter 0 in. Hg After Filter 0 in. Hg

4. Verify Operation of Demister Pump ✓
Vacuum Near Entrance To Demister 0 in. Hg

5. Check Air Dilution Valve (Open) Closed

6. Inspect Carbon Adsorbers ✓
Line Entering Primary Carbon (A or B) 14 psi Line Entering Secondary Carbon (A or B) _____ psi

7. % LEL 11

GROUNDWATER EXTRACTION SYSTEM

1. Check Levels of Submersible Well Pumps

	Set	Act		Set	Act		Set	Act		Set	Act		Set	Act
RW-1	4.0	3.9	RW-2	___	___	RW-3	OFF		RW-4	6.1	6.3	RW-5	5.8	6.0

2. Verify Operation of Aeration Tank Blower (On) Off

3. Verify Operation of Chlorine Feed Pump On (Off)
Amount of Chlorine In Tank ____ gal. Make Chlorine Yes (No)

4. Verify Operation of Polymer Feed Pump (On) Off
Amount of Polymer In Tank 55 gal. Make Polymer (Yes) No
↳ 11/15/93

5. Verify Operation of Wastewater Feed Pump ✓

6. Check Bag Filter System
Filter Set In Use (A) or B Filter Type: Set A Acc Set B 3M
Primary Filter Pressure 10 psi Secondary Filter Pressure 10 psi Differential Pressure 0 psi

7. Check Pressure in Carbon Canisters

	1st	2nd	3rd
Train 1	1.0	0.5	0.5
Train 2	1.0	1.0	0.5
Train 3	1.5	~	~

Columbia Mills
Test Pit 3 Area IRM
Groundwater and Vapor Treatment System

Operations, Maintenance and Monitoring Manual
Inspection Log Sheet

Date: 11/24/93 Initials DMS

VAPOR EXTRACTION SYSTEM

1. Individual Air Flow Lines

Well ID	Adjustment Necessary	Air Flow (cfm)	Vacuum (in. Hg)
~~VW-1~~			
~~VW-2~~			
~~VW-3~~			
~~VW-4~~			
~~VW-5~~			
~~VW-6~~			
~~VW-7~~			
~~VW-8~~			
~~VW-9~~			

2. Vacuum Pump Unit On Off
Temp (F) 130 Air Flow (cfm) 235 Pressure (psi) 6.5

3. Vacuum Pump Unit Filter
Before Filter 0 in. Hg After Filter 0 in. Hg

4. Verify Operation of Demister Pump ✓
Vacuum Near Entrance To Demister 0 in. Hg

5. Check Air Dilution Valve (Open) Closed

6. Inspect Carbon Adsorbers ✓
Line Entering Primary Carbon ((A) or B) 14 psi Line Entering Secondary Carbon ((A) or B) 5 psi

7. % LEL 12

GROUNDWATER EXTRACTION SYSTEM

1. Check Levels of Submersible Well Pumps

	Set	Act		Set	Act		Set	Act		Set	Act		Set	Act
RW-1	4.0	4.0	RW-2	5.8	5.8	RW-3	OFF		RW-4	6.0	6.0	RW-5	5.8	5.9

2. Verify Operation of Aeration Tank Blower (On) Off

3. Verify Operation of Chlorine Feed Pump On (Off)
Amount of Chlorine In Tank — gal. Make Chlorine Yes (No)

4. Verify Operation of Polymer Feed Pump (On) Off
Amount of Polymer In Tank 25 gal. Make Polymer (Yes) No

5. Verify Operation of Wastewater Feed Pump ✓

6. Check Bag Filter System
Filter Set In Use (A) or B Filter Type: Set A 1 µm Set B 2 µm
Primary Filter Pressure 7 psi Secondary Filter Pressure 7 psi Differential Pressure 0 psi

7. Check Pressure in Carbon Canisters

	1st	2nd	3rd
Train 1	0.9	0.7	0.5
Train 2	0.5	1.1	0.5
Train 3	1.0	—	—

Columbia Mills
Test Pit 3 Area IRM
Groundwater and Vapor Treatment System

Operations, Maintenance and Monitoring Manual
Inspection Log Sheet

Date: 12/3 Initials DMS

VAPOR EXTRACTION SYSTEM

1. Individual Air Flow Lines

Well ID	Adjustment Necessary	Air Flow (cfm)	Vacuum (in. ~~Hg~~ kPA)	in Hg (× 0.296)
VW-1	–	~~70~~	14	4.1
VW-2	–	250	14	4.1
VW-3	–	90	16	4.7
VW-4	–	140	16	4.7
VW-5	–	STUCK	15	4.4
VW-6	–	–	–	off
VW-7	–	–	–	
VW-8	–	–	–	
VW-9	–	115	16	4.7

2. Vacuum Pump Unit On Off
Temp (F) 145 Air Flow (cfm) 215 Pressure (psi) 4.0

3. Vacuum Pump Unit Filter
Before Filter 2.8 in. Hg After Filter 2.8 in. Hg

4. Verify Operation of Demister Pump ✓
Vacuum Near Entrance To Demister 3.0 in. Hg

5. Check Air Dilution Valve Open (Closed)

6. Inspect Carbon Adsorbers ✓
Line Entering Primary Carbon (A or B) 12 psi Line Entering Secondary Carbon (A or B) 4 psi

7. % LEL 15

GROUNDWATER EXTRACTION SYSTEM

1. Check Levels of Submersible Well Pumps

	Set	Act		Set	Act		Set	Act		Set	Act		Set	Act
RW-1	4.0	4.1	RW-2	5.7	5.7	RW-3	OFF		RW-4	6.1	6.3	RW-5	5.8	6.0

2. Verify Operation of Aeration Tank Blower (On) Off

3. Verify Operation of Chlorine Feed Pump On (Off)
Amount of Chlorine In Tank ____ gal. Make Chlorine Yes (No)

4. Verify Operation of Polymer Feed Pump (On) Off
Amount of Polymer In Tank 25 gal. Make Polymer Yes (No)

5. Verify Operation of Wastewater Feed Pump ✓

6. Check Bag Filter System
Filter Set In Use A or (B) Filter Type: Set A 5M Set B Accuf 25P2
Primary Filter Pressure 25 psi Secondary Filter Pressure 22 psi Differential Pressure 3 psi

7. Check Pressure in Carbon Canisters

	1st	2nd	3rd
Train 1	2.5	3.4	0.5
Train 2	5.5	0.5	0.0
Train 3	3.5	–	–

Columbia Mills
Test Pit 3 Area IRM
Groundwater and Vapor Treatment System

Operations, Maintenance and Monitoring Manual
Inspection Log Sheet

Date: 12/7/93 Initials DMS

VAPOR EXTRACTION SYSTEM

1. Individual Air Flow Lines

Well ID	Adjustment Necessary	Air Flow (cfm)	Vacuum (in. Hg)
VW-1	No	1	4
VW-2		19.5	4
VW-3		8.5-10	4.5
VW-4		9	4.5
VW-5		Stuck	4
VW-6		Stuck	4.5
VW-7		Stuck	4.5
VW-8		5.5	4
VW-9	↓	11	4

2. Vacuum Pump Unit (On) Off
Temp (F) 145 Air Flow (cfm) 215 Pressure (psi) 3

3. Vacuum Pump Unit Filter
Before Filter 3 in. Hg After Filter 2.5 in. Hg

4. Verify Operation of Demister Pump ✓
Vacuum Near Entrance To Demister 2.5 in. Hg

5. Check Air Dilution Valve Open Closed

6. Inspect Carbon Adsorbers ✓
Line Entering Primary Carbon (A or B) 12 psi Line Entering Secondary Carbon (A or (B)) 4 psi

7. % LEL 14

GROUNDWATER EXTRACTION SYSTEM

1. Check Levels of Submersible Well Pumps

	Set	Act		Set	Act		Set	Act		Set	Act		Set	Act
RW-1	4.0	4.1	RW-2	5.7	5.6	RW-3	OFF		RW-4	6.1	5.9	RW-5	5.8	5.8

2. Verify Operation of Aeration Tank Blower (On) Off

3. Verify Operation of Chlorine Feed Pump On (Off)
Amount of Chlorine In Tank ____ gal. Make Chlorine Yes (No)

4. Verify Operation of Polymer Feed Pump (On) Off
Amount of Polymer In Tank 75 gal. Make Polymer (Yes) No
12/6

5. Verify Operation of Wastewater Feed Pump ✓

6. Check Bag Filter System
Filter Set In Use A or (B) Filter Type: Set A 5PS 9 train Set B 3M 325
Primary Filter Pressure 16 psi Secondary Filter Pressure 20 psi Differential Pressure 3 psi

7. Check Pressure in Carbon Canisters

	1st	2nd	3rd
Train 1	0	1.5	0
Train 2	0	1.6	0
Train 3	0.5	—	—

Columbia Mills
Test Pit 3 Area IRM
Groundwater and Vapor Treatment System

Operations, Maintenance and Monitoring Manual
Inspection Log Sheet

Date: 12/10/93 Initials DMS

VAPOR EXTRACTION SYSTEM

1. Individual Air Flow Lines

Well ID	Adjustment Necessary	Air Flow (cfm)	Vacuum (in. Hg)
VW-1		>0	~~3.5~~ 4
VW-2		24	~~3.5~~ 4
VW-3		9	~~4~~ 4
VW-4		7.5	~~4~~ 4
VW-5		stuck	~~4~~ 4
VW-6		stuck	~~4~~ 4
VW-7		stuck	~~4~~ 4
VW-8		stuck	~~3.5~~ 4
VW-9		stuck 11	~~3.5~~ 4

2. Vacuum Pump Unit (On) Off
Temp (F) 145 Air Flow (cfm) 215 Pressure (psi) 4

3. Vacuum Pump Unit Filter
Before Filter 2.5 in. Hg After Filter 2 in. Hg

4. Verify Operation of Demister Pump ✓
Vacuum Near Entrance To Demister 2.5 in. Hg

5. Check Air Dilution Valve Open (Closed)

6. Inspect Carbon Adsorbers ✓
Line Entering Primary Carbon (A or B) 12 psi Line Entering Secondary Carbon (A or B) 4 psi

7. % LEL 15

GROUNDWATER EXTRACTION SYSTEM

1. Check Levels of Submersible Well Pumps

	Set	Act		Set	Act		Set	Act		Set	Act		Set	Act
RW-1	4.0	4.0	RW-2	5.4	5.7	RW-3	OFF		RW-4	6.2	6.3	RW-5	5.8	5.8

2. Verify Operation of Aeration Tank Blower On Off

3. Verify Operation of Chlorine Feed Pump On Off
Amount of Chlorine In Tank ____ gal. Make Chlorine Yes (No)

4. Verify Operation of Polymer Feed Pump On Off
Amount of Polymer In Tank 30 gal. Make Polymer Yes (No)

5. Verify Operation of Wastewater Feed Pump ✓

6. Check Bag Filter System
Filter Set In Use A or B Filter Type: ~~Set A~~ Rim Skimmer ~~Set B~~ 3m 525
Primary Filter Pressure 20 psi Secondary Filter Pressure 18 psi Differential Pressure 2 psi

7. Check Pressure in Carbon Canisters

	1st	2nd	3rd
Train 1	2.5	3.5	0
Train 2	2.5	3.25	0
Train 3	2.5	—	—

Columbia Mills
Test Pit 3 Area IRM
Groundwater and Vapor Treatment System

Operations, Maintenance and Monitoring Manual
Inspection Log Sheet

Date: 12/17 Initials DMS

VAPOR EXTRACTION SYSTEM

1. Individual Air Flow Lines

Well ID	Adjustment Necessary	Air Flow (cfm)	Vacuum (in. Hg)
VW-1		0	6
VW-2			6
VW-3			5.5
VW-4			6
VW-5			6.5
VW-6			5.5
VW-7			6
VW-8			6
VW-9		✓	5.5

