DUCHARME WHEELER, INC.
ENGINEERING ENVIRONMENTAL SURVEYING WETLANDS

CONSULTING ENGINEERS & LAND SURVEYORS
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PRO 04-012

February 11, 2004

Mr. Stanley McNiff
LeMack Realty Trust
280 Great Road
Shirley, MA 01464

RE: Recommended Closure Strategy
Former Esquire Cleaners Property
211 West Main Street
Ayer, Massachusetts

Dear Mr. McNiff:

This letter presents a recommended scope of services prepared by Ducharme & Wheeler, Inc. (Ducharme & Wheeler) to achieve regulatory closure at the Former Esquire Cleaners, 211 West Main Street, Ayer, Massachusetts. The proposal addresses the performance of the necessary remediation of soil and groundwater required to achieve a Response Action Outcome (RAO) statement including the preparation of all necessary reports and supporting documentation required for compliance with the Massachusetts Contingency Plan (MCP-310 CMR 40.0000).

The recommended scope of services presents a regulatory strategy aimed at minimizing the amount of paperwork required and provides a technical solution that addresses soil and groundwater contamination at the site. The technical approach recommends the implementation of an in-situ air sparging system for the removal of dissolved chlorinated volatile organic compounds (VOC) from site soil and groundwater associated with the former dry cleaning operation at the site. The regulatory strategy and technical approach are discussed below.

Background

On June 7, 1993, the Emergency Response Branch assigned case number C93-0281 to the disposal of tetrachloroethylene (PCE) on the ground behind the dry cleaners. According to the information at the MA DEP, the case was closed on August 23, 1993. No other information regarding this release was available at the Massachusetts Department of Environmental Protection (MA DEP).

On May 3, 2002, the MA DEP received a downgradient property status submittal (DPS) from Shell Oil Products Company (Shell). The DPS stated that PCE and trichloroethylene (TCE) detected in groundwater at the former Shell gasoline station located at 215 West Main Street originated from the former Esquire Cleaners at 211 West Main Street (the site). As a result of the DPS, the MA DEP sent a Notice of Responsibility (NOR), dated November 12, 2002, to LeMack Realty Trust assigning release tracking number (RTN) 2-14537 to the release. According to the NOR, November 8, 2002 is considered the date of release notification.

On October 13, 2003, a groundwater sample was collected from site monitoring well MW-7 and analyzed for VOC by EPA Method 8260. Naphthalene in the groundwater sample exceeded the applicable Method 1 Reportable Concentration for groundwater category RCGW-1. A Release Notification and Notification Retraction Form (BWSC-103) was submitted to the MA DEP. An RTN has not been assigned to this 120-day reporting condition. On November 3, 2003, upon receipt of the analytical results for MW-7, Ducharme & Wheeler notified LeMack Realty Trust of the presence of naphthalene.

The Licensed Site Professional associated with this project is Richard J. Cushing of Ducharme & Wheeler, License Number 3063.

Regulatory Strategy

The site is located within a Zone II of a public Water supply system, indicating that the most stringent clean up standards apply to groundwater conditions. The results of assessment activities conducted to date indicate that the chlorinated VOC have migrated over 100 feet from the original point of disposal. Based on conditions at the 211 West Main Street property, remediation is required to reduce the concentrations of chlorinated VOC in groundwater. In addition, remediation of chlorinated VOC in site soil and soil gas may be necessary to minimize potential exposures to occupants in the building at 211 West Main Street.

The site is currently classified as a Tier 1B. Under the Massachusetts Contingency Plan (310 CMR 40.0000), a Phase II report detailing the extent of contamination at the site and providing the results of a risk assessment is due to the MA DEP in November of 2005. At that time, a Phase III feasibility study presenting the recommended remedial strategy for the site is also due to the MA DEP. In addition, a Response Action Outcome statement, formally closing the site, is due to the MA DEP in November of 2008.

Although there is considerable time remaining before regulatory closure (RAO) is required for the 211 West Main Street property, Ducharme & Wheeler recommends that LeMack Realty Trust consider conducting response actions as soon as practicable because delaying response actions would ultimately result in significantly higher remedial costs. These higher costs would result from the costs to install and operate of a larger remedial system over an expanded area. In addition, while the current analytical data supports the conclusion that the Public Water Supply Well has not been impacted by the release at the 211 West Main Street property, delaying response actions could result in conditions in which it could be impacted.

