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International Business Machines Corporation

Endicott, New York 13760
607/755-0123
Direct Dialing No.:
607/757-6736

June 29, 1992

Ms. Alison Hess
USEPA, Region II, ERRD
26 Federal Plaza, Room 747
New York, New York 10278

RE: **Preliminary Screening of Feasible Technologies at the Endicott Wellfield Site**

Dear Ms. Hess:

The purpose of this letter is to present the results of the preliminary screening of remedial technologies available for remediation at the Endicott Wellfield Site. The technologies identified herein are designed to meet the specific objectives of the Feasibility Study (FS), as stated in our letter to you, dated June 2, 1992. The following objectives were identified:

- Ground water control and remediation.
- Landfill waste containment and associated landfill gas control.
- Control and treatment of leachate.

General Response Actions for ground water, landfill waste containment, and the leachate seep have been identified based upon information presented in the Remedial Investigation Report and the draft Risk Assessment Report. The USEPA Guidance Document for Conducting RI/FS for CERCLA Municipal Landfill Sites (USEPA, 1991) was also used as a basis for streamlining the FS process to concentrate on only those options which have been deemed most appropriate for municipal landfill remediations.

The following sections and attached tables (draft) present the rationale for the selection of technologies for final evaluation during the FS process. The final alternatives selected will be developed from these technologies to meet the above objectives of the project. Additionally, as requested, the last section of this letter presents documentation for a variance to New York State Part 360 Solid Waste Regulations for municipal landfill closure.

GROUND WATER CONTROL AND REMEDIATION

Previous remedial actions, including the installation of a air stripper and the existing Purge Well, are effectively protecting the water supplied by the Ranney Well from exceeding MCLs, thus minimizing the health-based risk from ground water ingestion. However, concentrations of certain VOCs still exceed MCLs in ground water, and the existing Purge Well is not completely effective in controlling contaminant migration. Therefore, contaminant migration control and aquifer restoration have been identified as objectives of this FS.

The need for an additional Purge Well, to be installed on the west side of Nanticoke Creek, has been identified and accepted as an Interim Remedial Measure. The USEPA has issued a Record of Decision (ROD) to this effect on March 29, 1991. The purpose of the additional well is to provide for increased source control and expedite aquifer restoration closer to the source of the contamination. Justification for the need for an additional Purge Well and its location were presented in the report, "Technical Memorandum for the Implementation of Interim Remedial Measures at the Endicott Wellfield Site", dated January 29, 1991.

The General Response Actions identified for ground water are as follows:

- No action
- Institutional controls

These were developed assuming that upgrading the Purge Well system with the addition of a second well will be completed, and therefore is considered as a no (additional) action alternative. Upgraded Purge Well system will effectively control contaminant migration within the Ranney Well aquifer and effectively remediate the aquifer. Therefore, the FS will not evaluate any additional groundwater-related alternatives other than those presented in Tables 1 and 2.

LANDFILL WASTE CONTAINMENT AND GAS CONTROL

The General Response Actions potentially applicable to landfill waste containment are:

- No Action;
- Institutional Controls;
- Containment, and;
- Landfill Gas Control.

Institutional controls could be implemented to reduce the potential for direct exposure to landfill waste and monitor the migration of contaminants. Containment of the landfill source could be implemented to reduce infiltration of precipitation through the landfill surface. Landfill gas control could be implemented in conjunction with containment to alleviate the buildup of gas pressure beneath a low permeability cap. Removal of wastes was not considered as a Response Action as no "hot spots" have been identified.

Preliminary screening of the Response Actions are presented in Tables 3 and 4.

CONTROL AND TREATMENT OF LEACHATE

The General Response Actions potentially applicable to landfill waste contaminant are:

- No Action;
- Institutional Controls;
- Collection/Treatment, and;
- Disposal.

Institutional controls could be implemented to reduce the likelihood of exposure to human and ecological receptors, and, to monitor receptors and contaminant loading to surface water by leachate. Collection/Treatment could be implemented to treat the leachate prior to disposal. Preliminary screening of the Response Actions applicable to leachate are presented in Tables 5 and 6.