2. Vacuum Pump Unit (On) Off
Temp (F) 170 Air Flow (cfm) 200 Pressure (psi) 1

3. Vacuum Pump Unit Filter
Before Filter 5.5 in. Hg After Filter 4.5 in. Hg

4. Verify Operation of Demister Pump ✓
Vacuum Near Entrance To Demister 1 in. Hg

5. Check Air Dilution Valve Open (Closed)

6. Inspect Carbon Adsorbers ✓
Line Entering Primary Carbon (A or B) 2.5 psi Line Entering Secondary Carbon (A or (B)) 0.5 psi

7. % LEL 12

GROUNDWATER EXTRACTION SYSTEM

1. Check Levels of Submersible Well Pumps

	Set	Act		Set	Act		Set	Act		Set	Act		Set	Act
RW-1	4.0	4.2	RW-2	5.7	5.9	RW-3	OFF		RW-4	6.2	6.4	RW-5	5.8	5.8

2. Verify Operation of Aeration Tank Blower (On) Off

3. Verify Operation of Chlorine Feed Pump On (Off)
Amount of Chlorine In Tank ____ gal. Make Chlorine Yes No

4. Verify Operation of Polymer Feed Pump (On) Off
Amount of Polymer In Tank 2.5 gal. Make Polymer Yes No

5. Verify Operation of Wastewater Feed Pump ✓

6. Check Bag Filter System
Filter Set In Use A or B Filter Type: Set A 7 r.n Set B 3m
Primary Filter Pressure 16 psi Secondary Filter Pressure 8 psi Differential Pressure 0 psi

7. Check Pressure in Carbon Canisters

	1st	2nd	3rd
Train 1	70	1.5	0.5
Train 2	70	1.5	0.5
Train 3	70	—	—

Columbia Mills
Test Pit 3 Area IRM
Groundwater and Vapor Treatment System

Operations, Maintenance and Monitoring Manual
Inspection Log Sheet

Date: 12/30/93 Initials DWK

VAPOR EXTRACTION SYSTEM

1. Individual Air Flow Lines

Well ID	Adjustment Necessary	Air Flow (cfm)	Vacuum (in. Hg)
~~VW-1~~			
~~VW-2~~			
~~VW-3~~	All VWs Off		
~~VW-4~~			
~~VW-5~~			
~~VW-6~~			
~~VW-7~~			
~~VW-8~~			
~~VW-9~~			

2. Vacuum Pump Unit (On) Off
Temp (F) 135 Air Flow (cfm) 230 Pressure (psi) 2.5

3. Vacuum Pump Unit Filter
Before Filter 3.2 in. Hg After Filter 3.2 in. Hg

4. Verify Operation of Demister Pump ✓
Vacuum Near Entrance To Demister 3 in. Hg

5. Check Air Dilution Valve (Open) Closed

6. Inspect Carbon Adsorbers ✓
Line Entering Primary Carbon (A or B) 2 psi Line Entering Secondary Carbon (A or (B)) 0.5 psi

7. % LEL 13

GROUNDWATER EXTRACTION SYSTEM

1. Check Levels of Submersible Well Pumps

	Set	Act		Set	Act		Set	Act		Set	Act		Set	Act
RW-1	5.5	5.5	RW-2	6.5	6.6	RW-3	OFF		RW-4	7.0	7.1	RW-5	7.0	7.0

2. Verify Operation of Aeration Tank Blower (On) Off

3. Verify Operation of Chlorine Feed Pump On (Off)
Amount of Chlorine In Tank ____ gal. Make Chlorine Yes No

4. Verify Operation of Polymer Feed Pump (On) Off
Amount of Polymer In Tank 50 gal. Make Polymer Yes (No)

5. Verify Operation of Wastewater Feed Pump ✓

6. Check Bag Filter System
Filter Set In Use (A) or B Filter Type: Set A ____ Set B ____
Primary Filter Pressure 9 psi Secondary Filter Pressure 9 psi Differential Pressure 0 psi

7. Check Pressure in Carbon Canisters

	1st	2nd	3rd
Train 1	/	0.3	0.1
Train 2	/	0.5	0.5
Train 3	/	—	—

APPENDIX B

Flow Monitoring Logs

(1)

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

GROUND WATER EXTRACTION SYSTEM – FLOW MONITORING LOG

MONTH/YEAR: Feb '93

Before start-up ↓ | end of day - shut down ↓ | 1:45 PM ↓

System Location	Parameter	READING				
		~~Week 1~~ 2/11/93	~~Week 2~~ 2/11/93	~~Week 3~~ 2/12/93	~~Week 4~~ 2/24/93	~~Week 5~~ 3/[illegible]/93
RW1	Flowrate (gpm)	0	0	2.6	1.2	
	Total Gallons	64029	64378	64733	90848	
RW2	Flowrate (gpm)	0	0	1.6	~ 0.5	
	Total Gallons	303696	304001	304243	317888	
RW3	Flowrate (gpm)	0	0	2.6	2.4	
	Total Gallons	114383	114394	114559	135989	
RW4	Flowrate (gpm)	0	0	3.1	3.0	
	Total Gallons	134386	134804	135253	176063	
RW5	Flowrate (gpm)	0	0	2.6	0	
	Total Gallons	101215	101706	102065	115588	
Carbon – Train 1	Flowrate (gpm)	0	0	6.4	3.5	
	Total Gallons	8999820	8000235	8000616	*033133	
Carbon – Train 2	Flowrate (gpm)	0	0	5.6	0	
	Total Gallons	1351	1760	2129	28282	
Carbon – Train 3	Flowrate (gpm)	0	0	7	5	
	Total Gallons	9999615	45	486	34503	
System Effluent	Flowrate (gpm)	0	0			
	Total Gallons	0	–			

10:30 AM sampling water + air

train 2 temporarily shut off

P:\PROJ\MISC\FORMS\FLOWLOG.WK1

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

GROUND WATER EXTRACTION SYSTEM – FLOW MONITORING LOG

MONTH/YEAR: March '93

wes

System Location	Parameter	READING				
		Week 1 3/1/93	Week 2 3/4/93	Week 3 3/11/93	Week 4 3/16/93	Week 5 3/26/93
RW1	Flowrate (gpm)		0.8	0.9	1.0	0.1
	Total Gallons		105078	113491	119743	128053
RW2	Flowrate (gpm)		> 0	> 0	0.1	> 0
	Total Gallons		321184	321184	321184	321184
RW3	Flowrate (gpm)		2.1	2.4	2.4	0.1
	Total Gallons		160924	182413	199504	220312
RW4	Flowrate (gpm)		2.1	2.0	2.1	0.1
	Total Gallons		206452	229989	247772	272557
RW5	Flowrate (gpm)		1.1	1.0	1.0	0.5
	Total Gallons		130645	141625	148553	158941
Carbon – Train 1	Flowrate (gpm)			2.4	2.0	2.0
	Total Gallons		3)058254	78476	92122	117796
Carbon – Train 2	Flowrate (gpm)			2.2	2.6	5.2
	Total Gallons		48727	63425	71218	96887
Carbon – Train 3	Flowrate (gpm)			2.1	2.1	—
	Total Gallons		60324	3076328	3087274	0109593
System Effluent	Flowrate (gpm)					
	Total Gallons					

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

GROUND WATER EXTRACTION SYSTEM – FLOW MONITORING LOG

MONTH/YEAR: Apr. '93

System Location	Parameter	READING				
		Week 1 3/29/93	Week 2 4/2/93	Week 3 4/15/93	Week 4 4/7/93	Week 5 4/14/93
RW1	Flowrate (gpm)	0	1	1	—	3
	Total Gallons	131409	137150	141066		155180
RW2	Flowrate (gpm)	0	1.2	1	—	3.2
	Total Gallons	321184	325283	329934		342380
RW3	Flowrate (gpm)	0	0	0	—	OFF
	Total Gallons	220312	—	—		232222
RW4	Flowrate (gpm)	5.2	2	2	—	OFF
	Total Gallons	276716	293149	302203		318013
RW5	Flowrate (gpm)	1.5	1.2	1.1	—	6
	Total Gallons	163249	170474	174918		190194
Carbon – Train 1	Flowrate (gpm)	2.5	3	2.4	—	3.7
	Total Gallons	125358	133771	141476	143875	161663
Carbon – Train 2	Flowrate (gpm)	~~[illegible]~~32	1.5	1.5	—	3.2
	Total Gallons	115272	128166	131479	132481	147459
Carbon – Train 3	Flowrate (gpm)	3.0	3	3	—	4.3
	Total Gallons	109824	122033	129283	131371	149255
System Effluent	Flowrate (gpm)					
	Total Gallons				6993.4	

1 12W-1 AND 12W-4 ARE CLOSING

START UP

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

GROUND WATER EXTRACTION SYSTEM – FLOW MONITORING LOG

MONTH/YEAR: 5/93

System Location	Parameter	READING				
		Week 1 5/3/93	Week 2 5/9/93	Week 3 5/20/93	Week 4 5/27/93	Week 5 __/__/__
RW1	Flowrate (gpm)	1	1.8	1.2	1.0	
	Total Gallons	157252	173134	192673	202718	
RW2	Flowrate (gpm)	1	1.0	> 0	0.5 *	
	Total Gallons	344510	355383	364297	364919	
RW3	Flowrate (gpm)	1	2.9	2.4	2.2	
	Total Gallons	232344	255180	296345	320439	
RW4	Flowrate (gpm)	1	3.0	1.6	0	
	Total Gallons	320776	348296	392315	399248	
RW5	Flowrate (gpm)	1	0	0	OFF	
	Total Gallons	194097	194131	194131	194131	
Carbon – Train 1	Flowrate (gpm)	4	2.6	3.2	2.7	
	Total Gallons	164677	184762	219043	238406	
Carbon – Train 2	Flowrate (gpm)	3	3.6	2.6	2.9	
	Total Gallons	149241	166435	193639	205905	
Carbon – Train 3	Flowrate (gpm)	4.5	3.6	2.8	2.1	
	Total Gallons	152766	176397	204070	1213904	
System Effluent	Flowrate (gpm)	–	–	–		
	Total Gallons	–	–	–		

* Removed Plug on 5/26 - Plugged 1/4 clear - Cleaned and reinstalled

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

GROUND WATER EXTRACTION SYSTEM – FLOW MONITORING LOG

MONTH/YEAR: 6/93

System Location	Parameter	READING				
		Week 1 6/1/93	Week 2 6/11/93	Week 3 6/16/93	Week 4 # 6/28/93	Week 5 __/__/__
RW1	Flowrate (gpm)	1.0	0.5	>0	1	
	Total Gallons	208938	217094	219459	219586	
RW2	Flowrate (gpm)	0.5	0.2	>0	2	
	Total Gallons	368849	371300	372726	372802	
RW3	Flowrate (gpm)	3.0	1.8	1.8	3.5	
	Total Gallons	336682	361924	370281	397892	
RW4	Flowrate (gpm)	**	1.6	1.5	2.5	
	Total Gallons	398248	421032	435407	466199	
RW5	Flowrate (gpm)	Off	1.1	0.9	1.2	
	Total Gallons	194131	204507	211839	222371	
Carbon – Train 1	Flowrate (gpm)	2.4	2.0	2.2	3.4	
	Total Gallons	249815	273156	284355	304755	
Carbon – Train 2	Flowrate (gpm)	2.8	2.9	2.4	2.0	
	Total Gallons	216601	242250	255160	271862	
Carbon – Train 3	Flowrate (gpm)	1.8	1.6	3.0	4.0	
	Total Gallons	1226341	1244099	1/2 253780	1/2 281680	
System Effluent	Flowrate (gpm)	—	—			
	Total Gallons	—	—			