Technical Strategy

According to information in the Phase I Report, chlorinated VOC have been identified in an area approximately 150 feet by 150 feet extending to the northwest from the site building. Chlorinated VOC have been identified in groundwater at a depth of approximately 40 feet below grade. Geology in the vicinity of the site has been characterized as fine to coarse sand. These conditions typically result in relatively high permeability and high groundwater velocities.

In-situ air sparging is a remedial technique used for the removal of VOC from both soil and groundwater where the soil permeability is relatively high and where VOC have migrated deep into the geological formation. Air sparging involves the injection of air into subsurface where the highly volatile VOC are transferred to the bubbles of injected air. The air, now containing VOC, rises to the surface where it is collected using a vacuum collection system. The air is then treated to remove the VOC and discharged. This technique offers a proven approach for the removal of substantial quantities of VOC and has been applied at similar sites where high soil permeability and the depth to which contamination has migrated limits the performance and reliability of other approaches. The limitation of this approach is that while it will successfully remove significant amounts of VOC, it may not be, in and of itself, sufficient to achieve extremely low groundwater concentrations required for conditions where groundwater is part of a drinking water supply area. For this reason, Ducharme & Wheeler recommends the use of chemical oxidation as a follow up treatment to be employed after in-situ air sparging has been used to the maximum extent. Chemical oxidation will be used to further reduce groundwater concentrations to the low levels required for regulatory closure.

Implementation of an air sparging/chemical oxidation system would be broken into several tasks which include: submitting a Release Abatement Measure (RAM) Plan to the MA DEP, conducting the pilot test, system design, system operation, rebound study, further groundwater remediation, and Response Action Outcome. Each is discussed in greater detail below.

RAM Plan

The regulatory mechanism used to conduct remediation at a site prior to the timelines laid out in the MCP is known as a Release Abatement Measure. The RAM Plan submitted to the MA DEP will include a description of the recommended program including the details of any field activities. In addition, the RAM Plan will include a description of how remediation waste will be handled, a description of procedures used for environmental monitoring during field activities, and a listing of permits required to conduct the RAM. As part of the RAM, periodic status reports will be submitted to the MA DEP detailing the results of the test and the design of the full scale remedial system.

Pilot Test

Although Ducharme & Wheeler is confident of the selection of the in-situ air sparging technology, it is necessary to obtain site-specific design data for use in selecting the number, spacing and location of injection and extraction wells, sizing and configuration of extraction equipment, and sizing and configuration of treatment equipment.

Ducharme & Wheeler will utilize an air sparging pilot test skid using an air compressor and vacuum extraction blower to obtain design data. Ducharme & Wheeler will provide an electrical generator to operate the pilot equipment as well as the equipment needed to contain residuals generated during the test.

Six new test wells to be used for injection of air and vacuum extraction will be utilized to characterize conditions throughout the impacted area. The air sparging pilot equipment will be used to characterize air injection and extraction rates along with the radius of influence for both the injection and extraction wells at various levels of air injection pressure and vacuum extraction.

The pilot unit would be expected to operate for 1-3 days. Extracted air will be treated using granular activated carbon (GAC) and exhausted to the atmosphere. At the conclusion of the pilot test, the area where the test was conducted will be restored to conditions prior to the test. Spent carbon will be disposed off-site.

During the pilot test, Ducharme & Wheeler will collect groundwater samples for bench-scale testing using various chemical oxidation agents to determine the dosage needed to treat site groundwater. This information will be used to compare the cost of treatment with the combined approach using air sparging and chemical oxidation to the cost to use chemical oxidation alone.

System Design

Ducharme & Wheeler will provide a pilot test report for submittal to the MA DEP as part of a RAM Status Report to document the outcome of the test. In addition, the report will provide a design of the system in a format suitable for obtaining competitive bids from qualified vendors.

The pilot test report will also include a discussion of potential health and safety issues to be addressed during construction and operation, contingency planning for environmental releases, security procedures and environmental permitting required for the implementation of the design.