In summary, Tables 1, 3, and 5 represent the results of the initial screening step of the FS process, in which technologies are identified and screened based on technical considerations. During the initial screening, the overall applicability of a given technology or process option to the media of interest (landfill waste and leachate), contaminants of interest (primarily VOCs), and site conditions (industrial/municipal wastes in contact with shallow ground water) are assessed. The technologies and process options presented in these tables represent a subset of possible technologies and process options which could be applied to the General Response Actions listed. The USEPA guidance document (USEPA, 1991) was used as a basis for streamlining the FS process to concentrate on only those process options which have been deemed most appropriate for landfills and leachate seeps.

Technologies and process options which passed the initial screening were then screened for effectiveness, ease of implementation, and cost. The secondary screening is summarized in Tables 2, 4, and 6 for the ground water, landfill and leachate seep, respectively.

VARIANCE TO PART 360 LANDFILL CLOSURE

As a result of recent telephone conference calls with the USEPA, it was requested by both the USEPA and NYSDEC that a preliminary basis for any landfill closure variance be provided with this document. The following section presents this preliminary information. Detailed basis for the variance will be provided in the draft FS.

Given the existing conditions of the Endicott Landfill, full compliance to current regulations for landfill closure (New York State 6 NYCRR Part 360, primarily landfill capping) would impose unreasonable economic burden, create airport hazards, and, from a technical standpoint, not enhance the ground water remediation effort.

As such, a variance from specific Part 360 regulations with respect to the final cover system (cap) is most appropriate, in particular a variance from the following specific provisions:

- Section 360-2.15 (b) Final Cover System
- Section 360-2.15 (i) (2) (ii) - four (4) percent slope

Section 360-1.7 (c) provides for variances from the specific regulations requiring that, for a variance, it must be demonstrated that: (1) compliance with the identified provisions would, on the basis of conditions unique to that situation, tend to impose unreasonable economic, technological or safety burden on the party or the public and (2) the proposed activity will have no significant adverse impact on the public health, safety or welfare, the environment or natural resources and will be consistent with the provisions of the ECL and the performance expected from application of the Part 360.

In requesting this variance, an understanding of the existing setting in view of current landfill siting criteria is presented. As discussed in Section 360-2.12 (c), five (5) settings are restricted for landfill siting. Of the five settings, the Endicott Landfill exhibits four (4) which are the following:

- Located over primary water supply and principal aquifer.
- Located in flood plain.
- Located less than 5000 feet from airport.
- Unstable areas - Kettle Deposit (peaty).

As such, the Endicott ~~Landfill~~ when used for landfill activities in the late 1950's through the mid 1970's, is unique in that its siting at that time is not consistent with current siting criteria. As such, closure criteria which are based upon current siting requirements and design are mostly not applicable.

Variance Justification

As specified in the referenced New York State regulations, final cap thickness can vary between 3.5 and 5 feet depending upon design. Maintaining a four percent grade across the length of the Landfill will result in a maximum increased fill thickness of between 20 and 25 feet. Assuming an average grade elevation of 825 feet, this would result in a maximum landfill elevation of nearly 850 feet, or 25 feet higher than the adjacent Tri-Cities Airport runway and more than 25 feet higher than the 100-year flood elevation. The alternative of lowering the grade elevation by excavating into the Landfill is not possible as existing wastes are very near the surface. Existing soils over the landfill can not be removed without exposing waste, therefore any materials added as part of a cap would have to be added to existing grade.

Conformance to current guidelines for capping would result in significant safety concerns at the airport. Federal Aviation Regulation Part 77, Objects Affecting Navigable Airspace would be applicable for cap construction resulting in a penetration of the Tri-Cities Airport Runway Protection Zone.

Additional justification for the variance is that the majority of the Endicott Landfill lies within the floodway of the Susquehanna River as well as the 100-year floodplain. The floodway is the channel of a stream plus any adjacent flood plain areas, that must be kept free of encroachment in order that the 100-year flood be carried without substantial increases in flood heights. Construction in the floodway would be under the jurisdiction of the following agencies:

- NYSDEC - Flood Protection Bureau
- Susquehanna River Basin Commission
- Army Corps of Engineers - Baltimore District

Given the percentage of the cross sectional width of the flood way which the landfill covers (nearly 40%), the projected height of the potential cap, and the relatively high density of population near and immediately upstream, capping of the landfill could lead to increased flood levels upstream of the site. This may result in increased property damage and increased risk to human health.