** - RW4 at set point + pumping, but nothing registering on flowmeter. pump was pulled and cleaned on 6/1/93

6/28/93 – System shut down on 6/27 for Vapor Phase Carbon Changeout Restarted on 6/28

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

GROUND WATER EXTRACTION SYSTEM – FLOW MONITORING LOG

MONTH/YEAR: July 1993

System Location	Parameter	READING				
		Week 1 7/2/93	Week 2 7/12/93	Week 3 7/19/93	Week 4 7/29/93	Week 5 __/__/__
RW1	Flowrate (gpm)	0.4	0.2	0.5	1.0	
	Total Gallons	223715	229600	231342	239843	
RW2	Flowrate (gpm)	0.6	0.1	0.0	0 off	
	Total Gallons	375631	379550	379776	380150	
RW3	Flowrate (gpm)	2.4	1.8	1.4	1.6	
	Total Gallons	403766	422817	437838	456679	
RW4	Flowrate (gpm)	2.2	1.8	1.4	1.5	
	Total Gallons	474308	497611	515950	537641	
RW5	Flowrate (gpm)	0.3	233674	0.5	0.4	
	Total Gallons	225816	0.4	234737	240924	
Carbon – Train 1	Flowrate (gpm)	2.1	1.7	1.2	2.4	
	Total Gallons	319837	330732	343466	358730	
Carbon – Train 2	Flowrate (gpm)	1.6	2.4	1.8	2.670	
	Total Gallons	275629	288267	295911	302825	
Carbon – Train 3	Flowrate (gpm)	3.0	3.4	2.0	3.3	
	Total Gallons	288775	310274	2320462	2346911	
System Effluent	Flowrate (gpm)	—	—			
	Total Gallons	—	—			

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

GROUND WATER EXTRACTION SYSTEM – FLOW MONITORING LOG

MONTH/YEAR: Aug 1993

System Location	Parameter	READING				
		Week 1 8/3/93	Week 2 8/13/93	Week 3 8/19/93	Week 4 8/24/93	Week 5 __/__/__
RW1	Flowrate (gpm)	>0	>0	>0	>0	
	Total Gallons	241462	241462	241462	241462	
RW2	Flowrate (gpm)	>0	>0	>0	>0	
	Total Gallons	381535	381535	381535	381535	
RW3	Flowrate (gpm)	1.6	1.2	1.4	1.3	
	Total Gallons	466871	485043	496073	505195	
RW4	Flowrate (gpm)	1.8	1.0	1.4	1.3	
	Total Gallons	549066	569992	582822	593687	
RW5	Flowrate (gpm)	0.2	>0	>0	>0	
	Total Gallons	244579	248783	248783	248783	
Carbon – Train 1	Flowrate (gpm)	1.4	1.0	2.4	1.2	
	Total Gallons	369711	381689	387997	394563	
Carbon – Train 2	Flowrate (gpm)	2.4	1.5	1.6	1.8	
	Total Gallons	305012	321236	329270	332016	
Carbon – Train 3	Flowrate (gpm)	1.8	2.0	1.4	1.4	
	Total Gallons	235-8631	2376253	2387021	2396431	
System Effluent	Flowrate (gpm)	–		–	–	
	Total Gallons	–		–	–	

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

GROUND WATER EXTRACTION SYSTEM – FLOW MONITORING LOG

MONTH/YEAR: 9/93

System Location	Parameter	READING				
		Week 1 9/2/93	Week 2 9/8/93	Week 3 9/14/93	Week 4 9/24/93	Week 5 9/30/93
RW1	Flowrate (gpm)	0.4	0.8	0.8	0.8	~~0.8~~ 0.6
	Total Gallons	242411	244761	250326	258272	263124
RW2	Flowrate (gpm)	70	0.3	70	70	0.2
	Total Gallons	382249	383422	385343	385996	388585
RW3	Flowrate (gpm)	1.5	1.6	70	70	1.6
	Total Gallons	519769	526100	526208	526208	533471
RW4	Flowrate (gpm)	0.9	1.2	1.4	1.3	1.3
	Total Gallons	611145	617264	630923	650152	661350
RW5	Flowrate (gpm)	0.4	1.0	0.3	0.2	0.1
	Total Gallons	249675	252410	257976	260788	263659
Carbon – Train 1	Flowrate (gpm)	2.6	2.4	1.4	1.6	1.8
	Total Gallons	409297	414375	422942	434984	441868
Carbon – Train 2	Flowrate (gpm)	2.2	3.0	1.7	1.0	2.0
	Total Gallons	342089	346917	358177	372066	381059
Carbon – Train 3	Flowrate (gpm)	2.6	2.8	1.7	1.6	2.4
	Total Gallons	9/5 403011	4/3 407198	3419629	3433582	3443690
System Effluent	Flowrate (gpm)	—	—	—	—	—
	Total Gallons	—	—		—	

P:\PROJ\MISC\FORMS\FLOWLOG.WK1

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

GROUND WATER EXTRACTION SYSTEM – FLOW MONITORING LOG

MONTH/YEAR: Oct 1993

System Location	Parameter	READING				
		Week 1 10/7/93	Week 2 10/14/93	Week 3 10/29/93	Week 4 __/__/__	Week 5 __/__/__
RW1	Flowrate (gpm)	1.0	>0	1.4		
	Total Gallons	269792	273040	273126		
RW2	Flowrate (gpm)	>0	>0	1.6		
	Total Gallons	389488	389488	397171		
RW3	Flowrate (gpm)	1.5	OFF	OFF		
	Total Gallons	546964	560082	560082		
RW4	Flowrate (gpm)	1.3	1.2	2.2		
	Total Gallons	676397	691616	739258		
RW5	Flowrate (gpm)	0.1	>0	0.3		
	Total Gallons	263659	263659	274582		
Carbon – Train 1	Flowrate (gpm)	1.9	2.1	1.6		
	Total Gallons	453934	465507	488885		
Carbon – Train 2	Flowrate (gpm)	3	3	2.0		
	Total Gallons	393116	409238	435365		
Carbon – Train 3	Flowrate (gpm)	1.8	1.4	1.9		
	Total Gallons	3455857	3464646	3485334		
System Effluent	Flowrate (gpm)	—	—	—		
	Total Gallons	—	—	—		

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

GROUND WATER EXTRACTION SYSTEM – FLOW MONITORING LOG

MONTH/YEAR: Nov 93

System Location	Parameter	READING				
		Week 1 11/4/93	Week 2 11/10/93	Week 3 11/17/93	Week 4 11/24/93	Week 5 __/__/__
RW1	Flowrate (gpm)	1.1	1.0	1.0	1.0	
	Total Gallons	281485	291327	298869	308407	
RW2	Flowrate (gpm)	1.0	1.0	2.0	20	
	Total Gallons	403459	411513	415403	423281	
RW3	Flowrate (gpm)	OFF	OFF	OFF	OFF	
	Total Gallons	560082	560082	560082	560082	
RW4	Flowrate (gpm)	1.8	2.3	2.5	2.2	
	Total Gallons	753648	772941	796818	817947	
RW5	Flowrate (gpm)	0.5	0.7	1.6	0.5	
	Total Gallons	276503	282953	287876	296564	
Carbon – Train 1	Flowrate (gpm)	2.0	1.4	2.0	2.0	
	Total Gallons	498658	507798	518654	531185	
Carbon – Train 2	Flowrate (gpm)	3.0	1.3	3.8	2.4	
	Total Gallons	444515	458013	463859	474842	
Carbon – Train 3	Flowrate (gpm)	1.6	1.2	1.6	2.0	
	Total Gallons	3494379	0503601	0506282	518365	
System Effluent	Flowrate (gpm)	—	—	—	—	
	Total Gallons	—	—	—	—	