The pilot test report will also include a discussion of operation, maintenance and monitoring plans which will specify how the system will be operated and what information will be collected to ensure that the system is operating as designed. The pilot test report will also include a schedule of the construction, start up and operation of the system.

While final details of the system design would not be available until the completion of the pilot test, Ducharme & Wheeler expects that the system will include the following components:

- An air compressor connected to a number of injection wells through a header system enabling individual control of each well;
- An vacuum blower to collect air injected in the subsurface;
- Air treatment, which would include multiple beds of granular activated carbon; and
- System electrical supply will be provided independent of the power supply for the existing site building.

The system would be provided in a totally enclosed, heated trailer to ensure trouble free operation on a continuing basis and will be equipped with systems to enable remote monitoring of system operations. The system will be designed to operate without continuous operator supervision. The design will incorporate fail-safe equipment capable of shutting down system operations in the event of system failure. The equipment trailer will be located to minimize noise potential and to avoid aesthetic issues.

All piping leading to the equipment trailer will be below grade. Following completion of the system construction, all grades will be re-established and any damaged asphalt will be repaired.

Based on other systems installed by Ducharme & Wheeler, it is anticipated that construction would be completed within four months following the completion of the pilot test. Following completion of construction activities, Ducharme & Wheeler will initiate operations by verifying operation of all fail-safe devices and focusing treatment operations in areas with the highest VOC concentrations. After the completion of start up activities, Ducharme & Wheeler will prepare a Final Inspection Report documenting conditions at start up.

System Operation

Following initial start up activities, Ducharme & Wheeler personnel will periodically monitor system operation and conduct sampling and analysis to determine groundwater treatment progress. After the initial system start-up, it is anticipated that the remedial system will be serviced approximately twice per month. Vapor phase GAC will be replaced based on screening of the off-gas with a PID such that the air emissions requirements of 310 CMR 40.0049 are met. PID screening will be conducted approximately every two weeks.

Select site monitoring wells will be gauged and sampled as part of on-going activities on a quarterly basis and analyzed for VOC. As part of system operations, potential Critical Exposure Pathways (CEP) will be evaluated and mitigated to the extent feasible.

Ducharme & Wheeler will prepare and submit all DEP required status reports required for the RAM Plan.

The remedial system will operate on a full-time, unattended basis. it is anticipated that the remedial system will be operated until VOC concentrations have reach a consistently low level. Operating life of the system could range from 1 to 3 years.

Follow Up Treatment

The remaining soil and groundwater at the disposal site containing VOC will be treated with a remedial additive capable of reacting with and chemically oxidizing the VOC contamination. The remedial additive will be applied through the existing monitoring and injection wells at the site. Treatment with the remedial additive will be conducted in accordance with the requirements of a site-specific health and safety plan.

Rebound Study

When it has been demonstrated that VOC have been removed, Ducharme & Wheeler will conduct a rebound study to demonstrate that VOC have been permanently removed from the site groundwater. The rebound study entails the periodic sampling and analysis of the well network to check for the presence of VOC. Additional operation of the remedial system or treatment using the remedial additive to achieve concentrations of VOC in groundwater that would not pose a risk of harm to health, public welfare, safety and the environment may be necessary.

If VOC are not measured at concentrations greater than the GW-1 clean up standard in the monitoring well network for six months, the remedial system will be permanently shut down.

Response Action Outcome

Assuming that groundwater conditions following the operation of the remedial system do not pose a risk of harm to health, public welfare, safety and the environment, Ducharme & Wheeler will prepare documentation supporting the conclusion that an RAO has been achieved. In order to support the conclusion, it is anticipated that a Method 3 risk assessment would be required to characterize the risk posed to harm to health, public welfare, safety and the environment.

The RAO Report will include a summary of previous activities on the property, copies of all public involvement activities and the conclusion that conditions at the property meet the requirements required for the submittal of an RAO Statement.

Project Schedule

The portion of the program up to the initiation of system operations will require approximately 6 months to complete. This includes 2 weeks to prepare the RAM Plan, approximately 4 weeks to conduct the pilot test, 3 weeks to prepare the pilot test report, and approximately 16 weeks for system construction.

As state above, it is anticipated that the system would be in operation for 1-3 years, and another 6 months to conduct the rebound test. The RAO report would be complete approximately 12 weeks following the completion of the rebound study.