Additionally, any extensive capping construction could potentially affect the wetlands identified adjacent to Nanticoke Creek and the Susquehanna River. Both the Federal Protection of Wetlands Executive Order (E.O. 11990) and the New York Freshwater Wetlands Act require remedial actions to minimize the destruction, loss or degradation of wetlands.

From a technical effectiveness standpoint, the primary reason for installing a low permeability cap (Part 360) is to reduce the infiltration of precipitation into the Landfill, thereby reducing leachate generation. As was discussed in the RI, because of the hydrogeologic setting and landfill construction (lack of any bottom liner), frequent river rises (flooding episodes) cause much of the landfill material to become saturated from below as the result of rising ground water levels. This mechanism for contaminant migration is more dominant than precipitation infiltration, and, therefore capping in accordance with Part 360 regulations with the intent of significantly reducing the existing impact to ground water will provide little, if any, benefit as the majority of leachate entering the ground water system is associated with rising ground water levels rather than infiltration.

Finally, the volatile organics of concern are relatively persistent and mobile in ground water. The existing purge well and proposed supplemental purge well will provide hydraulic control to intercept the contaminants and continue the aquifer restoration and remediation process. Therefore, capping the Landfill will reduce the amount of flushing of contaminants, and, may actually be detrimental to the remediation process by (1) increasing the concentration of contaminants in the ground water reaching the Purge Wells, and (2), increasing the time to flush the aquifer to acceptable levels.

Therefore, for the reasons presented, a variance in both the cap type and grade is being sought. These reasons include technical (ground water inundation from below, reduced flushing), economic (high cost to cap 60 plus acres versus little or no benefit) and potential human and environmental impacts (airport, wetlands, flooding).

Capping Variance Requested

The variance sought is for regrading the existing landfill surface to promote more positive drainage, coupled with filling depressions with appropriate fill material. Surface debris would be placed in existing depressions on-site, covered with suitable fill material from off-site. The remaining depressions would then be filled with suitable fill materials with final grading to prevent ponding. The regraded areas would be re-seeded, fertilized, and protected from erosion until plant growth is established. These areas would be inspected and maintained on a regular basis for structural integrity and vegetation growth. The resulting surface will result in a minimal grade elevation change.

This proposed variance will have no significant adverse impact on public health, safety or welfare, or the environmental and natural resources. The variance is consistent with the provision of the ECL and performance expected from the application of 6NYCRR Part 360. As discussed in the draft Risk Assessment prepared by USEPA, the site presents no unacceptable risk other than for ground water exposure which has been addressed by past remedial efforts and further minimized by the ongoing IRM (Supplemental Purge Well).

SUMMARY

The technologies selected for final evaluation have been identified for the Endicott Wellfield Site. The rationale for the preliminary screening process is presented in this letter. Please review this document and notify us as soon as practical of your concurrence with our preliminary screening process so that we can work toward finalization of the draft FS report. Additionally, the justification for the landfill cap variance is also presented for your review and comment.

Sincerely,

D. F. Whittaker
Facility Coordinator

c.c. Mr. Steve Scharf, NYSDEC

TABLE 1

INITIAL SCREENING OF TECHNOLOGIES AND PROCESS OPTIONS FOR GROUND WATER ENDICOTT WELLFIELD SITE FEASIBILITY STUDY

Ground Water - General Response Action	Remedial Technology	Process Option	Description	Screening Comment
No Action	Use of Existing System	Not Applicable	Use of purge well, air stripper, and installation of second purge well.	Retained for consideration per NCP.
Institutional Controls	Site Use Limitations	Deed Restrictions	Administrative action used to restrict future site activities.	Potentially applicable.
		Town and Village Ordinances	Administrative action used to restrict ground water use in area.	Potentially applicable.
	Monitoring	Ground Water Monitoring	Periodic sampling and analysis of public supply and monitoring wells.	Potentially applicable.