COLUMBIA MILLS
TEST PIT 3 AREA IRM
VAPOR EXTRACTION/GROUND WATER EXTRACTION SYSTEM

OPERATIONS, MAINTENANCE AND MONITORING MANUAL

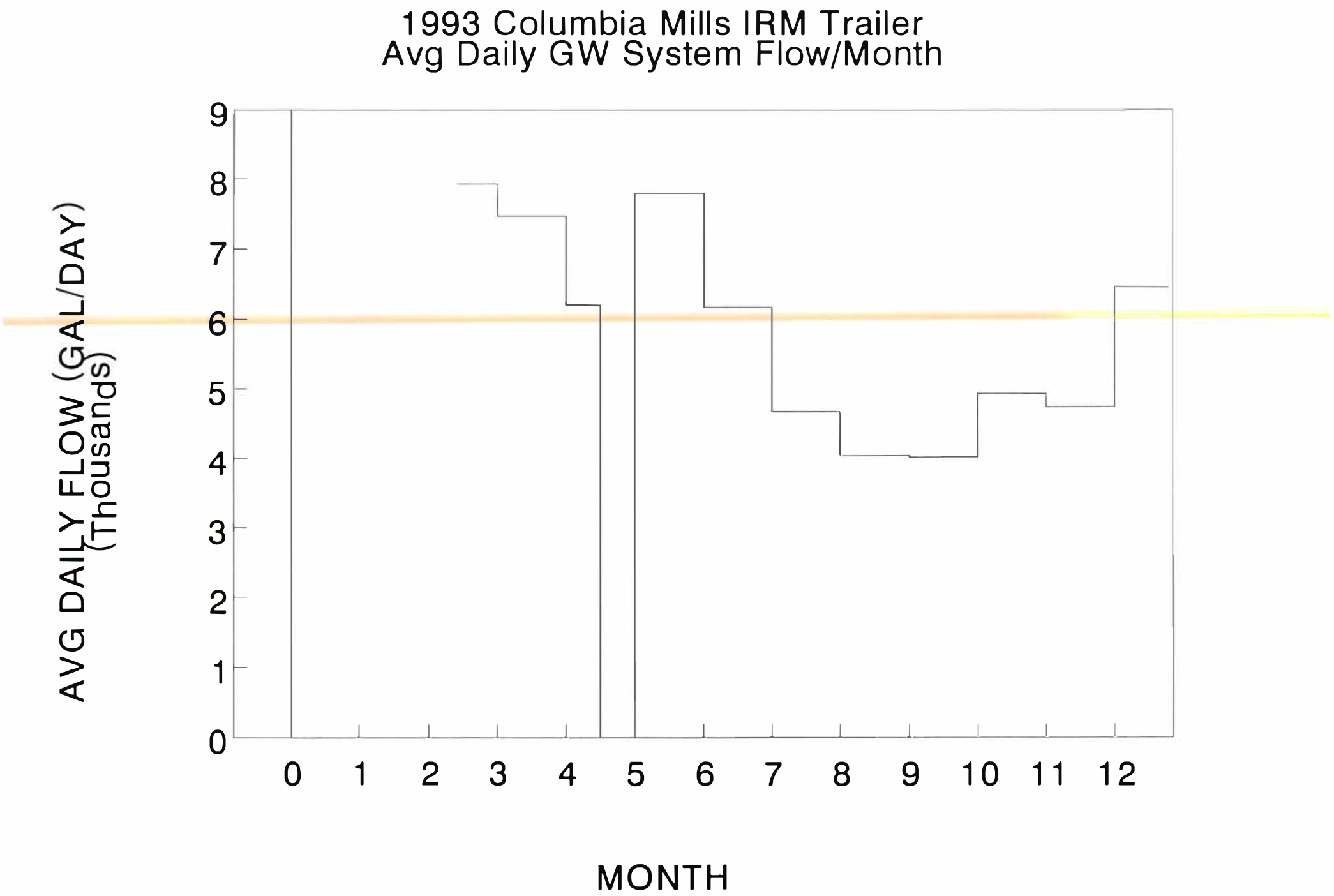
GROUND WATER EXTRACTION SYSTEM – FLOW MONITORING LOG

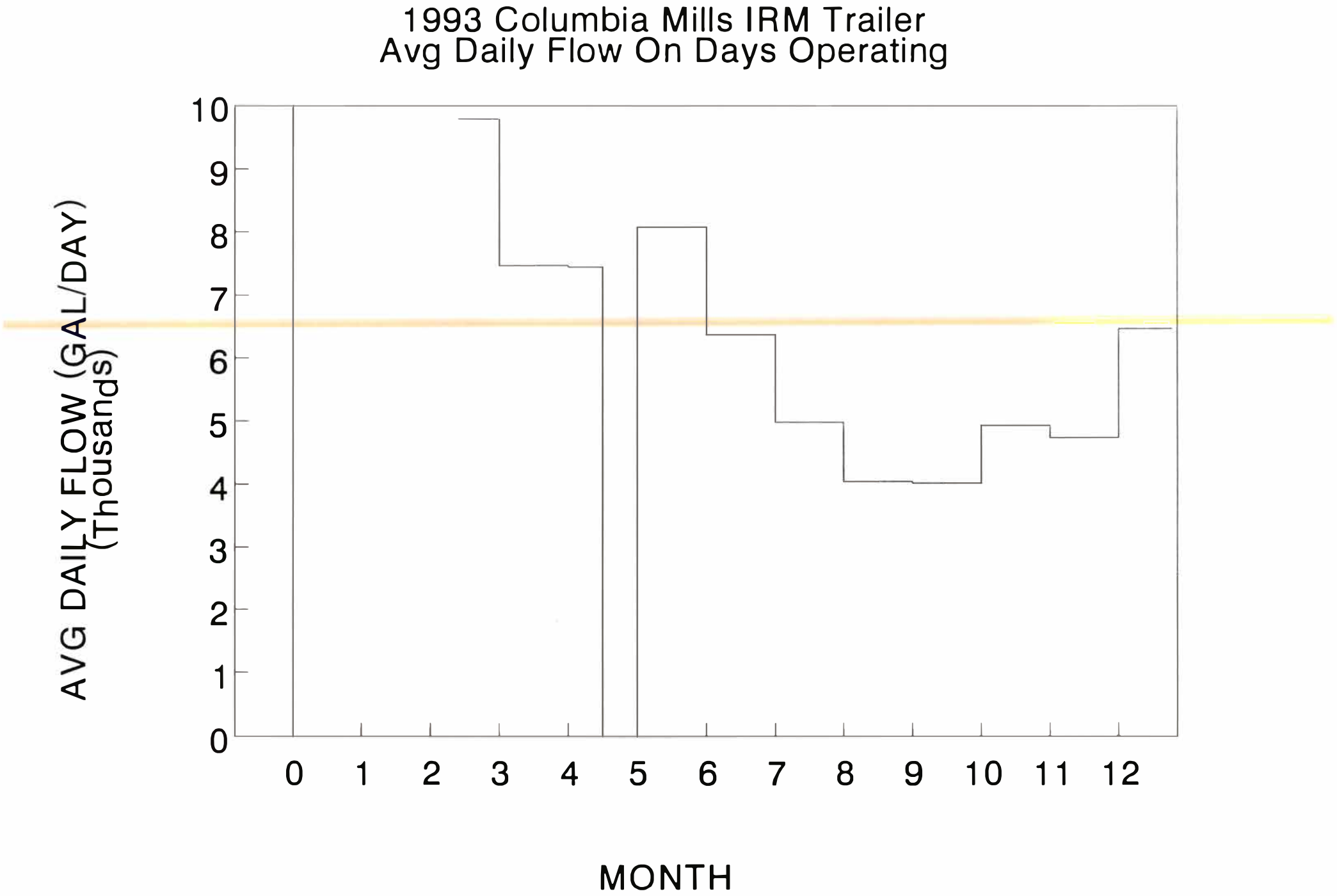
MONTH/YEAR: 12/93

System Location	Parameter	9:00 READING	11:00 READING			
		Week 1 12/3/93	Week 1 12/3/93	Week 2 12/10/93	Week 3 __/__/__	Week 4 12/30/93
RW1	Flowrate (gpm)	1.4	1.5	1.0	70	1.0
	Total Gallons	315410	315553	350268	332244	346148
RW2	Flowrate (gpm)	1.4	1.4	1.6	1.4	1.4
	Total Gallons	431718	431872	448456	465760	483853
RW3	Flowrate (gpm)	OFF	OFF	OFF	OFF	OFF
	Total Gallons	OFF 560082	560082	560082	560082	560145
RW4	Flowrate (gpm)	1.8	2.0	2.0	2.4	1.0
	Total Gallons	845900	846138	870123	895636	933913
RW5	Flowrate (gpm)	1.2	1.3	1.0	0.8	0.5
	Total Gallons	311278	311420	323645	333123	346356
Carbon – Train 1	Flowrate (gpm)	2.6	2.0	2.0	3.0	2.4
	Total Gallons	548263	548427	566444	583153	609280
Carbon – Train 2	Flowrate (gpm)	0.2	2.5	2.5	2.9	3.4
	Total Gallons	491120	491290	505216	519119	544060
Carbon – Train 3	Flowrate (gpm)	3.4	2.0	3.0	2.4	2.0
	Total Gallons	0535874	0536021	0554431	8/9 572443	8/9 596303
System Effluent	Flowrate (gpm)	—	—	—		9
	Total Gallons	—	—	—		

APPENDIX C

Groundwater System Flow Plots


1993 Columbia Mills IRM Trailer
Avg Daily GW System Flow/Month
AVG DAILY FLOW (GAL/DAY)
(Thousands)
9
8
7
6
5
4
3
2
1
0
0 1 2 3 4 5 6 7 8 9 10 11 12
MONTH


1993 Columbia Mills IRM Trailer
Avg Daily Flow On Days Operating
AVG DAILY FLOW (GAL/DAY)
(Thousands)
10
9
8
7
6
5
4
3
2
1
0
0 1 2 3 4 5 6 7 8 9 10 11 12
MONTH

COLUMBIA MILLS – TEST PIT 3 AREA IRM
1993 GROUND WATER TREATMENT SYSTEM FLOW DATA

Month	Actual Period of Time	Total Gallons Treated	Total Number of Days/Period	Average Flow (gal/day)	Approx. No. of Days System Operating	Avg. Flow on Days Operating (gal/day)
February	Feb 11 – Mar 4	166,519	21	7929	17	9795
March	Mar 4 – Apr 2	216,665	29	7471	29	7471
April (first half)	Apr 2 – Apr 14	74,407	12	6201	10	7441
April (second half)	Apr 15 – May 3	0	19	0	0	0
May	May 3 – Jun 1	226,073	29	7796	28	8074
June	Jun 1 – Jul 2	191,084	31	6164	30	6369
July	Jul 2 – Aug 3	149,513	32	4672	30	4984
August	Aug 3 – Sep 2	121,043	30	4035	30	4035
September	Sep 2 – Sep 30	112,220	28	4008	28	4008
October	Sep 30 – Oct 29	142,967	29	4930	29	4930
November	Oct 29 – Dec 3	165,673	35	4734	35	4734
December	Dec 3 – Dec 30	174,386	27	6459	27	6459

gwirmd

APPENDIX D

Filter Log Sheets

TEST PIT 3 AREA IRM
GROUND WATER TREATMENT SYSTEM
FILTER LOG 1993

Filter Set (A or B)	Date ~~Flow~~ Switched ~~Through~~ Filter	Initial System Effluent Totalizer Reading (gallons)	Final System Effluent Totalizer Reading (gallons)	Total Gallons Filtered	NOTES
A	3/10-11				All 4 filters in set new
A : B	3/16	STARTED THROUGH "A" SIDE @ 11 AM			CHANGED 527's on BOTH ONLY
A	3/17	CALLED @ 6 PM SWITCHED TO "B"			
A	3/18	SWITCHED FLOW TO "A" @ 9 AM			PUT 529 IN PRIMARY 525 SEC.
A	3/23	SWITCHED FLOW TO "B" @ 9 AM			PRI - 20 PSI, 527 PRIM. SEC - 14 PSI, 525 SEC GAC - 8 PSI
B	3/26	SWITCHED FLOW TO "B" @ 10 AM			529/525
A	3/26	Switched flow thru 3/28 @ 2:00 PM			new 527+525 "GW" IN
B	3/29	switched flow thru 3/30 at 5:45 AM			527/525 new
A	3/29	switched and flow thru system A continued @ 11 AM			527/525 new
A	3/30	switched flow thru 3/31 @ 9 AM			new 527 old 525
B	3/31				new 525 new 529 } GWTM
B	4/2				529/525
B	4/14				~~525~~/525
A	4/14				/525
A : B	5/3	STARTED THROUGH "B" SIDE @ 9:00 AM			529 PRIM. 525 SEC
B	WKND/DAY 5/26	SWITCHED TO "B" SIDE @ 11 AM			STARTED B SIDE CHECKED

flow switched to A because water settling tank was most colored - some flow in tubes going into carbon

P:\PROJ\MISC\FORMS\FILTERLG.WK1

TEST PIT 3 AREA IRM
GROUND WATER TREATMENT SYSTEM

FILTER LOG

	Filter Set (A or B)	Date Flow Switched Through Filter	Initial System Effluent Totalizer Reading (gallons)	Final System Effluent Totalizer Reading (gallons)	Total Gallons Filtered
replaced 5/12 NOON	A	5/9/93 12:25Am			
replaced 5/9, NOON	B	5/11/93 3:00 Pm			
replaced 5/12	A	5/22/93 3:30 pm			
replaced 5/31	B	6/2/93 6:30 Am			
replaced 6/12	A	6/4/93 11:00 Pm			
replaced 6/5	B				
~~replaced~~	A	7/1/93			
replaced 7/2	B	7/[illegible] after 5pm			
replaced 7/7	A	7/7/93 after 5pm			
replaced 7/8	B	7/10/93 2:30a			
RA 7/11/93	A	7/15/93 13:30			
RB 7/20/93	B	7/19/93 8:00a			
RA 7/21/93	A	7/21/93 8:05a			
RB 7/22/93 strain rite	B	7/22/93 3:15p			
RA 7/23/93 just installed pall	A	7/22/93 6:00P			
RB 7/23/93 just installed pall	B	7/23/93 4:30a			

P:\PROJMISC\FORMS\FILTERLG.WK1

TEST PIT 3 AREA IRM
GROUND WATER TREATMENT SYSTEM

FILTER LOG

Filter Set (A or B)	Date Flow Switched Through Filter	Initial System Effluent Totalizer Reading (gallons)	Final System Effluent Totalizer Reading (gallons)	Total Gallons Filtered
A				
B	7/23/93 6:00 pm			
A	8/[illegible]9/93 3:00p			
B	8/11/93 9:00a			
A	8/23/93 4:05p			
B	8/26/93 8:00p			
A	9/2/93 11:30 am			
B	9/5/93 11:00 pm			
A	9/8/93 10:30 am			
B	9/10/93 2:00am			
A	9/21/93 13:30			
B	9/27/93 10:00am			
A	10/20/93 7:30 pm			
B	11/15/93 12:30pm			
A	11/17/93 7:30am			
B	11/19/93 6:30 pm			
A	11/22/93 5:30 am			

primary - Palls

replaced primary filters 7/24 3m

replaced B 8/10/93 3m

replaced A 8/11/93 3m

replaced B 8/24/93 3m prim Accu sec.