Ducharme & Wheeler appreciates the opportunity to submit this recommended scope of services, if you need more detailed information than that provided or if you have any additional questions, please don't hesitate to call either of the undersigned at (978) 779- 6091.

Very truly yours,

DUCHARME & WHEELER, INC

Philip J. Wheeler, P. E.
Principal

Richard J. Cushing, L.S.P.
Senior Project Manager

Cost Estimate
211 West Main Street
Ayer, Massachusetts

		Phase II/Phase III				RAM									
	Hourly Billing Rate	Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	Task 7	Task 8	Task9	Task 10	Task 11	Task 12	Task 13	Task 14
		GW/Soil Assessment	Indoor Air Sampling	Phase II Report	Phase III Report	RAM Plan	Pilot Test	Test Report	Design Specifications	Status Reports	Equipment Procurement	Equipment Purchase	Equipment Installation	Start Up	Final Inspection Report
Senior (PW)	$110	2			2.0	4	8	2.0	2.0			4.0	2.0	2.0	2.0
LSP	$110	10	2	6	16.0	4	16	24.0	16.0	4	8.0		12.0	12.0	
Proj Mgr	$75	20	4	40	32.0	40	8	12.0	24.0	24	24.0	16.0	24.0	20.0	24.0
Proj Prof	$65														
Field	$50	60	8	10			60	4.0					170.0	40.0	16.0
	$65														
CAD	$65				8.0			16.0	8.0	4					
Admin/WP	$45				4			2	2						4
Total Hours		92.0	14.0	56.0	62.0	48.0	92.0	60.0	52.0	32.0	32.0	20.0	208.0	74.0	46.0
Labor		$5,820	$920	$4,160	$5,080	$3,880	$6,240	$5,090	$4,390	$2,500	$2,680	$1,640	$11,840	$5,040	$3,000
Driller		7500					2500						$13,000		
Eqpt Rental							3000								
Waste Disposal															
Crafts													$10,000	$1,000	
Electrical													$5,000		
Laboratory Soil		800											$400		
Laboratory GW		2000	500												
Total Subs	w 10%	$11,330	$550				$6,050						$31,240	$1,100	
Equipment		250										$50,000			
Misc.		50	25	100			100					$5,000	$2,000		
Total Other Direct Costs	w 10%	$330	$28	$110			$110					$60,500	$2,200		
Total Costs		$17,480	$1,498	$4,270	$5,080	$3,880	$12,400	$5,090	$4,390	$2,500	$2,680	$62,140	$45,280	$6,140	$3,000

Cost Estimate
211 West Main Street
Ayer, Massachusetts

	Hourly Billing Rate	Task 17 GW Sampling	Task 18 Rebound Study	Task 19 Risk Assessment	Task 20 Phase IV RIP	Task 21 RAO	Task 22 Decommissioning	Task 23 Contingency Technology	Total Labor Hour	Total Cost
Senior (PW)	$110		12.0	8.0	12.0	16.0	4.0		114.0	$12,540
LSP	$110	12.0	4.0			4.0			246.0	$27,060
Proj Mgr	$75	64.0	24.0	32.0	12.0	40.0			660.0	$49,500
Proj Prof	$65									
Field	$50	96.0	104.0				40.0		992.0	$49,600
	$65									
CAD	$65				4.0				40.0	$2,600
Admin/WP	$45					4			24.0	$1,080
Total Hours		172.0	144.0	40.0	28.0	64.0	44.0		2052.0	
Labor		$10,920	$8,760	$3,280	$2,480	$5,380	$2,440			$142,380
Driller							$7,800			$30,800
Eqpt Rental										$5,000
Waste Disposal										
Crafts										$11,000
Electrical				$5,000						$10,000
Laboratory Soil		$12,750	$10,800							$24,750
Laboratory GW										$2,500
Total Subs	w 10%	$14,025	$11,880	$5,500			$8,580			$92,455
Equipment										$50,250
Misc.							$2,000	$25,000		$39,275
Total Other Direct Costs	w 10%						$2,200	$27,500		$98,478
Total Costs		$24,945	$20,640	$8,780	$2,480	$5,380	$13,220	$27,500		$333,313