TABLE 2

SECONDARY SCREENING OF TECHNOLOGIES AND PROCESS OPTIONS FOR GROUND WATER ENDICOTT WELLFIELD SITE FEASIBILITY STUDY

Ground Water - General Response Action	Remedial Technology	Process Option	Effectiveness				Implementability			Cost	
			Handles Volume	Meets Goals	Protectiveness	Reliability	Permits Obtainable	TSD Availability	Equipment/Resource Availability	Capital	O & M
No Action	Use of Existing System	Not Applicable	High	High	High	High	NA	NA	High	Mod	Mod
Institutional Controls	Site Use Limitations	Deed Restrictions	NA	Mod	High	Low	NA	NA	High	Mod	Low
		Town/Village Ordinances	NA	Mod	High	Mod	NA	NA	High	Low	Low
	Monitoring	Ground Water Monitoring	NA	Low	Mod	Mod	NA	NA	High	Mod	Mod

TABLE 3

INITIAL SCREENING OF TECHNOLOGIES
AND PROCESS OPTIONS FOR LANDFILL
ENDICOTT WELLFIELD SITE
FEASIBILITY STUDY

Landfill - General Response Action	Remedial Technology	Process Option	Description	Screening Comment
No Action	None	Not Applicable	No action.	Retained for consideration per NCP.
Institutional Controls	Site Use Limitations	Deed Restrictions	Administrative action used to restrict future site activities.	Potentially applicable.
		Fencing	Barriers used to restrict site access.	Potentially applicable.
	Monitoring	Ground Water Monitoring	Periodic sampling and analysis of public supply and monitoring wells.	Potentially applicable.
		Gas Monitoring	Gas monitors installed near buidings in vicinity of site to monitor the horizontal migration of landfill gas.	Potentially applicable.
Containment	Cap System	Native Soil Cap	Uncontaminated layer of native soil placed in depressions to reduce pooling and infiltration of surface water.	Potentially applicable.
		Single Barrier Cap	Geomembrane or clay cap placed over site, protected by additional fill and topsoil, and graded to manage run-off and infiltration.	Potentially applicable.
		Double Barrier Cap	System consisting of two impermeable layers, a drainage layer, a protective layer, and a vegetative layer, graded to manage run-off and infiltration.	Potentially applicable.
Landfill Gas Control	Passive Collection/Venting	Pipe Vents	Atmospheric vents used to vent gas in order to prevent pressure from building up beneath the cap.	Potentially applicable.
		Trench Vents	Constructed by excavating a deep narrow trench surrounding the site or spanning a section of the landfill perimeter. The trench is backfilled with gravel, forming a path of least resistance through which the gas can	Potentially applicable.

TABLE 3 (Cont.)

Landfill - General Response Action	Remedial Technology	Process Option	Description	Screening Comment
Landfill Gas Control (cont.)	Active Collection/Treatment	Extraction Wells/Flares	Apply extraction vacuum to withdraw gas in both horizontal and vertical directions. Wells are connected by a collection header which leads to a waste gas burner.	Potentially applicable.

TABLE 4

SECONDARY SCREENING OF TECHNOLOGIES AND PROCESS OPTIONS FOR LANDFILL ENDICOTT WELLFIELD SITE FEASIBILITY STUDY

Landfill - General Response Action	Remedial Technology	Process Option	Effectiveness				Implementability			Cost	
			Handles Volume	Meets Goals	Protectiveness	Reliability	Permits Obtainable	TSD Availability	Equipment/Resource Availability	Capital	O & M
No Action	None	Not Applicable	NA	Mod	High	High	NA	NA	NA	Low	Low
Institutional Controls	Site Use Limitations	Deed Restrictions	NA	Mod	High	Low	NA	NA	High	Low	Low
		Fencing	NA	Mod	High	Mod	NA	NA	High	Low	Low
	Monitoring	Ground Water Monitoring	NA	Low	Mod	Mod	NA	NA	High	Low	Mod
		Gas Monitoring	NA	Low	Mod	Mod	NA	NA	High	Mod	Mod
Containment	Cap System	Native Soil Cap	High	High	Mod	Mod/High	NA	NA	Low/Mod	Mod	Lo...
		Single Barrier Cap	High	Mod	Mod	Mod/High	NA	NA	Low/Mod	Mod/High	Mod
		Double Barrier Cap	High	Mod	Mod	Mod/High	NA	NA	Low/Mod	High	Mod
Landfill Gas Control	Passive Collection/Venting	Pipe Vents	High	Mod/High	Mod	Mod/High	NA	NA	High	Low/Mod	Low
		Trench Vents	High	High	Mod	Mod/High	NA	NA	High	Mod	Low
	Active Collection/Treatment	Extraction Wells/Flares	High	High	Mod	Mod/High	NA	NA	High	Mod	Mod