rep. A 8/27/93 3m both

rep B 9/7/93 3m Both 327 prim

rep A 9/7/93 3m Both 327 prim

rep B 9/8/93 3m both

rep A 9/13/93 3m prim only

rep B 9/21/93 3m both

rep A 9/27/93 strain 3[illegible] 5pm prim 3m second

strain SP23 3m second

rep A Accu-sit prim 11/17/93 3m sec

rep B Acc prim 11/17/93 3m sec.

replaced 11/20 both 3m

ΔP increased to 9 since 5 was too low

ΔP = 12

P:\PROJ\MISC\FORMS\FILTERLG.WK1

Columbia MIlls
Test Pit 3 Area IRM
Groundwater Treatment System

FILTER LOG

Current Filter Set (A or B)	Date/Time Flow Switched Through Filter	Date/Time Filter Replaced	Initial Effluent Reading	Final Effluent Reading	Total Gallons Filtered	Initials
B	11/29/93 1:00 Am	11/22 1300 [illegible] 3m 525				
A	12/15/93 11:00	11/29 both 3m				LMS
B	12/20/93	12/15 523 Both 3m 529				LMS
A	12/21/93 3:00 pm	12/21 523 [illegible] 529				W.C.J [illegible]
B	manually 12/22 10:00 am	12/22 . 3m only 3pm 525				DMS
A	[illegible]					
B		[illegible]				
A	12/29 3:00 PM	525/529				DWK
B		12/30/93 529/525				DWK

APPENDIX E

Groundwater Elevations

Monitoring Location	RW-1	RW-2	RW-3	RW-4	RW-5	VW-1	VW-2
Meas. Pt. Elev. (FAMSL)	312.93	311.06	310.19	309.45	313.09	313.58	313.38
BOW (FBMP)	28.91	33.16	32.66	26.95	27.73	12.35	15.22
BOW Elevation (FAMSL)	284.02	277.90	277.53	282.50	285.36	301.23	298.16
02/11/93	304.38	303.51	303.39	304.04	304.65	304.46	304.94
02/24/93	290.23	283.96	283.49	288.25	*298.52	dry	299.93
03/01/93	290.26	283.99	283.42	288.28	291.42	dry	dry
03/03/93	289.06	283.99	283.52	288.28	291.36	dry	dry
03/04/93	289.26	284.29	283.42	288.38	291.30	dry	dry
03/08/93	289.16	283.89	283.47	288.30	291.17	dry	dry
03/10/93	289.01	283.79	283.37	288.08	291.29	dry	dry
05/12/93	291.69	284.22	283.53	288.15	*300.18	dry	300.82
05/20/93	289.83	283.58	283.29	287.75	*299.47	dry	dry
05/28/93	292.73	–	288.99	–	*299.04	dry	dry
06/02/93	289.85	284.37	283.64	288.25	*299.28	dry	dry
06/08/93	289.98	284.06	283.49	288.35	291.39	dry	dry
06/16/93	289.96	283.90	283.35	288.11	291.27	+303.07	+300.36
07/09/93	290.26	284.54	#283.39	287.97	291.30	+302.48	+dry
07/14/93	289.66	285.50	283.61	288.15	291.51	dry	dry
07/20/93	289.77	284.02	283.57	288.01	291.25	dry	dry
07/28/93	289.25	*295.85	283.69	288.25	#294.44	dry	dry
08/03/93	289.55	284.12	284.09	287.61	291.17	dry	dry
08/10/93	290.65	284.54	284.26	288.30	291.19	dry	dry
08/18/93	290.00	283.91	284.32	288.28	291.21	dry	dry
08/24/93	290.29	284.39	284.75	288.22	291.28	dry	dry
09/02/93	290.04	284.24	285.69	288.15	291.41	dry	dry
09/08/93	289.88	284.51	286.28	287.92	291.26	dry	dry
09/14/93	289.73	284.56	286.09	288.05	291.14	dry	dry
09/24/93	290.23	284.71	287.14	288.22	291.43	dry	dry
09/30/93	290.48	285.26	287.69	287.85	291.32	dry	300.19
10/07/93	290.13	284.74	289.19	287.45	291.11	dry	dry
10/14/93	290.28	285.06	*294.27	288.40	291.24	dry	dry
10/29/93	290.23	284.96	*297.09	287.80	291.54	dry	299.80
11/04/93	290.63	285.40	*297.54	288.15	291.33	dry	dry
11/10/93	290.43	285.24	*297.80	287.95	291.35	dry	300.39
11/17/93	290.87	#289.14	*299.03	287.97	291.13	dry	300.80
11/24/93	290.37	285.24	*297.57	287.55	291.33	dry	299.94
12/01/93	291.13	293.74	*298.77	288.05	291.29	dry	302.40
12/10/93	290.09	285.68	*299.45	288.27	291.19	+303.35	+302.58
12/30/93	291.59	286.58	*–	289.07	292.39	dry	300.42

Monitoring Location	VW-3	VW-4	VW-5	VW-6	VW-7	VW-8	VW-9
Meas. Pt. Elev. (FAMSL)	312.41	311.61	310.34	312.53	316.52	314.11	316.05
BOW (FBMP)	16.76	16.37	15.92	18.56	19.40	16.97	18.75
BOW Elevation (FAMSL)	295.65	295.24	294.42	293.97	297.12	297.14	297.30
02/11/93	303.31	302.88	303.25	304.25	304.80	305.09	304.28
02/24/93	dry	dry	294.56	296.23	297.87	299.98	298.22
03/01/93	dry	dry	294.59	295.84	297.42	298.76	297.75
03/03/93	dry	dry	294.61	295.79	297.42	298.60	297.66
03/04/93	dry	dry	294.61	295.81	297.41	298.49	297.62
03/08/93	dry	dry	294.61	295.78	297.40	298.19	297.53
03/10/93	dry	dry	294.62	295.77	297.38	298.12	297.51
05/12/93	dry	dry	295.26	296.83	299.56	300.99	298.35
05/20/93	dry	dry	295.22	296.45	298.75	300.45	297.98
05/28/93	dry	dry	294.99	295.78	298.27	300.03	297.71
06/02/93	dry	dry	294.96	295.95	298.49	300.20	297.68
06/08/93	dry	dry	294.89	295.28	297.44	298.66	dry
06/16/93	+299.59	+299.25	294.86	295.51	dry	298.13	+300.25
07/09/93	+299.41	+dry	+299.04	+297.14	+297.71	+298.47	+300.76
07/14/93	dry	dry	294.60	295.27	297.39	298.17	dry
07/20/93	dry	dry	dry	295.25	dry	dry	dry
07/28/93	dry	dry	dry	294.95	dry	dry	dry
08/03/93	dry	dry	dry	294.99	dry	dry	dry
08/10/93	dry	dry	dry	294.94	dry	dry	dry
08/18/93	dry	dry	dry	294.88	dry	dry	dry
08/24/93	dry	dry	dry	294.86	dry	dry	dry
09/02/93	dry	dry	dry	294.62	dry	dry	dry
09/08/93	dry	dry	294.85	294.82	297.43	dry	dry
09/14/93	dry	dry	dry	294.96	297.40	dry	dry
09/24/93	dry	dry	dry	294.66	dry	dry	dry
09/30/93	dry	dry	dry	294.87	dry	dry	dry
10/07/93	dry	dry	dry	294.89	dry	298.33	dry
10/14/93	dry	dry	dry	294.79	dry	298.51	dry
10/29/93	dry	dry	297.21	295.95	dry	298.96	dry
11/04/93	dry	dry	297.44	296.53	dry	301.17	dry
11/10/93	dry	dry	297.70	296.87	297.59	300.77	dry
11/17/93	dry	298.89	299.39	298.31	299.48	301.13	299.63
11/24/93	dry	dry	297.49	296.99	297.38	300.31	dry
12/01/93	dry	298.32	298.98	299.01	299.38	301.17	299.35
12/10/93	+300.14	+301.79	+299.53	+300.71	+299.38	+301.75	+304.46
12/30/93	dry	298.97	299.26	298.97	299.38	301.11	dry

Monitoring Location	W-1	B-3S	B-3D	B-12S	B-13S	B-13D	B-14S
Meas. Pt. Elev. (FAMSL)	313.18	309.65	310.74	310.58	313.30	313.42	310.10
BOW (FBMP)	29.98	14.56	28.08	12.54	15.09	31.77	11.61
BOW Elevation (FAMSL)	283.20	295.09	282.66	298.04	298.21	281.65	298.49
02/11/93	304.40	303.53	303.56	303.90	304.80	304.74	304.23
02/24/93	296.08	–	–	–	–	–	–
03/01/93	295.21	dry	293.04	298.43	299.29	299.82	dry
03/03/93	295.30	–	–	–	–	–	–
03/04/93	295.30	–	293.02	dry	299.25	299.85	dry
03/08/93	295.27	–	–	–	–	–	–
03/10/93	295.39	–	293.11	298.23	299.25	300.19	–
05/12/93	297.76	294.89	293.84	300.63	301.07	301.67	299.14
05/20/93	–	–	–	–	–	–	–
05/28/93	–	–	–	–	–	–	–
06/02/93	297.25	–	–	–	–	–	–
06/08/93	296.23	dry	293.29	dry	299.67	300.29	dry
06/16/93	296.11	–	–	–	–	–	–
07/09/93	295.84	dry	293.54	dry	299.26	299.57	dry
07/14/93	295.62	–	–	–	–	–	–
07/20/93	295.44	–	–	–	–	–	–
07/28/93	295.63	–	–	–	–	–	–
08/03/93	295.30	–	–	–	–	–	–
08/10/93	295.28	dry	293.18	dry	299.35	299.01	dry
08/18/93	295.13	–	–	–	–	–	–
08/24/93	295.09	–	–	–	–	–	–
09/02/93	295.33	–	–	–	–	–	–
09/08/93	296.41	–	–	–	–	–	–
09/14/93	295.86	–	–	–	–	–	–
09/24/93	295.43	dry	293.22	dry	299.16	299.05	dry
09/30/93	296.40	–	–	–	–	–	–
10/07/93	296.50	–	–	–	–	–	–
10/14/93	296.16	–	–	–	–	–	–
10/29/93	297.04	–	–	–	–	–	–
11/04/93	297.66	296.92	296.96	300.08	299.92	300.89	dry
11/10/93	297.95	–	–	–	–	–	–
11/17/93	299.63	–	–	–	–	–	–
11/24/93	297.88	–	–	–	–	–	–
12/01/93	–	–	–	–	–	–	–
12/10/93	299.64	–	–	–	–	–	–
12/30/93	299.44	–	–	–	–	–	–

