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February 26, 1990

Ms. Lynne Fratus
Rhode Island Superfund Section
U.S. Environmental Protection Agency
Region I
John F. Kennedy Federal Building
(Mail Code HSV CAN3)
Boston, Massachusetts 02203-2211

Subject: Western Sand and Gravel Groundwater
Remedial Investigation and Feasibility Study
BCM Project No. 00-4907-27

Dear Ms. Fratus:

On behalf of our client, Olin Corporation, please find enclosed for your review and approval the technology screening results and alternatives to be screened in the subject Feasibility Study.

In response to USEPA's letter of February 13, 1990, remedial action objectives have been revised and are presented in the Draft Groundwater Remedial Investigation report submitted by Olin February 26, 1990 under separate cover. The technologies and process options screened are based on the technologies identified in USEPA's February 13, 1990 letter.

Very truly yours,

Roy C. Peterson, P.E.
Project Manager

/lms 04530
Enclosure
cc: W. Angell, II
G. Benik

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1017

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INITIAL SCREENING OF TECHNOLOGIES AND PROCESS OPTIONS

General Response Action	Remedial Technology	Process Options	Description	Screening Comments	Status
No Further Action	None	Not Applicable	No Further Action	Required for consideration by MCP	Retained
Institutional Actions	Monitoring Access Restrictions	Groundwater Monitoring	Ongoing monitoring of wells.	Evaluates effects of remedial technologies.	Retained
		Deed Restrictions	Deeds for property in the area of influence would include restrictions on wells.	Controls access to property in area of influence.	Retained
	Restrictions on Property Transactions	Places restrictions on properties in the area of influence.	Controls property owners.	Retained	
	Acquisition of Property	All properties in the area of influence are acquired by PRPs.	Controls access to property in area of influence.	Retained	
	Non-enforceable controls	Places non-enforceable controls on properties in the area of influence.	Since are non-enforceable, may not be effective.	Rejected	
	Domestic Well Water Treatment	Carbon filtration for future residences in the area of influence.	Removes organic contaminants of concern.	Retained	
	Alternate Water Source	Permanent water source or temporary pipeline/tank or bottled water for future residences in the area of influence.	Provides alternate water source.	Retained	

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10 18

General Response Action	Remedial Technology	Process Options	Description	Screening Comments	Status
Containment	Vertical Barriers	Grout Curtain	Pressure injection of grout in a regular pattern of drilled holes.	Difficult to assure continuous barrier, not effective because upper zone of bedrock is fractured.	Rejected
		Slurry Wall/ Vibrating Beam	Trench around areas of contamination is filled with a soil (or cement) bentonite slurry.	Not effective because upper zone of bedrock is fractured.	Rejected
		Pressure Grouting of Fractured Bedrock	Pressure injection of special sealing fluid into fractured rock in order to seal the voids.	Difficult to assure continuous barrier.	Rejected
		Sheet Piling	Steel or concrete interlocking sheets which are driven through the overburden into the bedrock.	Difficult to install through cobbles in overburden material. Can't place in fractured bedrock.	Rejected
		Grout Injection	Pressure injection of grout at depth through closely spaced drilled holes.	Not feasible in saturated soils.	Rejected
		Extraction/Injection Wells	Groundwater is pumped from the down-gradient well and reinjected into the upgradient well to retard the migration of contaminated groundwater from the site.	Does not reduce contaminant concentration at site.	Rejected
Collection	Extraction	Extraction	Series of wells to extract contaminated groundwater.	Is considered feasible based on historic and hydrogeologic data for site for site.	Retained
		Extraction/Injection Wells	Injection wells inject uncontaminated water to increase flow to extraction wells.	Is considered feasible based on historic and hydrogeologic data for site.	Retained
		Interceptor Trench	Perforated pipe in trenches back-filled with porous media to collect contaminated groundwater.	Difficult to install to depth (approximately 80 feet) required at this site and not effective because upper zone of bedrock is fractured.	Rejected

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WSG 006

1019

General Response Action	Remedial Technology	Process Options	Description	Screening Comments	Status	
Treatment	Biological Treatment	Aerobic	Degradation of organics using micro-organisms in an aerobic environment.	Proven method of treatment for organic contaminants.	Retained	
		Anaerobic	Degradation of organics using micro-organisms in an anaerobic environment.	Proven method of treatment for organic contaminants.	Retained	
		Solids Removal/ Precipitation	Removes solids from groundwater by filtering or alteration of chemical equilibria.	Proven method for solids removal. May be required to remove solids that could interfere with treatment processes.	Retained	
	Physical/ Chemical Treatment	Stripping	Mixes large volumes of air with water in a packed column to promote transfer of VOCs to air.	Proven method for reducing VOC concentrations.	Retained	
		Carbon Adsorption	Absorption of contaminants onto activated carbon by passing water or vapor through a carbon column.	Proven method for reducing VOC concentrations.	Retained	
		POTW	Extracted groundwater discharged to local POTW for treatment.	Depends on availability of local capacity and effluent criteria. Permit would be required.	Retained	
	Offsite Treatment	RCRA Facility	RCRA Facility	Extracted groundwater discharged to licensed RCRA facility for treatment/disposal.	Depends on availability.	Retained
				Biological	System of injection and extraction wells introduce bacteria and nutrients to degrade contamination.	Would require pilot study to determine effectiveness. Time frame difficult to project. Difficult to implement and control. May not be effective in reducing contaminant concentrations significantly.
	Clean Water Injection		Injection Wells	Clean water injected in wells upgradient to increase flow in area of influence.	Difficult to control contaminant migration without extraction wells.	Rejected