TABLE 5

INITIAL SCREENING OF TECHNOLOGIES
AND PROCESS OPTIONS FOR SEEP LF-1-5
ENDICOTT WELLFIELD SITE
FEASIBILITY STUDY

Seep - General Response Action	Remedial Technology	Process Option	Description	Screening Comment
No Action	None	Not Applicable	No action.	Retained for consideration per NCP.
Institutional Controls	Monitoring	Gaging Stations	Monitoring to measure flow and contaminant concentrations.	Potentially applicable.
Collection/Treatment	Biological Treatment	Aerobic	The use of aerobic microbes to biodegrade organic substances.	Not applicable: Would not survive dry periods.
		Anaerobic	The use of anaerobic microbes to biodegrade organic substances.	Not applicable: Would not survive dry periods.
	Chemical Treatment	Ion Exchange	Contaminated leachate passed through a bed of resin material where exchange of ions occurs between the bed and leachate.	Not applicable: Volatile organic compounds are electrically neutral.
		Chemical Oxidation with UV Catalysis	Use of strong oxidizers such as ozone or peroxide with ultraviolet light catalysis to oxidize organic compounds.	Potentially applicable.
		Metals Precipitation	Inorganic constituents altered to reduce the solubility of heavy metals through the addition of a substance that reacts with the metals or changes the pH.	Not applicable: Does not effectively treat organics.
	Physical Treatment	Granular Activated Carbon Adsorption	Passage of contaminated leachate through a bed of adsorbents so that contaminants adsorb on the surface.	Potentially applicable.
		Air Stripping	Mixing of large volumes of air with leachate in a packed column or through diffused aeration to promote transfer of contaminants from liquid to air phase.	Potentially applicable.

TABLE 5 (Cont.)

Seep - General Response Action	Remedial Technology	Process Option	Description	Screening Comment
Disposal	Surface Discharge	Off-site Treatment and Disposal	Treatment and disposal of leachate at a permitted off-site facility.	Potentially applicable.
		Indirect Discharge	Discharge of treated leachate to a publicly owned treatment works.	Potentially applicable.
		Direct Discharge	Discharge of treated leachate to the river or stream.	Potentially applicable.
	Subsurface Discharge	Reinjection	Use of reinjection wells, spray irrigation, or infiltration to discharge treated leachate underground.	Not applicable: Failure of treatment system could impact public water supply.

TABLE 6

SECONDARY SCREENING OF TECHNOLOGIES AND PROCESS OPTIONS FOR SEEP L-1-5 ENDICOTT WELLFIELD SITE FEASIBILITY STUDY

Seep - General Response Action	Remedial Technology	Process Option	Effectiveness				Implementability			Cost	
			Handles Volume	Meets Goals	Protectiveness	Reliability	Permits Obtainable	TSD Availability	Equipment/Resource Availability	Capital	O & M
No Action	None	Not Applicable	NA	Low	High	High	NA	NA	NA	Low	Low
Institutional Controls	Monitoring	Gaging Station	NA	Low	Mod	Mod	NA	NA	High	Mod	Mod
Collection/Treatment	Chemical	Oxidation w/ UV Catalysis	High	Mod/High	Mod	High	NA	High	High	Mod	High
	Physical	GAC Adsorption	High	Mod/High	Mod/High	High	NA	High	High	Mod	Mod
		Air Stripping	High	Mod/High	Mod	High	High	High	High	Mod	Low/Mod
Disposal	Surface Discharge	Off-site Treatment/Disposal	High	High	Low/Mod	Mod/High	Mod/High	High	High	Low	Mod/
		Indirect Discharge	High	High	Mod	Mod/High	Mod/High	High	High	Low	Mod/High
		Direct Discharge	High	Mod/High	High	High	Mod	Mod	High	Low	Mod