Monitoring Location	B-16S	B-17S	B-27D	BP-1	BP-2	BP-3	BP-4
Meas. Pt. Elev. (FAMSL)	310.86	310.54	313.00	311.17	313.02	312.03	312.79
BOW (FBMP)	12.60	13.05	41.78	14.05	14.82	15.05	14.49
BOW Elevation (FAMSL)	298.26	297.49	271.22	297.12	298.20	296.98	298.30
02/11/93	302.01	302.45	304.62	303.54	304.84	304.68	304.58
02/24/93	–	–	–	–	–	–	–
03/01/93	300.17	300.37	299.19	dry	dry	298.21	dry
03/03/93	–	–	–	–	–	–	–
03/04/93	300.06	300.03	299.29	–	–	297.98	–
03/08/93	–	–	–	–	–	297.72	–
03/10/93	300.02	300.38	299.76	–	–	297.77	–
05/12/93	301.64	300.91	301.20	dry	299.87	300.47	dry
05/20/93	–	–	–	–	–	–	–
05/28/93	–	–	–	–	–	–	–
06/02/93	–	–	–	–	–	–	–
06/08/93	299.61	299.36	300.06	dry	299.05	300.17	dry
06/16/93	–	–	–	–	–	–	–
07/09/93	dry	298.39	299.53	dry	dry	298.11	dry
07/14/93	–	–	–	–	–	–	–
07/20/93	–	–	–	–	–	–	–
07/28/93	–	–	–	–	–	–	–
08/03/93	–	–	–	–	–	–	–
08/10/93	dry	dry	299.05	dry	dry	dry	dry
08/18/93	–	–	–	–	–	–	–
08/24/93	–	–	–	–	–	–	–
09/02/93	–	–	–	–	–	–	–
09/08/93	–	–	–	–	–	–	–
09/14/93	–	–	–	–	–	–	–
09/24/93	dry	dry	299.23	dry	299.45	dry	dry
09/30/93	–	–	–	–	–	–	–
10/07/93	–	–	–	–	–	–	–
10/14/93	–	–	–	–	–	–	–
10/29/93	–	–	–	–	–	–	–
11/04/93	dry	301.20	301.42	dry	299.86	299.88	dry
11/10/93	–	–	–	–	–	–	–
11/17/93	–	–	–	–	–	–	–
11/24/93	–	–	–	–	–	–	–
12/01/93	–	–	–	–	–	–	–
12/10/93	–	–	–	–	–	–	–
12/30/93	–	–	–	–	–	–	–

Monitoring Location	BP-5	BP-6	BP-8	BP-9	BP-10	BP-11	BP-12
Meas. Pt. Elev. (FAMSL)	313.20	313.63	311.80	313.03	313.02	313.11	311.37
BOW (FBMP)	13.99	14.87	14.31	12.56	17.72	16.95	17.75
BOW Elevation (FAMSL)	299.21	298.76	297.49	300.47	295.30	296.16	293.62
02/11/93	305.03	304.85	305.74	305.00	304.54	304.87	303.09
02/24/93	–	–	–	–	–	–	–
03/01/93	299.51	dry	301.74	dry	295.58	300.00	297.85
03/03/93	–	–	–	–	–	–	–
03/04/93	dry	–	301.35	–	295.48	299.76	297.75
03/08/93	–	–	–	–	295.39	–	297.67
03/10/93	299.47	–	302.84	–	295.36	299.58	297.77
05/12/93	301.50	300.30	305.51	301.61	298.03	301.81	298.82
05/20/93	–	–	–	–	–	–	–
05/28/93	–	–	–	–	–	–	–
06/02/93	–	–	–	–	–	–	–
06/08/93	299.54	299.70	–	dry	296.20	300.30	297.82
06/16/93	–	–	–	–	–	–	–
07/09/93	dry	dry	299.84	dry	296.22	299.32	297.41
07/14/93	–	–	–	–	–	–	–
07/20/93	–	–	–	–	–	–	–
07/28/93	–	–	–	–	–	–	–
08/03/93	–	–	–	–	–	–	–
08/10/93	dry	299.26	299.07	dry	295.32	297.84	296.74
08/18/93	–	–	–	–	–	–	–
08/24/93	–	–	–	–	–	–	–
09/02/93	–	–	–	–	–	–	–
09/08/93	–	–	–	–	–	–	–
09/14/93	–	–	–	–	–	–	–
09/24/93	dry	–	299.34	dry	295.65	297.68	296.57
09/30/93	–	–	–	–	–	–	–
10/07/93	–	–	–	–	–	–	–
10/14/93	–	–	–	–	–	–	–
10/29/93	–	–	–	–	–	–	–
11/04/93	dry	299.65	305.53	dry	297.66	299.66	298.60
11/10/93	–	–	–	–	–	–	–
11/17/93	–	–	–	–	–	–	–
11/24/93	–	–	–	–	–	–	–
12/01/93	–	–	–	–	–	–	–
12/10/93	–	–	–	–	–	–	–
12/30/93	–	–	–	–	–	–	–

Monitoring Location	BP-13	BP-14	BP-15	VP-6S	VP-6D	VP-7	VP-8
Meas. Pt. Elev. (FAMSL)	310.16	309.02	313.07	310.24	310.51	309.35	309.41
BOW (FBMP)	17.90	18.48	17.87	8.99	15.26	15.02	14.84
BOW Elevation (FAMSL)	292.26	290.54	295.20	301.25	295.25	294.33	294.57
02/11/93	301.18	304.10	304.80	303.77	303.37	303.98	304.04
02/24/93	–	–	–	–	–	–	–
03/01/93	297.71	294.44	295.87	dry	295.95	dry	dry
03/03/93	–	294.38	–	–	–	–	–
03/04/93	297.62	294.27	295.65	–	dry	–	dry
03/08/93	297.62	294.27	295.48	–	–	–	–
03/10/93	297.85	294.41	295.47	–	dry	–	–
05/12/93	298.41	296.95	299.70	dry	296.47	296.61	296.92
05/20/93	–	–	–	–	–	–	–
05/28/93	–	–	–	–	–	–	–
06/02/93	–	–	–	–	–	–	–
06/08/93	297.45	294.74	296.29	dry	dry	dry	dry
06/16/93	–	–	–	–	–	–	–
07/09/93	296.92	294.71	296.53	dry	284.54	dry	287.97
07/14/93	–	–	–	–	–	–	–
07/20/93	–	–	–	–	–	–	–
07/28/93	–	–	–	–	–	–	–
08/03/93	–	–	–	–	–	–	–
08/10/93	295.39	294.08	dry	dry	dry	dry	dry
08/18/93	–	–	–	–	–	–	–
08/24/93	–	–	–	–	–	–	–
09/02/93	–	–	–	–	–	–	–
09/08/93	–	–	–	–	–	–	–
09/14/93	–	–	–	–	–	–	–
09/24/93	295.08	294.30	295.54	dry	dry	dry	dry
09/30/93	–	–	–	–	–	–	–
10/07/93	–	–	–	–	–	–	–
10/14/93	–	–	–	–	–	–	–
10/29/93	–	–	–	–	–	–	–
11/04/93	298.21	297.23	297.16	dry	297.34	297.17	296.74
11/10/93	–	–	–	–	–	–	–
11/17/93	–	–	–	–	–	–	–
11/24/93	–	–	–	–	–	–	–
12/01/93	–	–	–	–	–	–	–
12/10/93	–	–	–	–	–	–	–
12/30/93	–	–	–	–	–	–	–

Monitoring Location	VP-9	VP-10S	VP-10D	VP-11S	VP-11D	VP-12
Meas. Pt. Elev. (FAMSL)	313.47	313.70	313.64	312.11	311.99	312.78
BOW (FBMP)	15.27	9.40	15.34	9.13	15.01	14.58
BOW Elevation (FAMSL)	298.20	304.30	298.30	302.98	296.98	298.20
02/11/93	304.89	304.65	304.40	304.70	304.90	304.64
02/24/93	–	–	–	–	–	–
03/01/93	dry	dry	dry	302.79	298.02	298.18
03/03/93	–	–	–	–	–	–
03/04/93	–	–	–	dry	297.70	dry
03/08/93	–	–	–	–	dry	–
03/10/93	–	–	–	–	dry	298.13
05/12/93	dry	dry	dry	302.90	299.63	300.50
05/20/93	–	–	–	–	–	–
05/28/93	–	–	–	–	–	–
06/02/93	–	–	–	–	–	–
06/08/93	dry	dry	dry	dry	298.14	298.23
06/16/93	–	–	–	–	–	–
07/09/93	dry	dry	dry	dry	dry	dry
07/14/93	–	–	–	–	–	–
07/20/93	–	–	–	–	–	–
07/28/93	–	–	–	–	–	–
08/03/93	–	–	–	–	–	–
08/10/93	dry	dry	dry	dry	dry	dry
08/18/93	–	–	–	–	–	–
08/24/93	–	–	–	–	–	–
09/02/93	–	–	–	–	–	–
09/08/93	–	–	–	–	–	–
09/14/93	–	–	–	–	–	–
09/24/93	dry	dry	dry	dry	dry	dry
09/30/93	–	–	–	–	–	–
10/07/93	–	–	–	–	–	–
10/14/93	–	–	–	–	–	–
10/29/93	–	–	–	–	–	–
11/04/93	dry	dry	dry	dry	dry	dry
11/10/93	–	–	–	–	–	–
11/17/93	–	–	–	–	–	–
11/24/93	–	–	–	–	–	–
12/01/93	–	–	–	–	–	–
12/10/93	–	–	–	–	–	–
12/30/93	–	–	–	–	–	–

Notes:

•Recovery Well off for this reading
#Recovery Well fluctuating for this reading
+ Vacuum Well on for this reading
FAMSL Feet above mean sea level.
BOW Bottom of well.
FBMP Feet below measuring point.
dry Ground water table below bottom of well screen.
– No measurement was taken.

APPENDIX H

Vapor Carbon Loading/ Percent Removal Calculations

CALCULATIONS
VAPOR CARBON LOADING & WEIGHT PERCENT REMOVAL

1. Calculations based on difference in apparent density of carbon

June 28, 1993 Changeout – 1182 lbs hydrocarbons/both adsorbers (Report Table 7)
primary adsorber – 591 lbs/2000 lbs carbon = 29.6% removal
secondary adsorber – 591 lbs/2000 lbs carbon = 29.6% removal

January 12, 1994 Changeout – (Contaminant loading from Report Table 7)
primary adsorber – 374 lbs/1628 lbs carbon = 23.0% removal
secondary adsorber – 114 lbs/1628 lbs carbon = 7.0% removal

2. Calculations based on carbon influent & effluent concentrations

A) June 28, 1993 Changeout:

Op. Dates	No. of Days	Total Hydrocarbons (ppm)			ppm Adsorbed		Flowrate	lbs Hydrocarbons Removed	
		Prim. In.	Prim. Eff.	Sec. Eff.	Primary	Secondary	(ft3/min)	Primary	Secondary
2/11-3/10	27	27	14	(14)	13	0	240	31.0	0
3/10-3/11	1	(911)	(266)	(266)	645	0	235	55.7	0
3/11-6/8	71	(46)	23	(23)	23	0	240	144.1	0
6/8-6/21	8	149	31	(2)	118	29	220	76.4	18.8
	5	(5000)	3475	1921	1525	1554	220	616.8	628.5
6/21-6/28	7	(27)	(20)	(14)	7	6	230	4.1	3.6
							TOTAL LBS	928.1	650.9

Note: (911) – indicates concentration is estimated

lbs hydrocarbons removed = (ppm Ads.)X(100/24.45)X(lb/453593 mg)X(m3/35.3145 ft3)X(flowrate)X(1440 min/day)X(No.Days)
– this assumes a molecular weight of 100

% Weight Removal:
primary adsorber – 928.1 lbs/2000 lbs carbon = 46.4% removal
secondary adsorber – 650.9 lbs/2000 lbs carbon = 32.5% removal