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1020

General Response Action	Remedial Technology	Process Options	Description	Screening Comments	Status
Discharge	Onsite Discharge	Local Surface Water	Untreated/treated water discharged to the local surface water.	Effluent criteria to be established to minimize impact to surface water.	Retained
	Offsite Discharge	POTW	Treated water discharged to local POTW.	Depends on availability of local capacity and effluent criteria.	Retained
		Water Supply	Treated water used as a local domestic or industrial water supply.	Effluent criteria could be difficult to meet. May be difficult to identify potential users because of public perception.	Rejected

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1021

EVALUATION OF PROCESS OPTIONS

General Response Action	Remedial Technology	Process Options	Effectiveness	Implementability	Cost
No Further Action	None	Not Applicable	Does not achieve remedial action objectives alone.	Implementable. Restrictions on future land use.	None
Institutional Actions	Monitoring	Groundwater Monitoring	Useful for documenting conditions.	Alone, does not achieve remedial action objectives.	Low capital, Low O&M
	Access Restrictions	Deed Restrictions	Effectiveness depends on continued future implementation.	Depends on legal requirements and authority.	Negligible cost
		Restrictions on Property Transactions	Effectiveness depends on continued future implementation.	Depends on legal requirements and authority.	Negligible cost
		Acquisition of Property	Effective in preventing use of contaminated groundwater.	Implementable if current property owners are willing to sell.	Moderate cost
		Alternate Water Supply for Future Residences	Domestic Well Water Treatment	Effective in preventing use of contaminated groundwater.	Implementable.
		Alternate Water Source	Effective in preventing use of contaminated groundwater.	Implementable.	Low capital, Low O&M

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1022

General Response Action	Remedial Technology	Process Options	Effectiveness	Implementability	Cost
Collection	Extraction	Extraction Wells	Effective for contaminated ground-water removal if placed properly.	Implementable with conventional construction techniques.	Moderate capital, Moderate O&M
		Extraction/Injection Wells	Effective for contaminated ground-water removal if placed properly. Provides for controlled flushing of contaminants.	Implementable with conventional construction techniques.	Moderate capital, Moderate O&M
Treatment	Biological Treatment	Aerobic	Effective for many organic contaminants.	Implementable. However, some organics are difficult to biodegrade and require special microbes.	Moderate capital, Moderate O&M
		Anaerobic	Effective for many organic contaminants.	Implementable. May require special microbes. Anaerobic system more difficult to control.	Moderate capital, Moderate O&M
	Physical/Chemical Treatment	Solids Removal/Precipitation	Effective and reliable; conventional technology. Requires sludge disposal.	Implementable. Sludge disposal may be affected by land ban.	Low capital, Moderate O&M (Sludge disposal)
		Stripping	Effective and reliable; proper pre-treatment required.	Implementable.	Low capital, Low O&M

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1023

General Response Action	Remedial Technology	Process Options	Effectiveness	Implementability	Cost
		Carbon Adsorption	Effective and reliable, spent carbon requires regeneration or disposal.	Implementable.	Low capital, Low O&M
	Offsite Treatment	POTW RCRA Facility	Effectiveness and reliability require pilot test to determine. Effective and reliable treatment; transportation required.	Implementable; permit required; transport expense. Implementable; high transportation costs.	Low cost Moderate cost
Discharge	Onsite Discharge Offsite Discharge	Local Surface Water POTW	Effective and reliable. Effective and reliable.	Implementable. Permit required. Permit required.	Low capital, Low O&M Moderate capital, moderate O&M

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1024

ALTERNATIVES TO BE SCREENED

General Response Actions	Remedial Technology	No Action ¹	Limited Action ¹	Active Restoration to 10 ⁻⁴ Cancer Risk	Active Restoration to 10 ⁻⁶ Cancer Risk and Meet ARARs
<u>Institutional Actions</u> Monitoring: Access Restrictions:	Groundwater Monitoring	*	*	*	*
	Property Restrictions		*	*	*
	Alternate Water Supply for Future Residences		*	*	*
<u>Collection</u>	Extraction Wells			*	*
	Extraction/Injection Wells			*	*
<u>Treatment</u> Onsite:	Solids Removal/Precipitation			*	*
	Biological			*	*
	Stripping			*	*
	Carbon Adsorption			*	*
	Offsite POTW			*	*
Offsite:	Offsite RCRA Facility			*	*
<u>Discharge</u>	Local Surface Water			*	*
	Offsite POTW			*	*

¹ With passive restoration (natural contaminant reduction)
 * Specific Technologies (within each alternative evaluated, each general response action will consist of a combination of the specific technologies indicated for that category)

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1025

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FEASIBILITY STUDY

OLIN - WESTERN SAND AND GRAVEL SITE
ALTERNATIVES TO BE SCREENED

1. No action with groundwater monitoring
2. Property restrictions with groundwater monitoring
3. Alternate Water Supply for future residences with groundwater monitoring.

The following to be evaluated for 10^{-4} and 10^{-6} cancer risk and ARAR criteria:

4. Collection with extraction wells with discharge to local surface water with groundwater monitoring and short term property restrictions or alternate water supply.
5. Collection with extraction wells with onsite treatment (through use of one or more of the following treatment technologies: solids removal/precipitation, biological treatment, stripping or carbon adsorption) and discharge to local surface water with groundwater monitoring and short term property restrictions or alternate water supply.
6. Collection with extraction wells with onsite treatment and discharge to injection wells with groundwater monitoring and short term property restrictions or alternate water supply.
7. Collection with extraction wells with onsite treatment and discharge to an offsite POTW with groundwater monitoring and short term property restrictions or alternate water supply.
8. Collection with extraction wells with offsite treatment at a POTW with groundwater monitoring and short term property restrictions or alternate water supply.
9. Collection with extraction wells with offsite treatment at a RCRA facility with groundwater monitoring and short term property restrictions or alternate water supply.

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