CALCULATIONS
VAPOR CARBON LOADING & WEIGHT PERCENT REMOVAL

B) January 12, 1994 Changeout:

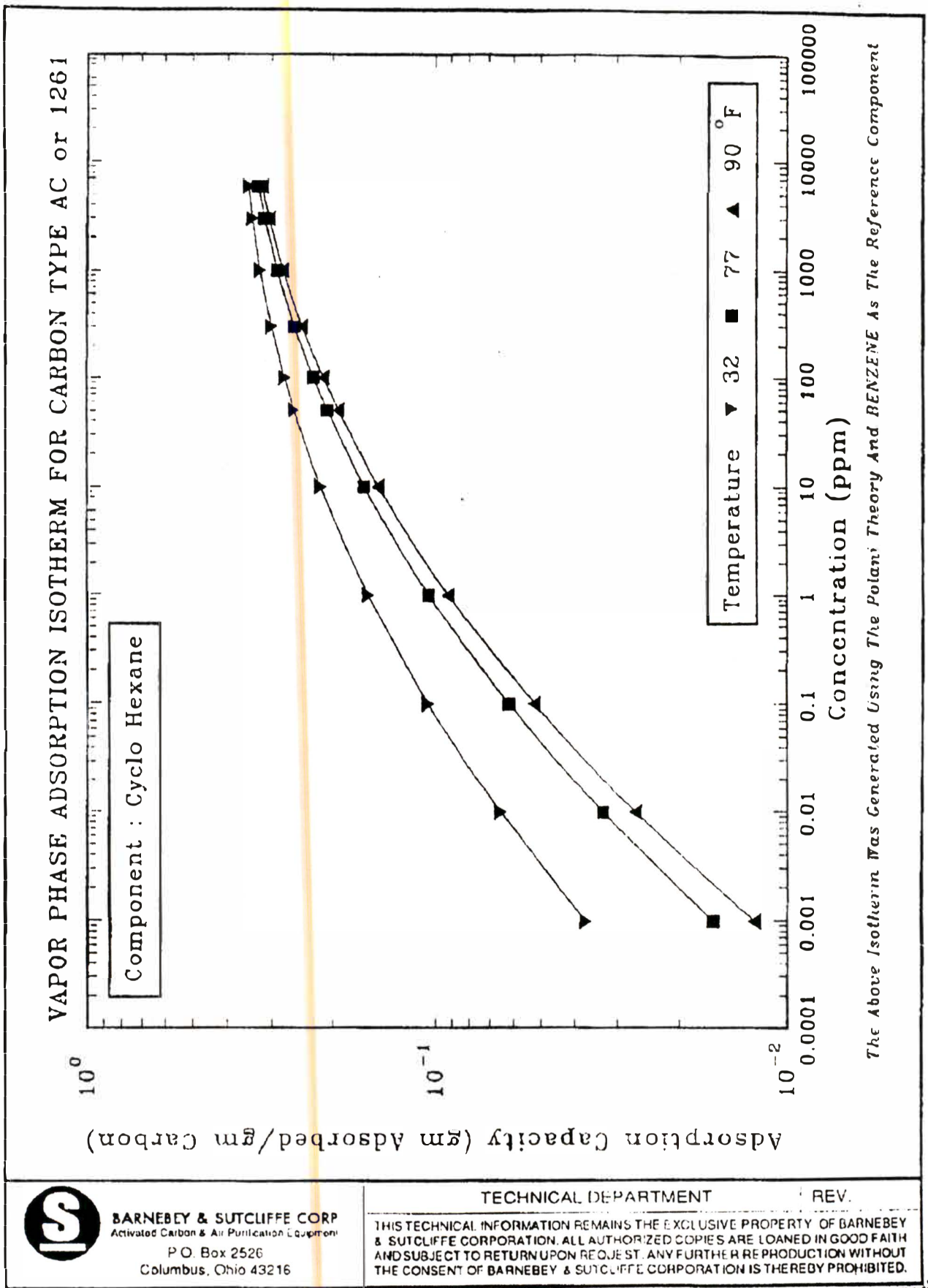
Op. Dates	No. of Days	Total Hydrocarbons (ppm)			ppm Adsorbed		Flowrate	lbs Hydrocarbons Removed	
		Prim. In.	Prim. Eff.	Sec. Eff.	Primary	Secondary	(ft3/min)	Primary	Secondary
6/29–7/5	6	4620	90	(84)	4530	6	210	2098.6	2.8
7/5–7/8	3	(28)	(25)	(20)	3	5	(230)	0.8	1.3
7/8–7/12	4	6890	1065	(105)	5825	960	220	1884.7	310.6
7/12–9/30	80	(28)	(25)	(20)	3	5	240	21.2	35.3
9/30–10/1	1	1018	46	17	972	29	228	81.5	2.4
10/1–12/2	62	28	25	20	3	5	235	16.1	26.8
12/2–12/9	7	312	57	38	255	19	215	141.1	10.5
12/10–12/14	4	(28)	(25)	(20)	3	5	(230)	1.0	1.7
12/14–12/17	3	165	60	27	105	33	200	23.2	7.3
12/17–12/20	3	(28)	(25)	(20)	3	5	(230)	0.8	1.3
12/20–12/23	3	257	62	28	195	34	(230)	49.5	8.6
12/23–1/12/94	20	(28)	(25)	(20)	3	5	230	5.1	8.5
							TOTAL LBS	4323.6	417.1

Note: (28) – indicates concentration is estimated

lbs hydrocarbons removed = (ppm Ads.)X(100/24.45)X(lb/453593 mg)X(m3/35.3145 ft3)X(flowrate)X(1440 min/day)X(No.Days)
– this assumes a molecular weight of 100

% Weight Removal:
primary adsorber – 4323.6 lbs/1628 lbs carbon = 265.6% removal
secondary adsorber – 417.1 lbs/1628 lbs carbon = 25.6% removal

p:\proj\1069079\carbwt%



BARNEBEY & SUTCLIFFE CORP
Activated Carbon & Air Purification Equipment
P.O. Box 2526
Columbus, Ohio 43216

TECHNICAL DEPARTMENT REV.

B&S 038

MAGNETIC MAY 1991

N

(FORMERLY BUILDING NO. 68)

BUILDING NO. 10A

BUILDING NO. 11

FOUNDATION RUINS
(FORMERLY BUILDING NO. 7)

B-17S <297.49

298

296

294

292

290

288

296.74

BP-12

BP-1

RW2

<297.12

284.64 (VW3)

<295.65

<295.09

B-3S

B-3D

<295.24 (VW4)

CONCRETE PAD ELEV 308.3'

284.26

CONCRETE PAD ELEV 309.7'

<301.25 (VP6S)

<295.25 (VP6D)

APPROXIMATE EXTENT OF VOC CONTAMINATION

297.84 (VW2)

BP-11 <298.16

BP-2 <298.20

TEST PIT 3

VP1 VP2 VP3 VP4 VP5

RW1

290.65

<296.98

BP-3

<301.23

B-27D

B-13S

299.07 BP-8

299.35

299.01 B-13D

<297.30 (VW9)

W-1

295.28

BP-10

295.32

BP-A <298.30

(VP10D) <298.30

(VP10S) <304.30

(VP11D)

(VP11S) <296.98

<302.98

CISTERN

SHALLOW TRENCHES

<299.21 BP-5

299.26 BP-6

<297.12 (VW7)

<297.14 (VW8)

BP-9 <300.47

RW3

291.19

(VP9) <298.20

(VP12) <298.20

BP-15 <295.20

CONCRETE PAD ELEV 311.2'

(FORMERLY BUILDING NO. 69)

<294.33 (VP7)

BP-14 294.08

<298.49

B-14S 294.94 (VW6)

RW4

<294.57 (VP8)

288.30 GROUND ELEV = 300'

TREATMENT TRAILER

B-12S <298.04

EXISTING FENCE

LEGEND

- EXISTING SEWER LINES (APPROXIMATE LOCATIONS)
- GROUND WATER RECOVERY SYSTEM PIPING
- VAPOR EXTRACTION SYSTEM PIPING
- APPROXIMATE EXTENTS OF VOC CONTAMINATION
- CHAIN LINK FENCE
- B-1S — GROUND WATER MONITORING WELL
- BP-1 — GROUND WATER PIEZOMETER
- BP-10 — NEW GROUND WATER PIEZOMETER – INSTALLED AUGUST 1991
- VP1 — VACUUM PIEZOMETER
- (VP6) — NEW VACUUM PIEZOMETER – INSTALLED JANUARY 1992
- RW1 — GROUND WATER RECOVERY WELL
- W-1 — GROUND WATER PIEZOMETER/POSSIBLE TO CONVERT TO RECOVERY WELL
- VW1 — VAPOR EXTRACTION WELL
- (VW2) — NEW VAPOR EXTRACTION WELL – INSTALLED JANUARY 1992
- WATER TABLE CONTOUR

10 0 10
SCALE IN FEET

MALCOLM PIRNIE

DES DWK
DRN RDM
CHD

THE COLUMBIA MILLS, INC.
MINETTO, NEW YORK

TEST PIT #3 AREA IRM VAPOR EXTRACTION SYSTEM

WATER TABLE CONFIGURATION
08/10/93

MALCOLM PIRNIE, INC.
DATE FEBRUARY 1994

FIGURE 5

MAGNETIC MAY 1991

N

(FORMERLY BUILDING NO. 68)

BUILDING NO. 10A

FOUNDATION RUINS (FORMERLY BUILDING NO. 7)

BUILDING NO. 11

CISTERN

SHALLOW TRENCHES

CONCRETE PAD ELEV 309.7'

CONCRETE PAD ELEV 308.3'

CONCRETE PAD ELEV 311.2'

(FORMERLY BUILDING NO. 69)

TREATMENT TRAILER

GROUND ELEV = 308'

APPROXIMATE EXTENT OF VOC CONTAMINATION

EXISTING FENCE

TEST PIT 3

B-17S 300.03

BP-12 297.75

BP-13 B-16S 300.06

<297.12

284.29 (MW3)

<295.65

<295.09

<295.24 (MW4)

283.42

B-35

B-30

<301.25 (VP6S)

<295.25 (VP6D)

299.76 BP-1X

(MW2) <298.16

BP-2 <298.20

289.26

296

294

292

290

288

286

(MW5) 294.61

297.62 (MW9)

<294.33 (VP7)

VP1 VP2 VP3 VP4 VP5

RW1 RW2

MW1 <301.23

B-27D

B-13S

299.25

297.98 BP-3

297.70 (VP11D)

(VP11S)

295.30 BP-10

295.48

BP-11 <298.30

(VP10D) <298.30

<298.49

B-14S 295.81

(VW6)

288.38

<302.98

(VP10S) <304.30

BP-14 294.27

301.35 BP-8

B-13D

<299.21 BP-5

298.76 BP-6

297.41 (MW7)

<294.57 (VP8)

298.49 (MW8)

RW3 RW4

(VP9) <298.20

291.30

BP-9 <300.47

(VP12) <298.20

BP-15 295.65

<298.0 B-12S

4S

LEGEND

- EXISTING SEWER LINES (APPROXIMATE LOCATIONS)
- GROUND WATER RECOVERY SYSTEM PIPING
- VAPOR EXTRACTION SYSTEM PIPING
- APPROXIMATE EXTENTS OF VOC CONTAMINATION
- CHAIN LINK FENCE
- B-1S GROUND WATER MONITORING WELL
- BP-1 GROUND WATER PIEZOMETER
- BP-10 NEW GROUND WATER PIEZOMETER – INSTALLED AUGUST 1991
- VP1 VACUUM PIEZOMETER
- (VP6) NEW VACUUM PIEZOMETER – INSTALLED JANUARY 1992
- RW1 GROUND WATER RECOVERY WELL
- W-1 GROUND WATER PIEZOMETER/POSSIBLE TO CONVERT TO RECOVERY WELL
- VW1 VAPOR EXTRACTION WELL
- (VW2) NEW VAPOR EXTRACTION WELL – INSTALLED JANUARY 1992
- 298 WATER TABLE CONTOUR

10 0 10

SCALE IN FEET

MALCOLM PIRNIE

DWN

RDM

CHD

THE COLUMBIA MILLS, INC.
MINETTO, NEW YORK

TEST PIT #3 AREA IRM VAPOR EXTRACTION SYSTEM

WATER TABLE CONFIGURATION

03/04/93

MALCOLM PIRNIE, INC.

DATE FEBRUARY 1994

FIGURE 4

GROUND WATER TREATMENT SYSTEM

VAPOR EXTRACTION SYSTEM

DISCHARGE TO ATMOSPHERE

BAG FILTERS

200# GAC CANISTER (TYP x9)

POLYMER

BAG FILTERS

A

B

C

2,000# GAC ADSORBER

2,000# GAC ADSORBER

SILENCER

L.E.L. MONITOR

AERATION

POLYMER ADDITION/ FLASH MIX

FLOCCULATION TANK

SUMP TANK

BLOWER

WASTEWATER FEED PUMP

FILTER

DEMISTER

DEMISTER PUMP

ACTIVATED CARBON ADSORPTION TREATMENT SYSTEM

METALS REMOVAL SYSTEM

VOLATILE ORGANIC REMOVAL SYSTEM

CONCENTRATED DEMISTER EFFLUENT HOLDING TANK

TO SEWER SYSTEM 4

LEGEND

- LIQUID PROCESS FLOW
- VAPOR PROCESS FLOW
- FLOW CONTROL VALVE (BALL VALVE OR DIAPHRAGM VALVE)
- CHECK VALVE
- FLOW CONTROL VALVE (BUTTERFLY VALVE)
- ELECTRICALLY ACTUATED FLOW CONTROL VALVE
- ELECTRICALLY ACTUATED 3-WAY FLOW CONTROL VALVE
- SAMPLE PORT
- AIR DILUTION VALVE

RW 1 RW 2 RW 3 RW 4 RW 5 W-1 INSTALLED AS A PIEZOMETER, CONVERTABLE TO RECOVERY WELL IF NEEDED

GROUND WATER RECOVERY WELLS

VW 1 VW 2 VW 3 VW 4 VW 5 VW 6 VW 7 VW 8 VW 9

VAPOR EXTRACTION WELLS

MALCOLM PIRNIE

REVISIONS

DES DWR

DWN RDM

CKD

THE COLUMBIA MILLS, INC.
MINETTO, NEW YORK

TEST PIT #3 IRM VAPOR EXTRACTION SYSTEM

TREATMENT SYSTEM SCHEMATIC

MALCOLM PIRNIE, INC.

DATE FEBRUARY 1994

FIGURE 1

MAGNETIC
MAY 1991

N

(FORMERLY BUILDING NO. 68)

BUILDING
NO. 10A

FOUNDATION RUINS
(FORMERLY BUILDING NO. 7)

BUILDING
NO. 11

(FORMERLY BUILDING NO. 69)

CONCRETE PAD
ELEV 309.7'

CONCRETE PAD
ELEV 308.3'

CONCRETE PAD
ELEV 311.2'

CISTERN

SHALLOW
TRENCHES

TEST PIT 3

TREATMENT
TRAILER

GROUND ELEV ~ 308'

APPROXIMATE
EXTENT
OF VOC
CONTAMINATION

EXISTING FENCE

B-17S 302.45
BP-12
BP-1
RW2
303.09
303.51
303.31
303.54
(VW3)
BP-13
B-16S
301.18
302.01
B-14S
(VW6)
304.25
304.04
RW4
(VP8)
304.04
302.88
(VW4)
B-3S
303.53
B-3D
303.39
RW3
303.77
(VP6S)
(VP6D)
(VW5)
303.25
303.5
304.87
BP-11
304.94
(VW2)
BP-2
304.84
VP5
304.28
(VW9)
(VP7)
303.98
BP-14
304.10
VP4
VP2
VP3
VP1
RW1
304.38
B-27D
B-13S
304.80
BP-3
304.68
304.90
(VP11D)
(VP11S)
304.70
304.40
BP-10
304.54
BP-4
304.58
(VP10D)
(VP10S)
304.65
304.23
304.46
BP-8
305.74
B-13D
304.85
BP-6
304.80
(VW7)
304.5
BP-5
305.03
305.09
(VW8)
RW5
304.65
(VP9)
304.89
BP-9
305.00
(VP12)
304.64
BP-15
304.80
303.90
B-12S
304
305
305.5
298

LEGEND

- EXISTING SEWER LINES (APPROXIMATE LOCATIONS)
- GROUND WATER RECOVERY SYSTEM PIPING
- VAPOR EXTRACTION SYSTEM PIPING
- APPROXIMATE EXTENTS OF VOC CONTAMINATION
- CHAIN LINK FENCE
- B-1S — GROUND WATER MONITORING WELL
- BP-1 — GROUND WATER PIEZOMETER
- BP-10 — NEW GROUND WATER PIEZOMETER – INSTALLED AUGUST 1991
- VP1 — VACUUM PIEZOMETER
- (VP6) — NEW VACUUM PIEZOMETER – INSTALLED JANUARY 1992
- RW1 — GROUND WATER RECOVERY WELL
- W-1 — GROUND WATER PIEZOMETER/POSSIBLE TO CONVERT TO RECOVERY WELL
- VW1 — VAPOR EXTRACTION WELL
- (VW2) — NEW VAPOR EXTRACTION WELL – INSTALLED JANUARY 1992
- 298 — WATER TABLE CONTOUR

10 0 10
SCALE IN FEET

MALCOLM PIRNIE

DES DWK
DRN RDM
CHD

THE COLUMBIA MILLS, INC.
MINETTO, NEW YORK

TEST PIT #3 AREA IRM
VAPOR EXTRACTION SYSTEM

WATER TABLE CONFIGURATION
02/11/93

MALCOLM PIRNIE, INC.
DATE FEBRUARY 1994

FIGURE 3

MAGNETIC
MAY 1991

N

FOUNDATION RUINS
(FORMERLY BUILDING NO. 7)

(FORMERLY BUILDING NO. 68)

BUILDING
NO. 10A

BUILDING
NO. 11

TEST PIT 3

CONCRETE
PAD
ELEV
306.7'

CONCRETE
PAD
ELEV
306.3'

CONCRETE PAD
ELEV 311.2'

(FORMERLY BUILDING NO. 69)

APPROXIMATE
EXTENT
OF VOC
CONTAMINATION

SHALLOW
TRENCHES

EXISTING FENCE

EXISTING FENCE

EXISTING DIRT ROAD

SCHUYLER ST.

EVENTUAL
DISCHARGE
TO
OSWEGO
RIVER

CONCRETE DIKE

OSWEGO RIVER

NIAGARA
MOHAWK
POWER
CORPORATION

CONCRETE SEAWALL

EXISTING
C.B.

NYS ROUTE 48

6" GROUND WATER
DISCHARGE CONNECTION
TO STORM SEWER

6" PVC DISCHARGE

GROUND ELEV = 299'

GROUND TREATMENT
STORAGE
TRAILER

6" VENT-TREATED
VAPOR DISCHARGE
TO ATMOSPHERE

EXISTING
C.B.'S

EXISTING
STORM
SEWER
SYSTEM
(SYSTEM 4)

EXISTING
STORM MH

LEGEND

- EXISTING SEWER LINES (APPROXIMATE LOCATIONS)
- GROUND WATER RECOVERY SYSTEM PIPING
- VAPOR EXTRACTION SYSTEM PIPING
- APPROXIMATE EXTENTS OF VOC CONTAMINATION
- CHAIN LINK FENCE
- GROUND WATER MONITORING WELL
- GROUND WATER PIEZOMETER
- NEW GROUND WATER PIEZOMETER - INSTALLED AUGUST 1991
- VACUUM PIEZOMETER
- NEW VACUUM PIEZOMETER - INSTALLED JANUARY 1992
- GROUND WATER RECOVERY WELL
- GROUND WATER PIEZOMETER/POSSIBLE TO CONVERT TO RECOVERY WELL
- VAPOR EXTRACTION WELL
- NEW VAPOR EXTRACTION WELL - INSTALLED JANUARY 1992

APPROXIMATE AREA OF SIGNIFICANT DEBRIS PILES

- MOSTLY LOW PILED DUCT
- MOSTLY HIGH PILED DUCT
- MOSTLY ROOFING MATERIAL
- MOSTLY WOOD
- MOSTLY FILL DIRT AND CONCRETE

20 0 20
SCALE IN FEET

MALCOLM PIRNIE

DWN
RDM

THE COLUMBIA MILLS, INC.
MINETTO, NEW YORK

TEST PIT #3 AREA IRM
VAPOR EXTRACTION SYSTEM

TEST PIT 3 AREA DETAILS

MALCOLM PIRNIE, INC.
DATE FEBRUARY 1994

FIGURE 2

GROUND WATER TREATMENT SYSTEM

VAPOR EXTRACTION SYSTEM

DISCHARGE TO ATMOSPHERE

BAG FILTERS

200# GAC CANISTER (TYP x9)

2,000#GAC ADSORBER

SILENCER

L.E.L. MONITOR

POLYMER

BAG FILTERS

2,000#GAC ADSORBER

FILTER

DEMISTER

AERATION

POLYMER ADDITION / FLASH MIX

FLOCCULATION TANK

SUMP TANK

SLOPPER

WASTEWATER FEED PUMP

ACTIVATED CARBON ADSORPTION TREATMENT SYSTEM

DEMISTER PUMP

METALS REMOVAL SYSTEM

VOLATILE ORGANIC REMOVAL SYSTEM

CONCENTRATED DEMISTER EFFLUENT HOLDING TANK

TO SEWER SYSTEM

LEGEND

- LIQUID PROCESS FLOW
- VAPOR PROCESS FLOW
- FLOW CONTROL VALVE (BALL VALVE OR DIAPHRAGM VALVE)
- CHECK VALVE
- FLOW CONTROL VALVE (BUTTERFLY VALVE)
- ELECTRICALLY ACTUATED FLOW CONTROL VALVE
- ELECTRICALLY ACTUATED 3-WAY FLOW CONTROL VALVE
- SAMPLE PORT
- AIR DILUTION VALVE
- SAMPLE PORT ROUTINELY SAMPLED/ SAMPLE PORT I.D.

RW 1 RW 2 RW 3 RW 4 RW 5 W-1

W-1 INSTALLED AS A PIEZOMETER, CONVERTABLE TO RECOVERY WELL IF NEEDED

GROUND WATER RECOVERY WELLS

VW 1 VW 2 VW 3 VW 4 VW 5 VW 6 VW 7 VW 8 VW 9

VAPOR EXTRACTION WELLS

MALCOLM PIRNIE

REVISIONS

DWN FROM CHKD

THE COLUMBIA MILLS, INC.
MINETTO, NEW YORK

TEST PIT #3 IRM VAPOR EXTRACTION SYSTEM

SAMPLE PORT LOCATIONS

MALCOLM PIRNIE, INC.
DATE MARCH 1994

FIGURE 8